NASA

Earth Resources
A Continuing
Bibliography
with Indexes

NASA SP-7041(47) October 1985

National Aeronautics and Space Administration



(NASA-SP-7041(47)) EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES (ISSUE 47) (National Aeronautics and Space Administration) 146 p HC \$12.50 CSCL 05B

N86-16687

Administration) Earth Res Resources irces

### **ACCESSION NUMBER RANGES**

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series) N85-22342 - N85-29909

IAA (A-10000 Series) A85-30223 - A85-39960

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by RMS Associates.

### **EARTH RESOURCES**

## A CONTINUING BIBLIOGRAPHY WITH INDEXES

### Issue 47

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced between July 1 and September 30, 1985 in

- Scientific and Technical Aerospace Reports (STAR)
- International Aerospace Abstracts (IAA)

This supplement is available as NTISUB/038/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of \$12 50 domestic, \$25 00 foreign for standing orders. Please note: Standing orders are subscriptions which do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

### INTRODUCTION

The technical literature described in this continuing bibliography may be helpful to researchers in numerous disciplines such as agriculture and forestry, geography and cartography, geology and mining, oceanography and fishing, environmental control, and many others. Until recently it was impossible for anyone to examine more than a minute fraction of the Earth's surface continuously. Now vast areas can be observed synoptically, and changes noted in both the Earth's lands and waters, by sensing instrumention on orbiting spacecraft or on aircraft.

This literature survey lists 524 reports, articles, and other documents announced between July 1 and September 30, 1985 in *Scientific and Technical Aerospace Reports (STAR)*, and *International Aerospace Abstracts (IAA)*.

The coverage includes documents related to the identification and evaluation by means of sensors in spacecraft and aircraft of vegetation, minerals, and other natural resources, and the techniques and potentialities of surveying and keeping up-to-date inventories of such riches. It encompasses studies of such natural phenomena as earthquakes, volcanoes, ocean currents, and magnetic fields; and such cultural phenomena as cities, transportation networks, and irrigation systems. Descriptions of the components and use of remote sensing and geophysical instrumentation, their subsystems, observational procedures, signature and analyses and interpretive techniques for gathering data are also included. All reports generated under NASA's Earth Resources Survey Program for the time period covered in this bibliography will also be included. The bibliography does not contain citations to documents dealing mainly with satellites or satellite equipment used in navigation or communication systems, nor with instrumentation not used aboard aerospace vehicles.

The selected items are grouped in nine categories. These are listed in the Table of Contents with notes regarding the scope of each category. These categories were especially chosen for this publication, and differ from those found in *STAR* and *IAA*.

Each entry consists of a standard bibliographic citation accompanied by an abstract. The citations include the original accession numbers from the respective announcement journals.

Under each of the nine categories, the entries are presented in one of two groups that appear in the following order

IAA entries identified by accession number series A85-10,000 in ascending accession number order,

STAR entries identified by accession number series N85-10,000 in ascending accession number order.

After the abstract section, there are seven indexes:

subject, personal author, corporate source, foreign technology, contract number, report/accession number, and accession number.

### **AVAILABILITY OF CITED PUBLICATIONS**

### IAA ENTRIES (A85-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc (AIAA), as follows. Paper copies of accessions are available at \$8.50 per document. Microfiche<sup>(1)</sup> of documents announced in *IAA* are available at the rate of \$4.00 per microfiche on demand. Standing order microfiche are available at the rate of \$1.45 per microfiche for *IAA* source documents.

Minimum air-mail postage to foreign countries is \$2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications

### STAR ENTRIES (N85-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the STAR citation. Current values for the price codes are given in the tables on page viii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161

NOTE ON ORDERING DOCUMENTS When ordering NASA publications (those followed by the \* symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail. SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

<sup>(1)</sup> A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction)

- Avail: DOE Depository Libraries Organizations in U.S cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in Energy Research Abstracts. Services available from the DOE and its depositories are described in a booklet, DOE Technical Information Center Its Functions and Services (TID-4660), which may be obtained without charge from the DOE Technical Information Center.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail: USGS Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.
- Avail. HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.
- Avail. BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)
- Avail: Fachinformationszentrum, Karlsruhe Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM)
- Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free
- Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vii.
- Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line

### **PUBLIC COLLECTIONS OF NASA DOCUMENTS**

**DOMESTIC:** NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019

**EUROPEAN:** An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and \* from ESA — Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 CEDEX 15, France

### FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. Over 1,300 other depositories also exists. A list of the regional GPO libraries appears on the inside back cover.

### ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics Technical Information Service 555 West 57th Street, 12th Floor New York, New York 10019

British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England

Commissioner of Patents and Trademarks U.S. Patent and Trademark Office Washington, D.C. 20231

Department of Energy Technical Information Center PO Box 62 Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service ESRIN Via Galileo Galilei 00044 Frascati (Rome) Italy

ESDU International, Ltd 1495 Chain Bridge Road McLean, Virginia 22101

ESDU International, Ltd 251-259 Regent Street London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH 7514 Eggenstein Leopoldshafen Federal Republic of Germany

Her Majesty's Stationery Office PO Box 569, S E 1 London, England

NASA Scientific and Technical Information Facility PO Box 8757 B W I Airport, Maryland 21240 National Aeronautics and Space Administration Scientific and Technical Information Branch (NIT-1) Washington, D C 20546

National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

Pendragon House, Inc 899 Broadway Avenue Redwood City, California 94063

Superintendent of Documents U S Government Printing Office Washington, D C 20402

University Microfilms A Xerox Company 300 North Zeeb Road Ann Arbor, Michigan 48106

University Microfilms, Ltd Tylers Green London, England

U S Geological Survey Library National Center – MS 950 12201 Sunrise Valley Drive Reston, Virginia 22092

U S Geological Survey Library 2255 North Gemini Drive Flagstaff, Arizona 86001

U S Geological Survey 345 Middlefield Road Menlo Park, California 94025

U S Geological Survey Library Box 25046 Denver Federal Center, MS 914 Denver, Colorado 80225

### **NTIS PRICE SCHEDULES**

### Schedule A

### STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	\$ 450	\$ 900
A02	001-025	7 00	14 00
A03	026-050	8 50	17 00
A04	051-075	10 00	20 00
A05	076-100	11 50	23 00
A06	101-125	13 00	26 00
A07	126-150	14 50	29 00
A08	151-175	16 00	32 00
A09	176-200	17 50	35 00
A10	201-225	19 00	38 00
A11	226-250	20 50	41 00
A12	251-275	22 00	44 00
A13	276-300	23 50	47 00
A14	301-325	25 00	50 00
A15	326-350	26 50	53 00
A16	351-375	28 00	56 00
A17	376-400	29 50	59 00
A18	401-425	31 00	62 00
A19	426-450	32 50	65 00
A20	451-475	34 00	68 00
A21	476-500	35 50	71 00
A22	501-525	37 00	74 00
A23	526-550	38 50	77 00
A24	551-575	40 00	80 00
A25	576-600	41 50	83 00
A99	601-up	<b> 1</b> ,	2

- 1/ Add \$1 50 for each additional 25 page increment or portion thereof for 601 pages up
  - Add \$3 00 for each additional 25 page increment or portion thereof for 601 pages and more

### Schedule E

### EXCEPTION PRICE SCHEDULE

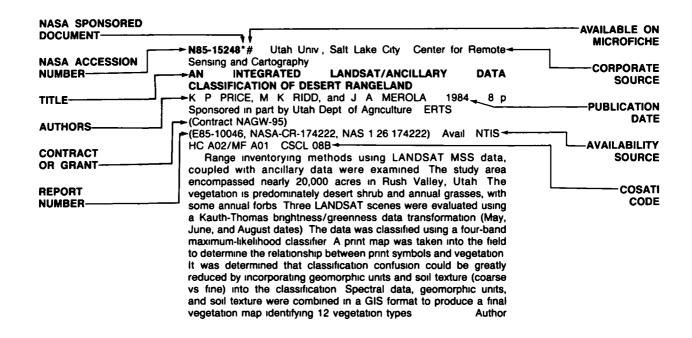
Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	\$ 650	\$ 1350
E02	7 50	15 50
E03	9 50	19 50
E04	11 50	23 50
E05	13 50	27 50
E06	15 50	31 50
E07	17 50	35 50
E08	19 50	39 50
E09	21 50	43 50
E10	23 50	47 50
E11	25 50	51 50
E12	28 50	57 50
E13	31 50	63 50
E14	34 50	69 50
E15	37 50	75 50
E16	40 50	81 50
E17	43 50	88 50
E18	46 50	93 50
E19	51 50	102 50
E20	61 50	123 50
E-99 - Write for quote		
N01	35 00	45 00

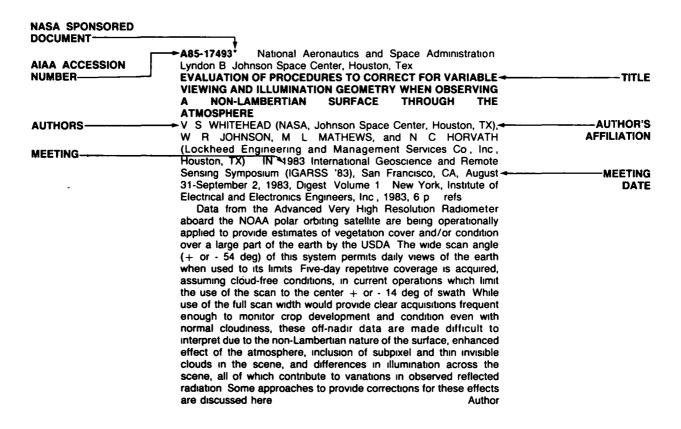
### **TABLE OF CONTENTS**

F T T T T T T T T T T T T T T T T T T T	Page	
Category 01 Agriculture and Forestry Includes crop forecasts, crop signature analysis, soil identification, disease detection, harvest estimates, range resources, timber inventory, forest fire detection, and wildlife migration patterns.	1	
Category 02 Environmental Changes and Cultural Resources Includes land use analysis, urban and metropolitan studies, environmental impact, air and water pollution, geographic information systems, and geographic analysis.	16	
Category 03 Geodesy and Cartography Includes mapping and topography.	20	
Category 04 Geology and Mineral Resources Includes mineral deposits, petroleum deposits, spectral properties of rocks, geological exploration, and lithology	22	
Category 05 Oceanography and Marine Resources Includes sea-surface temperature, ocean bottom surveying imagery, drift rates, sea ice and icebergs, sea state, fish location	30	
Category 06 Hydrology and Water Management Includes snow cover and water runoff in rivers and glaciers, saline intrusion, drainage analysis, geomorphology of river basins, land uses, and estuarine studies.	47	
Category 07 Data Processing and Distribution Systems Includes film processing, computer technology, satellite and aircraft hardware, and imagery	55	
Category 08 Instrumentation and Sensors Includes data acquisition and camera systems and remote sensors.	68	
Category 09 General Includes economic analysis	77	
Subject Index	<b>A-1</b>	
Personal Author Index		
Corporate Source Index		
Foreign Technology Index		
Contract Number Index		
Accession Number Index		
ACCESSION RUMBER MUCK	<b>G-</b> I	

### TYPICAL CITATION AND ABSTRACT FROM STAR



### TYPICAL CITATION AND ABSTRACT FROM IAA



## EARTH RESOURCES

### A Continuing Bibliography (Issue 47)

### OCTOBER 1985

### 01

### **AGRICULTURE AND FORESTRY**

Includes crop forecasts, crop signature analysis, soil identification, disease detection, harvest estimates, range resources, timber inventry, forest fire detection, and wildlife migration patterns

#### A85-30727

### **ECOLOGICAL STUDIES IN THE UKAI COMMAND AREA**

B SAHAI, M H KALUBARME (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), and K L JADAV (Directorate of Agriculture, Ahmedabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 401-409 refs

The present study was directed towards studying the impact of the Ukai-Kakrapar irrigation project on the ecology of the command area with particular reference to changes in cropping pattern and land degradation due to waterlogging/salinity. The data used were multitemporal (1972-1981) Landsat imagery of the entire command area, multitemporal color infrared plus black-and-white aerial photography, and multispectral scanner data over a test area of about 1200 sq km collected from November 1980 to February 1982 Land-use maps for the entire command area at 1 250,000 scale (Landsat) and land-use/cropping-pattern maps for the test area at 1 12,500 scale (aerial photography) have been prepared The results indicate that due to the introduction of large-scale irrigation, the cropping pattern has changed and the acreage under heavy perennial crops such as sugar-cane and banana has increased beyond permissible limits resulting in a rapid rise in the water-table in the area. The areas delineated as waterlogged and salt-affected from the aerial and Landsat imagery, when correlated with the subsoil water-table data, were found to have the water-table within 0-1 5 to 1 5-3 0 m Author

### A85-30728

## FOREST-TYPE STRATIFICATION AND DELINEATION OF SHIFTING CULTIVATION AREAS IN THE EASTERN PART OF ARUNACHAL PRADESH USING LANDSAT MSS DATA

P S ROY (National Remote Sensing Agency, Hyderabad, India), R N KAUL, M R SHARMA ROY, and S S GARBYAL (Arunachal Pradesh Forest Department, Itanagar, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 411-418 refs

### A85-30729

EVALUATION OF LANDSAT AND AIRBORNE MULTISPECTRAL DATA AND AERIAL PHOTOGRAPHS FOR MAPPING FOREST FEATURES AND PHENOMENA IN A PART OF THE GODAVARI BASIN

N V MADHAVAN UNNI, P S ROY (National Remote Sensing Agency, Hyderabad, India), and V PARTHASARATHY (Forest Department, Hyderabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 419-431 refs

### A85-30740

### LAND USE AND FORESTRY STUDIES OF HIMACHAL PRADESH

D M GUPTA and M K MUNSHI (Survey of India, New Delhi, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 535-539 refs

Of late, deforestation and the resulting soil erosion, especially in the hilly regions of India, has become a matter of concern and is receiving attention at the highest official level in the country. In this context the study in the changes in forestry and land use of the Himachal Pradesh, known for its scenic beauty and forests, assumes special significance. In this study, which was undertaken as an end-to-end experiment under the national natural resources management system program in India, the land-use changes in the state were initially analyzed on the basis of available topographical maps. Subsequently, the changes in the forest cover was evaluated with the help of Landsat data of 1973, 1977 and 1980.

### A85-30745

### ASSESSMENT OF WATER-STRESS EFFECTS ON CROPS

D S KAMAT, A K S GOPALAN, AJAI, M N SHASHIKUMAR (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), S K SINHA, G S CHATURVEDI, and A K SINGH (Indian Agricultural Research Institute, New Delhi, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6. Mar -Apr 1985, p 577-589 refs

Wheat, chickpea, and mustard crops in an agricultural area of India were studied from October-April 1980-1981 to provide a ground truth data base for satellite-based crop monitoring. Attention was focused on the spectral signatures of crop growth stages and vigor, water stress, and canopy temperature variations over the crop cycle. Efforts were also expended to develop a yield model. Radiometer data from 400-1100 nm were gathered, along with soil nutrient content, leaf area measurements, dry biomass, chlorophyll content, and water potential readings. Comparisons were made between the vigor of irrigated and nonirrigated crops. High correlations were established between spectral indices and the measured crop vigor variables, with the leaf area index being used as input to a model for calculating daily photosynthesis and respiration rates, the latter being a measure of the dry matter accumulation.

### A85-30826

COLOR AERIAL PHOTOGRAPHY IN THE PLANT SCIENCES AND RELATED FIELDS; PROCEEDINGS OF THE NINTH BIENNIAL WORKSHOP, ORLANDO AND UNIVERSITY OF FLORIDA, LAKE ALFRED, FL, NOVEMBER 15-17, 1983

G J EDWARDS, ED (Florida, University, Lake Alfred, FL) Workshop sponsored by the American Society of Photogrammetry Falls Church, VA, American Society of Photogrammetry, 1984, 210 p. For individual items see A85-30827 to A85-30845

The history of the air color photography workshops is considered along with a history of the Everglades and future applications of aerial imagery, aerial photo coverage planning, training and testing interpreters of small scale CIR photography, the detection of forest stress with 35 mm color photographs, and the analysis of photo interpretation test results for seven aerospace image types on the Mendocino National Forest Attention is also given to the interpretability of small and medium scale aerospace imagery for

wildland environments of California and Colorado, Alaska meander lines determined by vegetation appearance on color infrared photographs, the use of aerial photography to detect vegetation damage in large-scale air quality monitoring program, and the effects of the pubescence of Texas lantana on leaf spectra and image Other topics explored are related to the use of color and color infrared in control resources, spectral densitometer applications to stress detection in citrus, the devastation of a vineyard by phylloxera, and the estimation of woody biomass in slash pine plantations using color aerial photography

G R

#### A85-30827

### A HISTORY OF THE EVERGLADES AND FUTURE IMPLICATIONS OF AERIAL PHOTOGRAPHY

J R ORSENIGO (Florida Sugar Cane League, Inc., Clewiston, FL) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 7-14

The formation of the Florida peninsula is discussed, taking into account the development of the organic soils of the Everglades. The Everglades National Park shows now the plant and animal life which was typical for a time perhaps two to four thousand years ago. Attention is given to various species of flora and fauna, the flatwoods of Florida, the undeveloped area of south Florida, the Indian tribes formerly inhabiting Florida, and modern-day Florida. It is pointed out that one of the problems of south Florida today is ever-increasing urbanization. The use of aerial photography in Florida is considered, taking into account the detection and identification of plant species, the detection of plant injury, and delineation problems.

#### A85-30829

### ACQUISITION, PROCESSING AND PHOTO INTERPRETATION OF AN AERIAL COLOR INFRARED PHOTOGRAPH

W S RULE (Crowley Ridge Aero Service, Baton Rouge, LA) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 31-34

Indirect evidence is obtained from large scale, low altitude aerial color infrared (ACIR) photography at a given point in time. While some direct evidence is also obtained by this method, much direct evidence is obtained from good ground truth work utilizing indirect evidence as a guide. The planning, acquisition, film processing, process control, and interpretation of an agricultural photograph are presented in this paper. Research is needed to verify techniques, improve on existing techniques, interface computers for better data handling and to interface computer management programs presently used on some major crops.

### A85-30830

### TRAINING AND TESTING INTERPRETERS OF SMALL-SCALE CIR PHOTOGRAPHY - A DIGITIZER-AIDED APPROACH

C J DEMARS, JR (US Forest Service, Berkeley, CA) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 35-43 refs

A digitizer-aided system to record and compare the locations of individual dead and dying pine trees detected on panoramic optical bar camera photography using either monoscopic or stereoscopic viewing was recently developed. In a test, the interpretations of expert observers were compared with those of novice observers. Experts performed as well with 15-20 x monoscopic viewing as with a 4.5 x stereoscopic viewing in interpreting central segments of the panoramic photograph, within 12 deg of nadir. In these segments, trainees using 4.5 x stereoscopic viewing performed as well as experts, but performed more poorly than experts when using 15-20 x monoscopic viewing All interpreters benefitted from stereoviewing at angles greater than 12 deg from nadir, with experts performing better than trainees Extensive feedback between expert and trainee to reach

consensus on correct interpretations and reduce errors is needed Author

### A85-30831

### DETECTION OF FOREST STRESS WITH 35MM COLOR PHOTOGRAPHS

C E OLSON, JR (Michigan, University, Ann Arbor, MI) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 45-50 refs

It is pointed out that color aerial photography does not have to be expensive. Thus, many of the reconnaissance and monitoring needs in the plant sciences can be met with 35 mm or 70 mm photographs taken from light aircraft. However, any technique must meet certain conditions to be truly cost-effective. Some of these conditions have now been identified with the aid of recent experience in detecting and evaluating insect and disease attacks in forest stands. The present investigation is concerned with two examples regarding the considered developments, taking into account work with an OM-1 camera and a camera mount described by Meyer (1973). One example involves the assessment of spruce budworm damage, while the second entails an evaluation of Diplodia twig blight. The described studies illustrate the cost-effectiveness of color aerial photographs taken with 35 mm cameras from light aircraft.

#### A85-30832

## ANALYSIS OF PHOTO INTERPRETATION TEST RESULTS FOR SEVEN AEROSPACE IMAGE TYPES ON THE MENDOCINO NATIONAL FOREST, CALIFORNIA

A S BENSON and K J DUMMER (California, University, Berkeley, CA) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 51-60

### A85-30833

## THE INTERPRETABILITY OF SMALL AND MEDIUM SCALE AEROSPACE IMAGERY FOR WILDLAND ENVIRONMENTS OF CALIFORNIA AND COLORADO

A S BENSON and K J DUMMER (California, University, Berkeley, CA) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 61-69

Three series of photo interpretation tests were given to measure the relative interpretability of different types of aerospace imagery with respect to wildland environments in California and Colorado. The images included conventional scale U.S. Forest Service photography, U-2 photography, and Landsat enhancements. The results of these three years of study indicate that small scale color infrared photography (scales ranging from 1 30,000 to 1 60,000) would be the optimum image type for meeting all resource information requirements, but that careful consideration must still be given for selecting an image type to meet a specific resource information requirement.

### A85-30834

### ALASKA MEANDER LINES DETERMINED BY VEGETATION APPEARANCE ON COLOR INFRARED PHOTOGRAPHS

C A MCCAFFREY (U S Bureau of Land Management, Branch of Photogrammetry, Anchorage, AK) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 71-75 Research supported by the US Bureau of Land Management

## USING AERIAL PHOTOGRAPHY TO DETECT VEGETATION DAMAGE IN A LARGE-SCALE AIR QUALITY MONITORING PROGRAM

B M EVANS (Resource Technologies Corp., State College, PA) IN Color aenal photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 77-88 refs

#### A85-30836

### PUBESCENCE OF TEXAS LANTANA AFFECTS LEAF SPECTRA AND IMAGERY

J H EVERITT, H W GAUSMAN, and S J. INGLE (U.S. Department of Agniculture, Agnicultural Research Service, Weslaco, TX) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983. Falls Church, VA, American Society of Photogrammetry, 1984, p. 89-97. refs

Texas lantana (Lantana horrida), also called calico bush, is a shrub found on sandy and sandy loam soils throughout the eastern two-thirds of Texas and Mexico Texas lantana has an unpleasant pungent odor and is unpalatable to either livestock or wildlife. The identification of this undesirable shrub with the aid of aerial photography could provide a basis for the control or the reduction of the population of Texas lantana. The present investigation is, therefore, concerned with the feasibility of using color-infrared (CIR) aerial photography as a management tool to distinguish Texas lantana from other plant species on south Texas rangelands. The possibility to base such a distinction on differences regarding the reflectance in the case of the plant leaves was considered, taking into account the leaf pubescence (hairiness) of the Texas lantana it is found that large scale CIR aerial photography should be a useful tool for the identification of Texas lantana.

### A85-30837

### SPECTRAL DENSITOMETER APPLICATION TO STRESS DETECTION IN CITRUS

G J EDWARDS and C H BLAZQUEZ (Florida, University, Lake Alfred, FL) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 105-110 refs

Spectral densitometer analysis of Aerial Color Infrared film (ACIR) of the same 64 citrus tree images was studied over a 6-year-period. The spectral reflectance curves of each tree had two maximum intensities, one near 0.480 micrometers and one near 0.600 micrometers. The ratio formed with the two intensities is smaller for healthy trees than for trees under stress. Due to the variability in color among rools of film, the ratio values are not the same, however, increased ratio value always increases with increased stress.

### A85-30838

### THE DEVASTATION OF A VINEYARD BY PHYLLOXERA

W E WILDMAN (California, University, Davis, CA) IN Color aenal photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, Fl, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 111-119

The aphid-like insect, Phylloxera vitafolia (Fitch) is a native feeder on certain wild species of grapevines in North America. These species can tolerate the insect without suffering permanent damage. However, the European grapevines, Vitis vinifera, are highly susceptible to the root feeding form of the insect and are usually stunted and eventually killed. Vinifera grapevines with phylloxera-resistant rootstocks have now been developed, but, for economic reasons, vinifera grapevines with nonresistant rootstocks are still being used. It is, therefore, important to trace the increase of grapevines stunted or killed by phylloxera on the basis of annually taken aerial photographs. Phylloxera outbreaks in two separate Napa Valley vineyard blocks were selected for study. In connection

with the present investigation, a report is provided of the study of one of these blocks

#### A85-30839

## ESTIMATION OF WOODY BIOMASS IN SLASH PINE PLANTATIONS USING COLOR AERIAL PHOTOGRAPHY - A FEASIBILITY STUDY

A A ROST and L G ARVANITIS (Florida, University, Gainesville, FL) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 121-128 Research supported by the US Forest Service refs

### A85-30840

### COLOR AND COLOR-IR PHOTOGRAPHY FOR ASSESSING FOREST PEST MANAGEMENT TACTICS

W M CIESLA (US Forest Service, Forest Pest Management/Methods Application Group, Fort Collins, CO) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 129-141 refs

Color and color-IR photos, at a variety of photo scales and film formats, have been used, either alone or in combination with ground data, to evaluate effectiveness of a number of forest pest management tactics. Several case histories are presented where this approach was used with varying degrees of success. These include evaluation of aerial applications of chemical and microbial insecticides against forest tent caterpillar, pandora moth, and gypsy moth, and demonstration of silvicultural treatments to prevent mountain pine beetle infestations. Optimum photo scales, film types and formats, and some analytical approaches to evaluating treatment effects from aerial photos are described.

### A85-30841

### INVENTORYING FLORIDA'S CITRUS GROVES

J W TODD (Florida Crop and Livestock Reporting Service, Orlando, FL) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 143-145

Each second winter since 1965-66 the Florida Crop and Livestock Reporting Service has photographed the State's citrus production belt to maintain an inventory of commercial citrus groves Approximately 150,000 homogeneous variety blocks are delineated and indexed on master photographic enlargements, with the accompanying vital statistics documented in a data base file To accomoplish this task approximately 14,000 square miles are photographed by an aerial contractor using black and white panchromatic film

### A85-30845#

### UTILITY GUIDE FOR AERIAL PHOTOGRAPHY

H \_M \_LACHOWSKI\_(U S\_Forest-Service, Washington, DC) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 167-171

A utility guide for aerial photography is a tool that allows resource managers to determine photography's ability to satisfy certain information requirements. It consists of hierarchically scaled user requirements and an empirically derived relationship between the scaled requirements and photo acquisition specifications. The Forest Service is currently developing a utility guide for resource photography used by the National Forests. The new techniques will be tested during the resource photography selection process on several National Forests.

DIGITAL PROCESSING TO IMPROVE FOREST CLASSIFICATION RESULTS AT RESOLUTIONS OF 5 TO 50 METRES

F J AHERN, D N H HORLER, J CIHLAR (Canada Centre for Remote Sensing, Ottawa, Canada), W J BENETT (Intera Environmental Consultants, Ltd., Calgary, Alberta, Canada), and E MACAULAY (Nova Scotia Department of Lands and Forests, Canada) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 153-170 refs

New developments regarding remote sensing technology and its utilization are related to significant improvements in sensor resolution and increasing prices for Landsat data. The question of the possible usefulness of Landsat data arises in connection with the work of the Nova Scotia Department of Lands and Forests (NSDLF). The NSDLF is annually required to identify, map, and report all logging on Crown land, which comprises 1.6 million ha. A study was, therefore, conducted to determine the quality of forest information which can be obtained using various spatial resolution data and digital spatial processing techniques. Attention is given to visual assessment, aggregated area estimates, mapping accuracy, areas of small clearcuts, and the improvement of classification results by various means.

### A85-32102

### INFLUENCE OF THE VIEWING GEOMETRY ON VEGETATION MEASURES

K STAENZ (Intera Environmental Consultants, Ltd., Ottawa, Canada), R J BROWN, and P M TEILLET (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 5-12 refs

The influence of viewing geometry on vegetation measurements (indices) which are used for monitoring vegetation biomass and physiological conditions is discussed To investigate the dependence of vegetation indices on the viewing angle, a ground-based reflectance data set acquired with a SPECTRASPAN SP-2000 radiometer from agricultural targets such as soil, rapeseed, and wheat, near Melfort, Saskatchewan is used. The data are analyzed using software on a PDP11/10 and the Landsat-4 digital-image analysis system. The following vegetation indices are calclated using the TM band 3 and band 4 reflectance factors NIR/red ratio, NIR-red difference, and normalized NIR-red difference It is shown that for the NIR/red ratio for black soil, the viewing angle effect is reduced by an average of 90 percent, whereas for the normalized NIR-red difference for rapeseed and wheat, the reduction is about 60 percent for viewing angle ranges of 0 to 32 deg Nevertheless, the indices still show a significant variation with the viewing angle

### A85-32113

### PRELIMINARY RESULTS OF AN EXAMINATION OF C-BAND SYNTHETIC APERTURE RADAR FOR FORESTRY APPLICATIONS

D G LECKIE (Petawawa National Forestry Institute, Chalk River, Ontario, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 151-164 Research supported by the Canada Centre for Remote Sensing refs

#### A85-32114

### GLOBAL CROP CONDITION ASSESSMENT USING REMOTELY SENSED SATELLITE DATA

J R HICKMAN (US Department of Agriculture, Foreign Crop Condition Assessment Div, Houston, TX) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 165-173 refs

An analysis of remotely-sensed satellite data for crop-condition assessment on a large scale, domestic or foreign, is discussed To support a quantifiable estimate of crop condition and production, the Foreign Crop-Condition Assessment Division in Houston, Texas relies on the convergence of evidence from multiple alternate-data sources such as satellite data (both Landsat and NOAA satellite series), model results, and ancillary meteorological and agronomic data. The input of the alternate-data sources into Division analyses, the storage and retrieval of ancillary data, and the FCCAD analyst selection and training criteria are considered. Wheat is selected as the crop to be used as an example in the analysis. The models and parameters that are directly applicable to this crop are examined.

### A85-32125

### OPERATIONAL CROP FORECASTING USING REMOTELY SENSED IMAGERY

H L GLICK, J F BENCI (Canadian Wheat Board, Winnipeg, Canada), and R J BROWN (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 331-337, 339-341 refs

An assessment is made of the effectiveness of incorporating satellite remotely sensed data into ground-based synoptic-scale meteorological data as an aid in forecasting worldwide crop conditions. The economics of national grain production in Canada for export are influenced by the empirical firmness of perceptions of worldwide grain production, i.e., growing conditions in other regions. The WMO surface grid of 2000 meteorological stations is not dense enough for good climatic evaluation in some grain-producing parts of the globe. Examinations of the use of Landsat MSS and NOAA AVHRR and VISSR sensor data to detect, e.g., frost and precipitation, revealed that the higher resolution MSS data were not gathered frequently enough. The AVHRR data are useful for crop phrenology and vigor input to crop yield models and for estimating frost and snow damage. The GOES satellite VISSR data can serve in quick looks to evaluate the extent of a frost outbreak.

### A85-32126

EVALUATION OF THE TM, MSS, AND HRV SENSORS IN ESTIMATING THE SURFACE AREA OF CORN WITHIN CANADA [EVALUATION DES CAPTEURS TM, MSS ET HRV POUR ESTIMER LA SUPERFICIE DU MAIS DANS LE CONTEXTE CANADIEN]

K P B THOMSON, M BERNIER, P TEILLET, D HORLER (Canada Centre for Remote Sensing, Ottawa, Canada), and C GOSSELIN (Intera Environmental Consultants, Ltd., Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 343-353 In French refs

## LANDSAT INFORMATION AS BASIS FOR A PERMANENT MONITORING OF ECOLOGY AND AGRICULTURAL SITUATIONS IN TROPICAL ZONES

I KIKULA (Dar es Salaam, University, Dar es Salaam, Tanzania), W KIRCHOF (Deutsche Forschungs- und Versuchsanstalt füer Luft- und Raumfahrt, Forschungszentrum, Wessling, West Germany), and W MUEKSCH (Bonn, Universitäet, Mayen auf dem Werth, West Germany) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 8th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 439-448 refs

The Landsat MSS sensors were used to scan drainage patterns, vegetal growth conditions and land use patterns of southern Tanzania in November 1972. The data were employed to generate maps at a 150,000 scale which were false color coded for interpretive reasons. The classifications were compared with aerial surveys to enhance their accuracy and permit the identification of areas subject to severe erosion. The areal images were given artificial boundaries with maximum likelihood statistical analyses and photographic prints were then generated of the maps for interpretive studies. Ground truth data were found to be essential for accurate characterizations, particularly for shambas (subsistence farming) regions. Overall costs were concluded to be 10 percent the costs associated with aerial surveys.

### A85-32129

## OVERCOMING PROJECT PLANNING AND TIMELINESS PROBLEMS TO MAKE LANDSAT USEFUL FOR TIMELY CROP AREA ESTIMATES

R DOBBINS, R RYERSON, and J LEBLANC-COOKE (Statistics Canada, Agriculture Statistics Div , Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 485-494 refs

### A85-32130

### OVERCOMING TECHNICAL PROBLEMS TO MAKE LANDSAT USEFUL FOR TIMELY CROP AREA ESTIMATES

R A RYERSON, R DOBBINS, and C THIBAULT (Statistics Canada, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 495-505 Research supported by Statistics Canada, Canada Centre for Remote Sensing, Alberta Remote Sensing Centre, and Canola Council of Canada refs

### A85-32132

### DRYLAND SALINITY MAPPING IN SOUTHERN ALBERTA FROM LANDSAT DATA - A SEMIOPERATIONAL PROGRAM

M D THOMPSON (Intera Environmental Consultants, Ltd , Calgary, Alberta, Canada), N A PROUT (Intera Environmental Consultants, Ltd , Ottawa, Canada), and T G SOMMERFELDT (Agriculture Canada, Lethbridge, Alberta, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 519-527. Sponsorship. Department of Supply and Services. refs (Contract DSS-OSZ-81-00110)

#### A85-32133

### NEW REMOTE SENSING TECHNIQUES FOR MONITORING THE FESCUE GRASSLANDS OF ALBERTA

K P B THOMSON, F J AHERN, R J BROWN (Canada Centre for Remote Sensing, Ottawa, Canada), C PEARCE (Calgary, University, Calgary, Alberta, Canada), S HOYLES (Department of Energy, Mines and Resources, Lands Div, Lethbridge, Alberta, Canada), and G FEDOSEJEVS (Intera Environmental Consultants, Ltd, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings. Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 543-558 refs

#### A85-32134

# A METHOD FOR ENHANCING LANDSAT IMAGES FOR CLASSIFYING PLANT COVER [UNE METHODE DE REHAUSSEMENT D'IMAGES LANDSAT POUR LA CLASSIFICATION DU COUVERT VEGETAL]

J BEAUBIEN (Canadian Forestry Service, Laurentian Forest Research Centre, Sainte-Foy, Quebec, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p. 559-566 In French refs

Features of a menu-driven algorithm for implementation on the ARIES (Applied Resource Image Exploitation System) for enhancing forest canopy images through selective sampling of Landsat MSS images are described. The program divides each spectral band into 0-255 radiance levels. Up to three images from different spectral bands can then be overlaid on a CRT with automated scaling of each image to achieve a match. Since each color band provides high resolution for a limited number of species, the enhanced images furnish more species identification and vegetal vigor data than single band data. Judicious scanning of regions according to statistical criteria lessens the total number of images required for forest health surveillance. Statistical sampling of the brightness histograms allows classification of the dominant types of vegetation in a sample zone in terms of the most frequent bands sensed in a 30,000 pixel scene. The technique has been applied to mapping 280,000 sq km of northern Canada.

### A85-32135

## A PRACTICAL METHOD FOR MONITORING AND MAPPING CUTOVERS BASED ON THE DIGITAL ANALYSIS OF LANDSAT DATA AND AUTOMATED MAP PRODUCTION

A JANO and S PALA (Ontario Centre for Remote Sensing, Toronto, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 567-573

### A85-32136

### CLASSIFICATION OF MIRES USING MULTITEMPORAL LANDSAT MSS AND TOPOGRAPHIC MAP DATA

L. BORESJO (Stockholm, Universitet, Stockholm, Sweden) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May\_3-6,\_1983,\_Proceedings\_Sainte-Eoy,\_Quebec,\_Canada, Association Quebecoise de Teledetection, 1984, p 581-590 Research sponsored by the Swedish Environmental Protection Board and Naturvetenskapliga Forskningsradet refs

The worth of applying Landsat MSS data in combination with topographic maps to characterize wetlands in Sweden was evaluated A 500 sq km region served as a test area, containing 10 types of wetlands, e.g., fens, hummocks, bogs, forests, etc Six Landsat images taken from 1975-79 were treated to furnish uniformly scaled images which could be overlapped. The resulting images were compared with color IR images taken in aerial surveys at a 1 60,000 scale. Statistical comparisons were also made between the data gathered on different MSS bands. A Bayes maximum likelihood classifier was employed for the classifications.

A reduction in the fineness of classifications of mire types from ten to six was found necessary to achieve classification accuracies of 90 percent MSK

A85-32139

SEASONAL AND INTERANNUAL EVOLUTION OF THE SPECTRAL SIGNATURE IN FOREST ENVIRONMENTS USING LANDSAT DATA [EVOLUTION SAISONNIERE ET INTER-ANNUELLE DE LA SIGNATURE SPECTRALE EN MILIEU FORESTIER APARTIR DE DOCUMENTS LANDSAT]

R CHAUME and A COMBEAU (Office de la Recherche Scientifique d'Outre-Mer, Bondy, Seine-Saint-Denis, France) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 631-637 In French

Multitemporal Landsat MSS images of two forested regions near Paris were examined in an attempt to track seasonal variations in the spectral signatures of the forest canopy. Oak and beech trees dominated one wood, pines the other. The variations in spectral signatures are caused by the solar angle, canopy evolution over the year and the soil type. The ground truth parcels monitored were captured in 156 x 156 pixel areas of the images. A total of 15 images selected from the 1975-81 period were analyzed according to channel, theme and global characteristics. Correlations were also sought between leafy and coniferous trees. Luminance variations were most apparent on channel 4, and the overall levels were least in winter. Thematic trends, however, displayed diverse directions among the channels.

### A85-32142\* Hunter Coll, New York TIMBER INVENTORY USING LANDSAT

A H STRAHLER (Hunter College, New York, NY) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 665-673 Sponsorship U S Department of Agriculture refs

(Contract USDA-53-9158-0-6362, USDA-8-484032-25214, USDA-1-6504-484032-25218, NAS9-15509, NAS7-100)

The results of recent efforts to apply Landsat MSS imagery, in concert with topological maps, to forestry timber inventories via the FOCIS program are reported FOCIS (Forests Classification and Inventory System) was defined for inventorying the lumber volume of coniferous tree types in rugged terrain regions Data from four bands serve as input for unsupervised clustering and iterative labeling of the elevation, slope angle, and subregions of interest Simulated photographic maps are generated which serve as overlays for regular maps for assessing timber harvests and sales goals Sample procedures followed in mapping the Eldorado region forests in the Sierra Nevada mountains are discussed

MSK

### A85-33352

### MAPPING NATIVE VEGETATION USING LANDSAT DATA

S M TIMMINS (Department of Lands and Survey, Wellington, Department of Scientific and Industrial Research, Physics and Engineering Laboratory, Lower Hutt, New Zealand), B D CLARKSON (Department of Scientific and Industrial Research, Forest Research Institute, Rotorua, New Zealand), W B SHAW (Department of Lands and Survey, Wellington, New Zealand), and I A E ATKINSON (Department of Scientific and Industrial Research, Soil Bureau, Lower Hutt, New Zealand) New Zealand Journal of Science (ISSN 0028-8365), vol 27, no 4, 1984, p 389-397 refs

Landsat imagery of three New Zealand national parks - Egmont, Urewera, and Tongariro - was analyzed for native vegetation Results show that broad vegetation classes can be rapidly and reliably mapped so that small-scale maps showing major physiognomic classes of vegetation can be produced of large areas in a relatively short time Distinguishing between forest types is often not possible Shadowing in steep dissected country makes Landsat data of less use in this terrain However, where detailed

vegetation maps are being prepared, areas requiring further field checking can sometimes be quickly highlighted. The potential value of Landsat maps for park interpretation has not been fully realized. Author

#### A85-33450

### ESTIMATING PHYTOMASS OF SAGEBRUSH HABITAT TYPES FROM MICRODENSITOMETER DATA

L L STRONG (Technicolor Goverment Services, Inc., Moffett Field, CA, Colorado State University, Fort Collins, CO), R W DANA (US Forest Service, Fort Collins, CO), and L H CARPENTER (Colorado, Div of Wildlife, Fort Collins, CO) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1122), vol. 51, April 1985, p. 467-474 refs

#### A85-33556

### SIMULATION OF ERRORS IN A LANDSAT BASED CROP ESTIMATION SYSTEM

D B RAMEY and J H SMITH (Lockheed Engineering and Management Service Co, Inc, Houston, TX) (Environmental Research Institute of Michigan, NOAA, NASA, et al, International Symposium on Remote Sensing of Environment, 17th, University of Michigan, Ann Arbor, MI, May 9-13, 1983) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 50, Dec 1984, p. 1707-1712 refs

The design, implementation, and performance of the Agricultural Information System Simulator (Agsim), intended for locating design flaws, aiding in the selection of the competing component technologies, and providing iterative feedback for fine-tuning of an estimation procedure, are presented. The simulator is an interactive computer program which models each of the major steps required to estimate a region's crop production. The approach is generally similar to that of the Landsat-based crop forecasting technology, the simulator combines the use of empirical observations, theoretical probability distributions, and the reconstruction of archived weather patterns. The system was used in a study of the effect of changing the Landsat orbit from an 18-day repeat coverage cycle to a 16-day cycle.

A85-33558\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

CHANGES IN VEGETATION SPECTRA WITH LEAF DETERIORATION UNDER TWO METHODS OF PRESERVATION

M L LABOVITZ, E J MASUOKA (NASA, Goddard Space Flight Center, Geophysics Branch, Greenbelt, MD), and S G FELDMANN (Maryland, University, College Park, MD) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 50, Dec 1984, p 1737-1745 refs

Changes in leaf spectra caused by mineralization under different conditions of preservation are measured using a three-band portable radiometer which simulates three Thematic Mapper bands 3, 4, and 5 Daily spectral measurements of white oak (Quercus alba) leaves did not distinguish among the fresh, bottled, and bagged vegetation in the spectral bands 3 and 5 for up to four days after collection. The reflected energy of the preserved vegetation increased thereafter, reportedly due to the loss of chlorophyll and dehydration it is concluded that the measurement procedure is sufficiently sensitive as to discern documented patterns of variation in reflectance measurements.

A85-35120°# Jet Propulsion Lab , California Inst of Tech , Pasadena

REMOTE DETECTION OF GEOBOTANICAL ANOMALIES ASSOCIATED WITH HYDROCARBON MICROSEEPAGE USING THEMATIC MAPPER SIMULATOR (TMS) AND AIRBORNE IMAGING SPECTROMETER (AIS) DATA

B N ROCK (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 299-309 NASA-supported research refs

An interpretation of TMS and AIS data sets collected from Lost River, West Virginia, are presented, along with a brief review of the supervised vegetation classification approach to vegetation mapping used at Lost River. A preliminary study of AIS data suggests that contiguous high-spectral resolution data from a very limited portion of the spectrum (1.2-1.5 micron) provide a greater discriminatory capability than do broad-band sensors such as the TMS covering of wider spectral range (0.45-2.35 microns).

#### A85-37117

## EXPERIMENTAL LAND MAPPING BASED ON PHOTOGRAPHIC DATA FROM SPACE (OPYT KARTOGRAFIROVANIIA ZEMEL' NA OSNOVE KOSMICHESKOI FOTOINFORMATSII)

L N KULESHOV (Gosudarstvennyi Nauchno-Issledovatel'skii Institut Zemel'nykh Resursov, Moscow, USSR) Issledovanie Zemli iz Kosmosa (ISSN 0205-9614), Mar -Apr 1985, p 41-44 In Russian refs

The use of photographic images obtained in space to compile large scale (1 500,000) thematic maps of agricultural land in the Kalmyk territory of the USSR is evaluated. It is shown that the information content of space images may vary according to the type of map being compiled for maps of the topographical features and uses of agricultural land, 70 percent of the data extracted from space images was useful, for maps of soil types, only 40 percent of the photographic information data was useful.

### A85-37119

THE APPLICATION OF COMPUTERIZED SPACE IMAGE PROCESSING TECHNIQUES TO DATA FROM LARGE SCALE AERIAL SURVEYS OF FORESTS [ISPOL'ZOVANIE MATERIALOV KRUPNOMASSHTABNOI AEROFOTOS'EMKI LESA PRI AVTOMATIZIROVANNOM DESHIFRIROVANII KOSMICHESKIKH SNIMKOV]

L A KUZENKOV, N A APARINOVA, and A V STARCHENKO (Vsesoiuznoe Aerofotolesoustroitel'noe Ob'edinenie Lesproekt, Moscow, USSR) Issledovanie Zemli iz Kosmosa (ISSN 0205-9614), Mar -Apr 1985, p 90-96 In Russian

A step-wise numerical technique to process large scale aerial survey data for forestry applications is described. The method is based on the SNIMOK-DANNYE computer system for processing photographic data obtained by satellite. A block diagram illustrating the step-wise processing procedure is given and the statistical correlation used to match forest features with suitable deciphering indicators is described. The technique has been used to process photographic data from 30 different aerial surveys of forest land in lakutsk, USSR, and was found to be practical for widespread use.

### A85-37730

### METEOROLOGICAL SATELLITE DATA USEFUL FOR AGROCLIMATE

P K RAO, J D TARPLEY, R A SCOFIELD, and J F MOSES (NOAA, Satellite Applications Laboratory, Washington, DC) IN Conference on Satellite/Remote Sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, Preprints Boston, MA, American Meteorological Society, 1984, p 15-21 refs

The meteorological products developed by NOAA/NESDIS for agricultural users on the basis of data from satellite sensors are characterized and illustrated with maps, graphs, and sample images. These products include vegetation-index maps using the normalized difference of NOAA AVHRR channels 1 and 2, surface insolation maps based on GOES data, canopy, shelter, dewpoint

and daily-extreme temperatures derived from HIRS/2 and TOVS data, and precipitation estimates based on AVHRR cloud-cover data

T K

A85-37742\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### A CASE STUDY ON THE APPLICATION OF GEOSYNCHRONOUS SATELLITE INFRARED DATA TO ESTIMATE SOIL MOISTURE

R H WOODWARD (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, General Software Corp , Landover, MD), P J WETZEL, and D ATLAS (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, MD) IN Conference on Satellite/Remote Sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, Preprints Boston, MA, American Meteorological Society, 1984, p 80-85 refs

The use of GOES IR temperature data to estimate soil moisture content is discussed and demonstrated, modifying the procedure proposed by Wetzel et al. (1984) to provide for incorporation of independent measurements of vegetation biomass, geostrophic wind speed, and surface dewpoint. Data acquisition, processing, and the statistical approach employed are described, data for Kansas and Nebraska during a six-day period in July 1978 are analyzed, and a statistical relationship between observed surface temperature and antecedent precipitation index is established. The results are presented in tables, graphs, and maps, and the regression procedure is found to predict antecedent precipitation with statistically significant precision.

#### A85-37868

### SANTA ANA AIRFLOW OBSERVED FROM WILDFIRE SMOKE PATTERNS IN SATELLITE IMAGERY

J SVEJKOVSKY (California, University, La Jolla, CA) Monthly Weather Review (ISSN 0027-0644), vol 113, May 1985, p 902-906 refs

(Contract NOAA-NA-80AAD00120)

Strong mountain downslope winds over southern California known as 'Santa Ana' bring dry inland air through the coastal region, posing a serious wildfire hazard. Between November 26 and 30, 1980 several large brushfires raged out of control south of Los Angeles. The smoke plume from the fires was visible in NOAA 6 AVHRR images and was used to trace the seaward extent of the Santa Ana influence. The smoke followed the 700 mb air flow pattern and was detectable in the images up to 1100 km from its source.

### A85-37958

CAPABILITY OF BHASKARA-II SATELLITE MICROWAVE RADIOMETER BRIGHTNESS TEMPERATURE DATA TO DISCRIMINATE SOIL MOISTURE CONDITIONS OF INDIAN LANDMASS

K S RAO, P VENKATACHALAM, A SOWMYA (Indian Institute of Technology, Bombay, India), A K KANDYA, and T J MAJUMDAR (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 91-96 refs

The capability of the brightness temperature data acquired by Bhaskara-II satellite microwave radiometers, operating at 19 35, 22 235, and 31 4 GHz, to discriminate various soil-moisture conditions of Indian land mass and to study atmosphenic phenomena is demonstrated. The data obtained in February 1983 extends from the northern Himalayan snow regions to the southern sea regions. It is shown that large-scale assessment of soil moisture is possible to a limited extent. Histograms of the data of the radiometers are presented.

### ESTIMATING CANOPY COVER IN DRYLANDS WITH LANDSAT **MSS DATA**

K OLSSON (Lunds Universitet, Lund, Sweden) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 161-164 refs

The possibilities of using Landsat MSS data for wood resources monitoring are evaluated The relationship between canopy cover, measured in 32 test plots through air-photo interpretation, and spectral characteristics of the corresponding areas is studied in a semi-arid savannah environment in Kordofan, Sudan The values are correlated with multitemporal Landsat raw data and manipulated data It is shown that the highest correlation coefficients are obtained between crown cover and MSS data recorded during the dry season and that the negative correlations between nIR (MSS 6 and MSS 7) and crown cover are striking. To establish a relationship between woody wet weight and crown diameter, destructive measurements of woody biomass are carried out

#### A85-37967

REMOTE SENSING FOR DROUGHT IMPACT ASSESSMENT - A STUDY OF LAND TRANSFORMATION IN KORDOFAN, SUDAN U HELLDEN (Lunds Universitet, Lund, Sweden) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 165-168 refs

National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### A GEOREFERENCED LANDSAT DIGITAL DATABASE FOR

FOREST INSECT-DAMAGE ASSESSMENT
D L WILLIAMS, R F NELSON, and C L DOTTAVIO (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, MD) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 643-656 refs

In 1869, the gypsy moth caterpillar was introduced in the US in connection with the experiments of a French scientist Throughout the insect's period of establishment, gypsy moth populations have periodically increased to epidemic proportions For programs concerned with preventing the insect's spread, it would be highly desirable to be able to employ a survey technique which could provide timely, accurate, and standardized assessments at a reasonable cost A project was, therefore, initiated with the aim to demonstrate the usefulness of satellite remotely sensed data for monitoring the insect defoliation of hardwood forests in Pennsylvania A major effort within this project involved the development of a map-registered Landsat digital database A complete description of the database developed is provided along with information regarding the employed data management system

### A85-37981\* Pan American Univ , Edinburg, Tex A TEST OF THE SUITS VEGETATIVE-CANOPY REFLECTANCE MODEL WITH LARS SOYBEAN-CANOPY REFLECTANCE

J E CHANCE and E W LEMASTER (Pan American University, Edinburg, TX) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 665-672 (Contract NSG-9033, NAG9-61)

The Suits vegetative-canopy reflectance model is tested with an extensive set of field reflectance measurements made by the Laboratory for Application of Remote Sensing (LARS) for soybean canopies. The model is tested for the full hemisphere of observer directions as well as the nadir direction. The results show moderate agreement for the visible channels of the Landsat MSS and poor agreement in the near-infrared channel of Landsat MSS An analysis of errors is given Author

A85-38273\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md
DIURNAL MOVEMENTS OF COTTON LEAVES EXPRESSED AS

### THERMODYNAMIC WORK AND ENTROPY CHANGES

J B SCHUTT, D S KIMES (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, MD), and W W NEWCOMB (RMS Technologies, Inc., Landover, MD) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol. 51, June 1985, p 697-702 refs

It is pointed out that some important agricultural crops show heliotropic leaf movements. In these species, the proclivity of leaves to orient either perpendicularly or parallel or in some combination of these positions with respect to the sun is controlled by the leaf turgor and the availability of water Such an orientational response is particularly noticeable for cotton. Schutt et al. (1985) have detailed leaf trajectories using three angles. The present investigation applies the three-angle representation to leaf trajectory mapping and to the calculation of the phase angle 'gamma' between the individual leaf normals and the solar direction. Using gamma, the thermodynamic work and entropy functions are evaluated and used to distinguish between the behavior of water-stressed and well watered cotton canopies

### A85-38389\* Kansas State Univ , Manhattan ESTIMATION OF TOTAL ABOVE-GROUND PHYTOMASS PRODUCTION USING REMOTELY SENSED DATA

G ASRAR, E T KANEMASU (Kansas State University of Agriculture and Applied Science, Manhattan, KS), R D. JACKSON, and P J PINTER, JR (US Department of Agriculture, Water Conservation Laboratory, Phoenix, AZ) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 211-220 Remote Sensing of

(Contract NAS9-16457)

Remote sensing potentially offers a quick and nondestructive method for monitoring plant canopy condition and development In this study, multispectral reflectance and thermal emittance data were used in conjunction with micrometeorological data in a simple model to estimate above-ground total dry phytomass production of several spring wheat canopies. The fraction of absorbed photosynthetic radiation (PAR) by plants was estimated from measurements of visible and near-infrared canopy reflectance Canopy radiation temperature was used as a crop stress indicator in the model Estimated above-ground phytomass values based on this model were strongly correlated with the measured phytomass values for a wide range of climate and plant-canopy conditions

#### A85-38390\* Cornell Univ, Ithaca, N Y OF SPECTRAL **ESTIMATORS ABSORBED** PHOTOSYNTHETICALLY ACTIVE RADIATION CANOPIES

K P GALLO (Cornell University, Ithaca, NY, Purdue University, West Lafayette, IN), C S T DAUGHTRY (Purdue University, West Lafayette, IN), and M E BAUER (Minnesota, University, St Paul, MN, Purdue University, West Lafayette, IN) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 221-232 Previously announced in STAR as N85-16242 refs (Contract NAS9-16528)

Most models of crop growth and yield require an estimate of canopy leaf area index (LAI) or absorption of radiation Relationships between photosynthetically active radiation (PAR) absorbed by corn canopies and the spectral reflectance of the canopies were investigated. Reflectance factor data were acquired with a Landsat MSS band radiometer. From planting to silking, the three spectrally predicted vegetation indices examined were associated with more than 95 percent of the variability in absorbed PAR The relationships developed between absorbed PAR and the three indices were evaluated with reflectance factor data acquired from corn canopies planted in 1979 through 1982 Seasonal cumulations of measured LAI and each of the three indices were associated with greater than 50 percent of the variation in final grain yields from the test years. Seasonal cumulations of daily absorbed PAR were associated with up to 73 percent of the variation in final grain yields Absorbed PAR, cumulated through the growing season, is a better indicator of yield than cumulated leaf area index Absorbed PAR may be estimated reliably from spectral reflectance data of crop canopies

A85-38391\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

SATELLITE REMOTE SENSING OF TOTAL HERBACEOUS BIOMASS PRODUCTION IN THE SENEGALESE SAHEL -1980-1984

C J TUCKER (NASA, Goddard Space Flight Center, Laboratory for Terrestrial Physics, Greenbelt, MD), C L VANPRAET, M J SHARMAN, and G VAN ITTERSUM (United Nations, Food and Agriculture Organization, Dakar, Senegal) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 233-249 refs

### A85-38393\* Stanford Univ, Calif INFLUENCE OF ROCK-SOIL SPECTRAL VARIATION ON THE ASSESSMENT OF GREEN BIOMASS

C D ELVIDGE and R J P LYON (Stanford University, Stanford, CA) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 265-279 Research supported by the Shell Companies Foundation and NASA refs

A comparison of how n-spaced and ratio-based vegetation indices respond to rock and soil spectral variation is made, using a set of ground-based reflectance spectra and airborne Thematic Mapper imagery of the Virginia Range, NV. The influence of variations in rock-soil brightness on ratio-based vegetation indices is also discussed. It is shown that of all the vegetation indices tested, the perperdicular vegetation index is the most appropriate for use in multispectral imagery of arid and semiarid regions where there is a wide variation in substrate characteristics.

### A85-38394\* Purdue Univ , Lafayette, Ind CHANGES IN SPECTRAL PROPERTIES OF DETACHED BIRCH LEAVES

C S T DAUGHTRY and L L BIEHL (Purdue University, West Lafayette, IN) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 281-289 refs (Contract NAS9-16528)

A study conducted in order to determine the rate of changes in spectral properties of detached leaves and to evaluate the effectiveness of low temperature and cytokinins for delaying the changes, is examined. For five minutes, leaves from red birch are immersed in water or 0 001 M BAP, and then stored in plastic bags in the dark at either 5 or 25 C. Using a spectroradiometer and an integrating sphere, total directional-hemispherical reflectance and transmittance of the adaxial surface of the leaves are measured over the 400-1100 nm wavelength region. The results indicate that for leaves stored at 5 C for one week, the changes in the spectral properties are less than 5 percent of the initial values, whereas storage at 25 C promotes rapid senescence and large changes in the spectral properties. It is shown that low temperature is more effective than BAP in delaying senescence.

M D

A85-38395\* Environmental Research Inst of Michigan, Ann Arbor

### A TM TASSELED CAP EQUIVALENT TRANSFORMATION FOR REFLECTANCE FACTOR DATA

E P CRIST (Michigan, Environmental Research Institute, Ann Arbor, MI) Remote Sensing of Environment (ISSN 0034-4257), vol 17, June 1985, p 301-306 refs (Contract NAS9-16538)

A transformation of TM-waveband reflectance-factor data which provides features related as directly as possible to the corresponding TM Tasseled Cap brightness, greennes, and wetness features is presented The reflectance factor transformation is based on spectrometer data integrated over the prelaunch composite-detector response functions of the Landsat-4 Thematic Mapper A description, in general terms, of the approach

for adjusting the transformation matrix to other types of reflectance factor data (different instrument or band response) is given

M<sub>D</sub>

#### A85-38704

OPERATIONAL PLANNING FOR A REMOTE-SENSING SPACE SYSTEM [K VOPROSU PLANIROVANIIA RABOTY KOSMICHESKOI SISTEMY IPRZ]

IU G SIMONOV, T A VOROBEVA, and N A ROZHDESTVENSKAIA IN. Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 14-19 in Russian

An approach to establishing a schedule of operation for a space system intended for crop inventory is described Consideration is given to methods for collecting the information that defines the areas in need of space system services, the regions of the Soviet Union that are characterized by a specific combination of crop species are identified, and their relative value is assessed For each region a temporal characteristic exists which can be used as a basis for a calendar-type system schedule. The parameters most descriptive of the major species are defined for all stages of their development and for ground-based, aero-visual, and aerophotometric methods.

#### A85-38708

A PRELIMINARY METHOD FOR COMPLEX AEROVISUAL AND GROUND-BASED SUBSATELLITE OBSERVATIONS AGROPHYTOCENOSIS STATUS (THROUGH THE EXAMPLE OF WHEAT) WINTER [PREDVARITEL'NAIA **METODIKA** AEROVIZUAL'NYKH KOMPLEKSNYKH **NAZEMNYKH** ZA PODSPUTNIKOVYKH SOSTOIANIEM NABLIUDENII AGROFITOTSENOZOV /NA PRIMERE POSEVOV OZIMOI PSHENITSY/1

E A VASILEV, P M KARIAGIN, and E B POSPELOVA IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 40-49 In Russian refs

### A85-38719

ASSESSMENT OF THE STUDY AND MAPPING OF PASTURES IN SEMIARID ZONES USING REMOTE SENSING METHODS [K OTSENKE IZUCHENIIA I KARTOGRAFIROVANIIA PRIRODNYKH KORMOVYKH UGODII POLUPUSTYNNOI ZONY DISTANTSIONNYMI METODAMI]

N A SEMENOV, N V BELIAEVA, and I A TROFIMOV IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 103-115 In Russian refs

### A85-38809

### REMOTE SENSING OF THE AGROCHEMICAL PROPERTIES OF SOILS

K IA KONDRATEV (Akademiia Nauk SSSR, Institut Ozerovedeniia Leningrad, USSR), V V KOZODEROV (Akademiia Nauk SSSR, Moscow, USSR), and P P FEDCHENKO (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Sel'skokhoziastvennoi Meteorologii-Moscow, USSR)—IN -Machine-processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 62-64 refs

Pokrovsky (1929) has conducted an investigation regarding the correlation existing between the spectral reflectivities of soils and their humus content. He found that the spectral reflectivity of soil depended on its humus content according to an exponential relationship. The conclusions reported by Pokrovsky could be verified with the aid of experimental data obtained by Tolchelnikov (1960). Additional calculations have shown that for cases involving humus contents in the range from 5 to 6 percent the obtained correlation can be replaced by a linear correlation. The present

investigation is concerned with an experiment which had the objective to establish a quantitative correlation between soil reflectivity parameters and the soil humus content. The experiment involved measurements conducted with a spectrophotometer, taking into account samples consisting of humus-containing soil and soil-forming rock particles. Measurements conducted with the aid of satellite and aircraft are also considered.

A85-38812\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

## COLLECTION OF IN SITU FOREST CANOPY SPECTRA USING A HELICOPTER - A DISCUSSION OF METHODOLOGY AND PRELIMINARY RESULTS

D L WILLIAMS (NASA, Goddard Space Flight Center, Greenbelt, MD), C L WALTHALL (Nebraska, University, Lincoln, NE), and S N GOWARD (Maryland, University, College Park, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 94-106 refs

An important part of fundamental remote sensing research is based on the measurement and analysis of spectral reflectance from earth surface materials in situ. It has been found that for an effective analysis of the target of interest, different applications of remotely sensed data require spectral measurements from different portions of the electromagnetic spectrum. It is pointed out that the detailed spectral reflectance characteristics of forest vegetation are currently not well understood, particularly in the middle infrared wavelength region. Details regarding the need for in situ forest canopy measurements are examined, taking into account certain difficulties arising in the case of satellite observations. Because of these difficulties, the present paper provides a discussion of methodology and preliminary spectra based on an experiment to use a helicopter as an observing platform for in situ forest canopy spectra measurement.

### A85-38815

### IDENTIFYING VEGETATIVE LAND USE CLASSES DURING EACH OF THE FOUR SEASONS ON AERIAL PHOTOGRAPHS AND LANDSAT IMAGERY IN COASTAL SOUTH CAROLINA

K O KELTON (Union Camp Corp , Bloomingdale, GA), W A SHAIN, and L E NIX (Clemson University, Clemson, SC) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 126-133 refs

## A85-38820\* Michigan State Univ, East Lansing SPECTRAL RESPONSE CURVE MODELS APPLIED TO FOREST COVER-TYPE DISCRIMINATION

W D HUDSON and D P LUSCH (Michigan State University, East Lansing, MI) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 175-179 (Contract NGL-23-004-083)

The potential of remote sensing systems to provide a cost-effective inventory tool in the case of forest resources is currently of interest to a variety of natural resources management agencies. A number of studies have been performed regarding the use of Landsat data for mapping forest resources in Michigan. The present paper is concerned with current research, which has been directed toward the development and evaluation of computer-implemented classifications for the identification and characterization of coniferous forest types in Michigan's northern Lower Peninsula Attention is given to the characteristic response curves from Landsat MSS data, spectral response curve models, and forest cover-type discrimination. It is found that spectral response curve models can be used to evaluate and explain the

characteristic spectral responses of coniferous forest types on a snow-covered, winter Landsat scene GR

### A85-38828

## AN ANALYSIS OF THE UTILITY OF LANDSAT THEMATIC MAPPER DATA AND DIGITAL ELEVATION MODEL DATA FOR PREDICTING SOIL EROSION

D B GESCH and B I NAUGLE (Murray State University, Murray, KY) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 260-265 refs

#### A85-38829

## UTILITY OF SOME IMAGE ENHANCEMENT TECHNIQUES FOR RECONNAISSANCE SOIL MAPPING - A CASE STUDY FROM SOUTHERN INDIA

R S DWIVEDI (National Remote Sensing Center, Hyderabad, India) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 266-274

### A85-38834

### **ROLE OF VEGETATION IN THE BIOSPHERE**

D B BOTKIN (California, University, Santa Barbara, CA) and S W RUNNING (Montana, University, Missoula, MT) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 326-332 refs

The role of terrestrial vegetation in influencing energy, water, and biogeochemical cycles is examined. An approach to the remote sensing research which is required in order to understand this role in the biosphere is discussed. Remote sensing is used to classify major vegetation landscape units and to measure leaf area indexes which are correlated with net primary production and total biomass. The ability to distinguish and map biomes by remote sensing is demonstrated for Landsat sensors.

**A85-38835\*** National Aeronautics and Space Administration Johnson (Lyndon B ) Space Center,

### TECHNIQUES FOR THE ESTIMATION OF LEAF AREA INDEX USING SPECTRAL DATA

G D BADHWAR (NASA, Johnson Space Center, Houston, TX) and S S SHEN (Lockheed Engineering and Management Services, Co, Inc, Houston, TX) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 333-338 NASA-supported research refs

Based on the radiative transport theory of a homogeneous canopy, a new approach for obtaining transformations of spectral data used to estimate leaf area index (LAI), is developed. The transformations which are obtained without any ground knowledge of LAI show low sensitivity to soil variability, and are linearly related to LAI with relationships which are predictable from leaf reflectance, transmittance properties, and canopy reflectance models Evaluation of the SAIL (scattering by arbitrarily inclined leaves) model is considered. Using only nadir view data, results obtained on winter and spring wheat and corn crops are presented. M.D.

A85-38836\* New York State Univ, Binghamton
ESTIMATION OF LEAF AREA INDEX FROM BIDIRECTIONAL
SPECTRAL REFLECTANCE DATA BY INVERTING A CANOPY
REFLECTANCE MODEL

N S GOEL (New York, State University, Binghamton, NY), K E HENDERSON, and D E PITTS (NASA, Johnson Space Center, Houston, TX) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 339-347 refs

A technique for estimating the leaf area index from bidirectional canopy reflectance (CR) data, in the infrared region, e.g., in band 4 of a Thematic Mapper (TM), is described. It involves inversion of a CR model which accurately represents the reflectance from the canopy. A method for remotely collecting this CR data using an aircraft based TM is described. The bidirectional CR's, for a black spruce (picea maniana) canopy, for 7 solar/view directions, as measured using this technique, are given. A very preliminary analysis of the data from a point of view of estimating LAI by inversion of a CR model is given. This analysis suggests that for an acceptably accurate estimation of LAI, one will require bidirectional CR's for many more than 7 solar/view directions.

Autho

## A85-38837 SPECTRAL ESTIMATES OF AGRONOMIC CHARACTERISTICS OF CROPS

C S T DAUGHTRY, K P GALLO, L L BIEHL (Purdue University, West Lafayette, IN), E T KANEMASU, G ASRAR (Kansas State University of Agriculture and Applied Science, Manhattan, KS), B L BLAD, J M NORMAN, and B R GARDNER (Nebraska, University, Lincoln, NE) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 348-356 refs

Data obtained with the aid of remote sensing from aerospace platforms could provide a basis for forecasting crop production. The interaction of solar radiation with a crop as a function of the quantity of vegetation, the geometric configuration of the canopy, and solar illumination angles is discussed. A study was conducted with the objective to determine the relationships of canopy characteristics to the reflectance factor of crops, taking into account also an integration of spectral and meteorological data for estimating crop yields. Experiments involving the planting of corn and wheat were performed. Attention is given to the relation of canopy reflectance to agronomy characteristics and the relation of spectral vanables to yield. The concept of combining spectral estimates of canopy characteristics with meteorological models is considered. It is believed that such a concept should permit implementation of crop models for large areas.

## A85-38838 ASSESSING BIOPHYSICAL CHARACTERISTICS OF GRASSLAND FROM SPECTRAL MEASUREMENTS

R L WEISER, G ASRAR, G P MILLER, and E T KANEMASU (Kansas State University of Agriculture and Applied Science, Manhattan, KS) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 357-361

A85-38839\* Technicolor Government Services, Inc., Moffett Field,

### REMOTE SENSING OF THE LEAF AREA INDEX OF TEMPERATE CONIFEROUS FORESTS

M A SPANNER, W ACEVEDO (Technicolor Government Services, Inc., Moffett Field, CA), K W TEUBER, S W RUNNING (Montana, University, Missoula, MT), D L. PETERSON, D H CARD (NASA, Ames Research Center, Moffett Field, CA), and D A MOUAT (Stanford University, Palo Alto, CA) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 362-370 NASA-supported research

To estimate the one-sided leaf area index (LAI) of temperate coniferous forests using data acquired from the Daedalus Airborne Thematic Mapper, an empirical model is developed. The study area follows an environmental gradient across west-central Oregon, where leaf development varies in response to temperature and moisture. The relationship between the ratio of thematic-mapper simulator channels four and three and the leaf area index for selected closed canopy or fully stocked forest stands along the gradient is analyzed. Results show that a good relationship exists between the LAI and the IR/red ratio for conifers and that a conifer species-independent asymptotic relationship is observed between LAI and near IR/red reflectance, with near radiometric saturation occurring at an LAI of about 7-8.

#### A85-38840

### MONITORING GLOBAL VEGETATION DYNAMICS USING THE NOAA/AVHRR

D H GREEGOR, JR (Nebraska, University, Lincoln, NE) and J R NORWINE (Texas A & I University, Kingsville, TX) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 371-376 refs

NOAA/AVHRR satellite data have been shown to be useful for regional-scale monitoring of both spatial and temporal dynamics of vegetation, particularly when used in conjunction with climate data. In this investigation, the authors have examined AVHRR Normalized Difference (ND) greenness values along an east-west transect across Texas and evaluated the ND gradient relative to the environmental change in climate and actual vegetation.

Author

### A85-38841

### APPLIED GEOGRAPHIC INFORMATION SYSTEM TECHNIQUES FOR ASSESSING AGRICULTURAL PRODUCTION POTENTIAL IN DEVELOPING COUNTRIES - A HONDURAN CASE STUDY

D L MOKMA, S G WITTER, and G SCHULTINK (Michigan State University, East Lansing, MI) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 383-388 Research supported by the U S Agency for International Development refs

### A85-38842

### MODELLING FOREST BIOMASS ACCESSIBILITY IN SOUTH CAROLINA WITH DIGITAL TERRAIN DATA

L E NIX, W A SHAIN (Clemson University, Clemson, SC), and K O KELTON (Union Camp Corp, Bloomingdale, GA) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984, New York, Institute of Electrical and Electronics Engineers, 1984, p 389-394 Research supported by the US Department of Agriculture refs

### DISCRIMINATION OF TROPICAL FOREST COVER TYPES USING LANDSAT MSS DATA

A SINGH (Reading, University, Reading, England) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 395-404 Research supported by the Forest Department of Manipur refs

N85-22440# Joint Publications Research Service, Arlington, Va REMOTE SENSING USED FOR STUDY OF FOREST RESOURCES

A METALNIKOV, V YEZHKOV, and P MOROZ In its USSR Rept Space (JPRS-USP-85-001) p 67-72 4 Feb 1985 Transl into ENGLISH from Ekonomicheskaya Gaz (USSR), no 34, Aug 1984 p 16

Avail NTIS HC A07

Remote methods of probing the Earth from space have not only improved the operational efficiency and precision of work on forest management, but have also reduced the costs. The effectiveness of using space photography was demonstrated in the recording and inventory of field and soil protective planting. Ongoing changes in forest resources caused by human activity and natural factors are recorded by measurement of length, width, and areas of forests. Damage done by forest fires and changes in the condition of damaged areas over time are monitored, development of burn areas into centers of forest pathology is predicted and prevented, and steps toward economic incorporation of damaged sectors and restoration of the forests are determined.

N85-23190\*# California Univ , Berkeley Remote Sensing Research Programs

CHARACTERIZATION OF LANDSAT-4 TM AND MSS IMAGE QUALITY FOR THE INTERPRETATION OF CALIFORNIA'S AGRICULTURAL RESOURCES

S D DEGLORIA and R N COLWELL In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 91-118 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS (Contract NAS5-27377)

Avail NTIS HC A19/MF A01 CSCL 02C

The quality of LANDSAT-4 MSS and TM data was determined by analyzing TM spectral and spatial performance in terms of spectral variability of natural targets and the TM-ground instantaneous field-of-view (IFOV) variability in level and mountainous terrain, and by assessing the suitability of TM and MSS image products for characterizing renewable resourse features The TM data should be extremelly valuable for crop type and area proportion estimation, undating agricultural land use survey maps at 1 24,000 scale and smaller, field boundary definition, and determining the size and location of individual farmsteads Ongoing research activities are focused on making spectral and spatial analyses of both MSS and TM analytical film products The improved spectral, spatial, and radiometric quality of the TM data, should promote a renewed emphasis and interest in direct visual interpretation of these image products, both for updating and improving land stratification in support of resource inventory and for enhancing the image analyst's contribution to computer-assisted analysis procedures ARH

N85-23193\*# National Aeronautics and Space Administration Earth Resources Labs , Bay St Louis, Miss

AN INITIAL ANALYSIS OF LANDSAT-4 THEMATIC MAPPER DATA FOR THE DISCRIMINATION OF AGRICULTURAL, FORESTED WETLANDS, AND URBAN LAND COVER

D A QUATTROCHI *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 131-152 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS

Avail NTIS HC A19/MF A01 CSCL 08B

The capabilities of TM data for discriminating land covers within three particular cultural and ecological realms was assessed. The agricultural investigation in Poinsett County, Arkansas illustrates that TM data can successfully be used to discriminate a variety of crop cover types within the study area. The single-date TM classification produced results that were significantly better than those developed from multitemporal MSS data. For the Reelfoot Lake area of Tennessee TM data, processed using unsupervised signature development techniques, produced a detailed classification of forested wetlands with excellent accuracy Even in a small city of approximately 15,000 people (Union City, Tennessee) TM data can successfully be used to spectrally distinguish specific urban classes. Furthermore, the principal components analysis evaluation of the data shows that through photointerpretation, it is possible to distinguish individual buildings and roof responses with the TM

## N85-23198\*# Delaware Univ , Newark Coll of Marine Studies REMOTE SENSING OF COASTAL WETLANDS BIOMASS USING THEMATIC MAPPER WAVEBANDS

M A HARDISKY and V KLEMAS *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 151-270 Jan 1985 refs ERTS

(Contract NAS5-27580, NSF DAR-80-17836) Avail NTIS HC A19/MF A01 CSCL 08B

Spectral data, simulating thematic mapper bands 3, 4 and 5 were gathered in salt and brackish marshes using a hand-held radiometer. Simple regression models were developed equating spectral radiance indicies with total live biomass for S alterniflora in a salt marsh and for a variety of plant species in a brackish marsh Models were then tested and compared to harvest estimates of biomass. In the salt marsh, biomass estimates from spectral data were similar to harvest biomass estimates during most of the growing season. Estimates of annual net aerial primary productivity calculated from spectral data were within 21% of production estimated from harvest data. During August, biomass estimates from spectral data in the brackish marsh were similar to biomass estimated by harvesting techniques but not always comparable at other times in the growing season.

N85-23201\*# National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,

THEMATIC MAPPER DATA QUALITY AND PERFORMANCE ASSESSMENT IN RENEWABLE RESOURCES/AGRICULTURE/REMOTE SENSING

R M BIZZELL and H L PRIOR *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 299-312 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS

(Contract PROJ AGRISTARS) Avail NTIS HC A19/MF A01 CSCL 05B

Analysis of the early thematic mapper (TM) data indicate the TM sensor and associated ground processing are performing equal to the high expectations and within advertised specifications. The overall TM system with improved resolution, together with additional and more optimumly placed spectral bands shows much promise for benefits in future analysis activities. By selecting man-made features of known dimensions (e.g., highways, airfields, buildings, and isolated water bodies), an assessment was made of the TM performance relative to the specified 30-meter (98-foot) resolution. The increase of spatial resolution of TM (30 m) over MSS (80 M)

appears to be significant not only in resolving spectrally distinct classes that were previously undefinable but also in distinguishing within-field variability. An Important result of the early TM evaluation and pre-TM analyses was the development of an integrated system to receive LANDSAT-4 TM (as well as MSS) data and analyze the data via various approaches

N85-23206\*# National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,

OF **PRELIMINARY EVALUATION** TM **FOR** SOILS INFORMATION

D. R THOMPSON, K E HENDERSON, A G HOUSTON, and D E PITTS In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 359-368 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sloux Falls, SD 57198 ERTS

Avail NTIS HC A19/MF A01 CSCL 08M

The capability of the LANDSAT TM for providing information for soil association maps and for detecting soil properties (variability within vegetated fields) was assessed using TM imagery of fields in Mississippi County, Arkansas that were planted with rice, cotton, and soybeans. Results indicate that the TM bands are providing information that is related to the soil properties within the field Over large areas, these bands also appear to provide information that is related to the soil properties that are important to plant condition While these results are only an indication of the information that TM can provide, they do indicate the TM data-especially, the mid-TR and thermal bands--show the capability for separating vegetated soil landscapes on a broad basis. The analysis at the field level with a growing crop also indicates that TM, with its additional and narrower bands and improved spatial and radiometric resolution is influenced by within field variability due to soils that has to be accounted for in the analysis of TM ARH data

N85-23213\*# Kansas Univ Center for Research, Inc , Lawrence Remote Sensing Lab

THE MICROWAVE PROPAGATION AND BACKSCATTERING **CHARACTERISTICS OF VEGETATION Final Report** 

F T ULABY, Principal Investigator and E A WILSON Dec 1984 231 p refs ERTS (Contract NAG5-272)

(E85-10088, NASA-CR-175523, NAS 1 26 175523) Avail NTIS .HC-A11/ME\_A01\_\_CSCL\_20N\_

A semi-empirical model for microwave backscatter from vegetation was developed and a complete set of canope attenuation measurements as a function of frequency, incidence angle and polarization was acquired. The semi-empirical model was tested on corn and sorghum data over the 8 to 35 GHz range The model generally provided an excellent fit to the data as measured by the correlation and rms error between observed and predicted data. The model also predicted reasonable values of canopy attenuation. The attenuation data was acquired over the 16 to 102 GHz range for the linear polarizations at approximately 20 deg and 50 deg incidence angles for wheat and soybeans. An attenuation model is proposed which provides reasonable agreement with the measured data **Author** 

Tsukuba Univ (Japan) Environmental Research N85-23233\*# Center

ESTIMATION OF REGIONAL EVAPOTRANSPIRATION USING REMOTELY SENSED LAND SURFACE TEMPERATURE. PART MEASUREMENT OF EVAPOTRANSPIRATION AT THE **ENVIRONMENTAL RESEARCH CENTER AND DETERMINATION** OF PRIESTLEY-TAYLOR PARAMETER

K KOTADA, S NAKAGAWA, K KAI, M M YOSHINO, K TAKEDA (Science and Technology Agency, Tokyo), and K SEKI (Science and Technology Agency, Tokyo) In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 99-114 Feb 1985 refs Avail NTIS HC A09/MF A01 CSCL 08H

In order to study the distribution of evapotranspiration in the humid region using remote sensing technology, the parameter (alpha) in the Priestley-Taylor model was determined The daily means of the parameter alpha = 114 can be available from summer to autumn and alpha = to approximately 20 in winter The results of the satellite and the airborne sensing done on 21st and 22nd January, 1983, are described Using the vegetation distribution in the Tsukuba Academic New Town, as well as the radiation temperature obtained by remote sensing and the radiation data observed at the ground surface, the evapotranspiration was calculated for each vegetation type by the Priestley-Taylor method The daily mean evapotranspiration on 22nd January, 1983, was approximately 0.4 mm/day. The differences in evapotranspiration between the vegetation types were not detectable, because the magnitude of evapotranspiration is very little in winter

N85-23234\*# Tsukuba Univ (Japan) Environmental Research Center

ESTIMATION OF REGIONAL EVAPOTRANSPIRATION USING REMOTELY SENSED LAND SURFACE TEMPERATURE. PART APPLICATION OF EQUILIBRIUM EVAPORATION MODEL TO ESTIMATE EVAPOTRANSPIRATION BY REMOTE SENSING **TECHNIQUE** 

K KOTODA, S NAKAGAWA, K KAI, M M YOSHINO, K TAKEDA (Science and Technology Agency, Tokyo), and K SEKI (Science and Technology Agency, Tokyo) In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p Feb 1985 refs Original contains color illustrations Avail NTIS HC A09/MF A01 CSCL 08H

In a humid region like Japan, it seems that the radiation term in the energy balance equation plays a more important role for evapotranspiration then does the vapor pressure difference between the surface and lower atmospheric boundary layer A Priestley-Taylor type equation (equilibrium evaporation model) is used to estimate evapotranspiration. Net radiation, soil heat flux, and surface temperature data are obtained. Only temperature data obtained by remotely sensed techniques are used

National Aeronautics and Space Administration N85-23235\*# Goddard Space Flight Center, Greenbelt, Md

MICROWAVE REMOTE SENSING OF SOIL MOISTURE

J SCHMUGGE In its Remote Sensing of Snow and Feb 1985 refs Evapotranspiration p 129-148 Avail NTIS HC A09/MF A01 CSCL 08M

Because of the large contrast between the dielectric constant of liquid water and that of dry soil at microwave wavelength, there is a strong dependence of the thermal emission and radar backscatter from the soil on its moisture content. This dependence provides a means for the remote sensing of the moisture content in a surface layer approximately 5 cm thick. The feasibility of these techniques is demonstrated from field, aircraft and spacecraft platforms. The soil texture, surface roughness, and vegetative cover affect the sensitivity of the microwave response to moisture variations with vegetation being the most important. It serves as an attenuating layer which can totally obscure the surface Research indicates that it is possible to obtain five or more levels of moisture discrimination and that a mature corn crop is the limiting vegetation situation Author N85-23238\*# Pennsylvania State Univ, University Park Dept of Meteorology

### A METHOD FOR ESTIMATING SOIL MOISTURE AVAILABILITY Semiannual Report

T N CARLSON 22 Mar 1985 15 p refs (Contract NAG5-184)

(NASA-CR-175606, NAS 1 26 175606) Avail NTIS HC A02/MF A01 CSCL 08M

A method for estimating values of soil moisture based on measurements of infrared surface temperature is discussed A central element in the method is a boundary layer model. Although it has been shown that soil moistures determined by this method using satellite measurements do correspond in a coarse fashion to the antecedent precipitation, the accuracy and exact physical interpretation (with respect to ground water amounts) are not well known This area of ignorance, which currently impedes the practical application of the method to problems in hydrology, meteorology and agriculture, is largely due to the absence of measurements surface Preliminary corresponding measurements made over France have led to the development of a promising vegetation formulation (Taconet et al., 1985), which has been incorporated in the model It is necessary, however, to test the vegetation component, and the entire method, over a wide variety of surface conditions and crop canopies

National Aeronautics and Space Administration N85-23818\*# Langley Research Center, Hampton, Va

### ORBITING MULTI-BEAM MICROWAVE RADIOMETER FOR SOIL MOISTURE REMOTE SENSING

J C SHIUE (NASA Goddard Space Flight Center) and R W LAWRENCE In its Large Space Antenna Systems Technol, 1984 p 73-85 Apr 1985 refs Avail NTIS HC A20/MF A01 CSCL 08H

The effects of soil moisture and other factors on soil surface emissivity are reviewed and design concepts for a multibeam microwave radiometer with a 15 m antenna are described Characteristic antenna gain and radiation patterns are shown and losses due to reflector roughness are estimated

### N85-24506\*# Department of Agriculture, Columbia, Mo SUPPLEMENT TO EVALUATION OF SATELLITE DERIVED **ESTIMATES OF SOLAR RADIATION**

G H SULLIVAN, V FRENCH, S K LEDUC, J L SEBAUGH, and W W WILSON Dec 1984 97 p Sponsored by NASA, USDA, Dept of Commerce, Dept of the Interior, and Agency for International Development Prepared in cooperation with NOAA, Columbia, Mo and Missouri Univ, Columbia ERTS (Contract PROJ AGRISTARS)

(E85-10086, NASA-CR-175521, YM-15-00405, JSC-20241, NAS 1 26 175521) Avail NTIS HC A05/MF A01 CSCL 02C

Graphs and statistical tables are provided for each of the 23 stations which were analyzed in an effort to evaluate satellite derived estimates of solar radiation

### N85-24507\*# Department of Agriculture, Columbia, Mo **EVALUATION OF SATELLITE DERIVED ESTIMATES OF SOLAR RADIATION**

G H SULLIVAN, V FRENCH, S K LEDUC, J L SEBAUGH, and W W WILSON Dec 1984 50 p refs Sponsored by NASA, USDA, Dept of Commerce, Dept of the Interior, and Agency for International Development Prepared in cooperation with NOAA, Columbia, Mo and Missouri Univ, Columbia ERTS (Contract PROJ AGRISTARS)

(E85-10087, NASA-CR-175522, YM-15-00404, JSC-20240, NAS 1 26 175522) Avail NTIS HC A03/MF A01 CSCL 02C

The reliability of satellite derived estimates of daily insolation is analyzed for twenty-three ground truth observations in the United States over the period March through September 1983. A selection of graphic and statistical comparisons is generated for each location Summarized results show the general level of reliability of these estimates Author

National Aeronautics and Space Administration N85-24508\*# Goddard Inst for Space Studies, New York

#### ATLAS OF ARCHIVED VEGETATION, LAND-USE AND SEASONAL ALBEDO DATA SETS

E MATTHEWS 55 p Feb 1985 refs Submitted for publication

(NASA-TM-86199, NAS 1 15 86199) Avail NTIS HC A04/MF A01 CSCL 08B

Global digital data bases of natural vegetation and land use were compiled, for use in climate studies, at 1 deg resolution from over 100 published sources A series of 6 data sets, derived from the original compilations, was prepared and archived on tape at the National Center for Atmospheric Research (NCAR) (Matthews, 1984) The first is a vegetation data set representing natural (pre-agricultural) vegetation based on the UNESCO classification system. The second, derived from the land-use compilation, is a cultivation-intensity data set defining the areal extent of presently-cultivated land in the 1 deg cells. The last four are integrated surface-albedo data sets (January, April, July, October) for snow-free conditions, incorporating natural-vegetation and cultivation characteristics from the vegetation and cultivation-intensity data sets Each of these data sets covers the entire surface of the earth. They include non-zero data for permanent land only, including continental ice, water, including oceans and lakes, is zero. The present report includes maps, presented by continent, of the complete archived data, with the exception of Antarctica

### N85-25359# Joint Publications Research Service, Arlington, Va USE OF SPACE PHOTOGRAPHIC INFORMATION TO MAP **PLANT COVER Abstract Only**

T V VERESHCHAKA, B V KRASNOPEVTSEVA, and V V USOVA In its USSR Rept Space (JPRS-USP-85-003) p 121 Transl into ENGLISH from Izv Vysshikh Uch 4 Mar 1985 Geod i Aerofotosyemka (USSR), no 4, Jul -Aug 1984 Zaved p 99-106 Original language document announced as A85-11815 Avail NTIS HC A08/MF A01

The paper examines the compilation of vegetation maps on the basis of Salyut-5 remote sensing data. Also considered are methodological questions pertaining to the interpretation of images of vegetation cover in the compilation of topographic survey maps Tables are presented, describing vegetation cover location and dynamics in various altitude zones (150 m to more than 2200 m) and the relationship with relief BJ (IAA)

### N85-26825# Joint Publications Research Service, Arlington, Va MULTIPLE REGRESSION ANALYSIS OF PHOTOGRAPHIC **IMAGE OF SOIL PROPERTIES Abstract Only**

B V VINOGRADOV, C RIEDEL, and A N KAPTSOV USSR Rept Space (JPRS-USP-85-004) p 84 6 Ma 6 May 1985 Transl into ENGLISH from Dokl Akad Nauk SSSR (Moscow), v 278, no 5, Oct 1984 p 1274-1277

Avail NTIS HC A06

Surface and remote studies of the spectral properties of soils and characteristics of the photographic image on multizonal photographs were carried out in an aerospace test range in the GDR central plain. An aerial survey was made with an MKF-6 camera, surface photographs of standard soil samples were taken in the same spectral intervals. The experiments were carried out under natural conditions with diffuse illumination. Only air-dried soil samples were used. The optical density of the image of each soil and an optical wedge were measured on the negatives. A target measuring 1 x 1 cm with 10,000 measured values was selected on the image of each soil and the mean optical density of the negative was then computed. All measurements were scaled to the optical density of the positive image. The correlation between the optical density of the positive photographic image D sub pos and the soil properties (humus content, iron oxides and carbonates) in the upper genetic soil horizon was measured. The multiple regression equation and its derivatives are useful in interpreting aerospace images of soils ВW

N85-26826# Joint Publications Research Service, Arlington, Va IDENTIFICATION OF STRUCTURE OF SOIL-VEGETATION COVER USING AERIAL AND SPACE PHOTOGRAPHS Abstract Only

S M GOROZHANKINA and V D KONSTANTINOV *In its* USSR Rept · Space (JPRS-USP-85-004) p 84-85 6 May 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (Moscow), no 6, Nov - Dec 1984 p 42-52 Original language document was announced in IAA as A85-25656 Avail. NTIS HC A06

The paper describes a method for the identification and mapping of the tructure of the vegetation and soil cover of taiga landscapes on the basis of aerial and space photographs in the scale range from 1 10,000,000 to 1 15,000 Meteor-satellite photographs of western Siberia are used. The main features of meta-, and macro-, meso-, and micro-structures are characterized.

B J (IAA)

N85-27320\*# Kansas Univ Center for Research, Inc , Lawrence Remote Sensing Lab

MODELING THE BACKSCATTERING AND TRANSMISSION PROPERTIES OF VEGETATION CANOPIES Final Report

C T ALLEN (Sandia National Lab., Albuquerque, N Mex) and F T ULABY (Michigan Univ, Ann Arbor) Feb 1984 357 p refs FRTS

(Contract NAS9-15421)

(E85-10099, NASA-CR-171864, NAS 1 26 171864, RSL-TR-360F) Avail NTIS HC A16/MF A01 CSCL 02F

Experimental measurements of canopy attenuation at 10 2 GHz (X-band) for canopies of wheat and soybeans, experimental observations of the effect upon the microwave backscattering coefficient (sigma) of free water in a vegetation canopy, and experimental measurements of sigma (10 2 GHz, 50 deg, VV and VH polarization) of 30 agricultural fields over the growing season of each crop are discussed. The measurements of the canopy attenuation through wheat independently determined the attenuation resulting from the wheat heads and that from the stalks An experiment conducted to simulate the effects of rain or dew on sigma showed that sigma increases by about 3 dB as a result of spraying a vegetation canopy with water. The temporal observations of sigma for the 30 agricultural fields (10 each of wheat, corn, and soybeans) indicated fields of the same crop type exhibits similar temporal patterns. Models previously reported were tested using these multitemporal sigma data, and a new model for each crop type was developed and tested. The new models proved to be superior to the previous ones

N85-27322\*# Kansas Univ Center for Research, Inc , Lawrence Remote Sensing Lab

MICROWAVE MODEL PREDICTION AND VERIFICATIONS FOR VEGETATED TERRAIN

A K FUNG Jan 1985 63 p refs ERTS

(Contract NAS9-15421)

(E85-10102, NASA-CR-171863, NAS 1 26 171863) Avail NTIS HC A04/MF A01 CSCL 02F

To understand the scattering properties of a deciduous and a coniferous type vegetation scattering models were developed assuming either a disc type leaf or a needle type leaf. The major effort is to calculate the corresponding scattering phase functions and then each of the functions is used in a radiative transfer formulation\_to\_compute\_the\_scattering\_intensity\_and\_consequently\_ the scattering coefficient. The radiative transfer formulation takes into account the irregular ground surface by including the rough soil surface in the boundary condition. Thus, the scattering model accounts for volume scattering inside the vegetation layer, the surface scattering from the ground and the interaction between scattering from the soil surface and the vegetation volume. The contribution to backscattering by each of the three scattering mechanisms is illustrated along with the effects of each layer or surface parameter. The major difference between the two types of vegetation is that when the incident wavelength is comparable to the size of the leaf there is a peak appearing in the mid angular region of the backscattering curve for the disc type leaf whereas it is a dip in the same region for a needle type leaf MG

N85-27324\*# Washington Univ , St Louis, Mo Dept. of Earth and Planetary Sciences.

SHUTTLE IMAGING RADAR-A (SIR-A) DATA ANALYSIS Final Report

R E. ARVIDSON 30 Dec 1983 25 p refs Prepared for JPL (Contract NAS7-100, JPL-956427)

(NASA-CR-175785, NAS 1 26 175785) Avail NTIS HC A02/MF A01 CSCL 17I

The utility of shuttle imaging radar (SIR-A) data was evaluated in several geological and environmental contexts. For the Ozark Plateau of southern Missoun, SIR-A data were of little use in mapping structural features, because of generally uniform returns For western Illinois, little was to be gained in terms of identifying land use categories by examining differences between overlapping passes For southern Australia (Koonamore Station), information ion vegetation types that was not obtainable from LANDSAT MSS data alone was obtained Specifically, high SIR-A returns in the Australian site were found to correlate with locations where shrubs increase surface roughness appreciably. The Australian study site results demonstrate the synergy of acquiring spectral reflectance and radar data over the same location and time Such data are especially important in that region, since grazing animals have substantially altered and are continuing to alter the distribution of shrublands, grasslands, and soil exposures Periodic, synoptic acquisition of MSS and SAR data would be of use in monitoring the dynamics of land-cover change in this environment

N85-27545# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil)

COMPARATIVE STUDY OF THE DIGITAL ANALYSIS OF AREAS OF THE EARTH'S SURFACE PREPARED FOR PLANTING USING DIFFERENT CLASSIFICATION ALGORITHMS [ESTUDO COMPARATIVO DA ANALISE DIGITAL DE AREAS DE SOLO PREPARADO PARA PLANTIO UTILIZANDO DIFERENTES ALGORITMOS DE CLASSIFICACAO]

M A MOREIRA, G V DEASSUNCAO, A R FORMAGGIO, and T K DEMORAIS Nov 1984 13 p refs In PORTUGUESE, ENGLISH summary Presented at the 4th Reuniao Anual da SELPER, Santiago, Chile, 12-17 Nov 1984 Submitted for publication

(INPE-3359-PRE/637) Avail NTIS HC A02/MF A01

The single-cell, Maxver, and K-median classifications in soil areas prepared for planting were studied and the use of the UNITOT method with the results of automatic classification was verified. The methodology consisted of a statistical study of classification analysis applied to alphanumeric maps. The classifications studies all are part of the Interactive Multispectral Image Analysis System (Image-100).

N85-28436# Michigan State Univ , East Lansing AIRPHOTO INTERPRETATION OF VEGETATION AND LANDFORMS FOR SOIL MAPPING

9 Nov 1984 127 p refs Presented at the Soil Sci Workshop, Higgins Lake, Mich, 5-9 Nov 1984

Avail NTIS HC A07/MF A01

Various aspects of the interpretation of aerial photographs of vegetation and landform for soil mapping are discussed Photographic sensors, stereo-viewing, photometric size determination color infrared photography and color infrared films are among the topics covered RJF

### ENVIRONMENTAL CHANGES AND CULTURAL RESOURCES

Includes land use analysis, urban and metroplitan studies, environmental impact, air and water pollution, geographic information systems, and geographic analysis

### A85-30737

### LAND-USE SURVEY OF IDUKKI DISTRICT

B SAHAI, J S PARIHAR, S R NAYAK, T P SINGH, M V MULEY, C B TIWARI, V TAMILARASAN, D M SHENDE (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), T V SAMUEL, C V THOMAS (Kerala State Land-Use Board, Trivandrum, India) et al International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 507-515

The preparation of a detailed land-use plan for the Idukki District in India is discussed. The project which uses color-infrared and black-and-white aerial photography has the following objectives (1) the identification and mapping of areas under various land uses, (2) the study of geomorphological features and identification of potential ground-water areas, and (3) the identification of areas requiring soil conservation and reclamation measures. The land-use categories which are mapped and subclassified are agriculture, forest, wasteland, bodies of water, and public use The major findings of the study indicate a reduction in the area under the forest and the existence of a large area under wasteland Geomorphological maps are prepared and show slope, relief, drainage, and vegetation, and when used with structural maps, potential groundwater areas are identified. A classification accuracy of 86 percent for land-use maps and a slope estimation accuracy of 72 percent are obtained. The locational/positional accuracy of the land features is found to be 50-150 m on the ground It is shown that the visual interpretation of Landsat images results in the identification of nine land-cover classes, while digital analysis enables the identification of twelve land-cover classes

### A85-30738

LAND-USE AND LAND-COVER MAPPING AND CHANGE DETECTION IN TRIPURA USING SATELLITE LANDSAT DATA N C GAUTAM and G CH CHENNAIAH (National Remote Sensing Agency, Hyderabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 517-528 refs

### A85-30739

### URBAN CHANGE DETECTION AND LAND-USE MAPPING OF DELHI

D M GUPTA and M K MUNSHI (Survey of India, New Delhi, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 529-534 refs

Today urban change detection is considered vital for monitoring the growth of an urban complex. Such a change-detection system must essentially make use of the data available from conventional sources as well as that derived through remote sensing. In this study, which was conducted as an end-to-end experiment under the national natural resources management system program in India, an attempt was made to utilize this concept in monitoring the changes in Delhi, the capital city of India, during the period 1959-1980. The analysis was undertaken mainly on the basis of the data available in guide maps. The utility of aerial photography and Landsat imageries for such studies was evaluated. A simple digital urban information system was also developed.

#### A85-31882

## REMOTE SENSING OF THE ATMOSPHERIC AEROSOL FROM SPACE [KOSMICHESKOE DISTANTSIONNOE ZONDIROVANIE ATMOSFERNOGO AEROZOLIA]

K IA KONDRATEV, A A GRIGOREV, O M POKROVSKII, and E V SHALINA Leningrad, Gidrometeoizdat, 1983, 216 p in Russian refs

Experimental and theoretical results are reviewed concerning the application of remote sensing technology to the study of the atmospheric aerosol. Attention is given to the deduction of atmospheric pollution conditions on the basis of remote sensing imagery from space, and the classification of smoke-laden and dust-laden atmospheres. Numerical techniques for estimating atmospheric aerosol content are described, including empirical correlations and inverse solutions to atmospheric optics problems Difficulties in evaluating the information content of remote sensing data for the aerosol and minor gas components of the atmosphere are also discussed.

#### A85-32110

### REMOTELY PILOTED AIRCRAFT FOR SMALL FORMAT AERIAL PHOTOGRAPHY

G F TOMLINS and M J MANORE (B C Research, Vancouver, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 127-136 Research supported by the Ministry of Universities, Science and Communications of British Columbia refs

The use of Remotely Piloted Aircraft (RPA) to acquire small-format aerial photography is discussed. Project AERIE (Airborne Equipment for Remote Imaging of the Environment), a research and development program which examines the feasibility, advantages, and limitations of using RPA systems in civil remote-sensing applications is described. A 2.7-m span fixed-wing model aircraft which carries a remotely operated 35-mm camera system is used as a platform for small-format aerial photography The RPA is used in a variety of applications including forestry, pollution detection, wildlife-habitat monitoring, real estate and publicity, and shoreline mapping The results obtained during demonstration studies undertaken in 1982 are reported Some advantages of RPA include low-noise levels, and low-speed and low-altitude capabilities. The development of a new airframe and command system which provides a solution to the most severe operational limitations is considered M D

### A85-32127

### MAPPING OF LAND/SOIL DEGRADATION USING MULTISPECTRAL DATA

L VENKATARATNAM (National Remote Sensing Agency, Hyderabad, India) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 421-429 refs

Applications of Landsat MSS data for mapping land/soil undergoing various forms of erosion in India are described. The main erosive processes are salinity/alkalinity, shifting cultivation, ravine growth, surface flooding, waterlogging and high water tables. It has been proven that salt enhancements increase the surface reflectance. Monsoon-waterlogged lands exhibit a characteristic reflectance when dry. Sand dunes are readily visible with MSS sensors, which also delineate flooded guillies and red soils (hard to penetrate). The MSS data have already identified seaside areas which have been successfully reclaimed.

## MONITORING EARTH RESOURCE AND ENVIRONMENTAL CHANGE - SOME LIMITATIONS AND POTENTIALS OF SATELLITE DATA

M A CLOUGH (Systems Engineering Associates, Ltd., Baden, Ontario, Canada), K S LANGLEY, A K MCQUILLAN, and E SHAW (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 591-605.

The necessary enhancements in the instrumental capabilities and number of remote sensing satellites to meet the needs for more thorough monitoring of resources and environmental changes are discussed Attention is focused on the potential benefits offered by the visual and near-IR (VIR) bands, which have high spectral and spatial resolution. The data would serve for monitoring sea ice movement, forest growth and depletion, crop and soil conditions and hydrological phenomena. Cloud cover statistics based on data taken during the presence of two Landsat spacecraft on orbit revealed the enhancements of image accuracy available with more than one functional satellite. A major bottleneck which must be overcome in any case is ensuring that the remotely sensed images are distributed in a timely manner and matched with information needs and accuracy The shear volume of data would need to be filtered to extract and limit the formation conveyed, yet keep the images in the same format from scene to scene for particular

A85-33557\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### AN EVALUATION OF SIMULATED THEMATIC MAPPER DATA AND LANDSAT MSS DATA FOR DISCRIMINATING SUBURBAN AND REGIONAL LAND USE AND LAND COVER

D L TOLL (NASA, Goddard Space Flight Center, Greenbelt, MD) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 50, Dec 1984, p 1713-1724 refs

An airborne multispectral scanner, operating in the same spectral channels as the Landsat Thematic Mapper (TM), was used in a region east of Denver, CO, for a simulation test performed in the framework of using TM to discriminate the level I and level II classes It is noted that at the 30-m spatial resolution of the Thematic Mapper Simulator (TMS) the overall discrimination for such classes as commercial/industrial land, rangeland, irrigated sod, irrigated alfalfa, and irrigated pasture was superior to that of the Landsat Multispectral Scanner, primarily due to four added spectral bands For residential and other spectrally heterogeneous classes, however, the higher resolution of TMS resulted in increased variability within the class and a larger spectral overlap

### A85-34534

### GEOGRAPHY IN THE SPACE AGE

R SMITH (Rochester, University, Rochester, NY) Space Education (ISSN 0261-1813), vol. 1, May 1985, p. 401-403.

Landsat imagery provides a worldwide terrestrial landform data base which can support geographers in assessing current effects of human activities and in making predictions of further changes Drainage systems are recorded on a synoptic scale by Landsat Fluvial landforms, soil erosion and agricultural patterns can be identified, as can flooding and human response to natural hazards Sample images are presented of the east slope of the Himalayas, the Rhone valley and the Mississippi delta, and examples are given of drainage basin, drainage basin hydrology, and hydrography plots which can be derived from the imagery

M S K

#### A85-36282

### MONITORING ENVIRONMENTAL RESOURCES THROUGH NOAA'S POLAR ORBITING SATELLITES

J C HOCK (NOAA, National Environmental Satellite Service, Washington, DC) ITC Journal (ISSN 0303-2434), no 4, 1984, p 263-268

NOAA's Assessment and Information Services Center (AISC) integrates data from NOAA's polar orbiting and geo-stationary satellites, geographic information, agronomic models and economic models to monitor land and marine resources assessments on food security for developing countries in the tropics include weekly rainfall/weather analyses and climatic impact assessment models for more than 400 agroclimatic regions. The results of these assessments are used in an 'early warning system' of impending crop failures. Agriculture monitoring programmes in Africa provided advanced warning of the crop failures which are now effecting the Sahel and east African countries and parts of southern Africa Experimental marine monitoring is being carried out in the United States and a special programme is being developed to aid the tuna fishing industry in the Philippines, The AVHRR data are also useful for monitoring deforestation and desert encroachment Author

#### A85-36990

### REMOTE SENSING IN CIVIL ENGINEERING

T J M KENNIE, ED and M C MATTHEWS, ED (Surrey, University, Guildford, England) Glasgow/New York, Surrey University Press/Halsted Press, 1985, 371 p No individual items are abstracted in this volume

A text containing all the necessary information for the location and interpretation of remote sensing images is presented. The general topics addressed include remote sensing photographic systems, remote sensing scanning systems, digital processing of remote sensing data, remote sensing in civil engineering practice, remote sensing and topographic mapping, and interpretation of Landsat images for regional planning studies. Also considered are interpretation of aerial photographs for site investigations, remote sensing for highway engineering projects in developing countries, environmental engineering applications of thermal infrared imagery, and remote sensing and water resource engineering.

### A85-37955

### LANDSAT DATA FOR POPULATION ESTIMATES -APPROACHES TO INTER-CENSAL COUNTS IN THE RURAL SUDAN

M STERN (Lunds Universitet, Lund, Sweden) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 69-73 refs

### A85-38274\* California Univ , Santa Barbara PILOT LAND DATA SYSTEM

J E ESTES, J L STAR (California, University, Santa Barbara, CA), P J CRESSY (NASA, Goddard Space Flight Center, Greenbelt, MD), and M DEVIRIAN (NASA, Washington, DC) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 51, June 1985, p 703-709 NASA-sponsored research refs

The full realization of the potential of satellite remote sensing would require the utilization of information systems which are currently not available. However, technological advances make it now possible to design a data system for meeting the land scientists' most critical information needs. A working group has been assembled to examine the need for a Pilot Data System (PLDS). The pilot program is to establish a limited-scale, distributed information system to explore approaches to satisfy the needs of the land science research community. Aspects and objectives considered by the working group are discussed, taking into account science scenanos, required functions, the characteristics of a land data system, and questions of pilot land data system development.

GEOGRAPHIC REGIONALIZATION AND THE PROBLEMS RELATED TO SPACE-BASED MONITORING [GEOGRAFICHESKOE RAIONIROVANIE ZADACHI KOSMICHESKOGO MONITORINGA]

VOROBEVA, and NEVIAZHSKII, T A ROZHDESTVENSKAIA IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space. Leningrad, Gidrometeoizdat, 1984, p. 19-22. In Russian refs

Agricultural regionalization of the Soviet Union is performed in the contex of territerial and functional organization of the central system of space data retrieval and processing. This is done by conducting a structural-textural analysis of maps and remote sensing data Intermediate thematic maps have been compiled, on their basis a final region map on a scale of 18,000,000 is established Finally, consideration is given to the main objectives of monitoring from space and the problems associated with particular agricultural regions

#### A85-38706

THE USE OF METEOR SATELLITE IMAGES FOR GEOGRAPHIC REGIONALIZATION OF THE SOVIET UNION (ISPOL'ZOVANIE SNIMKOV S ISZ SISTEMY 'METEOR' DLIA GEOGRAFICHESKOGO RAIONIROVANIIA TERRITORII SSSR1 N A EVLANOVA, E B LEVINA, and G V MURASHKINTSEVA IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 22-28 In Russian refs

Black-and-white images retrieved from the Meteor satellite, with resolution near 0 8-1 1 micron, are used for agrigultural regionalization of the Soviet Union with the objective of monitoring agricultural species from space. Regional maps with scales of 1 1,500,000 to 1 10,000,000 are used. The role of natural and anthropogenic factors forming the structural-textural features of emphasized, these factors IS geological-geomorphological structure, anthropogenic effects, and vegetation features. It is pointed out that structural-textural characteristics of low-resolution and medium-resolution images differ insignificantly, often rendering low-resolution imagery more practical than high-resolution imagery

A85-38811\* Maryland Univ, College Park
USE OF THE TM TASSELED CAP TRANSFORM FOR
INTERPRETATION OF SPECTRAL CONTRASTS IN AN URBAN

S N GOWARD (Maryland, University, College Park, MD) and S W WHARTON (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 Institute of Electrical and Electronics Engineers, 1984, p 84-91 refs

(Contract NCC5-26)

Investigations are being conducted with the objective to develop automated numerical image analysis procedures. In this context, an examination is performed of physically-based multispectral data transforms as a means to incorporate a priori knowledge of land radiance properties in the analysis process A physically-based transform of TM observations was developed. This transform extends the Landsat MSS Tasseled Cap transform reported by Kauth and Thomas (1976) to TM data observations. The present study has the aim to examine the utility of the TM Tasseled Cap transform as applied to TM data from an urban landscape. The analysis conducted is based on 512 x 512 subset of the Washington, DC November 2, 1982 TM scene, centered on Springfield, VA It appears that the TM tasseled cap transformation provides a good means to explain land physical attributes of the Washington scene This result provides a suggestion regarding a direction by which a priori knowledge of landscape spectral patterns may be incorporated into numerical image analysis

A85-38816\* New Orleans Univ, La ANALYSIS METHODS FOR THEMATIC MAPPER DATA OF **URBAN REGIONS** 

S C WANG (New Orleans, University, New Orleans, LA) Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 134-143 Research supported by the University of New Orleans and NASA refs

Studies have indicated the difficulty in deriving a detailed land-use/land-cover classification for heterogeneous metropolitan areas with Landsat MSS and TM data. The major methodological issues of digital analysis which possibly have effected the results of classification are examined. In response to these methodological issues, a multichannel hierarchical clustering algorithm has been developed and tested for a more complete analysis of the data for urban areas

#### A85-38822

ISSUES IN DESIGNING GEOGRAPHIC INFORMATION SYSTEMS UNDER CONDITIONS OF INEXACTNESS

V B ROBINSON and A H STRAHLER (Hunter College, New IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN. June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 198-204 refs

A discussion of locational approximation and attribute approximation as sources of inexactness in geographic information systems (GIS) is presented. By introducing a logic of inexactness that can serve as the basis of representing and manipulating spatial data that is intrinsically fuzzy, an attempt at formulating a consistent model for handling inexactness in GIS is made. Definitions and examples of four distinct cases where there is a nonfuzzy schema/nonfuzzy data, nonfuzzy schema/fuzzy data, fuzzy schema/nonfuzzy data, and fuzzy schema/fuzzy data are given, and three approaches to managing fuzzy data within a nonfuzzy schema are considered M D

A85-38823\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

**REGION-BASED** MODELING **ALGORITHMS** FOR REMOTELY-SENSED DATA

M GOLDBERG, M L IMHOFF (NASA, Goddard Space Flight Center, Greenbelt, MD), and E DADDIO (Science Applications Research, Riverdale, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems. Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 205-208

Five algorithms being developed for performing region-based modeling operations on classified remotely-sensed images are described The first algorithm converts images from standard grid structure into topological grid structure, while the remaining algorithms act upon topologically grid-structured images to perform region-based relabelling, overlaying, distance searching, and neighborhood scanning operations. The use of precomputed topological information, through the use of topological grid structure, makes region-based algorithms highly accessible to earth scientists M D

A85-38825\* Indiana State Univ, Terre Haute
EVALUATION OF ATMOSPHERIC PARTICULATE
CONCENTRATIONS DERIVED FROM ANALYSIS OF RATIO
THEMATIC MAPPER DATA

W H CARNAHAN, P. W MAUSEL, and G P ZHOU (Indiana State University, Terre Haute, IN) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p 235-243.

(Contract NAS5-26859)

An approach for atmosphenc particulate concentration evaluation above urban areas using ratio Thematic Mapper (TM) data is discussed October 25, 1982 TM data over Chicago, IL are analyzed using TM band ratios of 1/2, 1/3, 1/4, 1/5, and 1/6 and particulate concentration estimates derived from TM ratios are tested over low reflective turbid water sites and highly reflective concrete highways From analysis of the data it is evident that for water, the pattern of increasing particulate concentration is associated with decreasing ratio values in all band combinations used Over concrete features, the TM band 1/4 ratio values follow the predicted pattern, while the TM band 1/6 has ratios which are reversed from anticipated values

A85-39537

AN OBJECTIVE TECHNIQUE FOR THE DELINEATION AND EXTRAPOLATION OF THUNDERSTORMS FROM GOES SATELLITE DATA

E CHERNA, A BELLON, G L AUSTIN, and A KILAMBI (McGill Radar Weather Observatory, Sainte-Anne-de-Bellevue, Quebec, Canada) (National Science Foundation, International Conference on Atmospheric Electricity, 7th, Albarry, NY, June 4-8, 1984) Journal of Geophysical Research (ISSN 0148-0227), vol 90, June 30, 1985, p 6203-6210 Research supported by the Natural Sciences and Engineering Research Council of Canada, Atmospheric Environment Service of Canada, and US Air Force refs

An empirical relationship between radar reflectivity levels exceeding 32 and 40 dBZ at a height of 6 km and sferics data is used to generate maps that indicate regions of thunderstorms. These radar maps serve as ground truth when compared with colocated GOES visible and infrared imagery. A threshold computed to equalize the radar and satellite thunderstorm areas delineates the region in visible-IR space that is most probably associated with electrical activity. The locations of satellite-delineated storms beyond radar range, on the synoptic scale, show good agreement with sources of lightning determined from sferics detectors. The skill of the extrapolation of these areas for short-range forecasting is discussed.

N85-24392# National Environmental Satellite Service, Washington, D C

**ENVIRONMENTAL SATELLITES** 

R KOFFLER In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 11 p 1982

Avail NTIS HC A10/MF A01

The history, status, and future of NASA environmental satellite programs are discussed. The GOES, NOAA, and TIROS-N satellite contributions to meteorology and environmental monitoring are outlined.

Author (ESA)

N85-27321\*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

STUDY OF THE URBAN EVOLUTION OF BRASILIA WITH THE USE OF LANDSAT DATA [ESTUDO DA EVOLUÇÃO URBANA DE BRASILIA ATRAVES DO USO DE DADOS LANDSAT]

M. D L. N DEOLIVEIRA, Principal Investigator, C FORESTI, M NIERO, and E M D M F PARREIRAS Oct 1984 32 p refs In PORTUGUESE, ENGLISH summary Presented at the 15th Congr Intern de Fotogrametria e Sensonamento Remoto, Rio de Janeiro, Jun 1984 and at the 1st Congr Brasil de Defesa do Meio Ambiente, Rio de Janeiro, Jul 1984 Sponsored by NASA Original contains color imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 FRTS

(E85-10101, NASA-CR-175830, NAS 1 26 175830, INPE-3322-RPE/468) Avail NTIS HC A03/MF A01 CSCL 05R

The urban growth of Brasilia within the last ten years is analyzed with special emphasis on the utilization of remote sensing orbital data and automatic image processing. The urban spatial structure and the monitoring of its temporal changes were focused in a whole and dynamic way by the utilization of MSS-LANDSAT images for June 1973, 1978 and 1983. In order to aid data interpretation, a registration algorithm implemented at the Interactive Multispectral Image Analysis System (IMAGE-100) was utilized aiming at the overlap of multitemporal images. The utilization of suitable digital filters, combined with the images overlap, allowed a rapid identification of areas of possible urban growth and onented the field work. The results obtained permitted an evaluation of the urban growth of Brasilia, taking as reference the proposed stated for the construction of the city.

N85-27770# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

EXPERIENCE OF THE INSTITUTE OF SPACE RESEARCH WITH THE USE OF REMOTE SENSING IN URBAN PLANNING STUDIES [A EXPERIENCIA DO INPE NO USO DE SENSORIAMENTO REMOTO PARA ESTUDOS DE PLANEJAMENTO URBANO]

Jun 1984 18 p refs In PORTUGESE Presented at the 4th Congr Brasil de Geografos, Sao Paulo, Brazil, 14-23 Jul 1984 and at the 4th Ann Reunion of the Soc de Especialistas Latinoamericanos en Perception Remota, Santiago de Chile, 12-16 Nov 1984

(INPE-3159-PRE/533) Avail NTIS HC A02/MF A01

The expenence of researchers at Brazil's Institute of Space Research with the development and application of methods related to the use of remote sensing data is described. Since 1973 this expenence has involved the use of photographic products at low altitudes as well as the acquisition of orbital data. Studies are described which employ remote sensing data to monitor urban land use, urban growth, quality of life, and socioeconomic characteristics. The application of remote sensing data for the purpose of implementing urban mathematical models is discussed.

### 03

### **GEODESY AND CARTOGRAPHY**

Includes mapping and topography

#### A85-33448

### THE WORLD'S TOPOGRAPHIC AND CADASTRAL MAPPING **OPERATION**

A J BRANDENBERGER and S K GHOSH (UniversiteLaval, Quebec, Canada) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1122), vol 51, April 1985, p 437-444 Research sponsored by the United Nations and Natural Sciences and Engineering Research Council of Canada refs

The Cartographic Section of the United Nations conducts surveys on the status of the world topographic mapping at regular six-year intervals. The first survey was conducted in 1968, while a recount survey was undertaken in 1974. A third survey, performed in 1980, included cadastral mapping for the first time. The present paper has the objective to present and discuss the most important results of the 1980 survey As in previous UN surveys the available map coverage information was classified according to four scale ranges, including category 1 25,000 and larger, category 1 50,000, category 1 100,000, and category 1 250,000 Attention is given to an analysis of the status (progress) of world topographic mapping, topographic map revision, aerial photographic coverage, geodetic bases and ground control for base mapping, equipment used in the world's cartographic agencies, and aspects of world cadastral surveying and mapping

### A85-37302

THE DEVELOPMENT AND CURRENT STATE OF EARTH EXPANSION AND FLUCTUATION PROBLEMS [RAZVITIE I SOVREMENNOE SOSTOIANIE PROBLEM RASSHIRENIIA I PUL'SATSII ZEMLI]

E E MILANOVSKII IN Earth expansion and fluctuation problems Moscow, Izdatel'stvo Nauka, 1984, p 8-24 In Russian refs

The development of theories concerning the expansion of the earth and fluctuations in earth dimensions is reviewed. Data from the fields of geology, geophysics, and comparative planetology are presented in order to explain the major phenomena associated with planetary expansion including sea-floor spreading and variations in subduction rates. The data are used to develop a history of earth expansion covering the period 3.5 billion years ago to the present Maps illustrating the structural changes in the lithosphere over the last 3.5 billion years are provided

### A85-37310

**RESULTS OF A STUDY OF NONTIDAL GRAVITY VARIATIONS** [NEKOTORYE REZUL'TATY IZUCHENIIA NEPRILIVNYKH IZMENENII SILY TIAZHESTI

IU D BULANZHE IN Earth expansion and fluctuation problems Moscow, Izdateľ stvo Nauka, 1984, p 73-84 in Russian

Measurements of nontidal gravity variations in Eastern Europe in the period 1935-1984 are reported. It was found that the strength of the gravitational field in Siberia varied by as much as 50 mkGal in the period 1965-1977 At points in Moscow, Potsdam, and Novosibirsk, similar periodic variations were measured. The amplitude of the above variations was about 20 mkGal, and the period was about 7 years. The occurrence of variations was closely correlated with volcanic activity, and with tectonic phenomena which lead to upwelling of matter toward the earth surface A map of the gravity variations in Eastern Europe is provided

#### N85-23215\*# MacQuarie Univ, North Ryde (Australia) MAGSAT ANOMALY FIELD DATA OF THE CRUSTAL PROPERTIES OF AUSTRALIA

88 p refs Original contains color imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, SD 57198 ERTS

(E85-10100, NASA-CR-175615, NAS 1 26 175615) Avail NTIS HC A05/MF A01 CSCL 05B

Progress is reported in producing maps of Australia showing, crustal magnetic anomalies at constant elevation, bulk surface magnetization, and the geomagnetic field intensity, inclination and declination for the Australian region from global models of the geomagnetic field derived from MAGSAT data. The development of a data base management system is also considered

N85-23216\*# MacQuarie Univ, North Ryde (Australia) Centre for Geophysical Exploration Research

AN INVESTIGATION OF THE CRUSTAL PROPERTIES OF AUSTRALIA AND SURROUNDING REGIONS DERIVED FROM INTERPRETATION OF MAGSAT ANOMALY FIELD DATA Final Report

B D JOHNSON, C N G DAMPNEY, and B J J EMBLETON (CSIRO, North Ryde, Australia) In its MAGSAT Anomaly Field Data of the Crustal Propeties of Australia 40 p Original contains color imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 FRTS

Avail NTIS HC A05/MF A01 CSCL 08G

The 2 deg averaged data set was analyzed and filtered to produce a magnetic anomaly map of the Australian continental region. The map was overlain on a tectonic map of Australia and correlations were made. A data set was selected that is dominated by relatively low elevation profiles with small changes of elevation within the Australian area in an effort to maximize the crustal anomaly field signal and reduce the effect of variation in satellite elevation Support systems, both hardware and software are described and best-worst case errors encountered during processing of MAGSAT investigator tapes are summarized. The Broken Ridge anomaly was studied for model development purposes ARH

N85-23219\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

REMANENT MAGNETIZATION MODEL FOR THE BROKEN RIDGE SATELLITE MAGNETIC ANOMALY

B D JOHNSON (Macquarie Univ, North Ryde, Australia) Macquarie Univ MAGSAT Anomaly Field Data of the Crustal Properties of Australia 22 p 1983 refs ERTS Avail NTIS HC A05/MF A01 CSCL 08G

A crustal model for the interpretation of the Broken Ridge satellite magnetic anomaly was constructed from bathymetric data assuming an Airy-type isostatic compensation. An average crustal magnetization of 6 A m is required to account for the observed anomaly amplitudes provided that the whole crust is homogeneously magnetized in contrast, a model representing only the topographic expression of the Broken Ridge, above the surrounding sea floor, requires a magnetization of the order of 40 A m-1 Since this latter figure is much higher than is to be expected from studies of magnetic properties of oceanic rocks, it is concluded that the majority of the crustal volume of Broken Ridge is magnetized relatively uniformly. The direction of the source magnetization is consistent with an inclination shallower than the present geomagnetic field and close to that of an axial dipole Since a more northerly source location for Broken Ridge is contrary to the paleolatitude data it is though that the magnetization represents a magnetization obtained by averaging the geomagnetic field direction over a sufficient time to remove secular variation effects. This pattern is indicative of viscous magnetization

ARH

N85-25355# Joint Publications Research Service, Arlington, Va. PRELIMINARY PROCESSING OF LASER RANGING DATA FROM LAGEOS ARTIFICIAL EARTH SATELLITE DURING SHORT MERIT PROGRAM OBSERVATION PERIOD Abstract Only

V V NESTEROV *In its* USSR Rept Space (JPRS-USP-85-003) p 119 4 Mar 1985 Transl into ENGLISH from Pisma v Astronomicheskiy Zh (USSR), v 10, no 5, May 1984 p 397-400 Avail NTIS HC A08/MF A01

The results of LAGEOS ranging during the period August-September 1980 consists of pairs of numbers topocentric distances and observation times. The problems involved in the processing of these data are complex. The possible approaches which could be employed in preliminary processing are discussed and the procedures adopted are outlined. All data were recorded into a form adopted for computer processing, standardization and resorting. The normal points method was selected to improve accuracy, supplemented by the smoothing method. It is decided to use a smoothing interval of about 150 sec and a smoothing coefficient of 10/5. The distances are deemed suitable for checking various space geodesy algorithms.

## N85-26050# Lamont-Doherty Geological Inst, Palisades, N Y ON GEOID HEIGHTS AND FLEXURE OF THE LITHOSPHERE AT SEAMOUNTS

A B WATTS and N M RIBE 10 Dec 1984 21 p Repr from Jnl of Geophysical Research, v 89, no B13, 10 Dec 1984 p 11152-11170

(Contract N00014-80-C-0098)

(AD-A151220, LDGO-3708) Avail NTIS HC A02/MF A01 CSCL 08E

The sea suface height has now been mapped to an accuracy of better than + or - 1 m by using radar altimeters on board orbiting satellites. The major influence on the mean sea surface height is the marine good which is an equipotential surface. We have carried out preliminary studies of how oceanic volcanoes, which rise above the ocean floor as isolated seamounts and oceanic islands or linear ridges, contribute to the marine geoid Simple one and two dimensional models have been constructed in which it is assumed that the oceanic lithosphere responds to volcanic loads as a thin elastic plate overlying a weak fluid substratum Previous studies based on gravilty and bathymetry data and uplift/subsidence patterns show that the effective flexural rigidly of oceanic lithosphere and the equivalent elastic thickness T sub e increase with the age of the lithosphere at the time of loading This models predict that isolated seamounts emplaced on relatively young lithosphere on or near a mid-ocean ridge crest will be associated with relatively low amplitude geoid anomalities (about 04-05 m/km of height), while seamounts formed on relatively low over the Mid-Pacific Mountains and Line Islands, which formed on or near a mid-ocean ridge crest, and relatively high over the Magellan Seamounts and Wake Guyots, which formed off ridge

N85-26829# Joint Publications Research Service, Arlington, Va MINIMIZING INFLUENCE OF EARTH'S CURVATURE IN PROJECTIVE RECTIFICATION OF SPACE PHOTOGRAPHS INTO PHOTOPLANS AND PHOTOMAPS Abstract Only

A M KUZINA, N S RAMM, and A P SKORODUMOV *In its* USSR Rept Space (JPRS-USP-85-004) p 87 6 May 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (Moscow), -no-6; Nov---Dec-1984-p-101-106—Original-language-document was announced in IAA as A85-25662

Avail NTIS HC A06

The geometrical correction of space photographs required for their rectification into photoplans and photomaps in a particular projection is usually accomplished without allowance for local relief and involves elimination of the influence of tilt and the Earth's curvature in this article it is shown that this correction can be considerably simplified by replacing the coupling of space photograph coordinates and the photoplan (photomap) by a projective (linear-fractional) dependence Such a replacement makes it possible to rectify space photographs on standard photorectifiers. It also makes possible a sharp increase in the

efficiency of digital rectification of space photographs. It has been stated that in virtually all cases these procedures would result in a considerable decrease in the accuracy of the compiled maps of plans. It is demonstrated that with an effective choice of the projective correspondence the residual errors are decreased by several times and accordingly there is a broadening of the field of application of projective rectifications of space photographs

BW.

N85-27374# Federal Geodetic Control Committee, Washington, D.C.

### STANDARDS AND SPECIFICATIONS FOR GEODETIC CONTROL NETWORKS

Sep 1984 37 p refs

(PB85-166478, LC-84-600257) Avail NTIS HC A03/MF A01 CSCL 08E

This single publication is designed to replace both Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys, issued February 1974, and Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys, issued June 1980 Topics covered include the following (1) Standards--(horizontal control network standards, vertical control network standards, gravity control network standards), (2) Specifications--(triangulation, traverse, inertial surveying, geodetic leveling, photogrammetry, satellite Doppler positioning, absolute gravimetry, relative gravimetry), (3) Governmental authority, and (4) variance factor estimation Procedures for submitting data to the National Geodetic Survey are discussed

N85-29338# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

INFORMATION RELATIVE TO CARTOGRAPHY AND GEODESY. SERIES 2: TRANSLATIONS, NUMBER 42, VOLUME 1 1984 49 p refs

(ISSN-0469-4244) Avail NTIS HC A03/MF A01

The NOAA 7 satellite imagery mapping of Central Europe and Antarctica, the significance of orthophoto maps for developing nations, and German contributions to Antarctic cartography by photogrammetry and remote sensing are discussed

N85-29339# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

TWO SATELLITE IMAGE MAPS OF CENTRAL EUROPE

U BUECHER, W GOEPFERT, W WEBER, and I WILSKI In its Inform Relative to Cartography and Geodesy Ser 2 Transl, No 42, Vol 1 p 5-10 1984 refs

Avail NTIS HC A03/MF A01

Two satellite image maps of Central Europe at 1 3 million scale were produced using computer techniques. The technology, data sources, and hardware systems used for their production are described.

Author (ESA)

N85-29341# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

THE SIGNIFICANCE OF ORTHOPHOTO MAPS FOR DEVELOPING COUNTRIES

J NITTINGER In its Inform Relative to Cartography and Geodesy Ser 2 Transl , No 42, Vol 1 p 17-28 1984 refs Avail NTIS HC A03/MF A01

Orthophoto maps as planning tools are discussed. They can also be used as a basis for cadastral maps and for the recording of land register data. This is demonstrated by examples from Thailand, Central America, and Haiti. Author (ESA)

Institut fuer Angewandte Geodaesie, Frankfurt am N85-29342# Main (West Germany)

GERMAN CONTRIBUTIONS TO THE CARTOGRAPHY OF ANTARCTICA BY MEANS OF PHOTOGRAMMETRY AND REMOTE SENSING

H SCHMIDT-FALKENBERG In its Inform Relative to Cartography and Geodesy Ser 2 Transl, No 42, Vol 1 p 29-48 refs

### Avail NTIS HC A03/MF A01

Exploration of the Antarctic and cartographic activities by Germany before 1945 are reviewed, including the Antarctic Expedition of 1938/39 and the first use of aerial survey cameras Activities after 1945, German team ın the а topographic-chorographic cartography of the Antarctic and the establishment and revision of a Digital Name File Antarctica in German are described Activities planned by the Federal Republic of Germany in the Antarctic in photogrammetry and remote sensing are outlined Author (ESA)

N85-29343# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

REPORTS ON CARTOGRAPHY AND GEODESY. SERIES 1: ORIGINAL REPORTS, NUMBER 93 [NACHRICHTEN AUS DEM KARTEN- UND VERWESSUNGSWESEN. REIHE ORIGINALBEITRAEGE, HEFT NR 93]

1984 111 p refs in GERMAN, ENGLISH summary Original contains color illustrations

(ISSN-0469-4236) Avail NTIS HC A06/MF A01

An operational procedure for the universal, dynamic, geometric rectification of perturbed airborne scanner digital image recordings is presented. An information-theoretical method for automatic noise elimination in digital image processing is discussed

#### N85-29449\*# Sigma Data Services Corp , Greenbelt, Md DERIVATION OF MODEL TOPOGRAPHY Abstract Only R C BALGOVIND In NASA Goddard Space Flight Center

Res Rev, 1983 p 48-49 Jan 1985 Avail NTIS HC A08/MF A01 CSCL 04B

The Fourth-Order model necessitates representation of the topography The problem of the representation of the topography at grid points is addressed. The attempted was to derive an envelope topography. The TI is obtained by taking local mean plus one standard deviation at each grid point and sigma filtering it The method was greatly influenced by large standard deviations at steep mountains. The O1 topography is the local mean. The S1 is obtained by Sigma filtering in both latitude and longitude the mean O1 The S2 is when the operation is applied twice and S3 thrice, the Q3 is the sigma filtered local mean of the upper third quantile of the source data

### 04

### GEOLOGY AND MINERAL RESOURCES

Includes mineral deposits, petroleum deposits, spectral properties of rocks, geological exploration, and lithology

### A85-30733

APPLICATION OF DIGITALLY PROCESSED AND ENHANCED LANDSAT IMAGERY FOR GEOLOGICAL MAPPING AND MINERAL TARGETING IN THE SINGHBHUM PRECAMBRIAN MINERALIZED BELT, BIHAR-ORISSA

A M RAKSHIT (Geological Survey of India, Calcutta, India) and V L SWAMINATHAN (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar-Apr 1985, p 457-471 refs

### A85-30734

TARGETING AREAS FOR MINERAL EXPLORATION - A CASE STUDY FROM ORISSA, INDIA

S K BHAN and V S HEGDE (National Remote Sensing Agency, Hyderabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar - Apr 1985, p 473-479 Research sponsored by the Directorate of Mines of Orissa

Landsat data comprising eight scenes in the northern and central part of Orissa State, in eastern India were interpreted visually for delineation of target areas for mineral exploration. Even though this area has been mapped and studied in considerable detail Landsat data have been found to be very useful in redefining the tectonic structure, correlation of regional features, and mapping of hitherto unmapped features Subsequently one scene (path 152 row 047) was digitally analyzed, and enhanced for delineation of bauxitic lateritic plateaux and for comparison with visual interpretation Author

#### A85-30735

PROJECT INDRAVATI. I - AN APPRAISAL OF THE NATURAL RESOURCES OF THE INDRAVATI BASIN, ORISSA, MADHYA PRADESH AND MAHARASHTRA, INDIA

N K DUTTA, S M DUTTA, V K MATHUR, D N SETTI (Geological Survey of India, Raipur, India), S C SARKAR (National Atlas and Thematic Mapping Organization, Calcutta, India), C J THAMPI (National Bureau of Soil Survey and Land-Use Planning, Nagpur, India), and V B JOSHI (Forest Survey of India, Dehradun, India) International Journal of Remote Sensing (ISSN 0143-1161). vol 6, Mar - Apr 1985, p 481-496

An integrated natural resources survey over the Indravati basin, which covers an area of 40,000 sq km in central India is carried out in order to demonstrate the capabilities of remote-sensing techniques for the appraisal, evaluation, and effective utilization of natural resource potentials, and the structural linkages necessary to evolve a national natural resources management system. Several agencies of the Indian government and their roles in the project are discussed Data on geology, geomorphology, structure, lineaments, drainage, soil, and vegetation are collected and codified, based on visual interpretation of Landsat imagery. It is shown that the area exhibits a complex physiographic and geological history and varied soil types. Two areas are delineated for detailed work by large-scale aerial photography and multispectral scanner surveys coupled with ground exploration

MD

### A85-30736

CORRELATION OF LANDSAT DATA WITH SURFACE AND SUBSURFACE INFORMATION A SYNERGISTIC. APPROACH TO OIL EXPLORATION IN QUANTITATIVE **GUJARAT, INDIA** 

D S MITRA, K VARADARAJAN (Oil and Natural Gas Commission, Malaviya Institute of Petroleum Exploration, Dehradun, India), T J MAJUMDAR, and D S KAMAT (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar - Apr 1985, p 497-506

### A85-30741

MONITORING CHANGES IN ECOLOGY IN THE KUDREMUKH MINING REGION

D S KAMAT, A K S GOPALAN, K L MAJUMDER. R RAMAKRISHNAN (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), V R RAO (Indian Space Research Organization, Bangalore, India), S R NAGA BHUSANA, S THAYALAN (National Bureau of Soil Survey and Land-Use Planning, Bangalore, India), H P KRISHNAPPA, and A S SADASHIVAIAH (Karnataka Forest Department, Bangalore, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 541-548 refs

Iron-ore deposits of the Kudremukh region in Karnataka State, India, were discovered at the beginning of the present century These deposits have only recently begun to be exploited As a result the land cover, particularly the grassland areas, are becoming disturbed This paper is the outcome of a joint study undertaken by three central and state government agencies in India for monitoring the ecological changes in the above region Multitemporal Landsat MSS data together with aerial CIR photographs and ground data were used for the study The study mainly addressed the mapping of land-cover changes, which is one of the most important indicators of ecological monitoring

Author

#### A85-30742

ASSESSMENT OF THE ROLE OF REMOTE SENSING TECHNIQUES IN MONITORING SHORELINE CHANGES - A CASE STUDY OF THE KERALA COAST

P P RAO, M M NAIR, and D V RAJU (Geological Survey of India, Hyderabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 549-558 refs

The Kerala coastal region of Southwest India was the object of analysis using Landsat MSS data and aerial photographs due to its susceptibility to erosion, having lost 600 m of land to the sea in the past century. The surveys were performed to characterize the geological, structural and geomorphological features of the region, establish a data base for multitemporal monitoring of shoreline changes and their causes, and investigate the interrelationships among the operative erosive processes. The Landsat data is of sufficient quality to discern areas of crystalline rocks, soft sediments, granite and basic dikes, as well as lineament, fracture and fault patterns. The data have thus far pinpointed soft sediment areas as those most subject to erosion, which is modified by neotectonic movements. Mud banks were found to be responsible for both erosion and accretion. Long-term monitoring will be effected with airborne MSS scans, since the Landsat MSS does not have sufficiently high resolution

### A85-31736

### IMAGE PROCESSING APPLICATIONS FOR GEOLOGIC MAPPING

M ABRAMS, A BLUSSON, V CARRERE, T NGUYEN, and Y RABU (IBM France, S A, Paris, France) IBM Journal of Research and Development (ISSN 0018-8646), vol 29, March 1985, p 177-187 Research supported by the IBM France, S A, Centre National d'Etudes Spatiales, and Centre National de la Recherche Scientifique refs

The present investigation is concerned with approaches for the creation of better images for geologic mapping. A description is presented of the use of supervised classification methods for lithologic discrimination. In addition to the use of spectral information, a texture parameter was calculated to incorporate spatial information into the analyses. A supervised classification algorithm, the Bayesian maximum likelihood classifier, was used to produce thematic maps based on training areas. The different maps were combined to produce the final map. The application of automatic lineament detection and the generation of rose diagrams are also discussed, and a study is presented of the geologic utility of coregistered Landsat and Heat Capacity Mapping Mission (HCMM) data.

### A85-32144

COBALT-ABITIBI PROJECT - LANDSAT IMAGE ANALYSIS IN THE CANADIAN SHIELD APPLICATION OF THE GEOLOGICAL ANALYSIS AID PACKAGE

J HARRIS, F G BERCHA, and B BRUCE (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p. 697-706 refs

#### A85-32145

FRACTURE MAPPING OF PART OF NORTHERN ONTARIO USING LANDSAT IMAGERY

A BOUD and J WOOD (Ministry of Natural Resources, Ontario Geological Survey, Toronto, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 707-715 refs

An attempt was made to map fractures and fracture patterns in the Protozoic Huronian rocks of the Canadian Shield in northern Ontario as an aid to mineral surveying through mapping of tectonic features. Specifically, the study was targeted at detecting extensions of known faults, indentifying regional fracture patterns, establishing relationships between dikes and faults, quantifying the ages of the faults and outlining the structural blocks caused by rifting. Landsat images at a 1.250,000 scale were used in combination with aerial photographs on a 1.15,840 scale. Satellite imagaes during winter had 20 percent less cloud cover obscuration. The patterns observed were similar to those recorded on Mars, the moon and Mercury. The Landsat imagery was useful for identifying regions worthy of further geological investigations and neglecting surveys of rejected areas.

#### Δ85-32147

BASIC OUTLINE OF A GUIDE FOR THE USE OF LANDSAT IMAGES IN GEOLOGY [BASES D'UN GUIDE D'UTILISATION DES IMAGES LANDSAT EN GEOLOGIE]

M G TANGUAY (Montreal, Universite, Montreal, Canada) and C SEUTHE IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 733-745 In French Sponsorship Department of Energy, Mines and Resources refs

(Contract DEMR-101-4-80)

The results of a study to identify Landsat image characteristics which reveal subsurface geological features, i.e., lineaments, are reported Two regions in Quebec and Ontario, Canada, were chosen as the study areas Lineaments are known to appear as curved or intersecting straight lines, as lines darker than surrounding regions, and as textural or shape discontinuities in Ladsat images MSS images were scanned for lineaments, which were then compared with known lineaments from aerial magnetic and geological maps of the area. It was found that images taken in autumn, winter and summer, the latter as confirmational data, best revealed lineaments when combined It was necessary to segment the images into tectonic sectors of independent structural tendencies, divide the lineaments into major and secondary features, and then combine similar lineaments within each sector The mineralogical implications of the lineaments mapped in the study areas are discussed MSK

### A85-32148

MAPPING SURFICIAL GEOLOGY BY LANDSAT - AN INVESTIGATION INTO VARIATIONS IN SPECTRAL RESPONSE PATTERNS

J K HORNSBY (Intera Environmental Consultants, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 779-784 refs

The characteristics and degree of spectral variations from one Landsat image to another were investigated in terms of their yield of geologic and geomorphologic information. Sample images were generated for an area near Baker Lake in the Northwest Territories. The 512 x 512 pixel images were separated by two days and by 33 days for one subscene. Geological classifications were made on a 1 125,000 scale using all four MSS bands. The accuracies of the images were determined on the bases of a number of sample points previously characterized by aerial and ground surveys. Spectral variations were more significant temporally than

were spatially-induced variations, as determined by analysis of variance computations. The imagery was concluded suitable for mapping surficial geology over large regions by extending data from one region to another numerically, then performing a small amount of ground checking.

### A85-33875

### GEOLOGICAL INTERPRETATION OF LANDSAT IMAGERY OF THE BANGLADESH GANGES DELTA

A SESOREN (Rijks Geologische Dienst, Haarlem, Netherlands) ITC Journal (ISSN 0303-2434), no 3, 1984, p 229-232

### A85-35101

## REMOTE SENSING FOR GEOLOGICAL MAPPING; PROCEEDINGS OF THE SEMINAR, ORLEANS, FRANCE, FEBRUARY 2-4, 1984

P TELEKI, ED (US Geological Survey, Reston, VA) and C WEBER, ED (Bureau de Recherches Geologiques et Minieres, Orleans, France) Seminar sponsored by the International Union of Geological Sciences and UNESCO Orleans, France, Bureau de Recherches Geologiques et Minieres (IUGS Publication, No 18), 1984, 303 p For individual items see A85-35102 to A85-35120

Among the topics discussed are pattern recognition for geological remote sensing, the application of space images to neotectonic studies, an integral and orientational technique for geological mapping and ore exploration, the use of Landsat data for mineral exploration in Canada, a comparison of remote sensing systems employed for geological mapping in Brazil, geological cartography using SLR imagery, and the geological interpretation of Seasat SAR imagery. Also covered are medium-to-small-scale geological maps based on Landsat MSS data, recent developments in lithological mapping based on remote sensing data, the lithological mapping of heavily weathered terrain by means of IR remote sensing, satellite, ground, and laboratory spectral signature research on ore bodies, and the remote detection of geobotanical anomalies associated with hydrocarbon microseepage.

### A85-35102#

### REMOTE SENSING IN GEOLOGY - A DECADE OF PROGRESS

W D CARTER (Globex, Inc., Reston, VA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 15-27 Research supported by the US Geological Survey, International Union of Geological Sciences, and COSPAR refs

A development history is presented for Landsat and Space Shuttle multispectral imaging systems. The first Landsat-borne instrument began orbital operations in 1972, yielding black-and-white image transparencies and paper prints until color-IR images became available and facilitated the study relationships among vegetation, hydrological, and cultural features. The art of merging Landsat images with other hydrological, geophysical and geochemical data has further enhanced exploration techniques, especially with reference to vegetation anomalies that imply geochemical concentrations above ore deposits. Oil, gas, gold, tin, copper, lithium, and other mineral resources have been thus uncovered Experimental results from the Space Shuttle Multispectral IR Radiometer and imaging Radar are noted.

### A85-35103#

## IMPORTANCE OF PATTERN RECOGNITION FOR GEOLOGICAL REMOTE SENSING APPLICATIONS AND NEW LOOK AT GEOLOGICAL MAPS

J CHOROWICZ (Paris VI, Universite, Paris, France) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p. 29-40

The most important method for the derivation of geological maps from remote sensing data is the recognition of four-dimensional geological and geomorphological objects, using stereoscopic observations that are increasingly aided by

computerized image processing Through the use of geomorphological and geological pattern recognition as a priority, together with age dating that has been completed by image processing, it becomes possible to create and store regular geological maps, draw simplified small scale maps on the basis of large ones, and create a novel type of small scale geological map on which geomorphological features are represented by specific symbols which expressly indicate missing data and yield a superior representation of sub-surface features

#### A85-35104#

### APPLICATIONS OF SPACE IMAGES FOR NEOTECTONIC STUDIES

V G TRIFONOV (Akademiia Nauk SSSR, Geologicheskii Institut, Moscow, USSR) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p. 41-56 refs

Attention is given to three aspects of the application of aircraft and spacecraft imagery for the southern regions of the Soviet Union (1) the detection, study, and mapping of such neotectonic zones as the Holocene activity zones, (2) the study of the deep seated structures of active areas generally, and (3) seismic risk studies. The lineaments observable in spacecraft images correspond to patterns of geophysical anomalies and semismicity distribution, thereby reflecting elements of recent, deep seated structure in the active zones. These elements differ in some instances from the active upper crustal elements, and exhibit recent tectonic layering and lithospheric disharmony. The determination of seismically dangerous areas can be made on the basis of these neotectonic studies.

#### A85-35105#

# CORRELATIONS BETWEEN SPATIAL REMOTE SENSING, GEOCHEMICAL AND GEOPHYSICAL DATA IN WESTERN FRANCE - AN INTEGRATIVE AND ORIENTATION TECHNIQUE FOR GEOLOGICAL MAPPING AND ORE EXPLORATION

J-Y SCANVIC, PH DUTARTRE, and CH KING (Bureau de Recherches Geologiques et Minieres, Orleans, France) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 57-77 refs

### A85-35106#

### LANDSAT DATA FOR OPERATIONAL MINERAL EXPLORATION - THE CANADIAN EXPERIENCE

B BRUCE (Canada Centre for Remote Sensing, Ottawa, Canada) and V SINGHROY (Ontario Centre for Remote Sensing, Toronto, Canada) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 79-90 refs

An evaluation is made of Canadian experience with the application of Landsat imagery to mineral resources exploration, by means of the Geologic Analysis Aid Package (GAAP) GAAP consists of three entry-level image products designed to facilitate visual geologic interpretation of Landsat imagery, using the basic elements of 'Color Image Optimized for Visual Geologic Interpretation', a 'Textural Analysis Aid', and a 'Pattern and Linear Analysis Aid' Emphasis is given to the recognition of vegetation as an important source of geologic data, and fast production and supply of simple output products

### A85-35107#

### REMOTE SENSING SYSTEMS COMPARISONS FOR GEOLOGICAL MAPPING IN BRAZIL

G AMARAL (Sao Paulo, Universidade, Sao Paulo, Brazil) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 91-106

The territory of Brazil has been completely covered by Landdat MSS, Return Beam Vidicon (RBV) and Side-Looking Airborne Radar

(SLAR) imagery Comparative studies of the performance of different sensor products in geomorphological and mineralogical studies have indicated that Landsat MSS images are superior to those of SLAR for geological mapping SLAR images have furnished data similar to that of MSS band 7, but with lower tonal variations, for the case of the heavily vegetated areas of the Amazon and Atlantic forests For the drier and permanently clouded northeastern region, however, SLAR has provided most of the more useful data in some regions, Space Shuttle Imaging Radar-A images resemble those of MSS band 7

#### A85-35108#

## GEOLOGICAL CARTOGRAPHY OF GABON USING SIDE-LOOKING RADAR IMAGERY - AN EXAMPLE OF AN INTEGRATED MAPPING PROJECT

J-M MONGET (Paris, Ecole Nationale Superieure des Mines, Valbonne, Alpes-Maritimes, France), DIOULY-OSSO (Ministere des Mines et des Hydrocarbures, Libreville, Gabon), J-P BASSOT (Clermont-Ferrand, Universite, Clermont-Ferrand, France), R-R 'HERNER (Mars Associates, Inc., Phoenix, AZ), and Y PATOUREAUX (Societe d'Etudes Techniques et d'Entreprises Generales, Division Espace, Valbonne, Alpes-Maritimes, France) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 107-128 refs

The cloud-free synoptic view of Gabon which has been obtained by means of the X-band SAR mapping yields a true geological perspective for the entire country which will be of particular consequence for natural resource exploration Radar photogeologists have interpreted the radar imagery with a view of the refinement of the structural and lithological data content of existing maps, and compared the resuls thus obtained with field observations

**A85-35109\***# Societe Europeenne de Propulsion, Puteaux (France)

#### GEOLOGIC INTERPRETATION OF SEASAT SAR IMAGERY NEAR THE RIO LACANTUM, MEXICO

PH REBILLARD (Societe Europeenne de Propulsion, Puteaux, Hauts-de-Seine, France, California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and T DIXON (California Institute of Technology, Jet Propulsion Laboratory, Pasadena,CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 129-141 NASA-supported research refs

A mosaic of the Seasat Synthetic Aperture Radar (SAR) optically processed images over Central America is presented. A SAR image of the Rio Lacantum area (southeastern Mexico) has been digitally processed and its interpretation is presented. The region is characterized by low relief and a dense vegetation canopy. Surface is believed to be indicative of subsurface structural features. The Seasat-SAR system had a steep imaging geometry (incidence angle 23 + or - 3 deg off-nadir) which is favorable for detection of subtle topographic variations. Subtle textural features in the image corresponding to surface topography were enhanced by image processing techniques. A structural and lithologic interpretation of the processed images is presented. Lineaments oriented NE-SW dominate and intersect broad folds trending NW-SE. Distinctive karst topography characterizes one high relief area.

#### A85-35110#

## MEDIUM TO SMALL SCALE GEOLOGICAL MAPS BASED ON LANDSAT MSS AND RBV DATA - CASE HISTORIES OF PROJECTS IN NORTH AFRICA

F K LIST, B MEISSNER (Berlin, Freie Universitaet, Berlin, West Germany), G POEHLMANN, and U RIPKE (Berlin, Technische Fachhochschule, Berlin, West Germany) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1985 Bureau de Recherches Geologiques et Minieres, 1984, p 143-159 Research supported by the Deutsche Forschungsgemeinschaft and Continental Oil Co refs

#### A85-35111#

## APPLICATIONS OF LANDSAT IMAGES TO GEOLOGICAL MAPPING IN TROPICAL JUNGLE ENVIRONMENT - CARONI RIVER BASIN, VENEZUELA

H O BRICENO (Universidad Central de Venezuela, Caracas, Venezuela) and K LEE (Colorado School of Mines, Golden, CO) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologique et Minieres, 1984, p 161-175 refs

Thick and continuous vegetation cover, usually considered a constraint for geologic mapping with remote sensors, has been used as the main source of spectral data for interpretation of Landsat images from the mid-section of the Caroni River basin, Venezuela. The basic assumption made was that spectral properties of vegetation were a direct function of the nature of the underlying bedrock. This approach, when combined with geomorphic criteria, proved to be a valid one for regional geologic cartography. Three geologic domains defined in the interpretation stage correspond satisfactorily with the three major rock provinces in the area. Furthermore, six areas were selected as potential targets for diamond placer exploration, five of them were verified in the field as alluvium, and four of the five diamond placers.

Author

## A85-35112\*# IBM France S A, Paris RECENT DEVELOPMENTS IN LITHOLOGIC MAPPING USING REMOTE SENSING DATA

M ABRAMS (IBM France SA, Paris, France) and A KAHLE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p. 177-189 NASA-supported research refs

Major development trends noted in remote sensing scanners are toward greater spatial and spectral resolution, as well as the acquisition of data over a broader portion of the electromagnetic spectrum. Attention is presently given to representative samples of the product of two new-generation satellite sensors, the Landsat-4 Thematic Mapper and SPOT, as well as the status of airborne scanner research aimed at the exploration of multispectral data in the thermal IR wavelength region (which encompasses the diagnostic spectral features of silicates and carbonates) Testing is underway for scanners having spectral bands as narrow as 0.01 micron in the visible and near-IR, which will be capable of identifying specific minerals

A85-35114\*# Jet Propulsion Lab , California Inst of Tech , Pasadena

#### RECENT ADVANCES IN GEOLOGIC MAPPING BY RADAR

T G FARR (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Bureau de Recherches Geologiques et Minieres, 1984, p 199-215 NASA-supported research refs

Quantitative techniques are available which allow the analysis of SAR images for the derivation of geological surface and process data. In conjunction with calibrated radar sensors operating at several incidence angles, wavelengths, and polarizations, the compilation of multiparameter radar signatures of lithological and geomorphic units can accordingly proceed for geological mapping in unknown areas. While radar image tone can be used in and zones to derive surface micromorphology, heavily vegetated tropical regions require the analysis of radar image texture by means of Fourier techniques which decompose the image into bandpasses that represent different scales of texture.

#### A85-35115#

## LITHOLOGIC MAPPING IN DEEPLY WEATHERED TERRAIN USING VISIBLE-NIR, SWIR AND MID-INFRARED REMOTE SENSING TECHNIQUES

A -R GABELL, A -A GREEN, and J -F HUNTINGTON (Commonwealth Scientific and Industrial Research Organization, Div of Mineral Physics, North Ryde, New South Wales, Australia) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 217-232

Australian land surfaces have undergone deep lateritic weathering that produces mineral assemblages near the surface very different from those at depth. Toward the base of the saprolitic zone of various clays and other secondary minerals, where fresh rock is being broken down, many of the secondary minerals can be related to the primary mineralogy of the fresh rock. In order to deduce geology at depth, it is necessary to map and interpret the distribution of these secondary minerals, nearly all of which can fortunately be detected by means of visible, short wave IR, and mid-IR remote sensing. Attention is presently given to the results of both laboratory and airborne spectrometer measurements from different zones of the weathering profile, as developed on a variety of lithologies.

#### A85-35116#

### CO2 LASER REFLECTANCE OF ROCKS FOR GEOLOGICAL REMOTE SENSING

J-E EBERHARDT, A-A GREEN, J-G HAUB, A-W PRYOR (Commonwealth Scientific and Industrial Research Organization, Div of Mineral Physics, North Ryde, New South Wales, Australia), and R-J-P LYON (Stanford University, Stanford, CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 233-250 refs

The range of mid-IR (8-14 microns) wavelengths available from a C-12 isotope C-13 CO2 mixed laser system is sufficient to define the reflectance properties of nearly all the silicate and carbonate materials to be found on terrain surfaces. The problems inherent in passive systems are avoided by active sensing, and excellent spatial and spectral resolutions are obtainable. Unfortunately, a considerable increase in sensing system complexity is also incurred. Attention is presently given to the results of laboratory rock reflectance measurements.

#### A85-35117#

# CONTRIBUTION TO 'SPECTRAL SIGNATURE' RESEARCH ON ORE BODIES FOUND IN SOUTH MOROCCO, AT THREE LEVELS OF INVESTIGATION SATELLITE, GROUND AND LABORATORY

P BOUCHET, B CERVELLE, and J CHOROWICZ (Paris VI, Universite, Paris, France) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 251-265 refs

#### A85-35118#

### GEOBOTANY IN GEOLOGICAL MAPPING AND MINERAL EXPLORATION

M -M COLE (Bedford College, London, England) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 267-286 refs

The scope and applications of geobotany are outlined, and its role in the interpretation of remotely sensed imagery for geological mapping and mineral exploration is assessed. It is shown that the close relationship between vegetation, soils, and geology make geobotany an effective method of discriminating near-surface geological units, weathering products, and types and depth of overburden, particularly in remote areas of undisturbed natural terrains. Higher-resolution multispectral imagery from satellite and airborne systems increases the potential applications of geobotany

In geological mapping and mineral explorations. The discussion is illustrated by results of specific studies.

#### A85-35119#

## THE SIGNIFICANCE OF SCALE IN GEOBOTANICAL APPLICATIONS FOR LITHOLOGIC DISCRIMINATION AND MINERAL EXPLORATION

N -M MILTON (U S Geological Survey, Reston, VA) and D -A MOUAT (Stanford University, Palo Alto, CA) IN Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 Orleans, France, Bureau de Recherches Geologiques et Minieres, 1984, p 287-298 refs

Remotely sensed data are now available from a wide variety of instruments, each data set having a particular spectral and spatial resolution. The changes in vegetation associated with changes in lithology or the presence of mineral deposits can also occur at different scales. The task of geobotanical remote sensing is to choose or adapt the remotely sensed data to the appropriate geobotanical technique to solve the geological problem of interest Examples are given of a number of applications of data sets of different spectral and spatial resolution. The relative importance of spectral and spatial resolution is discussed.

#### A85-37118

GEOLOGICAL INFORMATION CONTENT OF SPACE IMAGES OBTAINED IN DIFFERENT SPECTRAL BANDS DURING THE GOBI-KHANGAI EXPERIMENT (MUSHUGAI TEST RANGE - GURVAN-BOGD) [GEOLOGICHESKAIA INFORMATIVNOST' KOSMICHESKIKH FOTOSNIMKOV, POLUCHENNYKH V RAZNYKH SPEKTRAL'NYKH DIAPAZONAKH V KHODE EKSPERIMENTE 'GOBI-KHANGAI' /POLIGON MUSHUGAI - GURVAN-BOGD/]

V I MAKAROV and G I VOLCHKOVA (Akademia Nauk SSSR, Geologicheskii Institut, Moscow, USSR) Issledovanie Zemli iz Kosmosa (ISSN 0205-9614), Mar -Apr 1985, p 52-58 In Russian refs

#### A85-37150

### VERTICAL COMPONENT MAGSAT ANOMALIES AND INDIAN TECTONIC BOUNDARIES

J G NEGI, P K AGRAWAL, and N K THAKUR (National Geophysical Research Institute, Hyderabad, India) Indian Academy of Sciences, Proceedings (Earth and Planetary Sciences) (ISSN 0370-0089), vol 94, March 1985, p 35-41 refs

Magsat vertical component (Z-component) of crustal anomalies are correlated for the first time with major geological and tectonic boundaries/features of the Indian subcontinent. A prominent 'low' is consistently observed on all the profiles centered between 19 and 23 deg latitudes over the broad Peninsular 'high'. The other conspicuous 'low' indicated from the present work is confined to the region above Sarda depression (29 deg N to 31 deg N) in the foothills of the Himalayas. Interesting magnetic signatures are identified over the Narmada-Son rift and Godavan graben.

Author

#### A85-38808

#### MAPPING OF WOLFRAMITE REGION IN THE SIROHI DISTRICT (RAJASTHAN) IN INDIA FROM DIFFERENT DIGITALLY ENHANCED DATA PRODUCTS OF LANDSAT

A K GUPTA and V R RAO (Indian Space Research Organization, Bangalore, India) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 56-61 refs

A85-38810\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

THE UTILITY OF THEMATIC MAPPER SENSOR CHARACTERISTICS FOR SURFACE MINE MONITORING

J R IRONS (NASA, Goddard Space Flight Center, Greenbelt, MD) and R L KENNARD (Science Applications Research, Riverdale, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 74-83 refs

The employment of Landsat Multispectral Scanner (MSS) data for surface coal mine inventory and inspection applications has been extensively investigated However, in spite of encouraging research results, MSS data have not gained wide acceptance for surface mine monitoring operations. This situation is partly related to MSS spatial resolution (80 m), which is considered insufficient for detailed surface mine inspection. The Thematic Mapper (TM) employed on the Landsat-4 and 5 satellites provides an improved resolution (30 m) and other refinements which are expected to enhance the usefulness of TM data relative to MSS data. The present paper reports research which was conducted to assess the usefulness of actual TM data and to quantitatively evaluate the contribution of individual sensor characteristics to data utility for surface mine monitoring. The obtained results demonstrate that the TM spatial resolution can be of immediate benefit for certain applications such as surface mine monitoring

## A85-38846\* California Univ , Santa Barbara REGISTERING THEMATIC MAPPER IMAGERY TO DIGITAL ELEVATION MODELS

J FREW (California, University, Santa Barbara, CA) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 432-435 refs

(Contract NAS5-27463)

The problems encountered when attempting to register Landsat Thematic Mapper (TM) data to US geological survey digital elevation models (DEMs) are examined. It is shown that TM and DEM data are not available in the same map projection, necessitating geometric transformation of one of the data type, that the TM data are not accurately located in their nominal projection, and that TM data have higher resolution than most DEM data, but oversampling the DEM data to TM resolution introduces systematic noise Further work needed in this area is discussed.

#### A85-38896

COMPLEX AERIAL AND SPACE REMOTE-SENSING STUDIES OF SIBERIA [KOMPLEKSNYE AEROKOSMICHESKIE ISSLEDOVANIIA SIBIRI]

A L IANSHIN, ED and L K ZIATKOVA, ED Novosibirsk, Izdatel'stvo Nauka, 1984, 96 p In Russian No individual items are abstracted in this volume

A collection of papers describing a Soviet program for the remote sensing of natural resources in Sibena and the Far East is presented. The manifestation of various types of tectonic structures on space photographs is examined, and the significance of these structures for petroleum exploration is discussed. Particular consideration is given to structural transition zones, the predictive significance of zones linking structures of different age, thematic mapping, and landscape divisions. Features characterizing morphological-tectonic and environment-protection mapping are discussed.

#### A85-39095

## SPACE-BORNE IMAGERY INTERPRETATION - EARTHQUAKE STUDIES IN ASWAN

E M. EL SHAZLY and M A ABDEL HADY (Academy of Scientific Research and Technology, Remote Sensing Centre, Cairo, Egypt) (Universita di Napoli, Aentalia S p A , ESA, and NASA, International Symposium on Spacelab 1 - Results, Implications and Perspectives, Naples and Capri, Italy, June 11-16, 1984) Earth-Oriented Applications of Space Technology (ISSN 0277-4488), vol 5, no 1-2, 1985, p 139-149 refs

Landsat imagery of an area near the epicenter of an earthquake event in Aswan, Egypt is analyzed in order to delineate geological features. The tectonic, hydrological, and environmental conditions of the area affected by the earthquake were also investigated. The Landsat imagery was used to develop a graph showing the distribution of surface fractures in the directions NNW-SSE and ENE-WSW. Some possible causes of the earthquake event are discussed, including Nile water seepage from the Aswan High Dam and local plate movement produced by the accumulating pressure of superheated steam. Several examples of Landsat imagery are provided.

#### A85-39341

## METHODS OF STRUCTURAL GEOLOGY AND GEOLOGICAL MAPPING [METODY STRUKTURNOI GEOLOGII I GEOLOGICHESKOGO KARTIROVANIIA]

I P KUSHNAREV, P I KUSHNAREV, and K M MELNIKOVA Moscow, Izdatel'stvo Nedra, 1984, 375 p In Russian refs

Methods of structural geology and geological mapping are examined with reference to the interpretation of various types of aerial photographs and the utilization of geophysical, geochemical, and geomorphological data to investigate the crustal structures Special emphasis is placed on microstructural analysis, calculations of the magnitudes of repeated fault displacements, and the mapping of coastal deposits

#### A85-39825

## INVESTIGATION OF THE EARTH BY MEANS OF NEUTRINOS - NEUTRINO GEOLOGY

G A ASKARIAN (Akademiia Nauk SSSR, Institut Obshchei Fiziki, Moscow, USSR) (Uspekhi Fizicheskikh Nauk, vol. 144, Nov. 1984, p. 523-530) Soviet Physics - Uspekhi (ISSN 0038-5670), vol. 27, Nov. 1984, p. 896-900 Translation refs

Possible applications are described for high energy neutrino beams in the production of sound pulses, electrical currents, and electromagnetic fields for study of the earth and for geological research. Forced conditions which increase the efficiency of the investigation are pointed out forced beam ejection, modulation, integrated fields, and so forth.

Author

## N85-23191\*# Earth Satellite Corp , Chevy Chase, Md EVALUATION OF THEMATIC MAPPER PERFORMANCE AS APPLIED TO HYDROCARBON EXPLORATION

J R EVERETT, C SHEFFIELD, and J DYKSTRA In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 119-126 Jan 1985 ERTS Avail NTIS HC A19/MF A01 CSCL 08G

The role data from the first three LANDSAT satellites have in geologic exploration and their current level of acceptance is reviewed and the advantages of LANDSAT 4 TM data over MSS data are discussed Specially enhanced Thematic Mapper imager can make a very significant contribution to the oil and gas and mineral exploration industries. The TM's increased spatial resolution enables the production of larger scale imagery, which greatly increases the amount of geomorphic and structural information interpretable. TM's greater spectral resolution, combined with the smaller, more homogeneous pixels, should enable a far greater confidence in mapping lithologies and detecting geobotanical anomalies from space. The results from its applications to hydrocarbon and mineral exploration promise to bring the majority of the geologic exploration community into that final stage of acceptance and routine application of the satellite data.

N85-23192\*# Jet Propulsion Lab , California Inst of Tech ,

#### **GEOLOGIC UTILITY OF LANSDAT-4 TM DATA**

M ABRAMS, A B KAHLE, A GILLESPIE, J CONEL, and H LANG In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 127-130 Jan 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 08G

The performance of the TM vis-a-vis various geological applications was quantified by analyzing (1) the geological utility of the data with respect to the increased spatial resolution and number of bands (compared to the MSS), (2) the geometric accuracy, (3) the radiometric performance of the TM scanner Preliminary analyses were performed on TM scenes over Death Valley, California, and over southern Arizona Both scenes were acquired in CCT-PT format, where the data were geometrically and radiometrically corrected Overall, the TM data appears to contain a marked increase in geologically useful information, however, a number of instrumental or processing artifacts may well limit the ability of the geologist to fully extract this information.

N85-23195\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

ASSESSMENT OF COMPUTER BASED GEOLOGIC MAPPING OF ROCK UNITS IN THE LANDSAT-4 SCENE OF NORTHERN DEATH VALLEY, CALIFORNIA

N M SHORT In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 163-216 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS

Avail NTIS HC A19/MF A01 CSCL 08G

Geologists obtain low accuracy levels when maps derived from LANDSAT MSS data are compared with those made by conventional methods Procedures developed for the IDIMS computer system and used to classify a subset of a TM image of the Death Valley, California - Nevada border are described Despite the superior resolution, broader spectral coverage, and greater sensitivity inherent to the TM, the actual recorded measured accuracy was in the same narrow range (30 to 60%) recorded for MSS data from earlier LANDSATs. The supervised classification approach appears to be superior to the unsupervised approach when applied to vegetation-sparse surfaces composed of spectrally contrasting rock/soil units distributed in relatively flat to low relief terrain As spatial resolution improves and optimal spectral bands for identifying rock materials are specified, use of classified multispectral remote sensing data from air and space when coupled with supporting field calibration and checks should become the dominant way in which geologic mapping is carried out in future decades

N85-23217\*# MacQuarie Univ , North Ryde (Australia) School of Mathematics and Physics

## GADB: A DATABASE FACILITY FOR MODELLING NATURALLY OCCURRING GEOPHYSICAL FIELDS

C N G DAMPNEY *In its* MAGSAT Anomaly Field Data of the Crustal Properties of Australia 12 p 1983 refs ERTS Avail NTIS HC A05/MF A01 CSCL 05B

In certain kinds of geophysical surveys, the fields are continua, but measured at discrete points referenced by their position or time of measurement. Systems of this kind are better modelled by databases built from basic data structures attuned to representing traverses across continua that are not of pre-defined fixed length. The general Array DataBase is built on arrays (ordered sequencies of data) with each array holding data elements of one type. The arrays each occupy their own physical data set, in turn inter-related by a hierarchy to other arrays over the same space/time reference points. The GADB illustrates the principle that a data facility should reflect the fundamental properties of its data, and support retrieval based on the application's view. The GADB is being tested by its use in NASA's project MAGSAT.

ARH

N85-23218\*# MacQuarie Univ , North Ryde (Australia) Centre for Geophysical Exploration Research

### DATA SELECTION TECHNIQUES IN THE INTERPRETATION OF MAGSAT DATA OVER AUSTRALIA

B. D JOHNSON and C N G DAMPNEY In its MAGSAT Anomaly Field Data of the Crustal Properties of Australia 6 p 1983 Presented at the 52nd Ann Meeting of the Soc of Exploration Geophys, Dallas, 17-21 Oct 1982 Original contains color imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail NTIS HC A05/MF A01 CSCL 05B

The MAGSAT data require critical selection in order to produce a self-consistent data set suitable for map construction and subsequent interpretation. Interactive data selection techniques are described which involve the use of a special-purpose profile-priented data base and a colour graphics display. The careful

described which involve the use of a special-purpose profile-oriented data base and a colour graphics display. The careful application of these data selection techniques permits validation every data value and ensures that the best possible self-consistent data set is being used to construct the maps of the magnetic field measured at satellite altitudes over Australia.

#### N85-24500# Joint Publications Research Service, Arlington, Va TEMPERATURE ANOMALIES ABOVE ORE BODIES Abstract Only

V I GORNYY and V B YERMOLAYEV-MASLOV *In its* USSR Rept Earth Sci (JPRS-UES-85-004) p 73 13 Mar 1985 Transl into ENGLISH from Sov Geol (USSR), no 6, Jun 1984 p 113-119

Avail NTIS HC A05/MF A01

Temperature anomalies above ore bodies which can be revealed by aerial thermal surveys and field geothermal surveys are related to distortions of the quasisteady field of the Earth by ore bodies with heat conductivity differing from their surroundings, exothermal reactions related to oxidation of sulfide ores, and distortion of the variable heat field by objects with contrasting thermal properties Geothermal measurements in boreholes at shallow depths are used to analyze the nature of changes in temperatures with depth at an ore deposit on the southern slope of the Caucausus Temperature anomalies above ore bodies are found to be greatest at very shallow depths (about 1 meter) Variations in albedo above ore deposits result in nonuniform absorption of solar radiation with resulting temperature anomalies Regular changes in the amplitudes of temperature anomalies with time and depth indicate that they are closely related to external variable heat sources

#### N85-25341# Joint Publications Research Service, Arlington, Va USE OF SPACE INFORMATION IN PETROLEUM- AND GAS-PROSPECTING WORK (EXAMPLE OF SOUTHERN MANGYSHLAK) Abstract Only

V T VOROBYEV and D S ORUDZHEVA In its USSR Rept Space (JPRS-USP-85-003) p 107-108 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (USSR), no 3, May-Jun 1984 p 33-38

Avail NTIS HC A08/MF A01

Space information makes it possible to reveal new features of the geology of petroleum and gas regions. The Mangyshlak region was used as an example revealing the effectiveness of its use in exploration work in already known producing regions High-resolution space photographs were used in studying the distribution and inheritance of structures, vertical neotectonic and recent movements, distribution of zones of compression and dilatation, nature and density of dislocations and relationship of known petroleum and gas deposits The photointerpretation operations were performed ranking of lineaments and annular photoanomalies, analysis of hypsometric position and dissection of defined blocks for determining amplitudes of vertical neotectonic and recent movements, study of microrelief. species composition of vegetation, nature of ground cover and degree of ground moistening. The detected petroleum and gas deposits in the Mangyshlak Basin are associated with zones of major neotectonic faults and recent dilatations, regions of positive recent vertical movements and local weak neotectonic uplifts and terntones with average fracturing

N85-25342# Joint Publications Research Service, Arlington, Va EXAMPLE OF JOINT USE OF DATA FROM SURFACE STUDIES AND SPACE PHOTOGRAPHS IN INVESTIGATING DYNAMICS OF ZONE OF NORTH ZERAVSHAN SEISMOGENIC FAULTS

A. I LAVRUSEVICH and D D BUZRUKOV In its USSR Rept. Space (JPRS-USP-85-003) p 108-109 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (USSR), no 3, May-Jun 1984 p 39-43 Original language document announced as A84-43206

Avail NTIS HC A08/MF A01

In the North Zeravshan fault zone the most important structural elements are dislocations, movements along which in large part determine the structural plan and geomorphological features of this area. The results of traditional surface geological research, as well as information obtained from medium-scale black-and-white space photographs taken from a Cosmos satellite and the Salyut-6 orbital station, were used The geological and recent movements of the Zeravshan and Zaknmatabad faults are described Space photograph interpretation yields interesting and valuable information, such as an unusual configuration of the valleys of the left tributaries of Zeravshan River The lower reaches Interpretation of the drainage pattern in general revealed the important placements during the recent tectonic stage. The recent tectonic activity manifested in the landscape and apparent on space photographs, light of proposed hydraulic construction on the Zeravshan River for the purpose of regulating its runoff

N85-25343# Joint Publications Research Service, Arlington, Va RELATIVE GEOLOGICAL INFORMATION YIELD FROM SMALL-SCALE MULTIZONAL SPACE IMAGES (EXAMPLE OF FERGAMA DEPRESSION AND ITS MOUNTAINOUS MARGINS) **Abstract Only** 

ZIMOV In its USSR Rept Space (JPRS-USP-85-003) 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz B G AZIMOV Kosmosa (USSR), no 3, May-Jun 1984 p 44-49 Original language document announced as A84-43207

Avail NTIS HC A08/MF A01

More than 40 sets of space photographs covering the territory of the Fergana intermont depression and its mountainous margins were analyzed for clarifying the relative yield of geological information and the nature of image generalization on small-scale space photographs depending on change in spectral range. The photographs used were from Meteor-Priroda satellites carrying multispectral TV apparatus and taking in four zones of the visible and near-IR ranges The spectral brightness coefficients (SBC) was used as the basic parameter A graph shows the change in spectral brightness coefficients of geological-geomorphological and other natural features as a function of the spectral range used Curves of the photoanomalies for the four types reveal distinctly different averaged SBC, indicating that in the visible range geological-geomorphological features are easily differentiated on the basis of reflectivity. In the near-IR there is a minimum of information on surface geological-geomorphological features, but lines and bands correlating with zones of deep faults, uplifts and depressions of the buried basement stand out

N85-25353# Joint Publications Research Service, Arlington, Va INTERPRETATION OF SPACE PHOTOLINEAMENTS Abstract Only

L. N ROZANOV and I N KALININA In its USSR Rept. Space (JPRS-USP-85-003) p 117 4 Mar 1985 Transl into ENGLISH from Sov Geol (USSR), no 9, Sep 1984 p 81-83 Avail NTIS HC A08/MF A01

A definite pattern of space photolineaments exists, most have northeasterly and northwesterly strikes. The two main systems are traced in all platform regions. Seismic observations along regional profiles help in solving the fracture, the results of interpretation of space survey data should be compared with seismogeological sections along regional profiles. The comparisons show that space photolineaments coincide well with faults both in the upper part of the crust and at considerable depths. It is revealed that almost all lineaments coincide with dislocations or zones of

increased permeability discriminated in the seismological sections, although not all the dislocations apparent in the sections are represented on space photographs. It is postulated that only those dislocations appear at the Earth's surface which are related to the most recent tectonic activation. Space photolineaments represent planetary fissuring manifested in the entire crust or its greater part. The dislocations reflected on space photos and in seismic sections are for the most part zones of crustal dilatation and circulation of fluids

N85-25927\*# Arizona State Univ , Tempe Dept. of Geology. ANALYSIS OF THE GRAN DESIERTO, PINACTE REGION, SONORA, MEXICO, VIA SHUTTLE IMAGING RADAR R GREELEY, P R CHRISTENSEN, J F MCHONE, Y ASMEROM, and J R ZIMBELMAN 1984 106 p refs Sponsored by **NASA** 

(NASA-CR-175711, JPL-9950-1026, NAS 1 26 175711) Avail NTIS HC A06/MF A01 CSCL 17I

The radar discriminability of geolian features and their geological setting as imaged by the SIR-A experiment is examined The Gran Desierto and Pincate volcanio field of Sonora, Mexico was used to analyze the radar characteristics of the interplay of aeolian features and volcano terrain. The area in the Gran Desierto covers 4000 sq km and contains sand dunes of several forms. The Pincate volcanio field covers more than 2 000 sq km and consists primarily of basaltic lavas. Margins of the field, especially on the western and northern sides, include several maar and maar-like craters, thus obtaining information on their radar characteristics for comparison with impact craters

N85-26828# Joint Publications Research Service, Arlington, Va ANALYSIS OF MESOFISSURING ON SPACE PHOTOGRAPHS. NEW TECHNIQUE FOR STUDY OF PETROLEUM AND GAS **DEPOSITS Abstract Only** 

G I AMURSKIY, G A ABRAMENOK, and M N SOLOVYEV In its USSR Rept Space (JPRS-USP-85-004) p 86 6 May 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (Moscow), no 6, Nov - Dec 1984 p 36-41 Avail NTIS HC A06

Zones of mesofissuring are linear (or in the case of their intersection by systems of a different strike, linear-focal) zones of reduced density, within whose areas increased fluid conductivity of rocks is ensured by a branched system of so-called tectonic channels of different scales from ordinary disjunctive dislocations to microfissures On large-scale photographs these zones of mesofissuring can be discriminated in the form of zones of increased density of relatively short (0.5-4 km) lineaments with a width up to several kilometers and with a length of many tens of kilometers. They are characterized by the following. (1) sustained orientation of individual elements, (2) complex unambiguous relationship to known faults, (3) nondependence on local plicative tectonics (the width of the zone of microfissuring frequently exceeds the dimensions of the folds, and (4) presence of systems of fissures of different morphology, such as stepped, sawtooth and echeloned arrangements) Since the formation of such zones results in the appearance of extended zones of intensive reduced density of rocks, their tracing and projection onto the level of productive strata can serve as a basis for solving important problems in study and exploitation of petroleum and gas deposits

N85-27350# Grenoble Univ (France)
A SEISMIC ARGOS DATA COLLECTION PLATFORM

G POUPINET and J P GLOT In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 6 p

Avail NTIS HC A16/MF A01

A network of seismic event detectors transmitting data via ARGOS was installed in the Pyrenees and Mount Etna Each ARGOS unit assumes precise GMT timing, transmission, and earthquake detection by a comparison between the seismic signal and a long term average. The Pyrenees network was compared with a standard seismological network. More than 80% of the automatic picks of earthquake P-arrivals are within 0.2 sec of

those performed by an operator playing back magnetic tapes. The performance ARGOS for microearthquakes within the network are even better. The ease in the installation of the equipment in the field and in processing the data independently of the number of detectors offers the possibility to complement present seismological networks to improve the precision in locating earthquakes and to monitor seismicity on a long term in remote zones. Author (ESA)

#### 05

#### OCEANOGRAPHY AND MARINE RESOURCES

Includes sea-surface temperature, ocean bottom surveying imagery, drift rates, sea ice and icebergs, sea state, fish location

A85-30599\* Jet Propulsion Lab, California Inst. of Tech, Pasadena

### SATELLITE-DERIVED SEA SURFACE TEMPERATURE - WORKSHOP COMPARISONS

E G NJOKU (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) American Meteorological Society, Bulletin (ISSN 0003-0007), vol 66, March 1985, p 274-281 NASA-supported research refs

A series of three workshops was held between January 1983 and February 1984 to assess the current status of global sea surface temperature (SST) measurement from space Workshop participants included sensor scientists, radiative transfer specialists, and users of SST data in the disciplines of oceanography and climate Data from four satellite sensors (three infrared and one microwave) were evaluated by direct comparison with each other and with data from ships, XBTs, and buoys. The satellite data showed good agreement in a global rms sense (about 0.5-1.0 C), but several anomalous regional biases were also observed. The nature of these biases and techniques for their removal require further study.

#### A85-30744

## JOINT EXPERIMENTS PROGRAMME IN REMOTE SENSING OF MARINE FISH RESOURCES

A NARAIN, R N JADHAV, R M DWIVEDI, K L MAJUMDER, G P SHARMA (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), K M JOSEPH, V S SOMVANSHI (Fisheries Survey of India, Bombay, India), E G SILAS, P V R NAIR, G SUBBARAJU (Central Marine Fisheries Research Institute, Cochin, India) et al International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar-Apr 1985, p 569-576 refs

#### A85-30980

#### THEORY OF RADAR IMAGING OF INTERNAL WAVES

W ALPERS (Hamburg, Universitaet, Max-Planck-Institut fuer Meteorologie, Hamburg, West Germany) Nature (ISSN 0028-0836), vol 314, March 21, 1985, p 245-247 refs

Radar images taken over ocean areas, in particular those obtained by the synthetic aperture radar aboard the Seasat satellite in 1978, sometimes show features that seem to be surface manifestations of oceanic internal waves. A theory is presented here which explains the large radar signatures of internal waves in which the imaging is attributed to variations in the short-scale surface roughness induced by current variations associated with internal waves.

A85-31200\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

#### SURFACE RADIATION IN THE TROPICAL PACIFIC

M -D CHOU (NASA, Goddard Space Flight Center, Laboratory for Atmospheres, Greenbelt, MD) Journal of Climate and Applied Meteorology (ISSN 0733-3021), vol 24, Jan 1985, p 83-92 refs

Monthly surface radiative fluxes have been calculated for the tropical Pacific between January 1970 and February 1978, using a radiative transfer parameterization. The radiative transfer parameterization included detailed treatments of the molecular and droplet absorptions, and surface and cloud reflections. The input data used in the calculations were obtained from the National Climatic Center (NCC), the National Center for Atmospheric Research (NCAR), and from the University of Hawaii The results show that the distribution of surface radiation closely follows the distribution of cloudiness, and, to a lesser degree, humidity. The rms net error in the surface radiation estimates was about 15 W per sq m, with the largest contribution from uncertainties in the cloud cover and humidity data. The sensitivity of surface radiation parameterizations to input data errors is discussed, and some accuracy requirements for satellite retrievals of atmospheric and cloud parameters are proposed. The calculations are presented in the annually-averaged maps of surface radiation variations

#### A85-31890

## OPTICAL NONCONTACT METHODS FOR THE STUDY OF THE WORLD OCEAN [OPTICHESKIE NEKONTAKTNYE METODY ISSLEDOVANIIA MIROVOGO OKEANA]

V V POLOVINKO Moscow, Izdateľ stvo Nedra, 1984, 168 p In Russian refs

Remote-sensing and laser techniques for determining the characteristics of the ocean were assessed theoretically and experimentally Attention is given to linear system models of the noncontact laser sounding of the ocean and of the remote sensing of ocean waters and the continental shelf in the visible and near-infrared ranges. The simulation of methods for the optical sounding of the ocean is discussed, and the synthesis of optical noncontact methods for measuring the characteristics of the ocean surface and bottom as well as of the main body of the ocean is described.

#### A85-32103

## PRELIMINARY RESULTS FROM SATELLITE SAR IMAGE SIMULATION EXPERIMENTS

A L GRAY, R K HAWKINS, C E LIVINGSTONE, L D ARSENAULT (Canada Centre for Remote Sensing, Ottawa, Canada), G WESSELS, and R LOWRY (Intera Environmental Consultants, Ltd, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 13-23 refs

A process in which high-resolution airborne SAR imagery is systematically degraded in order to simulate spaceborne SAR imagery appropriate to RADARSAT or ERS-1, is discussed. The image-simulation process consists of reducing the resolution from about 3 m to 25 m using various possible weighting functions in the range and azimuth direction. The simulation uses aircraft SAR images of sea ice and icebergs (Beaufort Sea pack ice and Labrador Sea marginal ice with icebergs) which are acquired by the CCRS SAR-580 system. The simulated images obtained by systematic variation of the final resolution, number of looks, and signal-to-noise ratio from the original images, are qualitatively analyzed The results support the contention that satellite SAR imagery will provide information on a scale and at a resolution that will be invaluable for large area strategic ice forecasting and operational planning. Illustrations derived from digitally processed X-band data are presented M D

#### A85-32104

## A SIMPLE MODEL FOR SATELLITE SAR RADIOMETRIC DISCRIMINATION ESTIMATION

A L. GRAY, R K HAWKINS, and C E LIVINGSTONE (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 25-38 refs

A simple model for radar-pixel brightness distributions which incorporates radar fading, thermal noise, and spatial variability of average backscatter and which can be used to estimate spaceborne SAR-image feature identification using radiometric classification and to simulate SAR imagery from high resolution aircraft imagery, is discussed Studies are carried out on the detection of small multi-year flows in a background of first-year ice and icebergs in the open ocean. The importance of signature contrast is shown, and the improved performance of the C-band in relation to the L-band for the detection of multi-year flows in a cold Arctic ice pack is considered. It is shown that the incidence angle and the windspeed are more important than the frequency for the detection of icebergs in the open ocean. Graphs are used to illustrate the results.

## A85-32112 AUTOMATED COMPUTER MONITORING SEA-ICE TEMPERATURE BY USE OF NOAA SATELLITE DATA

A R CONDAL and H V LE (Department of the Environment, Atmospheric Environment Service, Downsview, Ontario, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 145-150

The present status of the Ice Status System (ISS) which is being developed at the Aerospace Meteorology Division of the Atmospheric Environment Service in Ontario, is discussed The program's goal is to develop a computer assisted image-analysis system for monitoring sea-ice temperature. The system uses the advanced very high-resolution radiometer (AVHRR) data from the National Oceanic and Atmospheric Administration (NOAA) satellites and consists of three steps. The processes of navigation, to within + or - 1 image pixel, and calibration of the data in function of percent albedo (visual channels) and temperature (infrared channels) are examined. After the first two steps, a multiple-channel correction technique is applied to the data. It is shown that this remapping capability provides the user with AVHRR data in which temporal as well as multispectral analysis can be performed Data and results from the Gulf of St Lawrence and Great Lakes areas, which are the test areas for the ISS program, are presented

M D

#### A85-32118

COMPARISON OF METEOSAT-2 AND NOAA-7 DATA USED FOR UNDERSTANDING THE ENVIRONMENT OF ALBACORE IN THE EAST ATLANTIC [COMPARAISON DES DONNEES METEOSAT-2 ET NOAA-7 UTILISEES POUR LA CONNAISSANCE DE L'ENVIRONNEMENT DES THONS EN ATLANTIQUE EST]

J Y LE GALL and J CITEAU (Centre National pour l'Exploitation des Oceans Centre Oceanologique de Bretagne, Brest, France) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 211-221 In French refs

#### A85-32121

## TRANSIENT SEA SURFACE HEIGHT VARIATION AND THE SEASAT-ALTIMETER DATA APPLICATION

W MOON (Manitoba, University, Winnipeg, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 273-282 Sponsorship Natural Sciences and Engineering Research Council of Canada refs

(Contract NSERC-A-7400)

The Seasat Geophysical Data Record (GDR) file includes a number of corrections for instruments, atmospheric effects, coastal effects and geophysical effects. However, the transient sea surface variation due to the ocean circulation and wind surge is not implemented. In this research an interactive numerical modelling scheme is developed to make this correction. The application of the algorithm over the Hudson Bay area of Canada demonstrates that this technique can easily be applied to any regional oceanographic and geophysical research employing satellite altimeter data over a water-covered area.

#### A85-32149

### ON A VERIFICATION PLANE FOR MOS-1 (MARINE OBSERVATION SATELLITE-1)

K ARAI (National Space Development Agency of Japan, Earth Observation Systems Dept, Tokyo, Japan) and C ISHIDA (National Space Development Agency of Japan, Earth Observation Center, Hiki, Saitama, Japan) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 815-822 refs

Field measurement programs being carried out in Japan with visible, IR and microwave scanning radiometers (MSR) to acquaint the users with passive sensing data are described. Emphasis is being placed on defining common features of data for marine and land surfaces and characterizing the sea surface using visible, IR and microwave frequencies. The sensing instruments will eventually be installed on the 750 kg MOS-1 satellite in a 909 km orbit at 99.1 deg inclination. The sensors will be carried on airborne surveys to gather imagery for comparisons with ground truth data regarding snow depth and density, frozen and melt snow, humidity, clouds, liquid and solid ice content, and the effects of high wind speeds over the ocean. The field trials have thus far served in quantifying the effects of the viewing angle and frequency and the definition of a sidelobe correction factor.

#### A85-32166

#### THE WORLD OCEAN CIRCULATION EXPERIMENT

J D WOODS (Kiel, Universitaet, Kiel, West Germany) Nature (ISSN 0028-0836), vol 314, April 11, 1985, p 501-511 refs

The World Ocean Circulation Experiment (WOCE) is being planned to begin in 1990 as a survey of the global distribution of ocean variables, in order to significantly improve estimates of the circulation of heat, water, and chemicals over the world ocean as well as their exchanges with the atmosphere. The data set thus obtained will be used to test computer models of the ocean circulation which are required by decadal climate change predictions. Benefits are also anticipated for researchers in manne chemistry, biology, and geology. The World Climate Research Program, of which WOCE is an element, is divided into three 'streams' respectively concerned with climate prediction over periods of months, years, and decades, it is the last of these time scales that WOCE will address, allowing new determination to be made on such specific phenomena as the climatic effects of CO2 pollution.

A85-32192\* Jet Propulsion Lab , California Inst of Tech , Pasadena

#### **TOPEX GROUND DATA SYSTEM**

S N ROSELL and C A YAMARONE, JR (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p. 112-117 refs

The TOPEX Project is a proposed oceanographic mission to measure the topography of the sea surface for a period of three years This mission is sponsored by the National Aeronautics and Space Administration and managed by the Jet Propulsion Laboratory Measurements of topography are used to study ocean currents, tides, bathymetry and the oceanic geoid Several of the primary goals of this mission are to process and verify the altimetric data, and distribute them within days to the science investigators This paper describes the TOPEX end-to-end ground data system In addition to controlling the TOPEX satellite, the ground data system has been designed to minimize the time from data acquisition to science processing and data distribution centralized design supports the favorable response time of the system and also allows for operational efficiencies. Networking of real time and non-real time elements of the data system provides for more effective data processing

A85-32215\* Jet Propulsion Lab , California Inst of Tech , Pasadena

#### **EARTH AND SPACE SCIENCE - OCEANS**

R H STEWART (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, California, University, Scripps Institution of Oceanography, La Jolla, CA) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p. 295

Satellite observations of the oceans are now being used to obtain new information about the oceanic geoid, currents, winds, tides and the interaction of the ocean with the atmosphere. In addition, satellites routinely relay information from the sea surface to laboratories on land, and determine the position of instruments drifting on the sea surface.

Author

#### A85-32872

## INVESTIGATION OF THE ATMOSPHERIC AEROSOLS AND WATER VAPOR BY THE AVHRR RADIOMETER (VISIBLE AND IR) ON BOARD NOAA-7

T TAKASHIMA and Y TAKAYAMA (Meteorological Research Institute, Tsukuba, Ibaraki, Japan) IN Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p 90-93 refs

An attempt is made to improve the accuracy of sea surface temperature measurements from space through the inclusion of atmospheric correction obtained by multispectral observations by the Advanced Very High Resolution Radiometer (AVHRR) onboard the NOAA-7 satellite. The radiometer detects the emitted radiation in the IR window channels 3 55-3 93, 10 5-11 5, and 11 5-12 5 microns, together with the reflected radiation in the visible window channels 0 58-0 68 and 0 725-1 10 micron. Model computations, compared to the full-scale data, indicate that the presence of water vapor under clear conditions results in an insignificant change in the albedo, in the sunglint under hazy conditions the albedo difference due to wind and visibility conditions changes monotonically with an increase of the zenith angle of observations.

A85-35047\*# California Univ , La Jolla

ESTIMATING OCEAN PRODUCTION FROM SATELLITE-DERIVED CHLOROPHYLL - INSIGHTS FROM THE EASTROPAC DATA SET

R W EPPLEY, E STEWART (California, University, La Jolla, CA), M R ABBOTT (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, California, University, La Jolla, CA), and R W OWEN (NOAA, National Marine Fisheries Service, La Jolla, CA) Scientific Committee on Oceanograpic Research, Symposium on Vertical Motion in the Equatorial Upper Ocean and Its Effects Upon Living Resources, Paris, France, May 6-10, 1985, Paper 7 p refs (Contract NAGW-458)

The EASTROPAC expedition took place in 1967-68 in the eastern tropical Pacific Ocean Primary production was related to near-surface chlorophyll in these data. Much of the variability in the relation was due to the light-history of the phytoplankton and its photoadaptive state. This was due to changes in the depth of mixing of the surface waters more than changes in insolation. Accurate estimates of production from satellite chlorophyll measurements may require knowledge of the temporal and spatial variation in mixing of this region.

#### A85-35164

### THEORY OF SYNTHETIC APERTURE RADAR OCEAN IMAGING - A MARSEN VIEW

K HASSELMANN (Max-Planck-Institut fuer Meteorologie, Hamburg, West Germany), R K RANEY (Canada Centre for Remote Sensing, Ottawa, Canada), W J PLANT (U S Navy, Naval Research Laboratory, Washington, DC), W ALPERS (Hamburg, Universitaet, Max-Planck-Institut fuer Meteorologie, Hamburg, West Germany), R A SHUCHMAN, D R LYZENGA (Michigan, Environmental Research Institute, Ann Arbor, MI), C L RUFENACH (NOAA, Wave Propagation Laboratory, Boulder, CO), and M J TUCKER (Institute of Oceanographic Sciences, Somerset, England) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 4659-4686 refs

This paper reviews basic synthetic aperture radar (SAR) theory of ocean wave imaging mechanisms, using both known work and recent experimental and theoretical results from the Marine Remote Sensing (MARSEN) Experiment Several viewpoints that have contributed to the field are drawn together in a general analysis of the backscatter statistics of a moving sea surface A common focus for different scattering models is provided by the mean image impulse response function, which is shown to be identical to the (spatially varying) frequency variance spectrum of the local complex reflectivity coefficient From the analysis has emerged a more complete view of the SAR imaging phenomenon than has been previously available A new, generalized imaging model is proposed

#### A85-35165\* Oregon State Univ , Corvallis

## A REVIEW OF SATELLITE ALTIMETER MEASUREMENT OF SEA SURFACE WIND SPEED - WITH A PROPOSED NEW ALGORITHM

D B CHELTON (Oregon State University, Corvallis, OR) and P J MCCABE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 4707-4720 refs (Contract NAS7-100)

The scheduled February 1985 launch of a radar altimeter aboard the U.S. Navy satellite Geosat has motivated an in-depth investigation of wind speed retrieval from satellite altimeters. The accuracy of sea surface wind speed estimated by the Seasat altimeter is examined by comparison with wind speed estimated by the Seasat scatterometer. The intercomparison is based on globally distributed spatial and temporal averages of the estimated wind speed. It is shown that there are systematic differences between altimeter and scatterometer wind speed estimates. These differences are traced to errors in the Seasat altimeter geophysical data record wind speed algorithm. A new algorithm is proposed which yields consistent estimates from the two satellite sensors. Using this new algorithm, the rms difference between spatial and

temporal averages of the two wind speed estimates is less than 1 m/s, and their correlation is greater than 0.9 Author

A85-35166° Jet Propulsion Lab, California Inst. of Tech, Pasadena

OBSERVING LARGE-SCALE TEMPORAL VARIABILITY OF OCEAN CURRENTS BY SATELLITE ALTIMETRY - WITH APPLICATION TO THE ANTARCTIC CIRCUMPOLAR CURRENT

L.-L FU (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and D B CHELTON (Oregon State University, Corvallis, OR) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 4721-4739 refs

A new method is developed for studying large-scale temporal variability of ocean currents from satellite altimetric sea level measurements at intersections (crossovers) of ascending and descending orbit ground tracks. Using this method, sea level time series can be constructed from crossover sea level differences in small sample areas where altimetric crossovers are clustered. The method is applied to Seasat altimeter data to study the temporal evolution of the Antarctic Circumpolar Current (ACC) over the 3-month Seasat mission (July-October 1978) The results reveal a generally eastward acceleration of the ACC around the Southern Ocean with meridional disturbances which appear to be associated with bottom topographic features. This is the first direct observational evidence for large-scale coherence in the temporal variability of the ACC It demonstrates the great potential of satellite altimetry for synoptic observation of temporal variability of the world ocean circulation Author

A85-35167\* Naval Postgraduate School, Monterey, Calif A COOL ANOMALY OFF NORTHERN CALIFORNIA - AN INVESTIGATION USING IR IMAGERY AND IN SITU DATA

M M RIENECKER, C N K MOOERS (US Naval Postgraduate School, Monterey, CA), D E HAGAN (California Institute of Technology, Pasadena, CA), and A R ROBINSON (Harvard University, Cambridge, MA) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 4807-4818 Navy-NASA-sponsored research refs

The OPTOMA (Ocean Prediction Through Observation, Modeling and Analysis) program is developing an ocean descriptive-predictive system for four-dimensional data assimilation. It is presently concerned with the mesoscale variability in the California Current System (CCS). The present paper has the objective to assess the relationship of surface temperature structure to subsurface temperature structure and flow fields. Surface temperature anomalies are related to the mesoscale horizontal advective and subsurface mass fields. The cool anomaly off northern California in summer 1982 is discussed, taking into account the temperature structure along transects, T-S variations and inferred water masses, variation of horizontal temperature patterns with depth, and synoptic information from IR data.

A85-35169\* Oregon State Univ, Corvallis
COMMENT ON 'SEASONAL VARIATION IN WIND SPEED AND
SEA STATE FROM GLOBAL SATELLITE MEASUREMENTS' BY

D. SANDWELL AND R. AGREEN

D B CHELTON (Oregon State University, Corvallis, OR) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p.-5001-5008.

(Contract NAS7-100)

**A85-35170\*** Jet Propulsion Lab , California Inst of Tech , Pasadena

SUMMER ARCTIC SEA ICE CHARACTER FROM SATELLITE MICROWAVE DATA

F D CARSEY (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 5015-5034 refs

It is pointed out that Arctic sea ice and its environment undergo a number of changes during the summer period. Some of these changes affect the ice cover properties and, in turn, their response to thermal and mechanical forcing throughout the year. The main objective of this investigation is related to the development of a method for estimating the areal coverage of exposed ice, melt ponds, and leads, which are the basic surface variables determining the local surface albedo. The study is based on data obtained in a field investigation conducted from Mould Bay (NWT), Nimbus 5 satellite data, and Seasat data. The investigation demonstrates that microwave data from satellites, especially microwave brightness temperature, provide good data for estimating important characteristics of summer sea ice cover.

## A85-35171\* Kansas Univ Center for Research, Inc., Lawrence ACTIVE MICROWAVE MEASUREMENTS OF ARCTIC SEA ICE UNDER SUMMER CONDITIONS

R G ONSTOTT and S P GOGINENI (University of Kansas Center for Research, Inc , Lawrence, KS) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 5035-5044 refs

(Contract NAGW-334, N00014-76-C-1105)

Radar provides a valuable tool in the study of sea-ice conditions and the solution of sea-ice operational problems. For this reason, the U.S. and Canada have conducted studies to define a bilateral synthetic aperture radar (SAR) satellite program. The present paper is concerned with work which has been performed to explore the needs associated with the study of sea-ice-covered waters. The design of a suitable research or operational spaceborne SAR or real aperture radar must be based on an adequate knowledge of the backscatter coefficients of the ice features which are of interest In order to obtain the needed information, studies involving the use of a helicopter were conducted. In these studies L-C-X-Ku-band calibrated radar data were acquired over areas of Arctic first-year and multiyear ice during the first half of the summer of 1982. The results show that the microwave response in the case of sea ice is greatly influenced by summer melt, which produces significant changes in the properties of the snowpack and ice sheet

**A85-35172\*** National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

PROCESSES AND IMAGERY OF FIRST-YEAR FAST SEA ICE DURING THE MELT SEASON

B HOLT (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) and S A DIGBY (Canada Centre for Remote Sensing, Ottawa, Canada) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 5045-5062 Research supported by RADARSAT, Canada Centre for Remote Sensing, Department of Energy, Mines and Resources of Canada, Atmospheric Environment Service of Canada, and NASA refs

In June and July 1982, a field program was conducted in the Canadian Arctic on Prince Patrick Island to study sea ice during the melt season with in situ measurements and microwave instrumentation operated near the surface and from aircraft The objective of the program was to measure physical characteristics together with microwave backscatter and emission coefficients of sea ice during this major period of transition. The present paper is concerned with a study of both surface measurements and imagery of first-year fast ice during the melt season. The melting process observed in first-year fast ice was found to begin with the gradual reduction of the snow cover. For a two- to three-day period in this melt stage, a layer of superimposed ice nodules formed at the snow/ice interface as meltwater froze around ice and snow grains.

A85-35173\* Washington Univ, Seattle

## TEMPORAL VARIATIONS OF THE MICROWAVE SIGNATURES OF SEA ICE DURING THE LATE SPRING AND EARLY SUMMER NEAR MOULD BAY, NWT

T C GRENFELL (Washington, University, Seattle, WA) and A W LOHANICK (U S Naval Ocean Research and Development Activity, National Space Technology Laboratories Station, Bay St Louis, MS) Journal of Geophysical Research (ISSN 0148-0227), vol 90, May 20, 1985, p 5063-5074 NASA-supported research refs

(Contract N00014-81-K-0460)

It has been shown that passive microwave imagery obtained from satellite-borne sensors provides an important basis for the study of the polar regions. Because of the optical thinness of high-latitude clouds at microwave frequencies, radiometry can provide all-weather all-time observing capability. However, in order to clarify observational uncertainties and investigate the information content of passive microwave imagery, detailed ground-based observations are needed. Multifrequency data are also required to utilize the strong spectral dependence of both the dielectric properties of liquid water and volume scattering. The present investigation has the aim to provide information of the considered type for the calibration and interpretation of satellite observations of the Arctic during the summer season. Attention is given to instruments and calibration, the field program and the state of the ice cover, and the results.

#### A85-35832

INVESTIGATIONS OF THE OCEAN SURFACE BY RADIOPHYSICAL MEANS FROM AEROSPACE PLATFORMS [ISSLEDOVANIE POVERKHNOST! OKEANA RADIOFIZICHESKIMI SREDSTVAMI S AEROKOSMICHESKIKH NOSITELEI]

V B EFIMOV, A I KALMYKOV, V A KOMIAK, A S KUREKIN, A P PICHUGIN, A B FETISOV, V N TSYMBAL, V P SHESTOPALOV, S A SHILO, and S A VELICHKO (Akademiia Nauk Ukrainiskoi SSR, Institut Radiofiziki i Elektroniki, Kharkov, Ukrainian SSR) Akademiia Nauk SSSR, Izvestiia, Fizika Atmosfery i Okeana (ISSN 0002-3515), vol 21, April 1985, p 349-357 In Russian refs

Results of observations of regions of the ocean by spaceborne (Kosmos-1500 satellite) and airborne side-looking radars and scanning radiometers operating in the millimeter spectral region are discussed Radar images of the Pacific Ocean south of Kunl Islands are also analyzed, they reveal the presence of mesoscale inhomogeneities on the ocean surface with typical dimensions of 5-20 km and radar contrasts of 2-5 dB. It is pointed out that the side-looking radar is effective in detecting active substances on the surface of the ocean, this is demonstrated using images of the Sea of Japan and of the vicinity of two islands.

#### A85-35879

AIRBORNE MEASUREMENTS OF THE SEA STATE FROM MIRROR REFLECTIONS OF THE BEAM OF A CONTINUOUS-WAVE LASER [SAMOLETNYE IZMERENIIA MORSKOGO VOLNENIIA PO ZERKAL'NYM OTRAZHENIIAM LUCHA NEPRERYVNOGO LAZERA]

F V BUNKIN, K I VOLIAK, A I MALIAROVSKII, V G MIKHALEVICH, M V SOLNTSEV, T B SHEVCHENKO, and I V SHUGAN (Akademiia Nauk SSSR, Institut Obshchei Fiziki, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol 281, no 6, 1985, p 1441-1445 In Russian refs

#### A85-36427

MEASUREMENT OF THE CONDITION OF THE SEA BY IONOSPHERIC BACKSCATTER RADAR [MESURE DE L'ETAT DE LA MER PAR UN RADAR A RETRODIFFUSION IONOSPHERIQUE]

J PARENT DU CHATELET (Etablissement d'Etudes et de Recherches Meteorologiques, Boulogne-Billancourt, Hauts-de-Seine, France) Navigation (Paris) (ISSN 0028-1530), vol 33, April 1985, p 165-172 In French

The principles of meteo-oceanic parameter measurements are introduced, and the HF sky-wave radar equipment at Valensole is described. The maximum range of the radar, which depends on the reflector-layer altitude and on the frequency used, varies between 2500 and 4000 km. Consideration is given to the question of how to recognize the noise signal that is received and how to extract from it the information concerning the sea surface. The solution involves not only the detection of the echo amplitude but also a comparison of the phase of the received signal with that of the emitted signal. Results are presented which show that wind-directions measured by the radar are in good agreement with meteorological maps.

#### A85-36570

## ON THE MICROWAVE REFLECTIVITY OF SMALL-SCALE BREAKING WATER WAVES

M L BANNER (New South Wales, University, Kensington, Royal Australian Navy, Research Laboratory, Darlinghurst, New South Wales, Australia) and E H FOOKS (New South Wales, University, Kensington, Australia) Royal Society (London), Proceedings, Series A - Mathematical and Physical Sciences (ISSN 0080-4630), vol 399, May 8, 1985, p 93-109 Research supported by the Royal Australian Navy and University of New South Wales refs

The aim of this paper is to elucidate the microwave reflectivity properties of small-scale breaking water waves, which are a widespread feature of the wind-driven air-sea interface. By using a laboratory wave flume in which a small-scale breaking wave was held stationary against an opposing current, a detailed investigation of the microwave reflectivity at X-band revealed significantly enhanced levels of local backscattered power from the crest regions of small-scale breaking waves. A surprising level of organization is discovered in the hydrodynamic disturbances generated in such breaking zones. Their wavenumber-frequency spectral properties are reported in detail, from which it is concluded that the microwave reflectivity is consistent with Bragg scattering from these disturbances. The application of these findings to active microwave remote sensing of the oceans is discussed.

#### A85-37114

DETERMINATION OF SEA-ICE CONCENTRATION ACCORDING TO SATELLITE IMAGERY [OPREDELENIE SPLOCHENNOST! MORSKIKH L'DOV PO AEROKOSMICHESKIM IZOBRAZHENIIAM]

V IU ALEKSANDROV, A V BUSHUEV, and V S LOSHCHILOV (Gosudarstvennyi Komitet SSSR po Gidrometeorologii i Kontroliu Prirodnoi Sredy, Arkticheskii i Antarkticheskii Nauchno-Issledovatel'skii Institut, Leningrad, USSR) Issledovanie Zemli iz Kosmosa (ISSN 0205-9614), Mar -Apr 1985, p 5-11 In Russian refs

Analytical expressions are derived to determine the concentration of sea-ice according to satellite imagery. Two versions of an interactive computer algorithm for processing sea-ice imagery are proposed, based on the analytical expressions. Sample photographs of sea-ice formations obtained by the Meteor-25 satellite are provided.

A85-37269\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

## AN EVALUATION OF 685 NM FLUORESCENCE IMAGERY OF COASTAL WATERS

H H KIM (NASA, Goddard Space Flight Center, Greenbelt, MD, Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Optoelektronik, Oberpfaffenhofen, West Germany), H VAN DER PIEPEN, V AMANN (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Optoelektronik, Oberpfaffenhofen, West Germany), and R DOERFFER (Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt mbH, Geesthacht, West Germany) ESA Journal (ISSN 0379-2285), vol 9, no 1, 1985, p 17-27 refs

To evaluate the possible application of sunlight-illuminated fluorescence at 685 nm for remote sensing of phytoplankton concentrations, an ocean-color scanner is flown on an aircraft. The results of an analysis of the scanner data, obtained from a series of test flights conducted along the Elbe River and its estuary in the North Sea, show that 685 nm fluorescence is a promising remote-sensing method. The observation of a strong correlation between the fluorescence yields and the chlorophyll concentrations determined by the absorption method which uses the reflectance ratio of blue/green channels, is discussed. The two methods are compared and it is shown that the fluorescence method has an edge over the other due to the data-processing algorithm and its applicability for surveying bio-resources in all types of water. Photographs of the chlorophyll patterns are presented.

#### A85-37511

A METHOD FOR DETERMINING ANTARCTIC LAND ICE PARAMETERS FROM SATELLITE MULTICHANNEL MICROWAVE MEASUREMENTS [METODIKA OPREDELENIIA PARAMETROV MATERIKOVOGO L'DA ANTARKTIDY PO DANNYM MNOGOKANAL'NYKH SVCH IZMERENII S ISZ] IU G SPIRIDONOV and V V OZERKINA IN Methods for the

IU G SPIRIDONOV and V V OZERKINA IN Methods for the remote sensing from space of meteorological parameters of the atmosphere Leningrad, Gidrometeoizdat, 1984, p 118-128 In Russian refs

A method is proposed for determining the parameters of random inhomogeneities of land ice from satellite microwave measurements at three wavelengths. A description of the algorithm, results of model calculations, and preliminary results of determining the Antarctic land ice parameters are included. The latter are based on radiometric thermal radiation measurements performed by the Meteor-Priroda satellite at wavelengths of 0.8, 1.35, and 4 cm. It is pointed out that the main source of error during the interpretation of data is the discrepancies among the sighting angles and, therefore, radiation incidence angles at difference wavelengths.

#### LT

#### A85-37729

### MARINE AEROSOL OPTICAL DEPTH FROM SATELLITE-DETECTED RADIANCE

P A DURKEE, E E HINDMAN, T H VONDER HAAR (Colorado State University, Fort Collins, CO), and D R JENSEN (US Naval Ocean Systems Center, San Diego, CA) IN Conference on Satellite/Remote Sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, Preprints Boston, MA, American Meteorological Society, 1984, p 11-14 refs

(Contract-N00014-79-C-0793, NAVY\_PROJECT\_WR03302)...

The use of satellite-borne sensors to determine aerosol optical depth (AOD) and/or relative humidity (RH) over water is investigated experimentally by comparing almost simultaneous Nimbus-7 Coastal Zone Color Scanner and NOAA-7 AVHRR images with airborne measurements of atmospheric state variables and aerosol particle size, number, and composition obtained off the coast of southern California on October 7, 1982. The results are presented in graphs and discussed it is found that satellite-detected radiance is positively correlated with AOD, that extinction is related to RH in the manne boundary layer (permitting the use of satellite radiance data to estimate RH), and that particles above the boundary layer can be detected (in significant amounts) from the ratio of red to near-IR radiance.

#### A85-37752\*

## ARCTIC ATMOSPHERE - ICE INTERACTION STUDIES USING NIMBUS-7 SMMR

M. R ANDERSON and R G CRANE (Cooperative Institute for Research in Environmental Sciences, Boulder, CO) IN Conference on Satellite/Remote Sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, Preprints Boston, MA, American Meteorological Society, 1984, p 132-136 refs (Contract NAGW-363, NSF DPP-81-7265)

The use of data from the Scanning Multichannel Microwave Radiometer (SMMR) on board Nimbus 7 for studying ice-atmosphere interactions is discussed with reference to two case studies, one for the Greenland Sea and the other for the Sea of Okhotsk, for April/May 1979 By using SMMR data, rapid changes in ice extent and concentration have been observed in association with changes in synoptic atmospheric circulation Case studies and analyses of sample data indicate that ice concentration estimates may be accurate to within 10 percent V.L.

A85-37754\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

## SATELLITE DERIVED ATMOSPHERE WATER VAPOR AS A TRACER OF LARGE SCALE INTERACTIONS BETWEEN THE ATMOSPHERE AND OCEAN

D A SHORT and C PRABHAKARA (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, MD) IN Conference on Satellite/Remote Sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, Preprints Boston, MA, American Meteorological Society, 1984, p 143-148 refs

Two water-vapor distributions and the accompanying circulation patterns which occurred over the North and South Atlantic Ocean during February 1979 are described it is shown that scanning multichannel microwave radiometer observations from the Nimbus-7 satellite are used to remotely sense the vertically integrated atmospheric water vapor and liquid water, and the surface wind speed over the ocean and that they provide evidence of the events revealed in the satellite observations, FGGE data are used

#### A85-37979

### MAPPING OF COASTAL-WATER TURBIDITY USING LANDSAT IMAGERY

L T LINDELL (Statens Naturvardsverk, Uppsala, Sweden), O STEINVALL, TH CLAESSON (Forsvarets Forskningsanstalt, Linkoping, Sweden), and M JONSSON (SAAB-Scania AB, Forsvarets Forskningsanstalt, Linkoping, Sweden) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 629-642 Research sponsored by the Swedish Board for Space Activities, Forsvarets Forskningsanstalt and Statens Naturvardsverk refs

Secchi disk depth was recorded in the field all along the Swedish coastline and compared with LANDSAT data. Chromaticity analysis was applied in the evaluation to allow for sun angle and atmospheric corrections. The data were used to study the relative nutrient and solids loading situations around the Swedish coast and as a basis for the applicability of laser bathymetry for water depth soundings.

Author

#### A85-37986

EVALUATION OF SENSITIVITY DECAY OF COASTAL ZONE COLOUR SCANNER (CZCS) DETECTORS BY COMPARISON WITH IN SITU NEAR-SURFACE RADIANCE MEASUREMENTS

S M SINGH, A P CRACKNELL (Dundee, University, Dundee, Scotland), and D SPITZER (Nederlands Instituut voor Onderzoek der Zee, Ab Den Burg, Netherlands) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 749-758 Research supported by the Science and Engineering Research Council of England refs

A85-37987\* National Aeronautics and Space Administration Langley Research Center, Hampton, Va

## BRIGHT SPOT ANALYSIS OF OCEAN-DUMP PLUMES USING LANDSAT MSS

D E BOWKER (NASA, Langley Research Center, Hampton, VA) and S R LECROY (Kentron International, Inc., Hampton, VA) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 759-771 refs

Identifying ocean-dumped materials by analysing the upwelled solar energy from the plume is complicated by the dispersion of the plume and the spectral absorption of the water. It is shown that the spectral analysis of ocean-dump plumes, using Landsat multispectral scanner (MSS) data, should be confined to the brightest area within the plume, the region where the waste material is least dispersed and nearest the surface. The decay of the upwelled radiance with time of the brightest pixel within the plume, at least for iron acid waste, is predictable. An accurate age determination of an acid plume is limited by striping within the MSS data.

Author

#### A85-38578

ASSESSMENT OF SOME METHODS FOR INCREASING THE INFORMATION CONTENT OF AN ACTIVE-PASSIVE MICROWAVE REMOTE SENSING SYSTEM [OTSENKA NEKOTORYKH SPOSOBOV POVYSHENIIA INFORMATIVNOSTI AKTIVNO-PASSIVNOGO SVCH KOMPLEKSA DISTANTSIONNOGO ZONDIROVANIIA]

M O DRABKIN and S M SERGUNIN IN Radio-physical method for the study of the natural environment Leningrad, Gidrometeoizdat, 1984, p 12-21 In Russian refs

An assessment is made of several methods for increasing the information content of an airborne remote sensing system, consisting of a side-looking radar and a microwave radiometer, while decreasing instrumental errors. The analysis takes into account the effects of aircraft roll, variations in the signal-to-noise ratio, space-time averaging of signals reflected from the underlying surface, and improvements in the calibration accuracy of the two instruments. It is concluded that the methods considered provide for a considerable increase in the information content of the system. The age determination of sea ice is considered as an application of the system described.

#### A85-38681

METHODS FOR THE METEOROLOGICAL INTERPRETATION OF SATELLITE SPECTRAL MEASUREMENTS [METODY METEOROLOGICHESKOI INTERPRETATSII SPUTNIKOVYKH SPEKTRAL'NYKH IZMERENII]

A I BURTSEV, ED and A B USPENSKII, ED Leningrad, Gidrometeoizdat (Gosudarstvennyi Nauchno-Issledovatel'skii Tsentr Izucheniia Prirodnykh Resursov, No 16), 1984, 144 p in Russian For individual items see A85-38682 to A85-38696

Contributions deal with the methods for the derivation of quantitative meteorological information from satellite radiometric measurements in the IR and microwave spectral regions. The topics discussed include the remote sensing of vertical temperature and humidity profiles in the atmosphere, determination of water surface temperature, characterization of wind based on cloud observations from geostationary satellites, and assessment of the longwave component of radiation balance. Methods for computing the emissivity of the Antarctic land ice are presented, as well as several numerical experiments.

#### A85-38712

DISTINGUISHING HOMOGENEOUS REGIONS OF WATER SURFACES ON THE BASIS OF SPACE IMAGERY (VYDELENIE ODNORODNYKH ZON VODNYKH POVERKHNOSTEI PO DANNYM KOSMICHESKOI S'EMKI)

S M SAZHIN IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 61-70 In Russian

The digital processing techniques used for the sea surface data retrieved from the MSU-4M instrument onboard the Meteor

satellite, operating in spectral regions of 0.5-0.6, 0.6-0.7, 0.7-0.8, and 0.8-1.1 micron, are outlined. Numerical experiments are performed in which those regions of Azov Sea images that are homogneous with respect to their spectral parameters as distinguished. The numerical experiments indicate that the proposed method for thermatic analysis can be used successfully for near-real-time processing. The remote sensing data are compared to shipborne observations.

#### A85-38819

## DIGITAL PROCESSING OF SINGLE-BAND (33.6 GHZ) MICROWAVE IMAGERY FOR SEA ICE CLASSIFICATION

L D FARMER and D T EPPLER (US Navy, Bay St Louis, MS) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 167-173 refs

The Ka-band Radiometric Mapping System (KRMS) program has mainly the objective to develop an operational imaging system which can produce detailed information concerning sea ice conditions over broad regions of the arctic. In connection with this aim, methods suitable for automated classification of different investigation is concerned with a simple classification method which is based on Ka-band brightness temperatures alone. The method represents an initial step toward automated classification of Ka-band images of ice. The investigation has the purpose to define the extent to which KRMS brightness temperature data alone can be used to discriminate between winter ice types it is found that open water, new ice, old ice, and young/first-year ice are segmented reliably. However, second-year ice is indistinguishable from multilayer ice, and young ice is indistinguishable from first-year ice.

A85-38866\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### AIRBORNÉ DOPPLER RADAR VELOCITY MEASUREMENTS OF PRECIPITATION SEEN IN OCEAN SURFACE REFLECTION

D ATLAS (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Maryland, University, College Park, MD) and T J MATEJKA (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, MD, National Center for Atmospheric Sciences, Boulder, CO) Journal of Geophysical Research (ISSN 0148-0227), vol 90, June 20, 1985, p 5820-5828 refs

The use of airborne or spaceborne radars to observe precipitation simultaneously directly and in reflection could provide significant new opportunities for measuring the properties of the precipitation, wind field, and ocean surface. Atlas and Meneghini (1983) have proposed that the difference between direct and reflected precipitation echo intensities observed with a nadir-directed beam is a measure of two-way attenuation and thus of path average rain rate, taking into account an employment of direct and reflected echoes from very near the ocean surface to direct and reflected echoes from very near the ocean surface to mormalize for ocean surface scatter. In the present paper, some key meteorological and oceanographic research applications are illustrated, giving particular attention to airborne Doppler radar velocity measurements of the precipitation.

N85-22860# Admiralty Underwater Weapons Establishment, Portland (England)

### THE IMAGING OF INTERNAL WAVES BY THE SEASAT-A SYNTHETIC APERTURE RADAR

M T BAGG and K I JOHNSON (Newcastle-upon-Tyne Polytechnic, England) Aug 1984 28 p refs (ARE(PORTLAND)TN-720/84, BR93397) Avail NTIS HC A03/MF A01

Results from 5 million sq km of optical survey processed SEASAT-SAR imagery of the Northeast Atlantic are presented Markings attributed to internal wave activity were collated on maps with the bathymetry and surface meteorology. Two thirds of the imagery shows evidence of such activity. The markings occur

extensively at locations from Iceland to the Azores Simple analysis techniques were applied systematically to compare the very large data sets involved. The characteristics of the internal wave features are discussed. Imagery of the region between Scotland and Iceland is studied.

Author (ESA)

N85-23203\*# Delaware Univ , Newark Coll of Marine Studies ASSESSING LANDSAT TM AND MSS DATA FOR DETECTING SUBMERGED PLANT COMMUNITIES

S G ACKLESON and V KLEMAS *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 325-336 Jan 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 08B

The spectra, spacial, and radiometric characteristics of LANDSAT TM and MSS data for detecting and monitoring submerged plant communities were assessed. The following preliminary results focus upon the spectral aspects of the problem in which a submerged plant canopy is to be distinguished from a surrounding bottom of sand or mud. The effectiveness of an orbiting sensor in discriminating between submerged features and how strongly the bottom signal is attenuated by the water column. In optically shallow water the inherent contrast is the controlling factor. Thus, the optimum sensor band is that which correlates with the greatest inherent contrast between the submerged features. In optically deeper water, the optimum sensor band is that in which the bottom signal is attenuated the least.

N85-23237\*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va

CHARACTERISTIC VECTOR ANALYSIS OF INFLECTION RATIO SPECTRA: NEW TECHNIQUE FOR ANALYSIS OF OCEAN COLOR DATA

G W GREW Apr 1985 26 p refs (NASA-TP-2428, NAS 1 60 2428, L-15885) Avail NTIS HC A03/MF A01 CSCL 05B

Characteristic vector analysis applied to inflection ratio spectra is a new approach to analyzing spectral data. The technique applied to remote data collected with the multichannel ocean color sensor (MOCS), a passive sensor, simultaneously maps the distribution of two different phytopigments, chlorophyll alpha and phycoerythrin, the ocean. The data set presented is from a series of warm core ring missions conducted during 1982. The data compare favorably with a theoretical model and with data collected on the same mission by an active sensor, the airborne oceanographic lidar (AOL).

N85-23271\*# Pennsylvania State Univ , University Park Dept of Meteorology

ANALYSIS OF THE INFLOW LAYER AND AIR-SEA INTERACTIONS IN HURRICANE FREDERIC (1979) Annual Progress Report

W M FRANK Apr 1985 8 p refs (Contract NAG5-398)

(NASA-CR-175616, NAS 1 26 175616) Avail NTIS HC A02/MF A01 CSCL 04B

The current study is attempting to overcome the problem of uncertain heights of the satellite winds. The effective heights of the satellite wind vectors were determined. Satellite, aircraft, rawinsonde and surface wind measurements were integrated into a three dimensional analysis of the storm in flow layer over water. Similar analyses of the thermodynamic field in the inflow layer were conducted. Diagnostic budget analyses of moisture, sensible heat kinetic energy and momentum in the inflow layer were conducted. Air-sea interactions were also examined.

N85-23820\*# Kansas Univ Center for Research, Inc , Lawrence Remote Sensing Lab

LARGE SPACE ANTENNA TECHNOLOGY APPLIED TO RADAR-IMAGING, RAIN-RATE MEASUREMENTS, AND OCEAN WIND SENSING

R K MOORE and S P GOGINENI In NASA Langley Research Center Large Space Antenna Systems Technol, 1984 p 97-108 Apr 1985 refs

Avail NTIS HC A20/MF A01 CSCL 20N

During the last decade, the utility of spaceborne microwave remote sensing systems for ocean windspeed measurement, ocean wave imaging and sea ice studies was demonstrated. Development of large space antennas offers some interesting possibilities for rain rate measurements, ocean and ice studies, and radar imaging. The joint use of active and passive sensors using the 15 m antenna for ocean, ice, and soil moisture studies, rain rate measurements, and radar imaging is considered. Verification of the frequency agile rain radar concept with Shuttle offers the possibility of much needed rain rate statistics over the ocean.

N85-23874# Atmospheric Environment Service, Downsview (Ontario)

PROJECT PAPA: THE INTEGRATION OF DRIFTING BUOY DATA INTO AN OPERATIONAL METEOROLOGICAL SERVICE D A BOURQUE In CNES Data Collection and Platform Location by Satellite 5 p 1980 refs
Avail NTIS HC A07/MF A01

The Canadian Atmospheric Environment Service (AES) deployed expendable drifting meteorological buoys in the North-East Pacific Ocean Because the data from the buoys are required in real-time a Local User Terminal (LUT) was developed to ingest, decode, identify, sort data, convert platform sensor data to engineering units, compute platform locations, encode the data into WMO DRIBU code messages and issue the messages on meteorological circuits, within an acceptable real-time frame. The success of the LUT revealed potential expansions of the Canadian observational system into other remote areas, and forced the AES to adopt a non-AES-user policy.

N85-23875# Danish Meteorological Inst, Copenhagen APPLICATIONS OF ARGOS DATA COLLECTION SYSTEMS IN ARCTIC REGIONS

F JENSEN In CNES Data Collection and Platform Location by Satellite 12 p 1980

Avail NTIS HC A07/MF A01

The Royal Danish Meteorological Institute agreed to maintain a minimum net of meteorological observations points in Greenland This obligation is partly fulfilled by automatic observation stations. These stations are on remote locations and the most convenient method to communicate data is by METEOSAT and ARGOS data collecting systems. In the most northern part of Greenland geostationary satellites decline below the horizon and only ARGOS can be used. A ground station was established in Greenland to obtain real-time data from the ARGOS System Problems related to operating ARGOS platforms in the Arctic are discussed.

Author (ESA)

N85-23879# National Research Inst of Fisheries, Lisbon (Portugal)

AUTOMATIC BUOYS TO ASSIST THE TUNA FISHERY OFF THE AZORES

G L FIALHO and V R P BARROS *In* CNES Data Collection and Platform Location by Satellite 11 p 1980

Avail NTIS HC A07/MF A01

The sea surface temperature in the Azores tuna fishery was measured by airborne precision radiation thermometers and by stations every 15 days Calibration at sea of radiation thermometers in real time with data from buoys is described Surface temperature and the temperature of mixed layers are compared Mixed layer depth and its stability in the Azores are discussed Sea current speed and direction, and effects of weather conditions on sea surface temperature were studied Data reception delay was analyzed with telex and telephone data terminal experience Buoys,

beacons, transmitters and receivers are described Battery consumption of the buoys is presented as well as problems of transport, mooring and recovering buoys

Author (ESA)

N85-23883# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

DATA COLLECTION AND PLATFORM LOCATION BY

DATA COLLECTION AND PLATFORM LOCATION BY SATELLITE: ARGOS USERS' CONFERENCE

1981 96 p refs Conf held in Bergen, 3-4 Mar 1981 Avail NTIS HC A05

The ARGOS system, ARGOS equipment, offshore data collection, ocean circulation, sea surface temperature mapping, iceberg drift, oceanographic uses of ARGOS, and meteorological uses of ARGOS are discussed

N85-23887# Continental Shelf Inst, Trondheim (Norway)
OPERATIONAL EXPERIENCES WITH THE ARGOS SYSTEM IN
OCEANOGRAPHY AND OIL SPILL EMERGENCY PLANNING.
FUTURE PLANS FOR THE USE OF THE ARGOS SYSTEM AS
A COMPONENT IN OFFSHORE DATA COLLECTION SYSTEM
B A FOSSUM and T AUDUNSON In CNES Data Collection
and Platform Location by Satellite 7 p 1981
Avail NTIS HC A05/MF A01

The need for and advantages of a satellite transmission system for positioning and ocean data acquisitions are sketched

Author (ESA)

#### N85-23888# Kiel Univ (West Germany)

#### CIRCULATION PATTERN OF THE NORTH ATLANTIC, PART OF THE WARMWATER SPHERE RESEARCH EFFORT AT KIEL UNIVERSITY

W KRAUSS and J MEINCKE *In* CNES Data Collection and Platform Location by Satellite 10 p 1981 refs

Avail NTIS HC A05/MF A01

The North Atlantic current system is described About 30 Sv of the Gulf Stream waters recirculate south of the Grand Banks towards the Southwest. The remaining 35 Sv follow the bottom topography towards NE. It is expected that 10 Sv turn towards the Azores and the remaining 25 Sv form the North Atlantic Current As derived from hydrographic sections, this current should pass the North Atlantic Ridge near the Charly-Gibbs-Fracture Zone and should split into several branches east of the ridge. The main branches are the Portugal Current, the Norwegian Current and the Irminger Current. The ARGOS system could study the source area of the North Atlantic current and oceanwide features, but is too expensive.

## N85-23891# Norwegian Meteorological Inst, Blindern SOME EXPERIENCE FROM ARGOS STATIONS IN THE OPEN SEA

C K JENSEN In CNES Data Collection and Platform Location by Satellite 6 p 1981

Avail NTIS HC A05/MF A01

Buoy projects using the ARGOS system are summarized A meteorological buoy was anchored 200 nautical miles SW of Iceland Three free drifting First GARP Global Experiment (FGGE) buoys were deployed SW of Iceland Two free drifting FGGE buoys were deployed in the NE and NW Atlantic Three ships were equipped with ARGOS stations

Author (ESA)

# N85-23893# Danish Meteorological Inst, Copenhagen APPLICATIONS OF ARGOS DATA COLLECTION SYSTEM FOR AUTOMATIC METEOROLOGICAL OBSERVATORIES IN ARCTIC REGIONS

F JENSEN In CNES Data Collection and Platform Location by Satellite 17 p 1981

Avail NTIS HC A05/MF A01

The Royal Danish Meteorological Institute agreed to maintain a minimum net of meteorological observations points in Greenland This obligation is partly fulfilled by automatic observing stations. These stations are on remote locations and the most convenient method to communicate data is by Meteosat and ARGOS data collecting systems. In the most northern part of Greenland

geostationary satellites decline below the horizon and only ARGOS can be used A ground station was established in Greenland to obtain real-time data from the Argos System Problems related to operating ARGOS platforms in the Arctic are discussed

Author (ESA)

#### N85-24350# Polar Research Lab, Inc., Santa Barbara, Calif NEW DIRECTIONS IN ARGOS INSTRUMENTATION AT POLAR RESEARCH LAB (PRL)

W P BROWN and J ANDERSON In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 15 p 1981 refs

Avail NTIS HC A08/MF A01

A TIROS Arctic drifter for iceberg tracking and meteorological data, a buoy for water surface layer tracking, an iceberg tracker, mini ocean buoys, a thermistor string buoy for ocean current profiles, a conductivity buoy, a fishing boat tracker, an ARGOS/NAVSAT buoy for ice packs, an automatic weather station, and a polar bear tracker are described

Author (ESA)

N85-24351# Bristol Aerospace, Ltd., Winnipeg (Manitoba)
FOURIER TRANSFORM OF WAVE DATA ON ARGOS BUOYS
W R WHITEHEAD In CNES Proc of the ARGOS Users Conf
on Data Collection and Platform 5 p 1981
Avail NTIS HC A08/MF A01

An ARGOS buoy which measures ocean waves and performs on-board analysis of the data before it is transmitted is described Data is collected for 30 min and processed to find the mean heave, largest wave, and average period Then a Fourier transform of the wave data is computed The processed data is recorded on cassette tape and transmitted, in summary form, via the ARGOS satellite

Author (ESA)

N85-24354# Scripps institution of Oceanography, La Jolla, Calif Inst of Oceanography

### SURFACE CURRENTS IN THE TROPICAL PACIFIC DURING 1979-1980 USING DRIFTING BUOYS

W PATZERT and G J MCNALLY In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 5 p 1981 refs

Avail NTIS HC A08/MF A01

Results from the 60 satellite-tracked drifting buoys deployed in the NORPAX Hawaii/Tahiti Shuttle Experiment are discussed Although the primary objective of this project was to describe the variations of the near surface flow in the North Equatorial Countercurrent (NECC) and Current (NEC) on seasonal and shorter time scales, buoys were also deployed in the equatorial waveguide, i.e., 3N to 3S. The NECC exhibits strong annual variations in zonal flow, NECC meandering is present during most of the year, the NEC is steadlest and strongest between 9 and 12N. All buoy trajectories reveal inertial motions with amplitudes of + or - 20 cm/sec, the same amplitude as the mesoscale and annual signals.

N85-24356# Beak Consultants Ltd , Richmond (British Columbia)

#### INFERENCES OF FUTURE OPERATIONS DRAWN FROM PAST AND PRESENT APPLICATIONS OF DRIFTING BUOYS

N E J BOSTON *In* CNES Proc of the ARGOS Users Conf on Data Collection and Platform 5 p 1981 refs Avail NTIS HC A08/MF A01

In the subarctic North Pacific, drifting buoys are investigated as a mean of replacing the data gathering capabilities of ocean weather station P (or ship PAPA) In the eastern Arctic, drifting buoys provide current data in the ice and iceberg infested waters of Davis Strait The intergovernmental oceanographic commission, and the World Meteorological Organization, are investigating meteorological and oceanographic applications of drifting buoys which may provide products to incorporate into Integrated Global Ocean Station System Local studies are responses to immediate needs and tend to be industry oriented and supported Regional studies are related to national interests (weather, fishenes) and are sponsored by national governments Global studies have

applied and basic research applications which require international support. A center which assists in operations, is a clearing house of information, coordinates studies, and disseminates data is seen as the next development in drifting buoy technology.

Author (ESA)

N85-24358# National Oceanic and Atmospheric Administration, Bay St. Louis, Miss. Data Buoy Office

US PROGRAM IN ANCHORED DATA BUOY AND THE OTHER FIXED OBSERVATION PLATFORMS

J C MCCALL In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 11 p 1981

Avail NTIS HC A08/MF A01

The NOAA Data Buoy Office (NOBO) develops and operates moored buoys in all US coastal and offshore waters from New England to Hawaii (including the Great Lakes) to provide real-time environmental measurements in data-sparse areas for the National Weather Service and other public and private users. The NOBO also has a program for development, deployment, and operation of drifting buoys, which provide environmental measurements in the South Atlantic and Pacific from Chili to Australia and in the Northern Hemisphere. In addition, NOBO develops, deploys, and operates special purpose environmental measuring systems for other government agencies, particularly for petroleum-related purposes, and has an engineering development effort in procuring new and improved sensor and communications systems

Author (ESA)

N85-24359# National Research Inst for Oceanology, Stellenbosch (South Africa)

#### ONE THOUSAND DAYS IN THE BRINE

C C STAVROPOULOS and P A LEROUX (South African Weather Bureau, Pretoria) *In* CNES Proc of the ARGOS Users Conf on Data Collection and Platform 11 p 1981

Avail NTIS HC A08/MF A01

Twenty-three satellite tracked ARGOS drifting buoys were deployed in the Southern Ocean. The buoys continue working for 1000 days, with no instrument problems or broadcasting failures, but a high loss rate due to bad handling and electronics deficiencies is reported. The contribution of one buoy to meteorological data acquisition in the southern hemisphere is outlined. Author (ESA)

N85-24362# Department of Environment, Ottawa (Ontario) Atmospheric Environment Services

THE DEVELOPMENT OF AN AUTOMATED MARINE METEOROLOGICAL DATA SYSTEM

R VOCKEROTH In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 8 p 1981 Avail NTIS HC A08/MF A01

A real-time meteorological data buoy system using FGGE-type drifting buoys and an ARGOS local user terminal were developed Expansion of the system to include anemometer buoys and shipboard automatic platforms is discussed Projected operating costs are given

Author (ESA)

N85-24364# National Marine Fisheries Service, La Jolla, Calif Southwest Fisheries Center

#### TRACKING PELAGIC DOLPHINS BY SATELLITE

J G JENNINGS and R K STIVES In CNES Proc of the ARGOS Users Conf on Data Colection and Platform 6 p 1981 refs

Avail NTIS HC A08/MF A01

Two dolphins fitted with transmitter packs were tracked by plane and satellite for 1 week. The plane was equipped with a receiver similar to that onboard the satellite, but modified to serve as an automatic direction finder. Ground truth was collected from the plane during the orbits. The transmitter pack prototype weighed 907 gm and was packaged in 2 cylinders, measuring 17.5 x 5 cm. To conserve batteries, the units were clocked on daily for 4 hr, corresponding to the best satellite orbits. The 1 W antenna was mounted on a pedestal. Satellite position determinations are 2 to 10 km from actual locations. The packs must be reduced in

diameter for longterm application to pelagic dolphins

Author (ESA)

N85-24366# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

DATA COLLECTION AND PLATFORM LOCATION BY SATELLITE: ARGOS USERS' CONFERENCE

1982 196 p refs Partly in FRENCH and ENGLISH Confided at Pans, 20-22 Apr 1982

Avail NTIS HC A09

Use of the ARGOS satellite data collection and platform location system in oceanography, meteorology, biology, and hydrology was discussed Mantime applications and ARGOS equipment were described

N85-24367# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

#### THE ARGOS SYSTEM MAIN CHARACTERISTICS

J L BESSIS In its Data Collection and Platform Location by Satellite ARGOS Users' Conf p 1-10 1982 In FRENCH, ENGLISH summary

Avail NTIS HC A09/MF A01

The ARGOS satellite based localization system is described. The user platform weighs only 2 kg, so can be carried by a wide range of targets, e.g., balloons, icebergs, or animals. The platforms are linked to NOAA satellites, which act as relay stations for platform and satellite environmental and experiment data. Special ground stations were built for direct data collection. The localization system is based on Doppler positioning, with 60% of platforms located at each satellite passage. Accuracy is within 100 m. The data processing system assures 99% availability of data, 66% of the data are available. 3 hr after measurement, 87.5% 6 hr. Information includes raw and converted sensor data, and position, speed, and last localization date of platforms. Real time data transmission is assured by the Global Telecommunication System. Projects include meteorology, oceanography, and glaciology.

Author (ESA)

N85-24368# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

#### THE ARGOS SYSTEM AFTER 3 YEARS OPERATION

M TAILLADE *In its* Data Collection and Platform Location by Satellite ARGOS Users' Conf p 11-23 1982 In FRENCH, ENGLISH summary

Avail NTIS HC A09/MF A01

The ARGOS data collection and platform location contribution to the NOAA-TIROS program is reviewed Of 100 platforms seen during each orbit, 60 are correctly located Average location accuracy is 500 m. Environmental data collection for atmospheric, oceanographic, and Earth sciences is increasing with each year of system operation. Financial and promotional aspects of Service ARGOS are outlined.

N85-24373# National Oceanic and Atmospheric Administration, Washington, D C Special Research Programs Office

## A LARGE-SCALE AIR SEA INTERACTION PROJECT OVER THE PACIFIC BASIN

R J FLEMING *In* CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 67-84 1982 refs
Avail NTIS HC A09/MF A01

A study of relations between the Southern Oscillation, El Nino, and the Walker Circulation and atmospheric changes is discussed A 10 yr Basin Monitoring Activity includes measuring the wind field, surface heat and moisture fluxes, sea level, and the thermal structure in the upper ocean Specific observations of these parameters will build upon existing observing programs. However, much of the Pacific is not adequately observed in the ocean or the atmosphere and an array of buoys will be deployed to fill the most critical data-void areas.

Author (ESA)

N85-24374# Direction de la Meteorologie Nationale, Magny les Hameaux (France) Etablissement d'Etudes et de Recherches Meteorologiques

### METEOROLOGICAL BUOYS DEVELOPED AT THE EERM LABORATORY

V KLAUS In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 85-99 1982 refs In FRENCH, ENGLISH summary
Avail NTIS HC A09/MF A01

Moored and drifting meteorological buoys were developed. The Marisonde B drift buoy transmits atmospheric pressure and sea surface temperature data via the ARGOS system. The Navisonde fast drifting buoy measures pressure, sea surface temperature, and wind speed. The Marisonde G is bigger than the others, collecting air temperature and wind direction in addition to the previous parameters. The Marisonde RC is a moored automatic weather station for synoptic meteorology. The Marisonde H is a wave buoy, giving height and mean period in real time.

Author (ESA)

N85-24376# Rijkswaterstaat, The Hague (Netherlands) Data Processing Div

#### THE ARGOS COMMUNICATIONS PERFORMANCE TRIALS

J LOOYEN *In* CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 113-123 1982 Avail NTIS HC A09/MF A01

The ability of the ARGOS system to satisfy user requirements on data communication links for coastal and seaborne meteorological and hydrological buoys was assessed. The telemetry systems were designed for real time operation, imposing extra constraints on transmission delay times. Results show that ARGOS time delays exclude its use in a real time network. The time between passes creates gaps in data transmission. However, ARGOS is highly reliable, with good documentation and service, and the transmission ratio is good.

N85-24381# National Museum of Natural History, Paris (France) Lab d'Oceanography Physique

## THE ARGOS CONTRIBUTION TO THE SUCCESSFUL DREDGING OF A DEEP MOORED CURRENT METER

J GONELLA and B OLLIVIER (ORSTOM) In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 159-164 1982 In FRENCH, ENGLISH summary Avail NTIS HC A09/MF A01

Current meters moored at 1200 m from a seabed 4600 m deep in the Indian Ocean were recovered using the ARGOS system after failure of the explosive anchor-release bolts prevented recovery using acoustic methods. The position of each mooring was known to within 0.25 nautical miles, so the ARGOS system was used to position the recovery ships to within 100 m of the targets.

N85-24391# Centre National d'Etudes Spatiales, Toulouse (France)

## DATA COLLECTION AND PLATFORM LOCATION BY SATELLITE: ARGOS USERS' CONFERENCE

1982 225 p refs Conf held at Annapolis, 13-15 Dec 1982 Avail NTIS HC A10/MF A01

Use of the ARGOS satellite data collection and platform location system in oceanography, meteorology, biology, and hydrology was discussed Maritime applications and ARGOS equipment were described

N85-24396# National Data Buoy Center, Bay Saint Louis, Miss DRIFTING BUOY STUDIES FOR WEATHER APPLICATIONS

E G KERUT /n CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 20 p 1982

Avail NTIS HC A10/MF A01

Drifting buoys deployed in the Southern Hemisphere for the Global Weather Experiment improved weather analyses and forecasts dramatically Buoys deployed in the Storm Transfer and Response Scientific Experiment (STREX) did not improve weather analyses and forecasts to the degree of the data from buoys in

the Southern Hemisphere The STREX array was limited with small spacing, and consequently could improve analyses only over a rather limited area. A larger, more widely dispersed array in the Pacific would be more effective for weather operations. Many of the buoys reported unreliable data, therefore reducing the number of useful data buoys from 24 to 12. This, however, is a minor consequence because of the dense array spacing. The overall experimental results are sufficiently encouraging to propose operational drifting buoy programs for North American continent weather activities.

Author (ESA)

N85-24398# Atmospheric Environment Service, Toronto (Ontario)

### COLLECTING METEOROLOGICAL REPORTS WITH THE ARGOS SYSTEM

R VOCKEROTH and C DICENZO In CNES Data Collection and Platform Location by Satellite ARGOS User's Conf 12 p 1982 refs

Avail NTIS HC A10/MF A01

The Canadian Atmospheric Environment Service undertook to use FGGE type drifting buoys and the ARGOS data collection system on the NOAA satellites to reduce gaps in the coverage of surface data obtained from voluntary observing ships and moored buoys. To obtain the buoy data in real-time for meteorological analysis an ARGOS Local User Terminal (LUT) capability was developed by adding decoding and location computation facilities to the S-band High Resolution Picture Transmission weather satellite receiving station Experience in using the LUT, and the proposed operation of several such stations around the North Atlantic are discussed.

N85-24399# Centre National pour l'Exploitation des Oceans, Paris (France)

## THE FRENCH OCEAN CLIMATE IN EQUATORIAL ATLANTIC (FOCAL) DRIFTER PROGRAM, 1983-1984

J GONELLA, M FIEUX, A KARTAVTSEFF, G REVERDIN, C COLIN (ORSTOM), and Y DUPENHOAT (ORSTOM) In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 11 p 1982 refs Sponsored by Centre National pour l'Exploitation des Oceans and French Programme National pour l'Etude du Climat

Avail NTIS HC A10/MF A01

The French Ocean Climate in Equatorial Atlantic (FOCAL) experiment to study the response of the upper equatorial Atlantic Ocean to atmospheric forcing, the seasonal cycle of the depth of the thermocline, and surface currents in the intertropical zone is outlined. The FOCAL drifting buoys are equipped with thermistor chains and transmit the resulting data by the ARGOS system. The impact of the buoys on the FOCAL and Seasonal Equatorial Atlantic Experiment experimental array was studied in objective analysis simulations, where buoys followed a climatological surface flow, which included the mean seasonal cycle. Results indicate that drifting buoys released in the Eastern Equatorial Atlantic can make a significant contribution in understanding the response of the upper ocean. To achive the required accuracies, at least 20 buoys are needed.

**N85-24400**# Rhode Island Univ , Kingston Graduate School of Oceanography

#### THE DEEP DRIFTER PROGRAM

T ROSSBY and D DORSON In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 25 p 1982 refs

(Contract NSF OCE-80-10839)

Avail NTIS HC A10/MF A01

An instrument for studies of subsurface and deep ocean currents which employs the ARGOS system to determine the pop-up point of the drifter at the end of its mission is described. The instrument is 2 m long and weighs 12 kg. The entire electronics package including the quad-helix antenna fits inside a standard 7.5 cm ID glass pipe, which provides the flotation. In situ pressure and temperature information is collected with a CMOS microprocessor for later broadcast to ARGOS at the surface. The RF link at the

surface is very reliable, even in heavy weather 50% of the transmissions are received correctly. Two subsurface tests were conducted successfully in the Gulf Stream. 7 days at 400 m and 5 days at 1700 m. Author (ESA)

N85-24401# National Oceanic and Atmospheric Administration, Rockville, Md

## US PROGRAMS USING THE ARGOS DATA COLLECTION AND PLATFORM LOCATION SYSTEM

T E BRYAN *In* CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 10 p 1982 Avail NTIS HC A10/MF A01

Drifting buoy, constant level balloon, and moored, shipboard and animal tracking system experiments carried out by NOAA, the US Coast Guard, the Office of Naval Research, and the National Science Foundation using the ARGOS data collection and platform location system are summarized The experiments cover oceanographic, meteorological, pollution monitoring, Arctic region, and atmospheric studies Author (ESA)

# N85-24402# Woods Hole Oceanographic Institution, Mass TELEMETERED METEOROLOGICAL AND ENGINEERING DATA FROM A DEEP SEA MOORED BODY IN THE LONG TERM UPPER OCEAN STUDY (LOTUS)

C DESER In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 20 p 1982 refs
Avail NTIS HC A10/MF A01

The Long Term Upper Ocean study (LOTUS) experiment was designed to examine weekly, monthly and seasonal variability in air-sea interaction processes at a site in the Sargossa sea. The experiment employs a moored buoy as a platform for meteorological and oceanographic instrumentation. Engineering data, such as tension of the mooring line and battery voltage, and meteorological data are telemetered via the ARGOS satellite system. The ARGOS system provides buoy position and a precise timeword. The telemetered data are used for monitoring the meteorological conditions at the LOTUS site Instrument performance is also checked. If the mooring line fails as it did during a prior engineering deployment, the buoy can be tracked using the ARGOS system.

Author (ESA)

N85-24403# Oregon State Univ . Newport Marine Science

### TRACKING WHALE MIGRATIONS WITH THE ARGOS SATELLITE SYSTEM

B R MATE and J T HARVEY In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 15 p 1982 refs

Avail NTIS HC A10/MF A01

Center

The surfacing frequency of 10 radio tagged gray whales was analyzed to determine the feasibility of locating this species throughout its migratory range using the ARGOS satellite system A frequency distribution of the time necessary to complete 6 sequential surfacings at least 43 sec apart was used as a predictive model to estimate the probability of 6 qualified whale surfacings occurring for a satellite pass of any duration Results suggest that whales tagged with an ARGOS beacon would be monitored at least 75 min per day, with 2 daily location determinations predicted under ideal conditions at the southernmost part of their range In the northern range, the predicted performance more than doubles

N85-24405# Partech Electronics Ltd , St Austell (England)
PRACTICAL CONSIDERATIONS WHEN USING WATER
QUALITY AND STRUCTURE MONITORING SENSORS AS
APPLIED TO PORTABLE ARGOS SATELLITE TRANSMITTER
EQUIPMENT

A. R PARKER *In* CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 7 p 1982 Avail NTIS HC A10/MF A01

Design criteria for low cost ARGOS transmitter equipment are proposed. The transmitter packages should be able to withstand extreme weather conditions, house all sizes of ARGOS platform.

transmitter terminals, incorporate more equipment at a later date, and use car batteries. Water quality sensors should be maintenance-free long term devices, with minimal effects of marine growth. Packages should be of an open pattern to make them less attractive to marine life. Full load-bearing marine quality cables must be used. Power consumption of electromagnetic sensors should be minimized by using time switches to optimize warm-up prior to transmission.

Author (ESA)

N85-24406# Toyo Communication Equipment Co Ltd , Kawasaki (Japan) Mobile Radio Communication Div DRIFTING BUOY DEVELOPMENT AND FUTURE PROGRAMS M TSUTSUMI /n CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 9 p 1982 Avail NTIS HC A10/MF A01

A drifting buoy for the Kuroshio Current (Japan) survey, a drifting buoy for deep sea temperature measurement, and an ARGOS platform terminal transmitter for tracking dolphins are described Author (ESA)

## N85-24408# Hermes Electronics Ltd , Dartmouth (Nova Scotia) DEVELOPMENT OF A LOW COST DRIFTING BUOY

F GUPTILL and B THOMPSON (Petro Canada) In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 20 p 1982 refs Sponsored by Canadian government Avail. NTIS HC A10/MF A01

A buoy that costs up to one-third less than comparable buoys was developed. It can be deployed from either a helicopter or light plane if required, and is one-fifth the weight of a conventional drogued buoy. It can be launched by one person requiring only minimum instructions and no special equipment. It can be transported in one-fifth the volume of the conventional equivalent Drogue and tether fittings were pull-tested to destruction (at or above 18000 Nt). This gives a safety factor of 50 under computer simulated conditions. The hull was leak-tested in a full-up configuration in water to a depth of 8 m. The electronics payload was subjected to mil-spec vibration testing and temperature cycling down to -40C.

N85-24409# Centre National d'Etudes Spatiales, Toulouse (France)

DATA COLLECTION AND PLATFORM LOCATION BY SATELLITE: ARGOS USERS' CONFERENCE

1984 313 p refs Conf held in Seattle, 21-23 May 1984, sponsored by NOAA, CNES and NASA Avail NTIS HC A14/MF A01

Use of the ARGOS satellite data collection and platform location system in oceanography, meteorology, and biology was discussed Mantime applications and ARGOS equipment were described

N85-24410# National Oceanic and Atmospheric Administration, Rockville, Md

US PROGRAM USING THE ARGOS DATA COLLECTION AND PLATFORM LOCATION SYSTEM

T E BYRAN *In* CNES Data Collection and Platform Location by Satellite 10 p 1984

Avail NTIS HC A14/MF A01

Drifting buoy, constant level balloon, and moored, shipboard and animal tracking system experiments carried out by NOAA, the US Coast Guard, the Office of Naval Research, and the National Science Foundation using the ARGOS data collection and platform location system are summarized The experiments cover oceanographic, meteorological, pollution monitoring, Arctic region, and atmospheric studies

Author (ESA)

N85-24411# National Oceanic and Atmospheric Administration, Rockville, Md Office of Climatic and Atmospheric Research

THE TROPICAL OCEAN AND GLOBAL ATMOSPHERE PROGRAM (TOGA)

J M HALL In CNES Data Collection and Platform Location by Satellite 35 p 1984 refs Avail NTIS HC A14/MF A01

The Tropical Ocean and Global Atmosphere program was designed to investigate seasonal and interannual global climatic variations and to develop techniques for predicting them. Evidence suggests that the most pronounced air/sea interactions affecting climate on these time scales occur in the tropics in association with a systematic large-scale atmospheric pressure fluctuation called the Southern Oscillation Accompanying these pressure variations are significant changes in tropical and subtropical atmospheric circulation patterns, major shifts in the position of the jet stream, departures in the rainfall patterns in the monsoon regions and the Pacific Basin, and remarkable changes in the equatorial current system and the heat content of the tropical Pacific The 10 gr program includes a 2 yr intensive monitoring of El Nino.

### N85-24412# National Data Buoy Center, Bay Saint Louis, Miss ARABIAN GULF CIRCULATION

R L PICKETT (Naval Ocean Research and Development Activity), R M PARTRIDGE, J A GALT (NOAA, Seattle), and R A ARNONE (Naval Ocean Research and Development Activity) In CNES Data Collection and Platform Location by Satellite 18 p 1984 refs

Avail NTIS HC A14/MF A01

To help forecast oil spill movements, seven satellite-tracked drifting data buoys were launched in the Arabian Gulf Their month-long paths were compared to historical data and to a hydrodynamic model Results show a generally counterclockwise circulation with observed speeds off Saudi Arabia of 20 cm/sec

Author (ESA)

N85-24413# National Center for Atmospheric Research, Boulder, Colo

#### A REPORT ON THE DRIFTERS PROGRAM

R HEINMILLER (OMNET), J MASTERSON, and J MCWILLIAMS In CNES Data Collection and Platform Location by Satellite 10 p 1984 refs

Avail NTIS HC A14/MF A01

A plan for the development and utilization of ocean drifting buoys is presented. The evolution of drifting buoys and status of the drifters program are discussed. A projection of the use of drifting buoys for scientific investigations is outlined. An inexpensive, calibrated Lagrangian drifter, and a modularly configurable, surface flux (i.e., momentum, surface and latent heat, and precipitation), and upper ocean temperature and current (i.e., relative flow) drifter compatible with ARGOS were built.

Author (ESA)

N85-24414# National Oceanic and Atmospheric Administration, Seattle, Wash Pacific Marine Environmental Lab

APPLICATIONS OF ARGOS MEASUREMENTS IN EQUATORIAL PACIFIC OCEAN-ATMOSPHERE INTERACTION STUDIES

H P FREITAG, D HALPERN, and A SHEPHERD In CNES Data Collection and Platform Location by Satellite 13 p 1984 refs Sponsored by NOAA

Avail NTIS HC A14/MF A01

The Equatorial Pacific Ocean Climate Studies (EPOCS) program investigation of processes which generate, maintain, and dissipate the large-scale interannual sea surface temperature (SST) variations centered along the equator in the eastern and central Pacific is introduced. Because the velocity field within 1 to 2 deg of the equator is not geostrophic, moored current measurements are required in the upper ocean to unravel the complex dynamical processes (e.g., Kelvin and Rossby waves, wind-generated mixing, zonal, mendional and vertical advection, undercurrent meandering, air-sea heat and moisture fluxes) influencing SST. The ARGOS position and meteorological measurements used in EPOCS are described.

### N85-24415# Petro-Canada Ltd , Calgary (Alberta) DRIFTING BUOYS ON THE LABRADOR SHELF

J R BUCKLEY, W C THOMPSON, D B FISSEL (Arctic Sciences Ltd., Sidney, British Columbia), and J R BIRCH (Arctic Sciences Ltd., Sidney, British Columbia) In CNES Data Collection and Platform Location by Satellite 130 p 1984 refs Sponsored by Labrador Group of Companies

Avail NTIS HC A14/MF A01 Six ARGOS satellite-tracked drogued drifters and two moored buoys, which subsequently broke free from their moorings, deployed off Labrador provided near-surface current, air pressure and sea temperature data Near-surface currents are typically 30 to 50 cm/sec in the current core, and 20 cm/sec elsewhere Comparisons of the drifter velocity data with a data set of moored subsurface current measurements, obtained at depths of 52 to 102 m, shows that the near-surface velocities are on average twice the magnitude of those at depth. However, the steadiness of the currents as indicated by the ratio of vector average velocity to mean speed is in good agreement for the two data sets. A study of the internal consistency of air pressure data reveals significant differences among individual drifters. However, using a median averaging technique, typical random uncertainties are Author (ESA)

N85-24416# Computer Sciences Corp , Bay St Louis, Miss MOORED BUOY STATIONKEEPING AND LOCATION SYSTEM R F GARRAND In CNES Data Collection and Platform Location by Satellite 16 p 1984 refs (Contract NOAA-NA-80-QA-C-101)

Avail NTIS HC A14/MF A01

A reliable deep-ocean moored buoy stationkeeping and location system utilizing the Service ARGOS locating capability was made operational by the NOAA Data Buoy Center because of the need for an improved method with a faster response for detecting when buoys are adrift and for tracking and recovering an adrift buoy Watch circle radii and locations are calculated and then validated by plotting periodic and seasonal changes in the moored buoy locations Ongoing analyses are accomplished using computer plots generated from the buoy stationkeeping data base Correlations with LORAN-C data availabe from several buoys indicate negligible differences in mean calculated buoy locations

Author (ESA)

## N85-24417# Synergetics International, Inc., Boulder, Colo A NEW VERSATILE ARGOS PTT FOR OCEANOGRAPHIC APPLICATIONS

R C ROARK, P F SMITH (Ferranti O R E, Inc., Falmouth, Mass.), and D E FRYE (Ferranti O R E, Inc., Falmouth, Mass.) In CNES Data Collection and Platform Location by Satellite 12 p 1984 refs

Avail NTIS HC A14/MF A01

An ARGOS platform electronics system based on technology of 400 MHz GOES synthesized transmitters was developed. The electronic subsystem is flexible enough to interface to a variety of oceanographic/meteorological sensors, with a cost/performance ratio suitable for cost sensitive applications. Flexibility is achieved through the use of optional on board integrated circuits to provide analog and event counter inputs Without any optional sensor interface circuits, the platform accepts 5V ASCII serial data into the transmission buffer asynchronously, and transmits this data to the polar orbiting ARGOS satellite. The required ARGOS System protection from malfunctioning is provided, and all standard transmission repetition rates and message data lengths are supported Platform ID and all the setup parameters can be set by switches, jumpers, via the serial data interface, or directly from the CMOS EPROM Author (ESA)

N85-24418# Atmospheric Environment Service, Downsview (Ontario)

### OVERVIEW OF DATA PROCESSING AT AES LOCAL USER TERMINALS

W HUME and H KAGAWA In CNES Data Collection and Platform Location by Satellite 6 p 1984

Avail NTIS HC A14/MF A01

The Canadian Atmospheric Environment Service undertook a multiyear program designed to offset the loss of weather data from weatherships at Ocean Station P in the northeast Pacific The program includes the development and maintenance of a network of drifting buoys in the northeast Pacific, and the installation of an ARGOS Direct Readout Station, and a GOES VISSER readout station Expansion of the buoy and computing systems is discussed The status of the Pacific, Atlantic, Arctic, and Hudson Bay projects is summarized

Author (ESA)

N85-24421# Oregon State Univ , Newport Marine Science Center

THE ARGOS SYSTEM USED FOR TRACKING GRAY WHALES
B R MATE In CNES Data Collection and Platform Location by
Satellite 6 p 1984 refs
Avail NTIS HC A14/MF A01

The development of satellite whale tags used to track gray whales in the eastern north Pacific Ocean is summarized. Two gray whales were radio-tagged in San Ignacio Lagoon (Mexico) and tracked on their northbound migration. One of the transmitters was modified to record and relay depth-of-dive information at 15 sec intervals throughout the course of the dive. Technical elements of data acquisition and analysis are outlined. The major biological findings are discussed.

## N85-24422# National Data Buoy Center, Bay Saint Louis, Miss AN OVERVIEW OF NDBC DRIFTING BUOY DEVELOPMENT PROGRAMS

R KOZAK and J ANDERSON (Polar Research Laboratory, Inc.) In CNES Data Collection and Platform Location by Satellite 11 p ARGOS Users' Conf., 21-23 May 1984 11 p 1984 Avail NTIS HC A14/MF A01

Three drifting buoy development programs are described The first is a drifter capable of measuring subsurface water temperature to a depth of 600 m using a multiplexer network which allows for increased reliability and reduced thermistor cable size and weight This system uses ARGOS data for the reporting of diagnostic information to identify failure modes. The second program is the development of an operational sensor system for obtaining reliable wind direction measurements from drifting buoys. The third program addresses the design and development of a drifting buoy used to obtain hurricane information prior to landfall.

Author (ESA)

N85-24510\*# National Aeronautics and Space Administration Wallops Flight Center, Wallops Island, Va

### REMOTE SENSING OF DIRECTIONAL WAVE SPECTRA USING THE SURFACE CONTOUR RADAR

E J WALSH, D W HANCOCK, III, D E HINES, and J E KENNEY (NRL) 1985 4 p refs

(NASA-TM-84440, NAS 1 15.84440) Avail NTIS HC A02/MF A01 CSCL 08B

A unique radio-oceanographic remote sensing instrument was developed. The 36 GHz airborne Surface Contour Radar (SCR) remotely produces a real-time topographical map of the sea surface beneath the aircraft. It can routinely produce ocean directional wave spectra with off-line data processing. The transmitter is a coherent dual-frequency device that uses pulse compression to compensate for the limited available power at Ka band. The radar has selectable pulse widths of 1, 2, 4, and 10 nanoseconds. The transmitting antenna is a 58 lambda horn fed dielectric lens whose axis is parallel to the longitudinal axis of the aircraft. It illuminates an elliptical mirror which is oriented 45 deg to the lens' longitudinal axis to deflect the beam towards the region beneath the aircraft. The mirror is oscillated in a sinusoidal fashion through mechanical linkages driven to a variable speed motor to scan the transmitter beam (1.2 deg X 1.2 deg) with + or - 16 deg of the perpendicular

to the aircraft wings in the plane perpendicular to the aircraft flight direction BW

N85-24511# Naval Ocean Research and Development Activity, Bay St. Louis, Miss

## DIGITAL PROCESSING OF PASSIVE KA-BAND MICROWAVE IMAGES FOR SEA-ICE CLASSIFICATION Final Report

D T EPPLER, L. D FARMER, A W LOHANICK, and M HOOVER May 1984 62 p Original contains color illustrations (AD-A150686, NORDA-51) Avail NTIS HC A04/MF A01 CSCL 14E

The primary objective of NORDA's Ka-band Radiometric Mapping System (KRMS) program is to provide basic research needed for Navy development of an operational imaging system that can produce detailed information concerning ice conditions over broad regions of the Arctic To this end, methods suitable for automated identification and classification of sea ice types and open water are being developed. An experimental plan has been formulated that will lead to an automated system that will provide real-time ice classification information onboard Navy aircraft This report represents completion of the initial state of this plan. During March 1983 extensive high-quality KRMS imagery and coincident high-resolution photography were obtained of ice in the Beaufort Sea Analysis of these data suggests that four classes of winter surfaces can be distinguished solely on the basis on Ka-band brightness temperature open water, frazil, old ice. and young/first year ice New ice (excluding frazil) and nilas display brightness temperatures that overlap the range of temperatures characteristic of old ice and young/first year ice. Scenes in which new ice or nilas are present in appreciable amounts are subject to substantial errors in classification. Textural characteristics of nilas and new ice, however, differ significantly from textural features characteristic of other ice types and probably can be used with brightness temperature data to classify single-band microwave

N85-25354# Joint Publications Research Service, Arlington, Va ANALYSIS OF HYDROMETEOROLOGICAL CONDITIONS IN ANTARCTIC COASTAL WATERS ACCORDING TO DATA FROM HYDROLOGICAL AND SATELLITE OBSERVATIONS Abstract Only

V V GOLOSOV and O A REBENKOVA In its USSR Rept Space (JPRS-USP-85-003) p 118 4 Mar 1985 Transl into ENGLISH from Vestnik Leningradskogo Univ Geol , Geografiya (USSR), no 3, Sep 1984 p 96-99

Avail NTIS HC A08/MF A01

A hydrometeorological description of the coastal region of Antarctica is presented based on hydrological data obtained during the summer navigation season of 1980/1981, together with TV images of the Indian Ocean and Atlantic Ocean sectors of the Antarctic Ocean A monthly generalization of cloud cover conditions in the coastal area 0 to 40 deg, is given to detect the hydrological front in this region, to trace the destruction of the zone of drifting coastal-ice-in January-and-the appearance-of-young-ice in early March, and to evaluate the nature of water circulation on the basis of movement of a gigantic iceberg. It is found that there is a predominance of cloudless or nearly cloudless weather during the summer season. The TV photographs for the southwestern part of the Ruser-Larsen Sea identified the position of the hydrological front The front separates cold coastal and heated waters in the central part and persists stably at 15 deg E for at least a month. In summer, drifting ice advances into this region from the east, making navigation more difficult. Mapping of the trajectory of movement of an enormous iceberg in February-March 1981 confirms the pattern of circulation determined from hydrological observations EAK

National Aeronautics and Space Administration, N85-26047\*# Washington, D C

#### SPACE METHODS IN OCEANOLOGY

47 p refs A A BOLSHAKOV Mar 1985 ENGLISH of the book "Kosmicheskiye Metody v Okeanologii, No 6" Moscow, Znaniye, 1982 p 1-58, 64 Transl by The Corporate Word, Pittsburgh

(Contract NASW-4006)

(NASA-TM-77652, NAS 1 15 77652) Avail NTIS HC A03/MF A01 CSCL 08J

The study of Earth from space with specialized satellites, and from manned orbiting stations, has become important in the space programs The broad complex of methods used for probing Earth from space are different methods of the study of ocean, dynamics The different methods of ocean observation are described

EAK

N85-27331# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

#### COEFFICIENTS FOR WATER DIFFUSION COASTAL **DETERMINED FROM AERIAL PHOTOGRAPHS**

M R STEVENSON and H M INOSTROZAV Feb 1985 11 p Presented at the 4th Reuniao da SELPER, Santiago de Chile, 12-16 Nov 1984 (INPE-3413-PRE/679) Avail NTIS HC A02/MF A01

The horizontal coefficient of mixing (diffusion coefficient) in the ocean is necessary for a large variety of coastal and marine environmental studies. Two coastal embayments along the southeastern coast of Brazil were studied Rhodamine-B dye was dissolved in methanol and the solution was separated into three aliquots, each containing about 100 gm of dye During the experiment, an aircraft flew over the area and took a number of photographs with an RC-10 metric camera. From the film images it was possible to extract information on the areal changes of each dye patch. The data were used to construct dispersion diagrams. Using a least squares method, the diffusion coefficients for three dispersals were determined. The largest value corresponded to a bay more exposed to the sea, than the other two locations. The values, derived from aerial photographs. compared very well with previous determinations of K, based on conventional fluorometric methodology in a nearby area. It is suggested that it is possible to obtain reasonable estimates of diffusion from aerial photographs

Centre National d'Etudes Spatiales, Toulouse N85-27333# (France)

#### COLLECTION AND PLATFORM LOCATION DATA SATELLITE: ARGOS USERS' CONFERENCE

364 p refs Partly in ENGLISH and FRENCH held at London, 27-28 Sep 1983

Avail NTIS HC A16/MF A01

Use of the ARGOS satellite data collection and platform location system in oceanography, meteorology, biology, seismology and hydrology was discussed Maritime applications and ARGOS equipment were described

N85-27337# Thorn EMI, Hayes (England) Sheer Water Working

DB2 AND DB3: THE NEXT GENERATION
P A. BEDFORD In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 6 p 1983 refs Avail NTIS HC A16/MF A01

The application of satellite telemetry to the DB2 and 3 oceanographic/meteorological buoy project is described. The buoys acquire data for real time transmission and on-board recording Each buoy has two duplicated and independant data processing packages on-board and each transmits to the ARGOS and METEOSAT Systems The advantage of this highly redundant arrangement is the low probability of total data loss. Meteorological parameters are disseminated via the Global Telecommunication System to the UK Meteorological Office to be used as a data source for weather forecasting Transmitted data are recorded at ARGOS and METEOSAT ground stations, these data are merged

with that of the on-board recorders to produce the best possible data set Author (ESA)

N85-27338# National Oceanic and Atmospheric Administration, Bay St Louis, Miss

#### DEVELOPMENT OF A LAGRANGIAN DRIFTING BUOY

E G KERUT and W B WILSON In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 7 p refs

Avail NTIS HC A16/MF A01

The development of a well-calibrated Lagrangian drifting buoy system to measure surface currents in climate-related experiments in ocean basins to obtain a statistical description of surface ocean current dynamics is described. The development approach was based on a hull design to minimize the deleterious effects of wind and waves on a Lagrangian current tracker Theoretical studies indicated a spheroid hull shape to have a high potential as a surface Lagrangian tracking device A numerical computer model to simulate generic spheroid hull forms in a synthesized environment for Lagrangian effectiveness studies was developed and validated in laboratory tests for implementing preliminary system design studies. These studies were performed and recommendations for the design of a prototype Lagrangian drifting buoy system were made

N85-27339# Laboratoire de Meteorologie Dynamique du CNRS. Palaiseau (France)

#### LONG TERM DRIFTING FLOAT FOR MEASURING MEAN OCEANIC CIRCULATION USING ARGOS SYSTEM

J C GASCARD (Laboratoire d'Oceanographie Physique), P F JEANNIN (Laboratoire d'Oceanographie Physique), and H OVARLEZ In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 10 p 1983 Avail NTIS HC A16/MF A01

An expendable, 3 yr lifetime, glass float located via ARGOS was developed for ocean current mapping. The reliability of surface transmissions via TIROS-N satellite for location and for message reception was tested. Three floats were launched. Two were washed ashore after 1 week. The third remained offshore and lasted for 38 days. This float was located 8 times every day on average, with an accuracy of 800 m Fifteen messages were transmitted on average for each passage, lasting 10 min, with the float emitting every 40 sec. On average 12 messages are absolutely correct among the 15 Within the 32 bytes of the message, an error rate increasing from 1% on the first bytes collected to 3% or 4% on the last ones is found Author (ESA)

N85-27340# Scottish Marine Biological Association, Edinburgh (Scotland) Marine Physics Dept

#### ARGOS-TRACKED DRIFTERS IN THE ROCKALL TROUGH D J MELDRUM, D BOOTH, and D RITCHIE In CNES Data Collection and Platform Location by Satellite: ARGOS Users' Conf. 1983 refs 14 p

Avail NTIS HC A16/MF A01

A small, freely drifting satellite-tracked low-drag buoy, drogue and rigging system was designed, and was deployed in the Rockall Trough area of the Atlantic, known to possess a considerable thickness of possibly hydrocarbon-bearing sediments. The buoys are used to study horizontal surface current structure. A large anticyclonic gyre is detected Author (ESA)

N85-27341# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway)

#### MONITORING OF MARINE ENVIRONMENT

N S NERGAARD In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 13 p Avail NTIS HC A16/MF A01

Marine environmental monitoring buoys are described. A drifting buoy with an ARGOS transmitter was deployed in the Southern Ocean and on Antarctic icebergs. A cement drifter was used for oil pollution simulations. A wave following moored buoy was developed An iceberg monitoring capsule which can be deployed by parachute was built Author (ESA) N85-27343# Centre National pour l'Exploitation des Oceans, Paris (France) Dept d'Etudes Oceaniques

WAVE DIRECTIONAL SPECTRA VIA ARGOS

D BECQ In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 12 p 1983 refs
Avail NTIS HC A16/MF A01

A wave directional, satellite system buoy transmitting data via a radio link, enabling a detailed characterization of the sea was developed. A powerful microprocessor for computation and two low consumption ones monitoring the powerful one solve the autonomy problem. The use of two successives ARGOS messages for transmission of a complete and usable B spectrum overcomes the limitations imposed by the ARGOS System, which was chosen for its reliability. Tests prove the seaworthiness of the buoy, and its ability to resolve different wave propagation directions.

Author (ESA)

N85-27344# Continental Shelf Inst , Trondheim (Norway)
ROUTINE WAVE AND METEOROLOGICAL MEASUREMENTS IN
OFFSHORE AREAS USING ARGOS DATA SURVEILLANCE

S F BARSTOW, A LYGRE, and T AUDUNSON In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 28 p 1983 refs Sponsored by Norsk Hydro, Saga Petroleum, Statoil, British Petroleum, Philips Petroleum and IKU (Contract NTNF-1810 7890)

Avail NTIS HC A16/MF A01

Buoys which measure wave direction and meteorological parameters were deployed off Norway and the Ivory Coast The ARGOS system is used for surveillance and near real time data control The heave wave spectrum, and spectral and time series parameters are calculated on board Results show good agreement with physical and geographical truths The buoys show that they are able to withstand severe environmental conditions, from 20 m waves off Norway to the high temperatures in the tropical waters off the Ivory Coast

Author (ESA)

N85-27345# Institute of Oceanographic Sciences, Wormley (England)

RESULTS OF AN INITIAL TRIAL OF A SATELLITE TELEMETERING BUOY MEASURING NEAR SURFACE CURRENT

P G COLLAR and C A HUNTER In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 8 p 1983

Avail NTIS HC A16/MF A01

A satellite telemetering drifting buoy which incorporates a vector averaging electromagnetic current meter for measuring near surface currents was tested Results show that the characteristics of the ARGOS system are not easily matched to the efficient collection of an evenly sampled time series. The arrangement resulted at times in the transmission of much redundant data and in spite of this data were lost through uneven satellite coverage. Nevertheless the transmission of data is inexpensive compared with the cost of position location. For a drifter the advantage of using the transmission link rather than recording in-situ is that a data set can be accumulated even if the buoy is ultimately lost. Likewise the output of a moored system can be monitored continuously for correct operation and there is an additional advantage in that the position of the buoy is available in the event of loss of mooring integrity Author (ESA)

N85-27346# Pretoria Univ (South Africa) Mammal Research Inst

### MOTIVATION FOR SATELLITE TRACKING OF SOUTHERN ELEPHANT SEALS MIROUNGA LEONINA AT SEA

M N BESTER In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 11 p 1983 refs Sponsored by South African Department of Transport

Avail NTIS HC A16/MF A01

The lack of explanations for the decline in southern elephant seal numbers is underlined, and as predators entirely dependent on manne feeding, a study of their spatial and temporal distribution during their pelagic existence is proposed. The development of a

transmitter subject to Service ARGOS specifications, and admittance to this system would be the only cost effective method to study the movement of elephant seals in the Southern Ocean Author (ESA)

N85-27347\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md Marine Science Center

THE ARGOS SYSTEM USED FOR TRACKING GRAY WHALES B R MATE (Oregon State Univ, Newport), D BEATY (Telonics), C HOISINGTON, R KUTZ, and M L MATE (Oregon State Univ, Newport) In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 56 p 1983 refs Sponsored by Minerals Management Service, Anchorage and Office of Naval Research

Avail NTIS HC A16/MF A01 CSCL 05B

The development of satellite whale tags used to track gray whales in the eastern north Pacific Ocean is summarized. Two gray whales were radio-tagged in San Ignacio Lagoon (Mexico) and tracked on their northbound migration. One of the transmitters was modified to record and relay depth-of-dive information at 15 sec intervals throughout the course of the dive. Technical elements of data acquisition and analysis are outlined. The major biological findings are discussed.

## N85-27351# Norwegian Meteorological Inst, Blindern AN OPERATIONAL BUOY NETWORK COLLECTING METEOROLOGICAL DATA

C K JENSEN In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 11 p 1983

Avail NTIS HC A16/MF A01

The network of drifting buoys in Norwegian waters is described Norwegian participation in the First GARP Global Experiment in the Southern Ocean (air pressure and sea surface temperature measurement) is outlined. The use of an ARGOS local user terminal for meteorological data is summarized. Positioning accuracy with ARGOS is treated.

Author (ESA)

N85-27352# Royal Netherlands Meteorological Inst, De Bilt AVAILABILITY OF THE ARGOS SYSTEM BASED ON THE ORBITAL CHARACTERISTICS OF THE TIROS-N SATELLITES F GROOTERS In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 16 p 1983 refs Avail NTIS HC A16/MF A01

The availability of NOAA-7 and 8 satellites for communicating

The availability of NOAA-7 and 8 satellites for communicating with North Sea moored buoys was assessed, based on cyclic orbital frequencies, visibility periods spread over a number of days, and operational demands and data transmission limitations. Results are unfavorable to heliosynchronous satellites. Scientific utilization of a near polar orbiting satellite system is influenced by technical rather than time limitations, and offers a larger amount of data storage and processing capacity with simpler equipment.

Author (ESA)

## N85-27353# Danish Meteorological Inst, Copenhagen OPERATIONAL EXPERIENCES WITH THE ARGOS SYSTEM IN GREENLAND

F JENSEN, K SVANEMSELLEM, and J TAAGHOLT (Technical Univ of Denmark, Lyngby) /n CNES Data Collection and Platform-Location-by-Satellite—ARGOS-Users-Conf—14-p—1983—refs—Avail NTIS HC A16/MF A01

The Royal Danish Meteorological Institute agreed to maintain a minimum net of meteorological observation points in Greenland This obligation is partly fulfilled by automatic observing stations. These stations are on remote locations and the most convenient method to communicate data is by METEOSAT and ARGOS data collecting systems. In the most northern part of Greenland geostationary satellites decline below the horizon and only ARGOS can be used. A ground station was established in Greenland to obtain real-time data from the ARGOS System Problems related to operating ARGOS platforms in the Arctic are discussed.

Author (ESA)

N85-27354# Services Technique des Phares et Balises, Bonneuil-sur-Marne (France) Div Etudes Technologiques
CHECKING ON THE POSITION OF NAVIGATION MARKER **BUOYS BY THE ARGOS SYSTEM** 

J F RACAPE In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 17 p 1983 refs Avail NTIS HC A16/MF A01

Equipment operational requirements led the French lighthouse, beacon, and navigation office to use ARGOS data collection and location facilities. A drifting criterion capable of generating an alert in the event of a drift of buoys fitted with ARGOS transmitters was derived from analysis of the system characteristics. The criterion made it possible to accurately identify two drifts and one buoy location error The system allows operational monitoring of the equipment on buoys fitted with platforms Author (ESA)

N85-27355# Centre National pour l'Exploitation des Oceans, Brest (France)

CONTRIBUTION OF THE NOAA-7 AND 8 AND ARGOS PARTNERSHIP TO WHITE TUNA FISHING IN THE NORTHEAST **ATLANTIC** 

J Y LEGALL In CNES Data Collection and Platform Location by Satellite. ARGOS Users' Conf 8 p 1983 FRENCH, ENGLISH summary Avail NTIS HC A16/MF A01

During the exploratory phase of fishing operations for white tuna in the NE Atlantic, an ARGOS keypad terminal was installed aboard the leading boat Data transmitted on a daily basis give the meteorological/oceanographic parameters used to decide on starting dates and subsequent progression of fishing activities Data relating to the daily catch is transmitted in order to analyze the fish catch/environment relationship from a hydroclimate point of view Such ground data gives an opportunity to calibrate surface temperature maps emanating from data obtained by NOAA-7 and 8 satellites Real time data covering the fish-catch/environment interface are used for the construction of a predictive model of white tuna fishing Author (ESA)

N85-27504# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

COMPARISON OF A DIFFUSION MODEL WITH DYE DISPERSION MEASUREMENTS TO STUDY TURBULENCE IN **COASTAL WATERS** 

M R STEVENSON and H M INOSTROZAV Apr 1985 26 p refs Presented at the 1st Seminar de Modelagem Numerica do Mar, Sao Jose dos Campos, Brazil, 12-14 Dec 1984 (INPE-3492-PRE/729) Avail NTIS HC A03/MF A01

The operation of a coastal power plant provides the opportunity to conduct studies, which deals with circulation and horizontal mixing in coastal waters near a power plant. This study was initiated with field experiments in which small quantities of rhodamine dye solution were dispersed in the inlet and outlet bays adjacent to the power station. Sequential aerial photographs permitted the estimation of the magnitude of horizontal mixing (diffusion) coefficients. The high cost of the dye, however, makes the utilization of diffusion models an attractive supplement to such studies, since the model can be run a number of times with varied parameters The simulated concentration fields can then be compared with the field experiments. The simple diffusion model selected for this study is based on a point discharge of a dye solution. The model assumes an isotropic field with a diffusion coefficient constant over the period of the study. To simulate the two-dimensional dye patches, an equispaced grid (441 points) was used with 5m between grid points. The time step was set for 10 minute intervals. The results of the comparison between the numerical simulation and a dye experiment are discussed

N85-28438# Naval Postgraduate School, Monterey, Calif AN ASSESSMENT OF THE POTENTIAL ROLE OF MULTISPECTRAL IMAGERY IN BATHYMETRIC CHARTING M.S. Thesis

R T JOY Sep 1984 98 p (AD-A152460) Avail NTIS HC A05/MF A01 CSCL 08J

Previous research has demonstrated the feasibility of deriving water depth information from LANDSAT Multispectral Scanner (MSS) digital data. However, previously published results, analysed together with two new case studies, show that the magnitude of errors (approximately 1-2 meters) in MSS singleband depth extimates is too large for direct production of bathymetric charts Better accuracy is possible, though, if MSS data are used to interpolate conventional soundings between survey tracklines, especially if the survey vessels obtain concurrent optical ground truth data If depth accuracy standards can be met, the MSS interpolation approach will be extremely cost effective. In addition, MSS imagery is shown to be a useful tool for planning and managing conventional surveys A recommended set of procedures is outlined for incorporating MSS image data into an operational bathymetric mapping program A comprehensive program of development and operational demonstration surveys is recommended to convincingly establish the utility and cost effectiveness of these procedures

N85-28529\*# Jet Propulsion Lab , California Inst of Tech , Pasadena West Coast Satallite Time Series Advisory Group TOWARDS A STUDY OF SYNOPTIC-SCALE VARIABILITY OF THE CALIFORNIA CURRENT SYSTEM

1 Apr 1985 43 p refs (Contract NAS7-918)

(NASA-CR-175871, JPL-PUB-85-22, NAS 1 26 175871) Avail NTIS HC A03/MF A01 CSCL 08C

A West Coast satellite time series advisory group was established to consider the scientific rationale for the development of complete west coast time series of imagery of sea surface temperature (as derived by the Advanced Very High Resolution Radiometer on the NOAA polar orbiter, and near-surface phytoplankton pigment concentrations (as derived by the Coastal Zone Color Scanner on Nimbus 7) The scientific and data processing requirements for such time series are also considered it is determined that such time series are essential if a number of scientific questions regarding the synoptic-scale dynamics of the California Current System are to be addressed. These questions concern both biological and physical processes

National Aeronautics and Space Administration N85-29433\*# Goddard Space Flight Center, Greenbelt, Md **RESEARCH REVIEW, 1983** 

Jan 1985 155 p refs Submitted for publication (NASA-TM-86219, NAS 1 15 86219) Avail NTIS HC A08/MF A01 CSCL 04B

A variety of topics relevant to global modeling and simulation are presented Areas of interest include (1) analysis and forecast studies, (2) satellite observing systems, (3) analysis and forecast model development, (4) atmospheric dynamics and diagnostic studies, (5) climate/ocean-air interactions, and notes from lectures

N85-29505# Washington Univ , Seattle Polar Science Center ARCTIC MIXED LAYER DYNAMICS Final Report

J MORISON Feb 1985 40 p (Contract N00014-83-K-0115)

(AD-A153582) Avail NTIS HC A03/MF A01 CSCL 08J

Contents Seasonal Variations in the Upper Arctic Ocean as Observed at T-3 Hydrographic data from T-3 are analyzed to illustrate the behavior of the Arctic mixed layer. The mixed layer depth fluctuates 11 m annually and mixed layer salinity fluctuates 0 32% ppt The fluctuations in total salt content are consistent with theoretical work by Maykut and are in phase with mixed layer depth, indicating changes in the mixed layer are controlled by salt flux Oceanographic Conditions in the Marginal Ice Zone North of Svalbard in Early Fall 1979 with an Emphasis on Mesoscale Processes During September-October 1979 the Norwegian Remote Sensing Experiment was carried out in the marginal ice zone north of Svalbard Convergence of the ice cover is correlated with along-ice edge winds with the ice to the right, while divergence occurs during off-ice winds or calm conditions The Fram 3 Expedition On the fourteenth of March 1981, Fram 3 the third in a series of four U.S. manned ice camps, was established in the eastern Arctic Ocean at 84 32 N, 20 07 E for studies of physical and chemical oceanography, low-frequency underwater acoustics, geophysics, and the mechanics and propagation of waves through sea ice Salargos Temperature-Conductivity Buoys The design and testing of buoys capable of measuring temperature and salinity in ice covered oceans is described. The buoys are implanted in the sea ice and collect water temperature and conductivity data from pairs of sensors tethered to a cable suspended below the ice. The sensor data is collected and position is determined using the ARGOS satellite system

N85-29507# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Oceanography Div.

OPERATION GUIDING LIGHT-SCIENTIFIC PROGRAM AND FIELD PLAN. THE PILOT FIELD EXPERIMENT FOR NORDA PROJECT CHEMICAL DYNAMICS IN OCEAN FRONTAL AREAS Final Report

D A WIESENBURG Mar 1985 41 p refs (AD-A153765, NORDA-TN-308) Avail NTIS HC A03/MF A01 CSCL 08J

This document describes the scientific program and field plan for operation GUIDING LIGHT, the pilot field experiment for the NORDA project Chemical Dynamics in Ocean Frontal Areas The study area for GUIDING LIGHT is the western North Atlantic Ocean off the eastern coast of the United States. The operation will be conducted from 18 April to 10 May 1985 The fronts to be examined during this pilot experiment are the Gulf Stream front and shelf-slope front off New England GUIDING LIGHT will employ sampling and analytical capabilities to measure chemical-biological-physical variations in surface waters at these Both shipboard and remotely sensed frontal boundaries observations will be made. The field operation will be conducted from one ship (USNS BARTLETT), three aircraft, and the space shuttle (STS 51-B) Participates in GUIDING LIGHT include investigators from the Naval Ocean Research and Development Activity, the National Aeronautics and Space Administration, University of California, Texas A & M University, Old Dominion University, Florida State University, University of Southern Mississippi, and the University of Texas

N85-29511# Royal Netherlands Meteorological Inst., De Bilt. Oceanografisch Onderzoek

FIRST RESULTS OF OCEANOGRAPHY UTILIZATION OF INFRARED HIGH RESOLUTION PICTURE TRANSMISSION IMAGES [EERSTE BEVINDINGEN BIJ OCEANOGRAFISCH GEBRUIK VAN IR-HRPT BEELDEN]

H WALLBRINK and G J PRANGSMA 1984 42 p refs In DUTCH

(KNMI-TR-59, B8479639, ISSN-0169-1708) Avail NTIS HC A03/MF A01

Qualitative interpretation of infrared photographs made by the satellites NOAA 6, NOAA 7, and NOAA 8 of the Norwegian Sea, the North Sea and the Atlantic Ocean to determine utility for research on dynamic processes in the ocean and the climate is discussed. The photographs were received by the High Resolution Picture transmission facility Making several prints with different enhancements in the playback mode of one registration provides the correct temperature fronts Mesoscale and enlarged small scale phenomena are clearly visible

Author (ESA)

N85-29847# Eurosat S A, Geneva (Switzerland)
ERS ECONOMIC IMPACE STUDY Final Report

Paris ESA 15 Jul 1982 321 p (Contract ESA-4692/81-F-FC(SC))

(ESA-CR(P)-1979) Avail NTIS HC A14/MF A01

The capability of an operational European remote sensing (ERS) system to generate usable products, and the impact of these products on the economics of the most sensitive oceanic activity domains were studied Spacecraft sensors and orbits, system configuration; ocean parameters and phenomena of relevance to users, and the processes of generating information presently used or likely to be used in oceanic activity were examined. An economic analysis, based on statistics in oceanic activity sectors applicable to the ERS-1 participating countries and to the geographical areas of relevance was performed. Maximum potential economic impact figures were modulated by the technological capability figures, and the outcome over the years 1988 to 1999 was projected using 3 different economic growth scenarios.

#### 06

#### **HYDROLOGY AND WATER MANAGEMENT**

Includes snow cover and water runoff in rivers and glaciers, saline intrusion, drainage analysis, geomorphology of river basins, land uses, and estuarine studies

## A85-30730 GROUND WATER EXPLORATION IN THE SAURASHTRA PENINSULA

B SAHAI, R K SOOD (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), and S C SHARMA (Gujarat Water Resources Development Corp., Gandhinagar, India) International Journal of Remote Sensing (ISSN 0143-1161), vol. 6, Mar -Apr. 1985, p. 433-441 refs

The fact that groundwater in hard-rock formations is generally confined to fissures, fractures, joints and weathered zones makes space imagery extremely useful when prospecting for groundwater in hard-rock areas. Keeping this in mind, multitemporal Landsat imagery of the Saurashtra region has been studied by employing visual/manual-interpretation techniques hydrogeomorphological features, such as abandoned channels, buried channels, lineaments, water bodies, vegetation, and floodplains, were mapped at a scale of 1 250,000 Using these maps, areas with groundwater potential were identified Resistivity surveys were conducted in selected areas. Using these results, sites for exploratory drilling were chosen. The pumping-test results at most of the sites were quite encouraging. The present study therefore demonstrates the usefulness of remotely sensed data in groundwater exploration Author

### A85-30731 INUNDATION MAPPING OF THE SAHIBI RIVER FLOOD OF

A. S RAMAMOORTHI and P SUBBA RAO (National Remote Sensing Agency, Hyderabad, India)—International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 443-445

A major flood which occurred in the Sahibi basin in August 1977 is studied From an analysis of Landsat data, color-coded thematic photograph outputs showing the pre-flood condition and the condition of the basin immediately after the flood are prepared at 1 250,000 scale. The area inundated by the floods is compared with a map based on aerial photographs showing the flooded area, and found to be satisfactory Digital and visual interpretation techniques are used in the study. The reliability and usefulness of satellite flood-inundated data for mapping areas are demonstrated M D

#### A85-30732

THE EVALUATION OF HYDROGEOLOGICAL CONDITIONS IN THE SOUTHERN PART OF TAMIL NADU USING REMOTE-SENSING TECHNIQUES

S THILLAIGOVINDARAJAN (Public Works Department, Madras, India), S S KUMAR (National Remote Sensing Agency, Hyderabad, India), M JAYARAMAN, and P RADHAKRISHNAMOORTHY (Anna University, Madras, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 447-456

#### A85-30743

## COASTAL MORPHOLOGY - A CASE STUDY OF THE GULF OF KHAMBHAT (CAMBAY)

S R NAYAK and B SAHAI (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p 559-567 refs

Scans were carried out on the coastal area around the Gulf of Khambat using Landsat MSS spectral bands 6 and 7 at a 11 million scale. The survey was performed to characterize erosive processes and sediment transportation and deposition in the area, to estimate the total sediment content and its seasonal variations, to map shoreline changes, to assess tidal effects on sedimentation and to map the coastal wetlands Sea truth current data were collected as a complement to the MSS data. The sediments were of particular interest since they had already caused the closing of three port cities and were suspected to be carrying chemical pollutants from industrial areas in the Gulf to resort areas. A large tidal range was credited with a net surplus of sediment carried toward land. The data will be of use in monitoring and selecting industrial development areas and the effects of a new dam on the Mahi estuary Finally, preservation of mangrove vegetation on the coast was determined to be essential in any effort to slow erosion MSK

#### A85-32122

## THE ANALYSIS OF LANDSAT MSS DATA FOR CHARACTERIZING SEDIMENT DISPERSAL IN THE BEAUFORT SEA

T PERROTT (Remotec Applications, Inc., St John's, Newfoundland, Canada), J HARPER (Woodward-Clyde Consultants, Victoria, British Columbia, Canada), P HILL, and S BLASCO (Geological Survey of Canada, Atlantic Geoscience Centre, Dartmouth, Nova Scotia, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 283-291 refs

#### A85-32123

APPLICATION OF REMOTE SENSING BY MEANS OF A SATELLITE IN SURVEYING THE WATER RESOURCES OF THE SAHEL [APPLICATION DE LA TELEDETECTION PAR SATELLITE A L'INVENTAIRE DES RESSOURCES EN EAU AU SAHEL]

C PREVOST and G ROCHON (Universite Laval, Sainte-Foy, Quebec, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 309-319 In French refs

#### A85-32124

A THERMAL STUDY OF THE WATERS OF THE ST. LAWRENCE ESTUARY BY MEANS OF THE HCMM SATELLITE - PRELIMINARY RESULTS [ETUDE THERMIQUE DES EAUX DE L'ESTUAIRE DU SAINT-LAURENT A L'AIDE DU SATELLITE HCMM - RESULTATS PRELIMINAIRES]

A LAVOIE, F BONN, M DUBOIS (Sherbrooke, Universite, Sherbrooke, Quebec, Canada), and M I EL-SABH (Quebec, Universite, Rimouski, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 321-330 In French Research supported by the Ministere de l'Education du Quebec and Universite de Sherbrooke, Natural Sciences and Engineering Research Council of Canada refs (Contract NSERC-A-6043)

#### A85-32131

SPOT AND LANDSAT-4 SIMULATIONS: GENERALIZATION OF MRC BIOPHYSICAL-INVENTORY DATA ON THE UPPER ST. LAWRENCE PRELIMINARY ANALYSIS [SIMULATIONS SPOT ET LANDSAT-4: GENERALISATION DES DONNEES D'INVENTAIRE BIOPHYSIQUE DE LA MRC DU HAUT-SAINT-LAURENT ANALYSE PRELIMINAIRE]

P VINCENT, F BONN (Sherbrooke, Universite, Sherbrooke, Quebec, Canada), and P GANGLOFF (Montreal, Universite, Montreal, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 507-517 In French refs

#### A85-32138

THE USE OF LANDSAT IMAGES IN THE SELECTION OF HYDROELECTRIC-TRANSMISSION CORRIDORS ON THE NORTH SHORE PRELIMINARY STUDY OF THE PRINCIPAL SURFACE-MATERIAL TYPES [APPORT DES IMAGES LANDSAT DANS LA SELECTION DES CORRIDORS DE TRANSPORT HYDRO-ELECTRIQUE SUR LA COTE NORD - ETUDE PRELIMINAIRE DES PRINCIPAUX TYPES DE MATERIAUX DE SURFACE]

P LAFRAMBOISE (Societe de Developpement de la Baie James, Montreal, Canada), U LECONTE, and J P POMARES (Hydro-Quebec, Montreal, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 607-613 In French refs

#### A85-32146

CORRELATIONS BETWEEN SATELLITE DATA AND RADAR, THERMOGRAPHIC, AND MULTISPECTRAL SURVEYS FOR THE GEOMORPHOLOGICAL CHARACTERIZATION OF A REGION OF SOUTHERN QUEBEC [CORRELATIONS ENTRE LES DOCUMENTS SATELLITES, LEVES RADAR, THERMOGRAPHIQUES ET MULTISPECTRAUX EN VUE D'UNE INTERPRETATION GEOMORPHOLOGIQUE D'UNE REGION DU SUD DU QUEBEC]

A ROYER, P VINCENT, C DUBE, and F BONN (Sherbrooke, Universite, Sherbrooke, Quebec, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 717-732 In French Research supported by the Ministere de l'Education du Quebec, Natural Sciences and Engineering Research Council of Canada refs

(Contract NSERC-A-6043)

#### A85-33874

## USE OF LANDSAT IMAGERY TO DETECT HYDROLOGIC INDICATORS OF THE NIGER RIVER REGIME

P A BRIVIO, E ZILIOLI (Commission of the European Communities, Joint Research Center, Ispra, Italy), and J-M GREGOIRE (CNR, Istituto per la Geofisica della Litosfera, Milan, Italy) ITC Journal (ISSN 0303-2434), no 3, 1984, p 191-199. Research supported by the European Development Fund refs

#### A85-35985

### APPLICATIONS OF GOES VAS DATA TO NOAA'S INTERACTIVE FLASH FLOOD ANALYZER

L E SPAYD, JR (NOAA, Satellite Applications Laboratory, Washington, DC) IN International Conference on Interactive Information and Processing Systems for Meteorology Oceanography, and Hydrology, Los Angeles, CA, January 7-11, 1985, Preprints Boston, MA, American Meteorological Society, 1985, p 240-247 refs

In connection with a Flash Flood Program, the Synoptic Analysis Branch (SAB) of the National Environmental Satellite, Data, and Information Service has the task to produce satellite-derived estimates and short-range forecasts of heavy precipitation for operational use by the National Weather Service (NWS) The precipitation estimates are produced on the Interactive Flash Flood Analyzer (IFFA) Visible and infrared imagery provided by the Geostationary Operational Environmental Satellite (GOES) is routinely monitored Current GOES satellites are equipped with a Visible Infared Spin-Scan Radiometer (VISSR) Atmospheric Sounder (VAS) instrument The VAS provides derived data fields and multispectral imagery in 1986, this data will be operational and available for incorporation into IFFA routines Aspects of 1984 VAS assessment are discussed along with assessment difficulties, and a case study

#### A85-36565

## INFERENCE OF RAIN RATE PROFILE AND PATH-INTEGRATED RAIN RATE BY AN AIRBORNE MICROWAVE RAIN SCATTEROMETER

M FUJITA, S YOSHIKADO (Ministry of Posts and Telecommunications, Radio Research Laboratories, Koganei, Tokyo, Japan), K OKAMOTO, and K NAKAMURA (Ministry of Posts and Telecommunications, Radio Research Laboratories, Kashima, Ibaraki, Japan) Radio Science (ISSN 0048-6604), vol 20, May-June 1985, p 631-642 refs

A modified dual-frequency algorithm (DFA) is used to examine the accuracy of rain rate profiles estimated with an airborne rain scatterometer/radiometer and a ground based radar Both radars functioned in the 10- and 35-GHz C-bands. The DFA comprises a radar equation which accounts for, e.g., the echo power, a calibration factor, the system loss, the distance between the radar and scattering volume, the effective reflectivity and the attenuation coefficient. The attenuation is summed over a series of bins representing the range. Total attenuation is then related to the rainfall rate. Data from over-ocean rainfall shows that the algorithm overpredicts the rainfall rate, a situation indicating that further investigations are needed to characterize the sea surface microwave scattering characteristics.

#### A85-37855

### RAIN ESTIMATION IN EXTRATROPICAL CYCLONES\_USING. GMS IMAGERY

R DELBEATO and S L BARRELL (Bureau of Meteorology, Melbourne, Australia) Monthly Weather Review (ISSN 0027-0644), vol 113, May 1985, p 747-755 refs

A technique is presented which provides estimates of rainfall from extratropical cyclones over an area of 125,000 sq km in southeastern Australia in simulated real time conditions. It utilizes a statistical relation between blackbody temperature of cumuliform cloud and 90 minute rainfall totals to determine estimates of rainfall from cumuliform cloud, and approximates the lesser rainfall amounts from the stratiform pre-frontal cloud as a fixed proportion of rain from equivalent cumuliform cloud. It is based on the digitized 'HR Fax' imagery received at 3 h intervals from the Japanese

Geostationary Meteorological Satellite (GMS) Five case studies are presented, each for a 24 hour period Rainfall estimates for rainfall districts within the area vary from the observed district averages, which were calculated from daily gage data, by an average of 22 percent. The mean absolute error for districts is 4.2 mm.

Author

#### A85-37951

## REMOTE SENSING FROM SATELLITES; PROCEEDINGS OF THE FIRST AND NINTH WORKSHOPS AND TOPICAL MEETING, GRAZ, AUSTRIA, JUNE 25-JULY 7, 1984

W D CARTER, ED (Globex, Inc , Reston, VA) and E T ENGMAN, ED (US Department of Agriculture, Plant Physiology Institute, Beltsville, MD) Workshops and Meeting sponsored by COSPAR, IUGS, COSTED, and United Nations Advances in Space Research (ISSN 0273-1177), vol. 4, no. 11, 1984, 261 p. For individual items see A85-37952 to A85-37977

Satellite remote sensing and its applications in hydrology are discussed in a series of national reports from various developing countries including East and South Africa, India, and Latin America. Papers are presented on dielectric properties and microwave remote sensing, ocean chlorophyll retrieval algorithms, and estimating canopy cover in drylands with Landsat MSS data Consideration is also given to remote sensing based continuous hydrologic modeling, Landsat thematic-mapper studies of land-cover spatial variability related to hydrology, and synthetic aperture radar capabilities for snow and glacier monitoring. M D

#### A85-37961

## LANDSAT MODEL FOR GROUNDWATER EXPLORATION IN NUBA MOUNTAINS, SUDAN

F AHMED, Y A HAGAZ (Khartoum University, Khartoum, Sudan), and A S ANDRAWIS (South Dakota State University, Brookings, SD) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 123-131 refs

#### A85-37969

## APPLICATION OF SPACE SCIENCES TO HYDROLOGY AND WATER RESOURCES - THE POTENTIAL AND PRACTICAL USE AS REFLECTED BY WMO EXPERIENCE

J NEMEC (World Meteorological Organization, Hydrology and Water Resources Dept, Geneva, Switzerland) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 185-192

#### A85-37970

## REVIEW OF REMOTE SENSING APPLICATIONS IN HYDROLOGY AND WATER RESOURCES MANAGEMENT IN INDIA

P D BHAVSAR (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June\_25-July\_7,\_1984)\_Advances\_in\_Space\_Research\_(ISSN-0273-1177), vol 4, no 11, 1984, p 193-200 refs

The modern space technology of satellite remote sensing has been recognized in India as a useful tool for quick information gathering in many fields of resources management. Significant work has been carried out in hydrology and water resources management related problems using the remote-sensing data from Landsat satellites, aircraft remote sensing, and Indian experimental remote-sensing satellites Bhaskara I and II In particular it has been found useful in surface-water resources and flood-plain mapping, monitoring of sediment and water pollution, water management in command areas, and ground-water targeting. Significant results of the work carried out are presented. A brief description of the proposed program using the Indian

remote-sensing satellite to be launched in 1986 is also described

correlation evaporation estimates and good agreement was found Author

#### A85-37971

### REMOTE SENSING BASED CONTINUOUS HYDROLOGIC MODELING

E T ENGMAN (US Department of Agriculture, Hydrology Laboratory, Beltsville, MD) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 201-209 refs

Two ways in which remote sensing can be used with continuous hydrologic models by providing a cost-effective way for obtaining input data and by providing synoptic measurements of various state variables are discussed Existing hydrologic models are reviewed with respect to the modification which must be made to use remotely sensed data. It is shown that microwave and thermal infrared measurements have the greatest potential for use in hydrologic models. The use of spatial data, mechanisms for extrapolating point data, and direct measurement of several hydrologic state variables, including soil moisture, surface temperature, snow water equivalent, frozen ground, and rainfall distribution, are some of the additional applications of remote sensing data. Results from an aircraft experiment in which microwave data are collected to provide complete soil-moisture measurements over a small research basin are presented and discussed with respect to their application in continuous hydrologic simulation models

A85-37972\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

## LANDSAT THEMATIC MAPPER STUDIES OF LAND COVER SPATIAL VARIABILITY RELATED TO HYDROLOGY

S WHARTON, J ORMSBY, V SALOMONSON, and P MULLIGAN (NASA, Goddard Space Flight Center, Laboratory for Earth Sciences, Greenbelt, MD) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 217-226 refs

Past accomplishments involving remote sensing based land-cover analysis for hydrologic applications are reviewed Ongoing research in exploiting the increased spatial, radiometric, and spectral capabilities afforded by the TM on Landsats 4 and 5 is considered. Specific studies to compare MSS and TM for urbanizing watersheds, wetlands, and floodplain mapping situations show that only a modest improvement in classification accuracy is achieved via statistical per pixel multispectral classifiers. The limitations of current approaches to multispectral classifiers in the development of an alternative analysis approach for defining inputs to urban hydrologic models using TM are discussed.

A85-37973\* Maryland Univ , College Park

## MODELLING THE ATMOSPHERIC BOUNDARY LAYER FOR REMOTELY SENSED ESTIMATES OF DAILY EVAPORATION

R J GURNEY (Maryland, University, College Park, MD), K BLYTH (Institute of Hydrology, Wallingford, Oxon, England), and P J CAMILLO (SAR, Inc., Riverdale, MD) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 227-230 refs

(Contract NAG5-395, NAS5-28200)

An energy and moisture balance model of the soil surface was used to estimate daily evaporation from wheat and barley fields in West Germany The model was calibrated using remotely sensed surface temperature estimates Complete atmospheric boundary layer models are difficult to use because of the number of parameters involved and a simplified model was used here The resultant evaporation estimates were compared to eddy

#### A85-37974

## AN OBSERVATION OF SNOW MELTING PROCESS FROM REMOTELY SENSED DATA

T SAKAI, H NISHIKAWA, S ENDO (Nihon University, Narashino, Chiba, Japan), S TANAKA, and T SUGIMURA (Remote Sensing Technology Center of Japan, Tokyo, Japan) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 231-234

Observations of satellite images have shown that the snow melting in mountainous area proceeds more rapidly in the east-facing slope of the valley than in the west-facing one. The energy for melting snow consists of the total from the atmosphere and from the solar rays. The diurnal variation of the solar energy into the snow in the east-facing slope differs from that in the west-facing slope. This causes the highest value of the instantaneous energy for melting snow to occur in the west-facing surface. As one of the reasons for the above tendency, the difference of the highest value to melt snow may be taken into account.

#### A85-37975

USE OF SATELLITE IMAGES TO OBTAIN ACCURATE SNOWMELTING RUNOFF FORECASTS AND TO SURVEY GEOTHERMAL ACTIVITY ALONG LOS ANDES RANGE, CHILE M F ARAYA (Universidad de Chile, Santiago, Chile) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol. 4, no. 11, 1984, p. 235-240 refs

#### A85-37976

## SYNTHETIC APERTURE RADAR CAPABILITIES FOR SNOW AND GLACIER MONITORING

H ROTT (Innsbruck, Universitaet, Innsbruck, Austria) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 241-246 refs

The potential of SAR systems for monitoring the seasonal snow cover and glaciers has been investigated based on an airborne experiment in the Austrian Alps and on Seasat SAR and Shuttle Imaging Radar-A data X- and C-band SAR are useful sensors for mapping wet snow packs, while in L-band snow-covered and snow-free surfaces often cannot be separated SAR data in all three frequency bands provide valuable glaciological information

Author

#### A85-37977

## HYDROLOGIC APPRAISAL OF RIVERS PLAN-FORM AT CONFLUENCE ZONE A CASE STUDY USING LANDSAT MSS DATA

M G SRINIVAS and G T MARATHE (Indian Institute of Technology, Bombay, India) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 247-251 refs

A study using Landsat MSS data from December 1972 and black and white aerial photographs from November 1969 to analyze the planform configuration at the confluence zone of the Wainganga and Khobragadi rivers in the central part of India is discussed The study confirms that the differences in the discharges in the rivers constitute the dominating factors causing changes in the riverform The possibility of using digital techniques for the analysis of the data illustrates the speedy access to data inputs

#### A85-37982

DRAINAGE NETWORK ANALYSIS OF LANDSAT IMAGES OF THE OLYMPUS-PIERIA MOUNTAIN AREA, NORTHERN GREECE

T ASTARAS (Salonika, University, Salonika, Greece) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 673-686 refs

#### A85-38392

MACHINE CLASSIFICATION OF FRESHWATER ICE TYPES FROM LANDSAT-1 DIGITAL DATA USING ICE ALBEDOS AS TRAINING SETS

G A LESHKEVICH (NOAA, Great Lakes Environmental Research Laboratory, Ann Arbor, MI) Remote Sensing of Environment (ISSN 0034-4267), vol 17, June 1985, p 251-263 refs

#### A85-38587

CALCULATION OF THE EMISSIVITY OF ICE AND SNOW COVERS IN THE MICROWAVE REGION [RASCHET IZLUCHATEL'NOI SPOSOBNOSTI LEDIANOGO I SNEZHNOGO POKROVOV V SVCH DIAPAZONE]

R B BELICH IN Radio-physical method for the study of the natural environment Leningrad, Gidrometeoizdat, 1984, p 91-102 In Russian refs

Computational results concerning the reflection and transmission coefficients and emissivity of ice and snow in the microwave region are analyzed in terms of the cover's water content, density, and layer thickness variations for surface temperature near 0 C Qualitative analysis indicates that the reflection coefficient decreases with a decrease in density Moreover, with an increase in the water content, the layer thickness at which an asymptotic value of the reflection coefficient is established diminishes considerably. It is suggested that the water content of the snow cover should be measured at wavelengths between 0.8-2 cm, whereas ice cover characteristics can be measured at larger wavelengths.

#### A85-38709

MODELING OF SPATIALLY DISTRIBUTED OBJECTS USING REMOTE SENSING DATA [MODELIROVANIE PROSTRANSTVENNO-RASPREDELENNYKH OB'EKTOV S ISPOL'ZOVANIEM DISTANTSIONNOI INFORMATSII]

P A ZHUK and A A KAMISSARCHUK IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 49-53 In Russian

A graphic representation that was initially used for modeling hydrological systems is generalized to the case of random spatially distributed objects. A description of a method, based on cluster analysis, for defining the structure of the system being modeled from thematic maps is presented. Finally, two approaches to determining the optimal structure of the system are examined. (1) the identification of the structure, functions, and parameters of the complex system, and (2) the maximum decomposition of the system followed by its composition.

#### A85-38710

A GRAPHIC APPROACH TO THE MODELING OF RIVER DISCHARGE USING REMOTE SENSING DATA [GRAFOVYI PODKHOD PRI MODELIROVANII RECHNOGO STOKA S ISPOL'ZOVANIEM DANNYKH DISTANTSIONNYKH IZMERENII] P A ZHUK and A A KOMISSARCHUK IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 53-57 in Russian

#### A85-38713

THE USE OF ARTIFICIAL OBJECTS IN CALIBRATING REMOTE SENSING DATA ON THE QUALITY OF NATURAL WATERS [PRIMENENIE ISKUSSTVENNYKH OB'EKTOV PRI ETALONIROVANII DANNYKH DISTANTSIONNOI INDIKATSII KACHESTVA PRIRODNYKH VOD]

IU V ZAVOLOKIN, V. A KRIULKOV, and S M SAZHIN IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space. Leningrad, Gidrometeoizdat, 1984, p. 71-74. In Russian

The feasibility of producing an artificial reference sample for thematic processing of airborne and spaceborne imagery data is assessed. It is argued that the use of an artificial reference leads to a considerable decrease in amount of work required for the collection of support hydrochemical information. The discussion also covers the size of the cell containing the reference medium. The method was tested by producing a reference on a rigid frame with four cells, each with a specific concentration of suspended particles. The dependence of the film density on the particle concentration, obtained experimentally, can be used for concentration mapping.

#### A85-38714

OPTIMIZATION OF THE REFERENCE CALIBRATION METHOD FOR REMOTE SENSING DATA ON NATURAL WATERS [OPTIMIZATSIIA METODA ETALONIROVANIIA DANNYKH DISTANTSIONNOGO ZONDIROVANIIA PRIRODNYKH VOD]

IU V ZAVOLOKIN, V A KRIULKOV, and A V LABAZIN IN Problems related to the collection, systematization and use-of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 74-77 In Russian

Calibration of remote sensing data on natural waters by introducing an artificial reference sample is optimized by quantitatively decoding water surface imagery A model relating photometric characteristics of airborne and spaceborne images with the concentration of dissolved or suspended impurities is used to determine the minimum number of artificial key regions A comparison of remote sensing data with observations from ships on the Lake Baikal revealed a relative error of 3-21 percent

LT

#### A85-38817

WETLANDS CLASSIFICATION USING LANDSAT THEMATIC MAPPER DATA UNSUPERVISED CLASSIFICATION APPROACH

K. A RICHARDSON (Rhode Island, University, Narragansett, RI) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 154-158 refs

The conduction of a survey from the ground in the case of the wetland environment is very difficult, while the recent use of satellite data to aid in the analysis of wetlands has been limited for the most part by the lack of surface resolution. The present project has used a new Landsat sensor, the Thematic Mapper (TM), with an improved surface resolution (30 meters or 0 25 acres) The satellite Landsat IV, launched in July 1982, utilizes the TM sensor This sensor records electromagnetic radiation from seven different bands. A description of the current state of knowledge regarding the classification of coastal wetlands is given, and the method of analysis employed in the case of a study of Landsat TM data is discussed. The data used is from the TM scene E-40145-14492, Row 11, Path 31, dated December 8, 1982 The scene is 185 km long by 185 km wide with the center point around Chatham, MA The analysis led to the identification of 31 classes of land cover GR

**A85-38826\*** Technicolor Government Services, Inc , Moffett Field, Calif

### USE OF THEMATIC MAPPER FOR WATER QUALITY ASSESSMENT

E M HORN and L A MORRISSEY (Technicolor Government Services, Inc., Moffett Field, CA) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 244-252 refs

(Contract NAS2-11101)

The evaluation of simulated TM data obtained on an ER-2 aircraft at twenty-five predesignated sample sites for mapping water quality factors such as conductivity, pH, suspended solids, turbidity, temperature, and depth, is discussed. Using a multiple regression for the seven TM bands, an equation is developed for the suspended solids. TM bands 1, 2, 3, 4, and 6 are used with logarithm conductivity in a multiple regression. The assessment of regression equations for a high coefficient of determination (R-squared) and statistical significance is considered. Confidence intervals about the mean regression point are calculated in order to assess the robustness of the regressions used for mapping conductivity, turbidity, and suspended solids, and by regressing random subsamples of sites and comparing the resultant range of R-squared, cross validation is conducted.

#### A85-38827

## SPACEBORNE AND AIRBORNE RADAR, INFRARED AND THERMAL STUDIES OF COASTAL PROCESSES AT THE MISSISSIPPI DELTA, LOUISIANA

P MOUGINIS-MARK, C FERRALL, L GADDIS (Hawaii, University, Honolulu, HI), and S ZISK (Haystack Observatory, Westford, MA) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 253-259 refs

A digital Space Shuttle Imaging Radar (SIR-A) scene of the Mississippi Birdfoot Delta, southern Louisiana has been analyzed to test the usefulness of spaceborne radars in the investigation of coastal environments. Measurements of water inundation in an area of coastal marshland by the selective analysis of brightness histograms for image subscenes, and the application of simple variance and median value 'box car' filters to the morphological characterization of the area, are presented. The potential use of these types of analyses using radars with different incidence angles is further considered in the context of airborne radar (SLAR) images. Visible and near-IR U-2 aircraft images and a scene from the Landsat 4. Thematic Mapper are also discussed as further descriptors of the coastal and offshore environment of the Mississippi River.

#### A85-39347

# UTILIZATION OF AERIAL AND SPACE REMOTE-SENSING DATA STUDIES OF LAND WATER [ISPOL'ZOVANIE AEROKOSMICHESKOI INFORMATSII V ISSLEDOVANIIAKH VOD SUSHI]

V F USACHEV, ED Leningrad, Gidrometeoizdat (Gosudarstvennyi Gidrologicheskii Institut, Trudy, No 299), 1984, 135 p In Russian No individual items are abstracted in this volume

Papers are presented on such topics as space remote-sensing identification of river-discharge zones in central Asia, the use of remote sensing to assess anthropogenic effects on water resources of and regions, satellite determinations of the times of formation and melting of mountain snow cover, and remote-sensing of snow melting near industrial centers. Consideration is also given to radar measurements of lake ice thickness distribution, interpretation of ground-water icing conditions on multispectral photographs, and the study of flood characteristics on the basis of remote sensing Digital thematic processing methods in the study of land hydrology

are reviewed, and an interactive system for the interpretation of remote-sensing data is described B J

## N85-23204\*# Agricultural Research Service, Durant, Okla A FIRST EVALUATION OF LANDSAT TM DATA TO MONITOR SUSPENDED SEDIMENTS IN LAKES

F R SCHIEBE, J C RITCHIE, and G O BOATWRIGHT IN NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 337-348 Jan 1985 refs Prepared in cooperation with Agricultural Research Service, Beltsville, Md and Agricultural Research Service, Houston, Tex Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail NTIS HC A19/MF A01 CSCL 08H

The use of LANDSAT to monitor and track changes in the water quality of Lake Chicot, Arizona was assessed using MSS and TM digital data from nine water sites. Results show that (1) TM Bands 1, 2, 3, and 4 appear to be providing information on concentrations of particulate matter suspended in surface waters. These bands are also highly interrelated for water samples, (2) preliminary evaluation indicates that TM Band 3 showed the best relationship to surface suspended solids, (3) TM Bands 5 and 7 are useful for separating water from nonwater areas, (4) the MSS Bands 2 and 3 can be related to suspended solids in surface water, as has already been shown from previous LANDSAT research, and (5) analysis of TM Band 6 indicates that while synoptic temperature patterns may be discerned, the digital sensitivity to a two degree temperature difference is low.

#### N85-23205\*# California Univ , Santa Barbara SNOW REFLECTANCE FROM THEMATIC MAPPER

J DOZIER *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 349-358 Jan 1985 refs Previously announced as N83-32144 Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail NTIS HC A19/MF A01

Calculations of snow reflectance in all 6 TM reflective bands (i.e., 1,2,3,4,5, and 7) using a delta Eddington model show that snow reflectance in bands 4,5, and 7 is sensitive to grain size Efforts to interpret the surface optical grain size for the spectral extension of albedo are described Results show the TM data include spectral channels suitable for snow/cloud discrimination and for snow albedo measurements that can be extended throughout the solar spectrum Except for band 1, the dynamic range is large enough that saturation occurs only occasionally The finer resolution gives much better detail on the snowcovered area and might make it possible to use textural information instead of the snowline as an index to the amount of snow melt runoff

ARH

N85-23211\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

COMPARISON OF LAND COVER INFORMATION FROM LANDSAT MULTISPECTRAL SCANNER (MSS) AND AIRBORNE THEMATIC MAPPER SIMULATOR (TMS) DATA FOR HYDROLOGIC APPLICATIONS

J C GERVIN, Y C LU (Computer Sciences Corp., Greenbelt, Md.), and R F MARCELL (Computer Sciences Corp., Greenbelt, Md.) In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol. 4 p 421-430 Jan 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 05B

Thematic mapper simulator (TMS) data produced a more accurate and spatially contiguous classification than MSS for the Clinton River Basin in Michigan. While the accuracy of the 4-band TMS data set was as good as the 7-band, the 3-band TMS data sets were also better than the MSS. The combination of bands selected based on the transformed divergence technique provided one band in each of the major regions of the spectrum visible (band 3), near IR (band 4), middle IR (band 5) and thermal IR (band 7). These results should be viewed with some caution, since the data are from a TMS rather than the actual TM and the MSS.

data were obtained in early summer while the TMS was flown in late summer The higher accuracies for the developed categories (residential and commercial) should improve the predictions of runoff in flood forecasting models and of flood damage for damage calculation models appreciably

National Aeronautics and Space Administration N85-23223\*# Goddard Space Flight Center, Greenbelt, Md

REMOTE SENSING OF SNOW AND EVAPOTRANSPIRATION SCHMUGGE, ed Washington Feb 1985 176 p refs Proc of 2nd workshop held in Honolulu, Hawaii, 15-19 Nov 1983 Original contains color illustrations

(NASA-CP-2363, REPT-84B0036, NAS 1 55 2363) Avail NTIS HC A09/MF A01 CSCL 08L

The use of snowmelt runoff models from both the U.S. and Japan for simulating discharge on basins in both countries is discussed as well as research in snowpack properties and evapotranspiration using remotely sensed data

N85-23225\*# Science and Technology Agency, Tokyo (Japan) National Inst of Resources

GENERAL REPORT OF THE RESEARCHES OF SNOWPACK PROPERTIES, SNOWMELT RUNOFF AND **EVAPOTRANSPIRATION IN JAPAN** 

K TAKEDA In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 7-8 Feb 1985 Avail NTIS HC A09/MF A01 CSCL 08L

A method was developed for estimating the distribution of snow and the snow water equivalent in Japan by combining LANDSAT data with the degree day method A snow runoff model was improved and applied to the Okutadami River basin. The Martinec Rango model from the US was applied to Japanese river basins to verify its applicability. This model was then compared with the Japanese model Analysis of microwave measurements obtained by a radiometer on a tower over dry snow in Hokkaido indicate a certain correlation between brightness temperature and snowpack properties. A correlation between brightness temperature and depth of dry snow in an inland plain area was revealed in NIMBUS SMMR data obtained from the U.S. Calculation of evaporation using airborne remote sensing data and a Priestley-Taylor type of equation shows that the differentiation of evaporation with vegetation type IS not remarkable because of little evapotransportation in winter ARH

N85-23226\*# Agricultural Research Service, Beltsville, Md Hydrology Lab

### SNOWMELT-RUNOFF MODEL UTILIZING REMOTELY-SENSED

In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 9-27

Avail NTIS HC A09/MF A01 CSCL 08L

Remotely sensed snow cover information is the critical data input for the Snowmelt-Runoff Model (SRM), which was developed to simulatke discharge from mountain basins where snowmelt is an important component of runoff Of simple structure, the model requires only input of temperature, precipitation, and snow covered area SRM was run successfully on two widely separated basins The simulations on the Kings River basin are significant because of the large basin area (4000 sq km) and the adequate performance in the most extreme drought year of record (1976). The performance of SRM on the Okutadami River basin was important because it was accomplished with minimum snow cover data available Tables show optimum and minimum conditions for model application, basin sizes and elevations where SRM was applied, and SRM strengths and weaknesses. Graphs show results of discharge simulation ARH

N85-23227\*# Science and Technology Agency, Tokyo (Japan) Environmental Research and Technology Inst

SNOWMELT RUNOFF MODEL IN JAPAN

K. ISHIHARA, Y NISHIMURA, and K TAKEDA In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 29-52 Feb 1985 refs Avail NTIS HC A09/MF A01 CSCL 08L

The preliminary Japanese snowmelt runoff model was modified so that all the input variables arc of the antecedent days and the inflow of the previous day is taken into account A few LANDSAT images obtained in the past were effectively used to verify and modify the depletion curve induced from the snow water equivalent distribution at maximum stage and the accumulated degree days at one representative point selected in the basin Together with the depletion curve, the relationship between the basin ide daily snowmelt amount and the air temperature at the point above are exhibited homograph form for the convenience of the model user The runoff forecasting procedure is summarized

N85-23228\*# Science and Technology Agency, Tokyo (Japan) Environmental Research and Technology Inst

#### APPLICATION OF MARTINEC-RANGO MODEL TO RIVER BASIN IN JAPAN

K TSHIHARA, M INOUE, and K TAKEDA In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 53-59 Feb 1985 refs Avail NTIS HC A09/MF A01 CSCL 08H

Variables and parameters used in applying the Martinec-Rango model to Japan's Okutadami River basin are given The calculated inflow for three snowmelt seasons is shown in relation to the observed inflow When the peak inflow occurs, two values of the calculated and the observed do not coincide with each other A one day lag can be seen between them Most periods in the season (except peak stage) exhibited a good agreement ARH

N85-23229\*# Science and Technology Agency, Tokyo (Japan) DISTRIBUTION OF SNOW AND MAXIMUM SNOW WATER EQUIVALENT OBTAINED BY LANDSAT DATA AND DEGREE DAY METHOD

K TAKEDA, H OCHIAI, and S TAKEUCHI In NASA Goddard Space Flight Center Remote Sensing of Snow Evapotranspiration p 60-64 Feb 1985 Avail NTIS HC A09/MF A01 CSCL 08H

Maximum snow water equivalence and snowcover distribution are estimated using several LANDSAT data taken in snowmelting season over a four year period. The test site is Okutadami-gawa Basin located in the central position of Tohoku-Kanto-Chubu District The year to year normalization for snowmelt volume computation on the snow line is conducted by year to year correction of degree days using the snowcover percentage within the test basin obtained from LANDSAT data. The maximum snow water equivalent map in the test basin is generated based on the normalized snowmelt volume on the snow line extracted from four LANDSAT data taken in a different year. The snowcover distribution on an arbitrary day in snowmelting of 1982 is estimated from the maximum snow water equivalent map. The estimated snowcover is compared with the snowcover area extracted from NOAA-AVHRR data taken on the same day. The applicability of the snow estimation using LANDSAT data is discussed

N85-23230\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

MICROWAVE RADIOMETER OBSERVATIONS OF SNOWPACK PROPERTIES AND COMPARISON OF U.S. JAPANESE **RESULTS** 

Remote Sensing of Snow and A T C CHANG In its Evapotranspiration p 65-74 Feb 1985 Avail NTIS HC A09/MF A01 CSCL 08L

Microwave data collected by field experiments over Vermont and Hokkaido and Nimbus-7 SMMR over North Dakota and Hokkaido were studied The measured 37 GHz brightness temperatures show considerable effect of volume scattering by snow grains The 37 GHz brightness for a new snowpack with

average grain radius of 0.25 mm is generally about 40 K higher than the naturally compacted pack with average grain radius of 0.4 mm. The scattering effect is much less distinct for the 6.6 GHz. However, the layering effect is much stronger at the longer wavelength. For 10.7 and 18 GHz, the effect of layering and scattering vary due to different combinations of internal snow grain distribution and layering structures. Over the Hokkaido test site, the SMMR data are too coarse for the snow field. A better spatial resolution is required to study these snow fields.

N85-23231\*# Chiba Univ (Japan) Inst of Color and Image Technology

## STUDIES ON PHYSICAL PROPERTIES OF SNOW BASED ON MULTI CHANNEL MICROWAVE RADIOMETER

K TSUCHIYA and K TAKEDA *In* NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 75-87 Feb 1985 refs

Avail NTIS HC A09/MF A01 CSCL 08L

The analysis of the data observed over a snow field with a breadboard model of MSR (microwave scanning radiometer) to be installed in MOS-1 (Marine Observation Satellite-1) indicates that (1) the influence of incident angle on brightness temperature is larger in horizontal polarization component than in vertical polarization component. The effect of incident angle depends upon the property of snow with larger value for dry snow, (2) the difference of snow surface configuration consisting of artificially made parallel ditches of 5 cm depth and 5 cm width with spacing of 10 and 30 cm respectively which are oriented normal to electrical axis do not affect brightness temperature significantly, and (3) there is high negative correlation between brightness temperature and snow depth up to the depth of 70 cm which suggests that the snow depth can be measured with a two channel microwave radiometer up to this depth.

N85-23232\*# Chiba Univ (Japan) Inst of Color and Image Technology

#### **ANALYSIS OF NIMBUS-7 SMMR DATA**

K TSUCHIYA, K TAKEDA (Science and Technology Agency, Tokyo), and K KOZAI (Science and Technology Agency, Tokyo) In NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 89-97 Feb 1985 refs

Avail NTIS HC A09/MF A01 CSCL 08L

Measurements obtained with the SMMR OF NIMBUS-7 over Hokkaido snow field show that the relationship between snow depth and brightness temperature changes when snow depth becomes deeper than 50 cm. Average brightness temperature of the daytime indicates negative correlations with snow depth except for 6 6 GHz channel data which indicates weak positive correlation.

N85-23881# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France) Service Hydrologie

## THE ARGOS SYSTEM AND HYDROLOGY. RESULTS OBTAINED BY ORSTROM AND BENEFITS OF A DEGREE OF STANDARDIZATION

J CALLEDE In CNES Data Collection and Platform Location by Satellite 7 p 1980 In FRENCH, ENGLISH summary Avail NTIS HC A07/MF A01

Hydrological monitoring stations in the White Nile flood plain in Southern Sudan and on the Faleme, a tributary of the Senegal river in Senegal transmit river water level and rainfail data via the ARGOS system. The measured parameters being river water level and rainfall, a degree of standardization as regards the hardware and the processing methods was required. The order in which sensor data are transmitted must be the same Sensor 1 (water level) has a 16-bit parallel Gray-code output, sensor 2 (rainfall) may have either a 16-bit parallel output (external counting) or a pulse output (internal counting) with the count encoded as a pure binary 16-bit code. This degree of standardization cuts the cost of interfaces and considerably reduces the volume of processing software required, which means less risk of error. This degree of standardization is compatible with readily available equipment.

Author (ESA)

N85-23882# Water Survey of Canada, Ottawa (Ontario). HYDROMETRIC TELEMETRY IN CANADA

I A REID, K F DAVIES (Water Survey of Canada, Calgary, Alberta), and J CLARKE (Water Survey of Canada, Halifax, Nova Scotia) /n CNES Data Collection and Platform Location by Satellite 8 p 1980 refs

Avail NTIS HC A07/MF A01

The use of satellite telemetry by the Water Survey of Canada (WSC) for the acquisition of hydrometric and related data is described All the operational requirements of the WSC can be met through the use of the geostationary GOES or the polar orbiting ARGOS systems. The development of data reception and distribution facilities for GOES and ARGOS data will provide WSC users with the capacity and flexibility needed to meet their demands.

Author (ESA)

N85-24363# Compagnie pour l'Electronique, l'Informatique et les Systemes-Espace, Toulouse (France)

## AUTÓMATIC HYDRÓLOGICAL DATA COLLECTION FACILITY USING ARGOS

B FROMANTIN In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 4 p 1981

Avail NTIS HC A08/MF A01

A limnograph-ARGOS beacon interface card to overcome the problem of irregular satellite passages was developed to allow river level to be measured every 30 min and 16 sites to be measured simultaneously. The card stores 14 successive limnograph measurements in the memory, eliminating the most dated one each time. Author (ESA)

N85-24386# Electricite de France, Grenoble Div Technique Generale

### MEASUREMENT OF WATER EQUIVALENT OF MOUNTAIN SNOW COVER

P GUILLOT In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 195-199 1982 refs In FRENCH, ENGLISH summary Avail NTIS HC A09/MF A01

The ARGOS system was used to transmit daily high mountain snow layer measurements from areas of the Alps and Pyrenees too isolated to be connected to the wire network, and too deep in the surrounding relief to allow ground-ground VHF links. The good performance of the ARGOS system led to ARGOS beacons being used with a network of profiling horizontal radioactive snow gages, which records the snow layer density profile once a day.

Author (ESA)

N85-24388# Swedish Meteorological and Hydrological Inst , Stockholm

## HYDROLOGICAL DATA COLLECTION FROM SWEDISH MOUNTAIN AREAS

G WENNERBERG In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 209-213 1982 refs

Avail NTIS HC A09/MF A01

Swedish mountain stations transmit air temperature, precipitation and water level data. They are installed in remote areas and operate under severe conditions. The system of transmitting via satellite results in demands and possibilities of sensor equipment. Pressure sensors can be used to measure water level at stations without stilling wells and access to electricity. The ARGOS system means that automatic field stations can be set up in places without access to electricity or the telephone network, for hydrological runoff prediction.

N85-24389# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France)

THE ARGOS SYSTEM AND HYDROLOGY: THE USE OF PLATFORM TERMINAL TRANSMITTER (PTT) WITH BUILT-IN MEMORY AND DIRECT RECEPTION BY THE SEINE BASIN HYDROLOGY SERVICE

J CALLEDE, J RENTIERE, and Y ROUQUEROL In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf p 215-224 1982 In FRENCH, ENGLISH summary Avail NTIS HC A09/MF A01

An ARGOS platform transmitter terminal (PTT) with the entire ARGOS message capacity (256 bits) available in a built-in memory was built and deployed in the Seine basin. The PTT was linked to a direct reception ARGOS station to eliminate the time delay caused by transmitting via ARGOS centers. The station receives fewer messages than the complete ARGOS system, partly due to the use of an omnidirectional receive antenna. There is a good degree of redundancy in the water level data, corresponding to any given hour of data collection time, the exact degree of redundancy depending on the time of day. The experiment shows that the direct readout station provides timely data for forecasting and network management requirements, but that the DISPOSE file should be used if all 48 daily observations are required.

Author (ESA)

N85-25340# Joint Publications Research Service, Arlington, Va STUDY OF VOLGA RIVER DELTA USING SPACE PHOTOSURVEY MATERIALS Abstract Only

G F KRASNOZHON and Y S SOKOLOV *In its* USSR Rept Space (JPRS-USP-85-003) p 107 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (USSR), no 3, May-Jun 1984 p 27-32 Original language document announced as A84-43204

Avail NTIS HC A08/MF A01

The use of space photographs to map deltas is examined, and a hydrographic map of the Volga delta compiled on the basis of space photographs is presented. A comparison of this map with the hydrographic map of 1910 elucidates the dynamics of the Volga delta in the course of 65 years.

B J (IAA)

N85-27348# Office de la Recherche Scientifique et Technique, Bondy (France) Service Hydrologie

PRESENT STAGE OF UTILIZATION OF THE ARGOS SYSTEM BY THE ORSTOM HYDROLOGICAL SERVICE FOR HYDROMETRIC DATA COLLECTION

G RABBIA In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 6 p 1983 Avail NTIS HC A16/MF A01

Satellite telemetry utilization in hydrological studies in subtropical regions is described. Tests to inventory the possibilities applicable to hydrology (rainfall, water height level, flow gaging and flood forecasts), test and select equipment (catchers, coders, power supply), and estimate the cost for converting a standard station were performed with low orbiting and geostationary satellites. The data collection platforms used being of extremely reduced size made possible their installation in existing facilities without noticeable modifications. The data are especially interesting since users can register from 15% to 20% more daily readings with a 97% accuracy rate.

N85-27349# National Dept of Water and Electrical Energy, Brasilia (Brazil)

THE ARGOS SYSTEM IN BRAZIL

P R M GARCIA In CNES Data Collection and Platform Location by Satellite ARGOS Users' Conf 3 p 1983

Avail NTIS HC A16/MF A01

The use of satellite linked hydrology networks to study the day-to-day hydrological regime of the Amazon and its tributaries, to acquire data for fishing, agriculture, water transportation, management of dams and other facets of the river basin's economic development is discussed. Given the considerable problems of access in such a region, and the slow rate of change in water levels, the ARGOS System is suitable if there is no need to maintain

or adjust clocks at the station Experiments on two hydrological stations, and operation of a VHF direct readout station confirm the usefulness of ARGOS

Author (ESA)

N85-27499# National Environmental Satellite Service, Washington, D C Satellite Applications Lab

TECHNIQUE THAT USES SATELLITE, RADAR, AND CONVENTIONAL DATA FOR ANALYZING AND SHORT-RANGE FORECASTING OF PRECIPITATION FROM EXTRATROPICAL CYCLONES

R A SCOFIELD and L. E SPAYD, JR Nov 1984 58 p refs (PB85-164994, NOAA-TM-NESDIS-8) Avail NTIS HC A04/MF A01 CSCL 04B

A technique for estimating precipitation from extratropical cyclones using visible and infrared geostationary satellite imagery, radar data and conventional data is discussed. Extratropical cyclone systems were divided into five categories. For each category, schematics of evolution of cloud patterns associated with moderate to heavy precipitation were developed. Using the schematics along with radar and conventional data, precipitation estimates (rainfall and snowfall) and short range forecasts were produced. Verification was done on the estimates and forecasts produced from September 1982 through April 1983.

N85-27501# Wyoming Univ , Laramie Dept of Atmospheric Science

CLOUD PHYSICS STUDIES IN THE SCPP (SIERRA COOPERATIVE PILOT PROJECT) Interim Report, Oct. 1983 - Sep. 1984

Sep 1984 134 p refs (Contract DI-2-07-81-V0256)

(PB85-163095, AS147) Avail NTIS HC A07/MF A01 CSCL 04B

A case study of a katabatic frontal passage as observed by Sheridan Rawinsondes and the UW King Air aircraft is given Based on this case study and a preliminary summary of other frontal passages, the shallow orographic cloud which remains on the Sierra barrier following passage of upper level hyperbaroclinic zones and katabatic fronts usually contains a substantial amount of supercooled water. The responses to seeding of clouds seeded with dry ice in the SCPP-1 seeding experiment during SCPP/84 is described. No seeding effects were observed on the day when the randomization was NO SEED and distinct seeding effects were observed on an intentional SEED day. The combined hydrometeor distributions from three PMS probes are described. In the ice multiplication region centered at -5C the combined data are superexponential distributed such that it fits a straight line on a log-log plot.

#### 07

## DATA PROCESSING AND DISTRIBUTION SYSTEMS

Includes film processing, computer technology, satellite and aircraft hardware, and imagery

### A85-30828

### AERIAL PHOTO COVERAGE PLANNING - PROGRAMS TO HELP DETERMINE MISSION SPECIFICATIONS

J. A CAYLOR (U.S. Forest Service, San Francisco, CA) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 15-25

Acquisition of NEW resource project aerial photographs should be flight planned by the resource project leader. The PHOTO MISSION PLAN is the result of properly relating photographic variables to resource project requirements. Sets of photographic variables and project requirements which have proven useful are

discussed These are related through formulas to compute the following needed photo mission plan specifications. (1) Intervalometer setting, (2) number of flight lines, (3) flight line spacing on the planning map, (4) number of exposures per flight line, (5) number of exposures on the project area, (6) total project photo acquisition cost. The algorithm has been programmed (AOS) for solution by the Texas Instruments TI 59, and also (Level II Basic) for the Radio Shack TRS80PC Model 2. Using the program, a variety of flight plan models can be quickly tested for conformity to technical, manpower, and budgeting requirements of a resource project.

#### A85-30842

## THE RMS TM RESOURCE MEASUREMENT SYSTEM, DESCRIPTION AND APPLICATIONS

R R MCHAIL, K H KRECKEL, and M A FIAMMI (Bausch and Lomb, Inc., Rochester, NY) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 147-150

The capabilities of the software based resource measurement Resource Management System for extracting quantitative data from zoom transfer scope remotely sensed imagery via a lle microcomputer interface are described. The scope yields color photographs for generating color, shape and form map images and thematic maps. The software based system allows cursor or stylus tracing of the areas of interest, producing stored digitized boundaries which can be treated statistically. The program is also amenable to digitizing maps. Potential applications include lineament analysis, hydrological shoreline studies, and land surveys for taxation of urban, suburban and rural properties.

#### A85-30844

## VIDEO COLOR INFRARED IMAGERY - A FUTURE NATURAL RESOURCE MANAGEMENT TOOL

P R NIXON, D E ESCOBAR, R L BOWEN, and A J RICHARDSON (US Department of Agriculture, Agricultural Research Service, Weslaco, TX) IN Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and Lake Alfred, FL, November 15-17, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 159-165 refs

#### A85-30951

EXTRACTION OF INFORMATION FROM REMOTELY SENSED IMAGES; PROCEEDINGS OF THE CONFERENCE ON TECHNIQUES FOR EXTRACTION OF INFORMATION FROM REMOTELY SENSED IMAGES, ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NY, AUGUST 16-19, 1983

P F HOPKINS, ED (New York, State University, Syracuse, NY) Conference sponsored by the Society of Photographic Scientists and Engineers and American Society of Photogrammetry Falls Church, VA, American Society of Photogrammetry, 1984, 180 p For individual items see A85-30952 to A85-30965

Subjects related to multispectral image analysis are discussed, taking into account a computer-assisted synthesis of information from multispectral imagery, stereo models from synthetic aperture radar, a 7 1/2 map-image extraction from precision processed Landsat Multispectral Scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes, and multiband image classification with a distributed architecture Other topics explored are concerned with recent developments in data acquisition from satellites, digital image processing techniques, thermal infrared image analysis techniques, and techniques for removal of radiometric image degradation is given to resource inventory through instructionally-based digital processing system, hierarchical stereo matching, a comparison of techniques for radiometric calibration of aerial infrared thermal images, techniques for removal of radiometric image degradation effects, and resolution estimation for the Landsat-4 Thematic Mapper G R

#### A85-30953

RESOURCE INVENTORY THROUGH INSTRUCTIONALLY-BASED DIGITAL PROCESSING SYSTEM

R LOUGEAY and D ASH (New York, State University, Geneseo, NY) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falis Church, VA, American Society of Photogrammetry, 1984, p 15-19 (Contract NSF SER-81-60802)

The utilization of an instructionally-based interactive digital image processing system is discussed for resource inventory applications to assist public agencies. The availability of both photographic and digital remotely sensed data at a local college, plus user-friendly image processing software developed for the mainframe computer, has attracted interest from regional, county and state resource managers. A sample applications project is reviewed, including degrees of success and limitations which develop when the computer disk storage capacity and time-sharing capacity must be dedicated, as first priority, to instructional purposes.

#### A85-30955

## THE CONTRIBUTION OF THE HEAT CAPACITY MAPPING MISSION TO THE INTERPRETATION OF THERMAL INFRARED DATA

J C PRICE (U S Department of Agriculture, Hydrology Laboratory, Beltsville, MD) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 43-52 refs

A spectral window at 10-12 micrometers in the thermal infrared permits observations of surface temperature by satellite radiometry The Heat Capacity Mapping Mission (HCMM), launched in 1978, was the first satellite to acquire reasonably high resolution (600/sq m) thermal data at times of day favorable for estimation of surface thermal properties and the surface energy budget. The techniques for inverting the satellite obtained temperatures to derive surface parameters rely on numerical simulation of surface temperature, or on analytic manipulation of the energy balance equation. Two variables, surface wetness, which controls evaporation and hence mean surface temperature, and a heat storing capacity, which controls the diurnal excursion of surface temperature about the mean, are responsible for most observed temperature variability These variables may be estimated from the mid night (2 30 a m) and early afternoon (1 30 pm) data from the HCMM, or from similar data which are acquired by NOAA operational satellites

Author

#### A85-30956

## A COMPARISON OF TECHNIQUES FOR RADIOMETRIC CALIBRATION OF AERIAL INFRARED THERMAL IMAGES

J R SCHOTT, J D BIEGEL (Rochester Institute of Technology, Rochester, NY), and I MCCLEOD (Canadian Forces, Alberta, Canada) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 53-58 refs

Two methods of radiometric calibration of aerial infrared line scanner data are presented. These methods are designed to account for atmospheric transmission and path radiance effects, thereby permitting direct measurement of surface radiometric temperatures. The method used multiple flights over the same ground area at different altitudes. This method has been repeatedly tested and yields surface temperature values within 0.4 deg (standard error) of kinetic temperature values. The second method tested involved viewing the same points on the ground through two different viewing angles to acquire data for computation of the atmospheric parameters. A companson of these two methods yielded very small residual errors of 0.19 to 0.4 C. The multiple view angle approach affords considerable potention because of

the ease of data acquisition compared to the multiple altitude technique Author

#### A85-30958

## RADIOMETRIC CHARACTERIZATION OF THEMATIC MAPPER FULL-FRAME IMAGERY

M D METZLER and W A MALILA (Michigan, Environmental Research Institute, Ann Arbor, MI) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 72-80, refs

American Society of Photogrammetry, 1984, p 72-80. refs

The Thematic Mapper carried by Landsat-4 provides new potential for monitoring earth resources from space. This paper describes a study directed at determining the radiometric characteristics of Thematic Mapper image data, a step essential in the successful exploitation of this potential. The overall quality of Thematic Mapper image data appeared good. However, a few radiometric artifacts were observed in the data and were characterized. One such effect is the tendency of the mean signal level to decay as the active mirror scan progresses, leading to a small droop in the signal level from West to East during the forward scan, and an East to West droop during reverse scan. A second key finding was the detection of low-frequency noise which is quite noticeable (greater than 2 signal levels) in some detectors in Band 1 Preliminary correction procedures were developed for Band 1.

#### A85-30962

# 7 1/2' MAP-IMAGE EXTRACTION FROM PRECISION PROCESSED LANDSAT MULTISPECTRAL SCANNER (MSS) AND THEMATIC MAPPER (TM) IMAGERY USING A MICROCOMPUTER AND EROS COMPUTER COMPATIBLE TAPES

L D MILLER, Y K YANG, T CHENG, M J UNVERFERTH, and M G KIM (Nebraska, University, Lincoln, NE) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 115-125

#### A85-30963

### MULTI-BAND IMAGE CLASSIFICATION WITH A DISTRIBUTED ARCHITECTURE

I J CURINGTON and S E CANNON (Floating Point Systems, Inc., Portland, OR) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 126-134 refs

Much research has gone into specialized hardware for remotely sensed imagery analysis applications, particularly in the use of Landsat data for feature classification analysis (2) This paper outlines a particular multi-band classifier and shows expected performance using the FPS-5000 Series array processor. The advantage-of-distributed-resources-are-shown-in-an-optimized implementation of the algorithm in a particular processing environment.

#### A85-30964

## DESCRIPTION OF TECHNIQUES FOR AUTOMATION OF REGIONAL NATURAL RESOURCE INVENTORIES

J DANGERMOND (Environmental Systems Research Institute, Redlands, CA) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p. 135-152

#### A85-31893

## THEORY OF SINGLE SPACE PHOTOGRAPHS [TEORIIA ODINOCHNYKH KOSMICHESKIKH SNIMKOV]

L M BUGAEVSKII and A. M PORTNOV Moscow, Izdatel'stvo Nedra, 1984, 280 p In Russian. refs

The theory of single space remote-sensing photographs or images is considered from the viewpoints of the regularization of surfaces of single space photographs, external perspective azimuth projections of an ellipsoid with positive or negative images, perspective projection of the surface of an ellipsoid on the surface of a sphere, and the determination of the orientation elements of photographic images Consideration is also given to sidelooking radar images, space images obtained by scanning systems, the determination of the orientation elements of single images acquired by nonphotographic systems, analytical methods for the transformation of photographic and nonphotographic images, and the instrumented transformation of space photographs and methods for transferring elements of their images to a cartographic basis

#### A85-32105

### CURRENT LIMITATIONS ON QUANTITATIVE AIRBORNE THERMOGRAPHY

D I ROSS (Ontario Centre for Remote Sensing, Toronto, Canada) and S E FRANKLIN (Waterloo, University, Waterloo, Ontario, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 43-48 refs

To evaluate the advantages of the digital format for thermography, a set of experimental color maps was produced, by the Ontario Centre for Remote Sensing, (OCRS) by digital means from airborne thermal infrared linescanner data. The data were obtained in the 8.5 to 12.7-microns range over the cooling water discharge from the Bruce nuclear-power development site on Lake Huron Digital analysis of the data is performed using an ARIES-2 image analysis system, and the color maps are produced using software of the Applicon color plotting system, as well as OCRS-developed mapping software Analysis of the data is limited to a semiquantitative approach, in which the imagery is corrected for systematic errors noise and geometry but not for atmospheric attenuation and emissivity Consideration is given to the atmospheric correction of airborne infrared-linescanner data and to a conceptual design of an advanced scanner system.

#### A85-32107

#### **VIDEO IMAGE ANALYSIS**

J VLECK and E CHEUNG (Toronto, University, Toronto, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May-3-6, 1983, Proceedings—Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 63-69 Research supported by the Natural Sciences and Engineering Research Council and Ontario Tree Improvement and Forest Biomass Institute

Major features of video imaging and image analysis systems for remote sensing applications are discussed briefly. Examples are given of video image acquisition and analysis based on the LMS system. These include change detection and forest stand map updating, stand delineation and species identification on large-scale aerial video, area measurement, soil moisture and drainage pattern enhancement and analysis, density analysis, camera distortion calibration and determination of spectral reflectance and transmittance of poplar leaves.

#### A85-32108

### THE STEREOSCOPIC ACCENTUATION OF SPOT IMAGES [L'ACCENTUATION STEREOSCOPIQUE D'IMAGES SPOT]

R SIMARD (Canada Centre for Remote Sensing, Ottawa, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 81-87, 89, 90 In French refs

Data acquisition limitations may result in inaccurate determination of relief from SPOT HRV stereoscopic images A method of preprocessing stereoscopic pairs through simulated accentuation of the parallaxes has resulted in improved determination of relief The method was developed using simulated data from SPOT stereoscopic pairs in panchromatic and multispectral modes acquired from a site on the Chamouchouanne River in Quebec

A85-32109\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### TESTING THE RADIOMETRIC STABILITY OF HCMM THERMAL INFRARED DATA

R G WITT (NASA, Goddard Space Flight Center, Greenbelt, MD), R S SEKHON, and T B MINOR (Computer Sciences Corp, Silver Spring, MD) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 101-109 refs

A study conducted to test the radiometric stability of thermal infrared (TIR) data from the heat-capacity mapping mission (HCMM) satellites is considered. The radiance values associated with various land use and cover types in a regional study area centered on Washington, DC are examined The study shows that for three different day TIR-data sets, the relative ranking of mean thermal values associated with five Level I and three Level II land-use/land-cover categories remains constant over time Although HCMM predicted temperatures show variability up to 5 C from ground observed temperatures, the thermal measurements recorded by the satellite are fairly stable as indicators of surface temperature A method for combining HCMM thermal data and Landsat multispectral scanner (MSS) data to improve the classification of Level I land-cover categories, and in particular the separability of urban and nonurban areas is described A merged HCMM-MSS data set is found to yield the best results in terms of thematic-map accuracy

#### A85-32111

#### STEREO VIEWABILITY OF PROPOSED RADARSAT IMAGERY

E DERENYI and A STUART (New Brunswick, University, Fredericton, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 137-144 Research supported by the Department of Energy, Mines and Resources and Natural Sciences and Engineering Research Council of Canada refs

Stereo viewability of a radar-stereo model which is affected by the vertical exaggeration factor, layover, shadow, and the nature of the terrain is investigated. The angles of incidence govern vertical exaggeration which is not constant as in aerial photography, but decreases across the swath from near-range to far-range For an overlap of 60-80 percent the vertical exaggeration at the near-range of the overlap is larger than that at the far-range edge by a factor of between 18 and 20 It is shown that there is no direct relationship between the size of the stereo intersection angle and the vertical exaggeration, and that for moderate and high relief, stereo perception is possible with a 5-deg intersection angle. Within the range of incidence angles planned for Radarsat (20 - 45 deg) the portion of imagery rendered unviewable by layover is relatively small, except in cases of extremely rugged terrain. It is not anticipated that dead areas of radar shadow will be extensive enough to inhibit interpretation of the images M D

#### A85-32115

FIRST STEPS TOWARDS INTEGRATION OF REMOTE SENSING AND DIGITAL MAPPING [PREMIERS PAS VERS L'INTEGRATION DE LA TELEDETECTION ET DE LA CARTOGRAPHIE NUMERIQUE]

A GRENON, H AUDET, and A VERVILLE (Ministere de l'Energie et des Ressources du Quebec, Service de la Cartographie, Sainte-Foy, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p. 175-185 In French

To remedy the shortcomings of the Quebec joint digital-image analysis system (French designation, SCANIQ), a system which establishes a link between remote sensing and automated cartography is developed. The system uses a plotter to reproduce outlines of the thematic zones obtained from the SCANIQ processing, and it allows the integration of the outlines of the zones, in the form of polygons, with the IGDS digital mapping system Theme files generated on SCANIQ or on any system of the ARIES family are used in the system. The steps involved in the system are described. It is shown that in passing directly to the plotter, the following editing possibilities are offered by the system the addition of map projection grids, annotation at the bottom of the map, and the choice of scale, division, and color nibs. The system is applied to the preparation of small-scale maps (at 1 125,000) of water areas to the unaided visual interpretation of accented Landsat images, to the mapping of flooded zones, and to the localization of islands. The future of interactive graphic systems in remote sensing is discussed

#### A85-32116

AUTOMATED CARTOGRAPHY AND GEOMORPHOLOGICAL BOUNDARY-UNIT DETECTION IN THE MOPTI-BANDIAGARA (MALI) REGION USING MULTISATELLITE DATA FROM LANDSAT, SIR-A RADAR, AND SPOT SIMULATION [CARTOGRAPHIE AUTOMATIQUE ET DETECTION DE CONTOURS DES UNITES GEOMORPHOLOGIQUES DE LA ZONE DE MOPTI-BANDIAGARA (MALI) PAR DONNEES MULTISATELLITES LANDSAT, RADAR SIR-A, SIMULATION SPOTI

C BARDINET, M BENARD, J M MONGET (Paris, Ecole Nationale Superieure des Mines, Valbonne, Alpes-Maritimes, France), J P BLANCK, and J TRICART (CNRS, Centre de Geographie Appliquee, Strasbourg, France) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 187-194 In French refs

#### A85-32120

## AVALANCHE HAZARD MAPPING INTEGRATING LANDSAT DIGITAL DATA AND DIGITAL TOPOGRAPHIC DATA

O NIEMANN, G LANGFORD (Geo-Spatial Research Corp, Edmonton, Alberta, Canada), and G MORE (Alberta Recreation and Parks, Canmore, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 261-271 Research supported by the Boreal Institute for Northern Studies

#### A85-32140

#### LANDSAT STUDY OF CHANGES IN SURFACE COVER

Y J CHONG, V K VONG, and A C YEO (National University of Singapore, Singapore) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p. 639-643 Research supported by the National University of Singapore, Ministry of Trade and Industry (Contract MTI-RG09)

An overall assessment of the limits of applicability of Landsat gray-level imagery was performed on an HP3000 minicomputer The study focused on the imaging capabilities over an underdeveloped area of the Malaysian Peninsula by the South China Sea Normalized values were computed to lower the radiometric noise levels. Ground truth spectral signatures for selected features were accumulated for comparisons with the satellite drea. Attention was given to farmlands, beaches, forests, roads and urban areas The MSS data were found reliable for synoptic views of a region and for assessing the state of development

#### A85-32141

ESTIMATION OF BIDIRECTIONAL REFLECTANCES LANDSAT-IMAGE ANALYSIS - PROBLEMS AND POSSIBLE **SOLUTIONS [ESTIMATION REFLECTANCES** DES BIDIRECTIONNELLES PAR ANALYSE DES IMAGES LANDSAT - PROBLEMES ET POSSIBILITES DE SOLUTIONS1

F CAVAYAS, G ROCHON (Universite Laval, Sainte-Foy, Quebec, Canada), and P TEILLET (Canada Centre for Remote Sensing, IN Canadian Symposium on Remote Sensing, Ottawa, Canada) 8th, and Association Quebecoise de Teledetection, Congress. 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Fov. Quebec, Canada, Association Quebecoise de Teledetection, 1984, p 645-664 In French refs

#### A85-32210#

#### APPLICATIONS OF LANDSAT DATA AND THE DATA BASE **APPROACH**

D T LAUER (U.S. Geological Survey, EROS Data Center, Sioux Falls, SD) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p 265-270 refs

A generalized methodology for applying digital Landsat data to resource inventory and assessment tasks is currently being used by several bureaus and agencies within the U.S. Department of the Interior The methodology includes definition of project objectives and output, identification of source materials, the digital data base, performance of construction of computer-assisted analyses, generation of output, and preparation of a final report. The U.S. Geological Survey, Bureau of Land Management, U.S. Fish and Wildlife Service, Bureau of Indian Affairs, and National Park Service have used this generalized methodology to assemble comprehensive digital data bases for management Advanced information processing techniques have been applied to these data bases for making regional environmental surveys on millions of acres of public lands at-costs ranging from \$0.01 to \$0.08 an acre

#### A85-32868

#### AN EVALUATION OF THE USE OF ATMOSPHERIC RADIANCES FOR WATER VAPOR RETRIEVAL IN A GLOBAL RETRIEVAL

A SANYAL, C A DEAN, J S PRASAD (S M Systems and Research Corp , Lanham, MD), and L M MCMILLIN (S M Systems and Research Corp., Lanham, MD; NOAA, National Environmental Satellite, Data, and Information Service, Washington, DC) Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p. 76-79

National Aeronautics and Space Administration National Space Technology Labs, Bay Saint Louis, Miss THE USE OF LANDSAT-4 MSS DIGITAL DATA IN TEMPORAL DATA SETS AND THE EVALUATION OF SCENE-TO-SCENE

REGISTRATION ACCURACY

J E ANDERSON (NASA, National Space Technology Laboratories, Earth Resources Laboratory, Bay St Louis, MS) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1122), vol. 51, April 1985, p. 457-462 Previously announced in STAR as N83-35462

The MSS sensor on Landsat 4 is, in certain performance aspects, diferent from those of Landsats 1 through 3 These differences created some concern in the NASA research community as to whether individual data sets can be registered accurately enough to produce acceptable data sets for multitemporal data analysis The use of Landsat 4 MSS digital data in temporal data sets is examined and a method is presented for estimating temporal registration accuracy based on the use of an X-Y digitizer and grey tone electrostatic plots Results indicate that the RMS temporal registration errors are not significantly different from the temporal data sets generated using Landsat 4 and Landsat 2 data (33 35 meters) and the temporal data set constructed from two Landsat 2 data sets (33 61 meters) A derivation of the model used to evaluate the temporal registration is included Author

#### A85-33598

#### THE USE OF SPACE PHOTOGRAPHS FOR LANDSCAPE MAPPING [ISPOL'ZOVANIE KOSMICHESKIKH SNIMKOV PRI LANDSHAFTNOM KARTOGRAFIROVANII]

V VERESHCHAKA, B V KRASNOPEVTSEVA, and V V USOVA (Moskovskii Institut Inzhenerov Geodezii, Aerofotos'emki i Kartografii, Moscow, USSR) Geodeziia i Aerofotos'emka (ISSN 0536-101X), no 1, 1985, p 99-103 In Russian

Results of a landscape analysis of Salyut-5 photographs of the earth surface are presented The study was carried out with the aim of compiling a landscape map of a region of Central

#### A85-34351

#### **EDGE- AND SHAPE-BASED GEOMETRIC REGISTRATION**

T C HENDERSON (Utah, University, Salt Lake City, UT), E E TRIENDL, and R WINTER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wessling, West Germany) IEEE Transactions on Geoscience and Remote Sensing (ISSN 0196-2892), vol GE-23, May 1985, p 334-342 Research supported by the Deutsche Forschungsgemeinschaft refs

The standard method for geometric registration of images consists of selecting control points in the two images and computing the correlation maximum of small subimages containing the control points This method does not work well when applied to images taken at different seasons or with different sensors. The use of edge-based registration has been proposed to overcome these difficulties but has so far achieved no better than picture raster element accuracy This paper presents edge- and shape-guided correlation (or comparison) of control point areas for the analysis of multitemporal and multisource data. The direct correlation of control areas for registration is supplemented by comparison of descriptions of elementary objects, e.g., drawn lines, borders, and edges, whose positions are known with subpixel accuracy. These methods\_have\_been\_implemented\_as\_a\_set\_of\_image\_registration modules within the context of the DIBIAS image processing system Author

A85-34429\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

#### REDUCING LANDSAT MSS SCENE VARIABILITY

R. NELSON (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, MD) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 51, May 1985, p 583-593 refs

Landsat 1, 2, and 3 MSS data acquired for six different nonvegetated targets over a three-year period were used to determine which of five transformations was most useful for

reducing between-scene variability. The following values were calculated from the MSS digital numbers (dn) (1) radiance, (2) reflectance, (3) reflectance corrected for changes in the earth/sun distance, (4) normalized dn (normalization equations proposed by ERIM researchers), and (5) band ratios. Results indicated that reflectance calculations were most effective overall for reducing interscene variability, ratio proved most useful on the bright targets.

#### A85-34438#

## A CLASSIFICATION OF MSS DATA FOR LAND-COVER MAPPING

C DEGUCHI, M NUMATA (Kyushu University, Fukuoka, Japan), I YOKOYAMA (Nippon Koei Co , Ltd , Japan), and K MATSUO Kyushu University, Faculty of Engineering, Memoirs (ISSN 0023-6160), vol 44, Dec 1984, p 367-389 refs

A classification method has been developed for extracting the land-cover information from multispectral scanner (MSS) data effectively and for distinguishing the land-cover classes in accordance with this information. The original land-cover classes are subdivided and photo-interpreted manually using a grid which divides each training area of color aerial photographs into hundreds of cells Multiple regression analysis in a stepwise manner is performed repeatedly, in which the number of the cells photo-interpreted as the classes and that of the pixels of MSS data forming clusters are used as the mutually dependent and independent variables. Based on the statistical verification tested by F-ratio and t-value, which are derived from the multiple regression, the land-cover classes are defined and the clusters are related to the classes A maximum likelihood classifier is suggested, in which the classification is performed repeatedly until the a priori probabilities converge to a certain condition

#### A85-34865

# TEXTURE ANALYSIS AND CLASSIFICATION OF AIRBORNE RADAR DATA WITH SYNTHETIC APERTURE [TEXTURANALYSE UND KLASSIFIZIERUNG VON FLUGZEUGRADARDATEN MIT SYNTHETISCHER APERTUR]

B PFEIFFER (Karlsruhe, Universitaet, Karlsruhe, West Germany) Bildmessung und Luftbildwesen (ISSN 0006-2421), vol 53, May 1985, p 100-107 In German Sponsorship Bundesministerium fuer Forschung und Technologie refs (Contract BMFT-01-QS-103/0)

The European SAR-580 experiment discussed by Trevett (1983) has provided for selected European test areas digital data, obtained with the aid of aircraft Digital classification procedures have also been employed in the evaluation of the data. However, it was found that, on account of the speckle effect, an image point related classification of nonpreprocessed original data does not provide useful results An improvement of the classification can be obtained by filtering the original data, or by an employment of texture parameters The latter approach makes it possible to extract features from the vicinity of an individual image point. This investigation has the objective to study the feasibility of a use of texture parameters for land use classification, taking into account texture parameters employed in optical remote sensing. The obtained results show that, in principal, the employed texture parameters are useful for the land use classification of SAR 580 data

#### A85-36283

## STRUCTURES FOR GEO-INFORMATION AND THEIR APPLICATION IN SELECTIVE SAMPLING OF DIGITAL TERRAIN MODELS

B MAKAROVIC (International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands) ITC Journal (ISSN 0303-2434), no 4, 1984, p 285-295

A general framework is presented for structuring geo-information from a functional point of view. A distinction is made between the basic information and the control data, and further between the semantic and metric domains. Interrelationships are identified between information extraction, sampling and structuring. For composite sampling for DTMs, the primary ingredient is distinct

morphometric features to be extracted and sampled selectively Because manual extraction is subjective and therefore inconsistent, it needs to be systematized. Hence structuring rules and appropriate classification schemes need to be established. These refer to both the basic information and the control data, and further to the semantic and metric domains. Information should be already structured in the feature extraction stages, thus before sampling. The corresponding classification schemes provide a frame of reference for structuring information at collection and subsequent process stages.

Author

#### A85-37121

## DIGITAL PROCESSING OF METEOROLOGICAL SATELLITE IMAGERY [OPYT TSIFROVOI OBRABOTKI IZOBRAZHENII S METEOROLOGICHESKIKH ISZ]

M V IVANCHIK, S I KLIUSHNIKOV, V A KROVOTYNTSEV, M V MARTYNOV, and A N SEREBRENNIKOV (Akademiia Nauk Ukrainskoi SSR, Morskoi Gidrofizicheskii Institut, Sevastopol, Ukrainian SSR) Issledovanie Zemli iz Kosmosa (ISSN 0205-9614), Mar -Apr 1985, p 111-116 In Russian refs

A processing algorithm and computer hardware for compiling maps of cloud cover from satellite photographic images are described. The designs of the measurement and computing components of the system were patterned after the SM-3 computer. The system permits simultaneous processing of cloudiness images obtained by several satellites. The mathematical formula used to calculate the percentage of occultation due to cloud cover in an individual image is given, and preliminary results of an experiment to process NOAA-satellite images of cloud cover in the tropical Atlantic region are presented.

#### A85-38271

## A COMBINED PHOTOGRAMMETRIC AND DOPPLER ADJUSTMENT

J M ANDERSON (California, University, Berkeley, CA) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 51, June 1985, p 655-666 Research supported by the Naturvetenskapliga Forskningsradet refs

The feasibility of a combined, simultaneous adjustment of aerial photogrammetric data and Doppler satellite observations at ground stations is studied. Photogrammetric and Doppler condition equations are developed and formed into one system for which a solution by the method of least squares is discussed. The resulting system of equations is of massive proportions so that a simultaneous adjustment is not practical. A sequential least-squares adjustment is possible and merits further study as a potential solution to the system.

#### A85-38272

## SELECTING BAND COMBINATIONS FROM MULTISPECTRAL DATA

C SHEFFIELD (Earth Satellite Corp., Chevy Chase, MD) Photogrammetric Engineering and Remote Sensing (ISSN 0099-1112), vol 51, June 1985, p 681-687 refs

The question of selection of band subsets from multispectral image data, with particular reference to the choice of color combinations from Landsat-4 Thematic Mapper data, is addressed An algorithm for band subset selection is provided, and a relationship to multispectral image entropy is established. Author

#### A85-38707

A CONCEPT FOR ESTABLISHING A DATABASE FOR A SUPPORT DATABANK (THROUGH AN EXAMPLE OF AN AGRICULTURAL BLOCK) [KONTSEPTSII POSTROENIIA INFORMATSIONNOI BAZY BANKA OPORNYKH DANNYKH /NA PRIMERE BLOKA 'SEL'SKOE KHOZIAISTVO'/]

IU G SIMONOV and G I BARVYN IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 29-40 In Russian refs

A concept for establishing a database for a support databank, an autonomous subsystem of a remote-sensing system, is introduced Empirical, computational, and advanced concepts are

detailed, the advanced concept includes the results of synchronous subsatellite measurements in the processing and interpretation of data retrieved from space A matrix recording technique is proposed for the subsatellite observations. The example of a list of administrative-territorial regions is employed to illustrate the principles of coding the classifiers and organization the data retrieval system in the databank.

#### A85-38711

AN ALGORITHM FOR RECONSTRUCTING CORRELATING SERIES OF GROUND-BASED AND REMOTE OBSERVATIONS [ALGORITHM VOSSTANOVLENIIA KORRELIRUIUSHCHIKH RIADOV NAZEMNYKH I DISTANTSIONNYKH NABLIUDENII]

V O KESELMAN, P. T KOTLOVSKII, and A A ANDREEV IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p. 57-60 In Russian

The problem of reconstructing missing values in a set of several correlating series of observations is examined by proposing an iteration algorithm with three-stages iterations. The algorithm, developed for use in a linear regression model, makes it possible to analyze the information structure of the input data matrix in order to choose complete observation submatrices. A criterion determined by the method of expert estimates is used to derive the optimal integral algorithm for reconstruction at each step. The method was applied for reconstructing ground-based hydrological data with accuracy between 2 and 18 percent, depending on correlation coefficients and the volume of data, all missing information, constituting 20 to 40 percent of the total initial data, was constructed in some events.

#### A85-38716

THE SENSITIVITY OF THE COMPUTATIONAL SCHEME FOR TAKING INTO ACCOUNT THE CONTRIBUTION OF ATMOSPHERIC HAZE TO VARIATIONS IN INITIAL DATA [CHUVSTVITEL'NOST' RASCHETNOI SKHEMY UCHETA VKLADA ATMOSFERNOI DYMKI K VARIATSIIAM ISKHODNYKH DANNYKH]

V V IVANOVA, V V KOZODEROV, and T M ROMANOVA IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p. 83-89 In Russian

Corrected-image brightnesses are computed from known initial brightnesses for varying instrumentation parameters, angular coordinates, and atmospheric conditions. The effects of measurement errors, e.g., instrumental noise and calibration errors, of atmospheric model inadequacies, and of the angular scanning conditions, in the radiation correction scheme (departure of sighting angles from nadir, inaccurate factor of reflection nonorthotropy, etc.) are evaluated. It is concluded that the largest errors are caused by uncertainties in the specification of the optical characteristics of the atmosphere.

A85-38803\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md LANDSAT 4 AND 5 STATUS AND RESULTS FROM THEMATIC MAPPER DATA ANALYSES

-V—V—SALOMONSON-(NASA,—Goddard-Space-Flight-Center,—Greenbelt, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 13-18 refs

Landsat-1, 2, and 3 have functioned successfully well beyond their design lifetimes of one year and provided a very sizable collection of data On July 16, 1982 with the successful launch of Landsat-4, a second generation of Landsat satellites was introduced Landsat-4 continues to make available the observational services which had been provided by the Multispectral Scanner (MSS) on Landsats 1-3 in addition, the new satellite is provided with an improved observational capability

which is based on a utilization of the Thematic Mapper (TM). The system status (March 1984) of Landsat-4 is considered along with an evaluation of the MSS, and a description of the design and performance of the TM. Attention is also given to the satellite Landsat-5, which was launched successfully on March 1, 1984, taking into account design modifications leading to improved performance and some scenes provided by the new spacecraft

GR

#### A85-38806

### ALGORITHMS FOR THE ESTIMATION OF FAILED DETECTOR DATA

B GUINDON (Canada Centre for Remote Sensing, Ottawa, Canada) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 39-46

The Thematic Mappers of Landsat-4 and Landsat-5 employ arrays of detectors in order to acquire either 16 or 4 lines of video per swath. Due to failed detectors, partial data loss has already been experienced with the Landsat-4 sensor. It can be expected that multiple detector arrays will be a feature of many future sensors, and the development of algorithms for the accurate estimation of failed detector data is needed. A study has been conducted with the objective to compare the performance of a number of computationally simple replacement algorithms. Bernstein and Lotspiech (1983) have suggested that information from adjacent bands might be usefully employed if adjacent band correlation is high. For this reason, the present investigation is concerned with the development and evaluation of an adjacent band modulation technique. Attention is given to replacement algorithms, the test data, the statistical parameters and test results, and implementation considerations.

A85-38807\* Technicolor Government Services, Inc , Moffett Field, Calif

INFORMATION CONTENT COMPARISON OF THEMATIC MAPPER, MULTISPECTRAL SCANNER AND AIRBORNE THEMATIC MAPPER DATA

J S BUIS, W ACEVEDO, D A ALEXANDER (Technicolor Government Services, Inc., Moffett Field, CA), and R C WRIGLEY (NASA, Ames Research Center, Moffett Field, CA) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 47, 48 refs

#### A85-38813

APPLICATION OF DIGITAL IMAGE ENHANCEMENT PROCESSING OF LANDSAT DATA FOR TERRAIN MAPPING OF SOUTHERN HUAIROU COUNTY OF BEIJING (PEKING), CHINA

S X NI (Nanjing University, Nanjing, People's Republic of China) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 108-116.

### IMPACTS OF HIGH RESOLUTION DATA ON AN OPERATIONAL REMOTE SENSING PROGRAM

J A MASLANIK and C R SMITH (Technicolor Government Services, Inc., Denver, CO) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p. 117-124 refs

The increase in data volume associated with high resolution imagery such as TM and SPOT is a source of concern for managers of operational remote sensing programs. To assess the impact of this increased processing requirement on The Bureau of Land Management's remote sensing facility, simulated MSS, TM, and SPOT data were processed to provide system performance figures in addition, spectral clustering measures for MSS and TM data were compared to estimate the effects of feature selection on cluster detail and variability. Results show that increased tape and disk storage requirements will be the most significant factor affecting BLM's processing system.

# A85-38821\* Purdue Univ , Lafayette, Ind COMPARISON OF CLASSIFICATION SCHEMES FOR MSS AND TW DATA

P E ANUTA, L A BARTOLUCCI, D F LOZANO-GARCIA, J A VALDES, and C R VALENZUELA (Purdue University, West Lafayette, IN) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 180-184 (Contract NASS-26859)

The launch of the Landsat-4 satellite in July 1982 provided the first full coverage from space of the 0 4-12 micron spectrum of the earth scene. In addition to the green, red, and near IR bands of the MSS, the TM provides a band in the blue, two in the middle IR, and one thermal IR. The paper describes spectral class analysis of coincident MSS and TM data to evaluate the contribution of the additional TM bands. In addition, various classifiers are available which were applied to the TM data. In the spectral class analysis, twice the number of separable classes was found in the TM data compared to the MSS data.

# A85-38824\* California Univ, Santa Barbara REFLECTANCE MEASUREMENTS FROM LANDSAT THEMATIC MAPPER OVER RUGGED TERRAIN

J DOZIER (California, University, Santa Barbara, CA) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 230-234 refs

(Contract NAS5-27463)

Spectral albedo measurements from the Landsat-4/5 Thematic Mapper require that spacecraft upwelling radiances be corrected for atmospheric absorption and scattering and for local surface illumination. A two-stream model is developed, with a lower boundary condition that varies with incidence angle. TM data must be registered to digital terrain data. Reflectance from points in shadows can be used to estimate optical depth. The primary application here is determination of the spectral albedo of snow. The TM is better-suited for this purpose than the MSS because of its larger dynamic range.

## A85-38832\* Maryland Univ , College Park SCENE SEGMENTATION THROUGH REGION GROWING

R S LATTY (Maryland, University, College Park, MD) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 305-314 refs

(Contract NAG9-5)

A computer algorithm to segment Landsat Thematic Mapper (TM) images into areas representing surface features is described. The algorithm is based on a region growing approach and uses edge elements and edge element orientation to define the limits of the surface features. Adjacent regions which are not separated by edges are linked to form larger regions. Some of the advantages of scene segmentation over conventional TM image extraction algorithms are discussed, including surface feature analysis on a pixel-by-pixel basis, and faster identification of the pixels in each region. A detailed flow diagram of region growing algorithm is provided.

#### A85-38833

### ADAPTIVE FILTERING AND IMAGE SEGMENTATION FOR SAR ANALYSIS

D G GOODENOUGH, B GUINDON, J-F MEUNIER (Canada Centre for Remote Sensing, Ottawa, Canada), and N A SWANBERG (Intera Technologies, Ltd., Ottawa, Canada) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 315-324 refs

A new approach to image segmentation which uses adaptive filtering to reduce noise in a SAR image acquired over Makofen in the Federal Republic of Germany, is discussed. The effects of adaptive filter parameters, edge operators, and segmentation parameters on segmentation and classification are explored. Combinations of adaptive filter window sizes and edge operators are tested and a graph-theoretic segmentation algorithm is used. The resulting segments in each image are compared to a manually defined edge image following segmentation. The selected segmented image is classified, using an algorithm which performs a supervised classification computing the Euclidean distance between the segment means and those of a training set.

#### A85-38845

# EVALUATION OF LOCAL AND GLOBAL DEFORMATION MODELS FOR THE REGISTRATION OF SIMULATED SPOT IMAGES

M FORTIN (Societe Europeenne de Propulsion, Puteaux, Hauts-de-Seine, France), P T NGUYEN, W NIBLACK (IBM France, S A, Paris, France), and E BOQUET (Paris VII, Universite, Paris, France) IN Machine processing of remotely sensed data Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984 New York, Institute of Electrical and Electronics Engineers, 1984, p 412-420 refs

#### N85-22449# Joint Publications Research Service, Arlington, Va EXPERIENCE IN COMBINED SPECIAL MAPPING USING SPACE INFORMATION Abstract Only

V A ASTAKHOVA, V V KOŹLOV, and V I RYABCHIKOVA In Its USSR Rept Space (JPRS-USP-85-001) p 79-80 4 Feb 1985 Transl into ENGLISH from Geod i Kartografiya (USSR), no 7, Jul 1984 p 40-44 Avail NTIS HC A07

Several research organizations in the USSR are carrying out experimental work for developing new types of maps for certain regions, including the subarctic region of the Northeastern USSR In areas such as the latter, inaccessibility and other field work difficulties dictate a heavy reliance on space photographs the difficulties in visual special interpretation of space photographs peculiar to the investigated area are discussed in relation to the

overall objective, i.e., combining the special subject matter maps into one so-called complex mapping and the collating and integration of the special content maps which were initially compiled. The difficulties can be overcome in part by compiling intermediate maps of natural complexes and separate interpretations of key elements, such as hydrography, distribution of Quaternary deposits, geological structure as expressed at the surface, etc. A definite sequence for interpretation of space photographs was worked out. The intricacies of geomorphological, geological and landscape photointerpretation are discussed.

**Author** 

N85-23186\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md LANDSAT-4 SCIENCE CHARACTERIZATION EARLY RESULTS. VOLUME 4: APPLICATIONS

J L BARKER, ed Washington Jan 1985 442 p refs Symp held in Greenbelt, Md , 22-24 Feb 1983 Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls , S D 57198 ERTS 4 Vol (E85-10070, NASA-CP-2355-VOL-4, REPT-8580115-VOL-4, NAS 1 55 2355-VOL-4) Avail NTIS HC A19/MF A01 CSCL 08B

The excellent quality of TM data allows researchers to proceed directly with applications analyses, without spending a significant amount of time applying various corrections to the data. The early results derived of TM data are discussed for the following applications agriculture, land cover/land use, soils, geology, hydrology, wetlands biomass, water quality, and snow

N85-23187\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md
OVERVIEW OF TM APPLICATIONS RESEARCH REPORTS
D L WILLIAMS In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 1-6 Jan 1985 ERTS
Avail NTIS HC A19/MF A01 CSCL 05B

Applications-oriented users of TM data have every reason to be excited about the possibility of opening up other horizons using TM data. The data appear to be of excellent quality, and the investigations conducted to date, although preliminary, substantiate the findings of earlier research conducted with simulated TM data. Techniques used for sensor/data quality evaluation, data processing, analysis, and display, and comparisons of TM versus MSS data are summarized.

N85-23188\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md IMPACT OF THEMATIC MAPPER SENSOR CHARACTERISTICS ON CLASSIFICATION ACCURACY

D L WILLIAMS, J R IRONS, B L MARKHAM, R F NELSON, D L TOLL, R S LATTY (Maryland Univ, College Park), and M L STAUFFER (Computer Science Corp.) In its LANDSAT-4 Sci Characterization Early Results, Vol. 4 p 7-24 Jan 1985 refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail. NTIS HC A19/MF A01 CSCL 14B

A fixed effect, three factor (two levels per factor) analysis of variance was used to quantitatively assess the significance of the improved spectral, spatial and radiometric resolution capabilities .of\_the\_LANDSAT-4\_thematic\_mapper\_sensor\_relative\_to\_the\_familiar MSS sensor TM data acquired over the Washington, DC area were progressively degraded in spectral, spatial and radiometric characteristics to simulate the MSS, and classification accuracies were derived in a consistent manner for all eight treatments in the ANOVA design Statistical testing of the significance of differences in classification accuracies between treatments indicated that the increased number of spectral bands and the improved quantization capabilities afforded by the TM sensor design would lead to significant improvements in classification accuracies attainable relative to MSS. In contrast, however, the improved spatial resolution provided by the TM sensor did not enhance classification accuracy This latter result was felt to be more a function of the type of classification algorithms available

N85-23189\*# International Business Machines Corp , Palo Alto, Calif Scientific Center

ANALYSIS AND EVALUATION OF THE LANDSAT-4 MSS AND TM SENSORS AND GROUND DATA PROCESSING SYSTEMS: EARLY RESULTS

R BERNSTEIN and J B LOTSPIECH *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 25-90 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS (Contract NAS5-27355)

Avail NTIS HC A19/MF A01 CSCL 14B

The MSS and TM sensor performances were evaluated by studying both the sensors and the characteristics of the data Information content analysis, image statistics, band-to-band registration, the presence of failed or failing detectors, and sensor resolution are discussed The TM data were explored from the point of view of adequacy of the ground processing and improvements that could be made to compensate for sensor problems and deficiencies Radiometric correction processing, compensation for a failed detector, and geometric correction processing are also considered

N85-23194\*# National Aeronautics and Space Administration Johnson (Lyndon B) Space Center,

PRELIMINARY EVALUATION OF THEMATIC MAPPER IMAGE DATA QUALITY

R B MACDONALD, F G HALL, D E PITTS, R M BIZZELL, S YAO, C SORENSEN, E REYNA, and J CARNES In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 153-162 Jan 1985 refs Prepared in cooperation with Lockheed Engineering and Management Services Co, Inc, Houston, Tex Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS

Avail NTIS HC A19/MF A01 CSCL 05B

Improvements in the ability to monitor renewable resources/vegegation due to improvements in the spatial, spectral and radiometric resolution of TM data were evaluated Results presented from the first 4 months of analysis presented include (1) geometric performance, (2) band-to-band registration, (3) modulation transfer function, and (4) crop separability performance Crop separability in Webster County, lowa and in Mississippi County, Arkansas as determined by cluster and principal components analyses is assessed

N85-23196\*# Technische Univ , Munich (West Germany)
A CONCEPT FOR THE PROCESSING AND DISPLAY OF
THEMATIC MAPPER DATA

R HAYDN *In* NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 217-236 Jan 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 05B

The thematic mapper system provides spectral information in seven carefully selected spectral bands. The challenge is to devise the best approach for presenting this complex spectral information in\_a\_pictorial\_format\_which\_can\_be\_understood\_and\_accepted\_as\_a standard by the growing user community. For photointerpretation purposes, the overall approach in the processing of multispectral, and especially of Thematic Mapper data is based on the Independent definition and optimization of individual panchromatic and spectral (interpretive) components and the combined display of these individual interpretive components in a perceivable manner Processing of the Thematic Mapper data within the framework of interpretive components requires the application of special intensity, hue, saturation (IHS) and synthetic stereo (SST) display techniques The results to date using these techniques demonstrate improved visual separability of spectral surface categories relative to standard multispectral color composites as well as a greater potential for conducting meaningful spectral-diagnostic analysis

National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

#### QUICK LOOK ANALYSIS OF TM DATA OF THE WASHINGTON. DISTRICT OF COLUMBIA, AREA

D L WILLIAMS, J R IRÓNS, B L MARKHAM, R F NELSON, D L TOLL, R S LATTY (Maryland Univ , College Park), and M L STAUFFER (Computer Sciences Corp , Silver Spring, Md ) In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, SD 57198 ERTS

Avail NTIS HC A19/MF A01 CSCL 08B

Classification capabilities with TM data result from the interactive effects of all of the sensor's attributes which complicates a more quantitative evaluation of the effects of individual sensor improvements. An experiment conducted to quantify the effect of individual sensor parameters (e.g., spectral, spatial, and radiometric resolution) on classification accuracy is described on classification accuracy Preliminary results obtained using TM data acquired over the Washington, D.C., area indicate that the additional number of spectral bands and quantization levels of the TM relative to the MSS increase capabilities for the recognition and discrimination of land cover/use categories by per-pixel maximum likelihood classification. The refinement of spatial resolution, however, seems to hinder classification ARH

N85-23199\*# Agricultural Research Service, Beltsville, Md Hydrology Lab

#### A PRELIMINARY COMPARISON OF THE INFORMATION CONTENT OF DATA FROM THE LANDSAT 4 THEMATIC MAPPER AND MULTISPECTRAL SCANNER

J C PRICE In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 271-280 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 05B

The thematic mapper (TM) on LANDSAT 4, acquires 6 spectral channels at 30 meter resolution as well as a thermal IR channel at 120 meter resolution. Because both MSS and TM can acquire data simultaneously, the advantages and disadvantages of the two instruments can be directly compared. The information content of the two instruments is compared for areas in a representative agricultural region. Although the parameter information does not equate in an obvious way to the value or utility of the data, it provides a basis for physical interpretation. By focusing on the redundancy of the digital data, the estimation of information content suggests possibilities for algorithms dealing with subsets of the image data, as well as transformations which reduce the total volume of data to be analyzed. To the degree that a satisfactory description by a reduced data set is possible, there exist implications both for design of future satellite instruments and for analysis procedures

N85-23200\*# Technicolor Government Services, Inc., Sioux Falls,

#### EARLY RESULTS OF INVESTIGATIONS OF LANDSAT 4 THEMATIC MAPPER AND MULTISPECTRAL SCANNER **APPLICATIONS**

F G SADOWSKI, J A STURDEVANT, W H ANDERSON, P M SEEVERS, J W FEUQUAY, L K BALICK, F A WALTZ, and D T LAUER (EROS Data Center) In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol 4 p 281-298 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail NTIS HC A19/MF A01 CSCL 08B

The TM digital data were evaluated for their potential to provide improved land cover information. The analyses included (1) testing for information that may be offered by the new TM spectral bands,

of the TM and MSS sensors The analyses were conducted on several large samples of pixels corresponding to five broad land cover classes. Some TM spectral data are presented and evaluated as single-band, black-and-white images, and in several three-band

and (2) comparing data characteristics for equivalent spectral bands

color-composite images. Some data transformations which can be used to present TM data in a manner that is potentially more useful for analysis or display are demonstrated. These transformations enable generating hue, intensity, and saturation data space from red, green, and blue color space, as well as perspective view images

N85-23202\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

#### PRELIMINARY COMPARISONS OF THE INFORMATION CONTENT AND UTILITY OF TM VERSUS MSS DATA

B L MARKHAM In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 313-324 Jan 1985 refs Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS Avail NTIS HC A19/MF A01 CSCL 05B

Some preliminary indications were provided as to the relative ments of actual TM data versus MSS data for land cover mapping related applications. Three analyses were designed which had sensitivity to the differences in spectral, spatial and radiometric parameters between the TM and MSS In the water body analysis, a primarily spatially related test, the detectability of small uniform targets was examined The principal components analysis, an examination of the inherent dimensionality of the data, was more spectrally and radiometrically related. The spectral clustering analysis, also heavily spectrally and radiometrically influenced, provided information on the types of targets separable on TM versus MSS data. These analyses were to be conducted with simultaneously collected LANDSAT-4 complete TM (7 band) and MSS (4 band) data In actuality, 4-band TM data, and archived LANDSAT-2 MSS data of the same area were used

N85-23207\*# Natural Environment Research Council, London

#### THE USE OF THEMATIC MAPPER DATA FOR LAND COVER DISCRIMINATION: PRELIMINARY RESULTS FROM THE UK SATMAP PROGRAMME

M J JACKSON, J R BAKER, J R G TOWNSHEND (Reading Univ, England), J E GAYLER (Reading Univ, England), and J R HARDY (Reading Univ, England) In NASA Goddard Space Flight Center LANDSAT-4 Sci Characterization Early Results, Vol. 4 p 369-386 Jan 1985 refs Previously announced as N84-13631 Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 **ERTS** 

Avail NTIS HC A19/MF A01

The principal objectives of the UK SATMaP program are to determine thematic mapper (TM) performance with particular reference to spatial resolution properties and geometric characteristics of the data. So far, analysis is restricted to images from the US and concentrates on spectra and radiometric properties. The results indicate that the data are inherently three dimensional compared with the two dimensional character of MSS data Preliminary classification results indicate the importance of the near infrared band (TM 4), at least one middle infrared band (TM 5 or TM 6) and at least one of the visible bands (preferably either TM 3 or TM 1) The thermal infrared also appears to have discriminatory ability despite its coarser spatial resolution. For band 4 the forward and reverse scans show somewhat different spectral responses in one scene but this effect is absent in the other analyzed From examination of the histograms it would appear that the full 8 bit quantization is not being effectively utilized for all the bands MG

N85-23208\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

PRELIMINARY STUDY OF INFORMATION EXTRACTION OF LANDSAT TM DATA FOR A SUBURBAN/REGIONAL TEST

D L. TOLL In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 387-402 Jan 1985 refs Onginal contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS Avail NTIS HC A19/MF A01 CSCL 05B

A substantial amount of spectral information is available from TM (as compared to MSS) data for a 14 25 square km area between Beltsville and Laurel, Maryland Large buildings and street patterns were resolved in the TM imagery. While there was added information content in TM data for discriminating surburban/regional land cover, characteristics of MSS can improve land cover discrimination over TM when conventional classification procedures are used on digital data. The improved qualitization of TM is likely valuable in situations where there are spectral similarities between classes The spatial resolution in TM decreased land cover discrimination as a result of increased within class variability. For many general digital evaluations, inclusion of four bands representing the four spectral regions can provide much useful land cover discrimination Inclusion of TM 6 indicates an improvement in spectral class discrimination. Of primary spectral importance is the discrimination between water, vegetative surfaces, and impervious surfaces due to differences in thermal properties. Results from the principle component transformed data clearly indicates additional information content in TM over MSS

N85-23209\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

COMPARATIVE TECHNIQUES USED TO EVALUATE THEMATIC MAPPER DATA FOR LAND COVER CLASSIFICATION IN LOGAN COUNTY, WEST VIRGINIA

J O BRUMFIELD (Marshall Univ, Huntington, W Va), R G

WITT, H W BLODGET, and R F MARCELL (Computer Sciences Corp , Silver Spring, Md ) In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 403-414 Jan 1985 refs ERTS Avail NTIS HC A19/MF A01 CSCL 08B

Several digital data processing techniques were evaluated in an effort to identify and map active/abandoned, partially reclaimed, and fully revegetated surface mine areas in the central portion of Logan County The TM data were first subjected to various enhancement procedures, including a linear contrast stretch, principal components and canonical analysis transformations At the same time, four general procedures were followed to produce six classifications as a means of comparing the techniques involved Preliminary results show that various feature extraction/data reduction techniques provide classification results equal or superior to the more straightforward unsupervised clustering technique Analyst interaction time for labelling clusters is reduced using the canonical analysis and principal components procedures, though the canonical technique has clearly produced better results to

National Aeronautics and Space Administration N85-23210\*# Goddard Space Flight Center, Greenbelt, Md

COMPARISON OF MSS AND TM DATA FOR LANDCOVER CLASSIFICATION IN THE CHESAPEAKE BAY AREA: PRELIMINARY REPORT

P J MULLIGAN, J C GERVIN, and Y C LU (Computer Sciences Corp , Greenbelt, Md ) In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 415-420 Jan 1985 refs ERTS Avail NTIS HC A19/MF A01 CSCL 05B

An area bordering the Eastern Shore of the Chesapeake Bay was selected for study and classified using unsupervised techniques applied to LANDSAT-2 MSS data and several band combinations of LANDSAT-4 TM data The accuracies of these Level I land cover classifications were verified using the Taylor's Island USGS 7.5 minute topographic map which was photointerpreted, digitized and rasterized The the Taylor's Island map, comparing the MSS and TM three band (2.3.4) classifications, the increased resolution of TM produced a small improvement in overall accuracy of 1% correct due primarily to a small improvement, and 1% and 3%, in areas such as water and woodland. This was expected as the MSS data typically produce high accuracies for categories which cover large contiguous areas. However, in the categories covering smaller areas within the map there was generally an improvement of at least 10% Classification of the important residential category improved 12%, and wetlands were mapped with 11% greater accuracy

N85-23212\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

RELATIVE ACCURACY ASSESSMENT OF LANDSAT-4 MSS AND TM DATA FOR LEVEL 1 LAND COVER INVENTORY

E M MIDDLETON, Y C LU (Computer Sciences Corp., Silver

Spring, Md), R G WITT, and R S SEKHON (Computer Sciences Corp , Silver Spring, Md ) In its LANDSAT-4 Sci Characterization Early Results, Vol 4 p 431-446 Jan 1985 refs ERTS

Avail NTIS HC A19/MF A01 CSCL 05B

Digital data for the Washington, DC scene simultaneously acquired by the LANDSAT-4 Multispectral Scanner (MSS) and the LANDSAT-4 thematic mapper (TM) was compared Classification success for the TM and MSS data sets was determined by a per pixel comparison with digitized ground verification data (GVD) These GVD were comprised of Level 7 land cover (developed, agriculture, forest, water, wetlands, and barren) for four USGS 75 minute topographic quadrangle maps. The relative improvement in classification success for TM was between 11% and 14%, or about a factor of 13, for these data. This represents a meaningful improvement in accuracy for Level 7 land cover categorization for TM relative to MSS, particularly when errors of omission and commission were considered

N85-23214\*# Arizona Univ, Tucson

AN INVESTIGATION OF SEVERAL ASPECTS OF LANDSAT-5 **DATA QUALITY Quarterly Progress Report** 

R C WRIGLEY, Principal Investigator Sponsored by NASA ERTS (E85-10096, NASA-CR-175531, NAS 1 26 175531) Avail NTIS

HC A02/MF A01 CSCL 05B

Band-to-band registration, geodetic registration, interdector noise, and the modulation transfer function (MTE) are discussed for the Palmer County, TX scene Band combinations for several LANDSAT 4 and LANDSAT 5 scenes, the geodetic registration test for the Sacramento, CA area, periodic noise components in TM band 5, and grey level measurements by detector for Great Salt Lake (UT) dark water forescans and backscans are considered Results of MTF analyses of the San Mateo Bridge and of TM high resolution and aerial Daedalus scanner imagery are consistent and appear to be repeatable. An oil-on-sand target was constructed on the White Sands Missile Range in New Mexico. The two-image analysis procedure used is summarized

N85-23220\*# MacQuarie Univ, North Ryde (Australia) School of Mathematics and Physics

PRECEDENCY CONTROL AND OTHER SEMANTIC INTEGRITY ISSUES IN A WORKBENCH DATABASE

C N G DAMPNEY In its MAGSAT Anomaly Field Data of the Crustal Properties of Australia 8 p 1983 refs
Avail NTIS HC A05/MF A01 CSCL 05B

Most database systems model the current state of a system of real world discrete and simple entities together with their relationships. By examining instead a database system that is a workbench and models more complicated entities, a fresh perspective is gained. Specifically, semantic integrity is analysed Four aspects distinct from physical integrity are identified, namely - access, failure, concurrency and precedency. Access control is shown to be the consequence of semantic interdependency between data and its matching semantic routines Failure, concurrency precedency controls are concerned with preventing processes interfering with each other. Precedency is a new concept in the database context. It expresses a constraint between

processes that act on the database As processes create, update and delete entities they in general obey a partial ordering imposed by the semantics of their actions Precedency control ensures that data remains consistent with respect to this partial order

Autho

N85-24779 Centre National d'Etudes Spatiales, Toulouse (France)

SCIENTIFIC EXPERIMENTS. PREPROCESSING OF SCIENTIFIC DATA [LES EXPERIENCES SCIENTIFIQUES. PRETRAITEMENT DES DONNEES SCIENTIFIQUES]

M AVIGNON *In its* Space Math for the Prepn and the Develop of Satellite Exploit p 935-981 1984 In FRENCH Avail CEPADUES, Toulouse, France

Preprocessing of satellite-borne experiment data for spaceborne astronomy, geophysics, planetology, geodesy, oceanography, Earth observations, technology, and medicine and biology projects is introduced. The data acquisition chain is described. Passage from raw data to instrument data, calibrating, data sampling, passage from instrument to physically significant data, levels of processing, and data storage and access are outlined. Examples of ocean circulation and sea state, GEOS magnetospheric wave, and gamma ray astronomy data preprocessing are given.

Author (ESA)

N85-25348# Joint Publications Research Service, Arlington, Va IDENTIFYING LAND USE STRUCTURES OF MULTIZONAL AEROSPACE PHOTOGRAPHS USING DIGITAL DATA PROCESSING Abstract Only

I SCHMIDT and H STOYE In its USSR Rept Space (JPRS-USP-85-003) p 113 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (USSR), no 3, May-Jun 1984 p 89-96 Original language document announced as A84-43214 Avail NTIS HC A08/MF A01

The land-use patterns of part of the Leipzig region are interpreted by analyzing relationships between the brightnesses of multispectral images (obtained by Salyut-6 in August 1978) transformed into digital form Interpretation results in the 640 to 680 nm bands are compared with land-use maps, and sufficiently good agreement is obtained it is noted that the interpreted patterns can serve as the basis for further regional generalization

BJ (IAA)

EAK

N85-25349# Joint Publications Research Service, Arlington, Va EXPERIENCE IN AUTOMATION OF DATA PROCESSING IN INTERPRETATION AND DEFINING OF LINEAR ELEMENTS FROM SPACE PHOTOGRAPHS Abstract Only

V Y GOLTVEGER, V A ILIN, and N M KUNINA *In its* USSR Rept Space (JPRS-USP-85-003) p 114 4 Mar 1985 Transl into ENGLISH from Issled Zemli iz Kosmosa (USSR), no 3, May-Jun 1984 p 97-105

Avail NTIS HC A08/MF A01

Two aspects of geological interpretation of space photographs are examined automation in the processing of data interpretation, and automated discrimination of linear elements directly from space photographs The automated image processing system was used The experiment was done with a space photograph of the Kola Peninsula enlarged to a scale of 1 500,000 The interpretation was used to compile a map of fissures to demonstrate the possibility of automatic processing computer compilation of a density map, a map of fissures with particular directions and rose diagrams, followed by comparison with results obtained in an experiment with automated discrimination of linear elements. The procedures for preparation of each map are described. Computer interpretation is characterized by great detail. The method, however, has serious limitations, its applicability is limited to cases where most of the brightness drops on a photograph are composed of linear elements and the brightness drops caused by nonlinear elements are negligible. The methods do not differentiate the discriminated linear elements, and it is impossible to reject elements of anthropogenic features The method is characterized by speed of processing, reproducibility of the results and sensitivity of the procedures

N85-27318\*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

CNPQ/INPE LANDSAT SYSTEM: REPORT OF ACTIVITIES FROM OCTOBER 1, 1983 TO SEPTEMBER 30, 1984

J L DEBARROSAGUIRRE, Principal Investigator Oct 1984 30 p Presented at the LANDSAT Ground Station Operators Working Group and LGWOWG Data Distribution and Marketing Working Group Meetings, Sao Jose dos Campos, Brazil, Oct - Nov 1984 Sponsored by NASA Original contains imagery Original photography may be purchased from the EROS Data Center, Sioux Falls, S D 57198 ERTS

(E85-10097, NASA-CR-175612, NAS 1 26 175612,

INPE-3323-PRE/623) Avail NTIS HC A03/MF A01 CSCL 02F The status of Brazilian facilities for receiving, recording, processing, and distributing LANDSAT-generated products is presented Price lists and the revised LANDSAT-4 and -5 coverage map are included A R H

N85-27319\*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

NOISE CORRECTION ON LANDSAT IMAGES USING A SPLINE-LIKE ALGORITHM

N L VIJAYKUMAR, Principal Investigator and L A V DIAS Jan 1985 8 p refs Presented at the 4th Plenary Meeting of SELPER (Remote Sensing Latinamerican Experts Soc.), Santiago de Chile, 12-16 Nov 1984 Sponsored by NASA ERTS (E85-10098, NASA-CR-175613, NAS 1 26 175613,

INPE-3386-PRE/657) Avail NTIS HC A02/MF A01 CSCL 02F Many applications using LANDSAT images face a dilemma

the user needs a certain scene (for example, a flooded region), but that particular image may present interference or noise in form of horizontal stripes During automatic analysis, this interference or noise may cause false readings of the region of interest. In order to minimize this interference or noise, many solutions are used, for instane, that of using the average (simple or weighted) values of the neighboring vertical points. In the case of high interference (more than one adjacent line lost) the method of averages may not suit the desired purpose. The solution proposed is to use a spline-like algorithm (weighted splines) This type of interpolation is simple to be computer implemented, fast, uses only four points in each interval, and eliminates the necessity of solving a linear equation system. In the normal mode of operation, the first and second derivatives of the solution function are continuous and determined by data points, as in cubic splines It is possible, however, to impose the values of the first derivatives, in order to account for shapr boundaries, without increasing the computational effort. Some examples using the proposed method are also shown Author

N85-27371# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

LOCATION AND DATA COLLECTION SATELLITE SYSTEM ARGOS. USER'S GUIDE

1985 38 p

Avail NTIS HC A03/MF A01

The ARGOS satellite based localization system is described The user platform weighs only 2 kg, and can be carried by a wide range of targets, e.g., balloons, icebergs, or animals. The platforms are linked to NOAA/TIROS-N satellites, which act as relay stations for platform and satellite environmental and experiment data. Special ground stations were built for direct data collection The localization system is based on Doppler positioning, with 60% of platforms located at each satellite passage. Accuracy is within 100 m. The data processing system assures 99% availability of data, 66% of the data are available 3 hr after measurement, 87 5% 6 hr Information includes raw and converted sensor data, and position, speed, and last localization date of platforms Real time data transmission is assured by the Global Telecommunication System Uses include wildlife radiolocation and environmental data collection Author (ESA) N85-27753# Maryland Univ , College Park Computer Vision Lab

APPLICATION OF HIERARCHICAL DATA STRUCTURES TO GEOGRAPHICAL INFORMATION SYSTEMS Final Contract Report, 27 Sep. 1983 - 26 Sep. 1984

H SAMET and A ROSENFELD Fort Belvoir, Va Army Engineer Topographic Labs. 13 Nov 1984 117 p (Contract DAAK70-81-C-0059)

(AD-A152169, ETL-0376) Avail NTIS HC A06/MF A01 CSCL

In Phase I of the project, a database was built that contained three maps supplied under the terms of the contract. These maps described the flood plain, elevation contours, and landuse classes of a region in California. The map regions were represented in quadtree form, and algorithms were developed for basic operations on quadtree-represented regions (set-theoretic operations, point-in-region determination, region property computation, and submap generation) The efficiency of these algorithms was studied theoretically and experimentally in Phase II of the project a quadtree based Geographic Information System was partially implemented, allowing manipulation of images storing area, point and line data. This system included a memory management system. to allow manipulation of images too large to fit into main memory, a software package to allow users to edit and update images, database management and map manipulation functions, and an English-like query language with which to access the database Phase III of this project primarily dealt with enhancements and alteration to this information system package, an evaluation of some of the design decisions, and the collection of empirical results to indicate the utility of the software and to justify the indicated design decisions. Included with this report is a survey of appropriate data structures for future investigation vis-a-vis the current system

N85-28441# National Aerospace Lab , Amsterdam (Netherlands)

#### **DEVELOPMENTS IN REMOTE SENSING**

1983 12 p In DUTCH, ENGLISH summary Sponsored by Netherland Agency for Aerospace Programs Original contains color illustrations

(B8580069) Avail NTIS HC A02/MF A01

The processing of thermal-infrared remote sensing data from data aircraft and satellites is described. The analog data are, after a analog-to-digital conversion, checked and selected by a video quick-look system. After correction for systematic errors they are presented as pictures showing the surface temperature differences on a color TV in which a variable color coding is used.

Author (ESA)

N85-28877\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

EXPERIMENTAL PHILOSOPHY LEADING TO A SMALL SCALE DIGITAL DATA BASE OF THE CONTERMINOUS UNITED STATES FOR DESIGNING EXPERIMENTS WITH REMOTELY SENSED DATA

M L LABOVITZ, E J. MASUOKA, P W BRODERICK, T R GARMAN, R W LUDWIG, G N BELTRAN, P J HEYMAN, and L K HOOKER Apr 1983 22 p refs (NASA-TM-85009; NAS 1 15 85009) Avail NTIS HC A02/MF A01 CSCL-05B

Research using satellite remotely sensed data, even within any single scientific discipline, often lacked a unifying principle or strategy with which to plan or integrate studies conducted over an area so large that exhaustive examination is infeasible, e.g., the U.S.A. However, such a series of studies would seem to be at the heart of what makes satellite remote sensing unique, that is the ability to select for study from among remotely sensed data sets distributed widely over the U.S., over time, where the resources do not exist to examine all of them. Using this philosophical underpinning and the concept of a unifying principle, an operational procedure for developing a sampling strategy and formal testable hypotheses was constructed. The procedure is applicable across disciplines, when the investigator restates the research question.

in symbolic form, i.e., quantifies it. The procedure is set within the statistical framework of general linear models. The dependent variable is any arbitrary function of remotely sensed data and the independent variables are values or levels of factors which represent regional climatic conditions and/or properties of the Earth's surface These factors are operationally defined as maps from the U.S. National Atlas (U.S.G.S., 1970). Eighty-five maps from the National Atlas, representing climatic and surface attributes, were automated by point counting at an effective resolution of one observation every 176 km (11 miles) yielding 22,505 observations per map The maps were registered to one another in a two step procedure producing a coarse, then fine scale registration After registration, the maps were iteratively checked for errors using manual and automated procedures. The error free maps were annotated with identification and legend information and then stored as card images, one map to a file A sampling design will be accomplished through a regionalization analysis of the National Atlas data base (presently being conducted) From this analysis a map of homogeneous regions of the USA will be created and samples (LANDSAT scenes) assigned by region

BJF

N85-29340# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

DIGITAL IMAGE MAPPING OF ANTARCTICA USING NOAA-7 AVHRR IMAGERY

W GOEPFERT *In its* Inform Relative to Cartography and Geodesy Ser 2 Transl, No 42, Vol 1 p 11-16 1984 refs Avail NTIS HC A03/MF A01

Satellite image map production from NOAA-7 AVHRR imagery is described. The digital image processing steps are involved, i.e., the 10 bit/8 bit-reformatting of the raw data. The geometric and radiometric image mosaicing, and a final global contrast enhancement are described. A digital image mosaic of scale 1.6 million of the Antarctic region 110 W - 0 - 90 E, 70 - 90 S is presented.

N85-29344# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

DYNAMIC RECTIFICATION OF AIRBORNE SCANNER DIGITAL IMAGE RECORDINGS [DYNAMISCHE ENTZERRUNG VON FLUGZEUGABTASTER-BILDAUFZEICHNUNGEN]

K J SEEGEL *In its* Repts on Cartography and Geodesy Ser 1 Original Repts , No 93 p 7-80 1984 refs In GERMAN, ENGLISH summary

Avail NTIS HC A06/MFA01

An operational procedure for the universal geometric rectification of perturbed digital image recordings is presented Developments in preprocessing, as e.g., noise elimination, strict radiometric adaptation as well as the production of data-reduced edge images allow a clear, distinct and complete visualization of the geometric deviations and an appropriate interactive rectification. The direct comparison of edge images covering the same area between the reference image and the image to be rectified simplifies the quality control of the real time rectification and offers the possibility to increase at will the accuracy by iterative processing by additional measurements. The total procedure is demonstrated by the rectification of a multispectral airborne scanner recording onto a panchromatic digital orthophoto.

N85-29347# Army Engineer Topographic Labs , Fort Belvoir, Va

### AIR PHOTO ANALYSIS, PHOTO INTERPRETATION LOGIC, AND FEATURE EXTRACTION

J N RINKER and P A CORL Jun 1984 351 p refs (Contract DA PROJ 4A1-61102-B-52-C, DA PROJ 4A7-62707-A-855)

(AD-A153926, ETL-0329) Avail NTIS HC A16/MF A01 CSCL 14E

This is a status report about some of the research efforts within the Center for Remote Sensing (CRS) that are associated with image analysis Emphasis has been placed on the manual procedure of photo analysis, photo interpretation logic, classification

schemes, and knowledge based systems Information derived from other sources and information presented by contributors are acknowledged in the appropriate sections

GRA

#### 08

#### INSTRUMENTATION AND SENSORS

Includes data acquisition and camera systems and remote sensors

#### A85-30543#

## REMOTE SENSING OF SURFACE AND NEAR SURFACE TEMPERATURE FROM REMOTELY PILOTED AIRCRAFT

J L COGAN (U.S. Army, Atmospheric Sciences Laboratory, White Sands Missile Range, NM) Applied Optics (ISSN 0003-6935), vol. 24, April 1, 1985, p. 1030-1036 refs

Surface temperature and atmospheric temperature near the surface may be estimated through a method that uses data from common types of airborne thermal infrared imager or other radiometric device having a narrow field of view. The method accounts for effects of atmospheric attenuation, surface emissivity, reflected cloud and clear sky radiance, and sensor response to various levels of approximation. Required meteorological measurements are the temperature of the intervening atmosphere and possibly the cloud base. Data acquired by other investigators suggest accuracies approaching + or - 1 K for certain surfaces such as water and that similar accuracies in atmospheric temperature may be expected for certain vegetated surfaces.

Author

#### A85-30726

### THE EVOLUTION OF SATELLITE-BASED REMOTE-SENSING CAPABILITIES IN INDIA

K KASTURIRANGAN (Indian Space Research Organization, Satellite Centre, Bangalore, India) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, Mar-Apr 1985, p 387-400 Research supported by the Department of Space and Space Commission of India refs

This paper describes the Indian experience in evolving a satellite-based remote-sensing system. The experimental earth observation program represented by the Bhaskara-1 and Bhaskara-2 satellites are discussed to highlight the different components of a satellite-based remote-sensing mission. This is followed by a presentation of the key elements of the Indian remote sensing (IRS) satellite mission with particular reference to the details of IRS-1, the first of the planned satellites IRS-1 represents a major step in the transition from an experimental to an operational satellite-based remote-sensing system in India.

#### A85-30957

# ANALOG SIMULATION FOR RADIOMETRIC CORRECTION FOR SOLAR ANGLE

H B HALLOCK IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 61-71 refs

Practicality demands accuracy in correlating satellite sensor data to characteristic solar reflectance signatures of earth resources. These data are sensitive to the natural variations in solar angle, and to large changes in offset viewing angle. It is necessary to generate mathematical models for the correction of radiometric distortion resulting from these effects. The most commonly discussed radiometric distortion is that due to atmospheric absorption, but that due to solar and viewing angle effects can be comparable. Because of the difficulties and costs involved in accumulating enough data from field radiometry, this paper proposes extensive physical analog simulation. A case is made for a large simulator facility incorporating both indoor and

outdoor measuring equipment General design suggestions are given Author

#### A85-30960

### COMPUTER-ASSISTED SYNTHESIS OF INFORMATION FROM MULTISPECTRAL IMAGERY

R F PASCUCCI and A F SMITH (Autometric, Inc., Falls Church, VA) IN Extraction of information from remotely sensed images, Preceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 91-104

A research program was conducted to evaluate and compare the geologic information content of the imagery from five different remote sensors In the investigation, use was made of a computer-assisted geographic information system called Autogis The area of study comprised two US Geological Survey 1 250,000-scale quadrangles, including Utukok River, and Lookout Ridge, Alaska Within this area, a subarea of 5200 square kilometers was delineated for separate study. The imagery examined consisted of real-aperture SLAR (APS/94D) imagery, synthetic-aperture SLAR (GEMS-1001) imagery, standard Landsat multispectral scanner (MSS) imagery, digitally enhanced Landsat MSS imagery, and color aerial photographs. The largest area (5889 km) of geologic structure was detected by the enhanced Landsat MSS system, while the real-aperture SLAR system detected 5601 The last place is occupied by the standard-product Landsat MSS which detected 3704 km GR

#### A85-30961

#### STEREO MODELS FROM SYNTHETIC APERTURE RADAR

E S LEONARDO (Goodyear Aerospace Corp , Litchfield Park, AZ) IN Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images, Rochester, NY, August 16-19, 1983 Falls Church, VA, American Society of Photogrammetry, 1984, p 105-114 refs

For a long time, image interpreters and geoscientists have been intrigued by the possibility of using conventional stereoscopes and stereo plotters to obtain measurable three-dimensional models of synthetic aperture side-looking radar (SAR) imagery. On the basis of studies, it has now been verified that a visual stereo radar model is not only theoretically possible, but that measurements compatible with the sensor's resolution and the terrain can be made using conventional stereo mensuration Because of SAR's unique geometries characteristics, the flight parameters required for stereo collection flights are much more stringent than for aerial photography Flightpath configurations are discussed, taking into account preferred configuration, and alternate configurations Attention is given to radar stereo measurements, steep depression angle effects, and edge guidance and flightpath effects GR

#### A85-31397

## PROBING OF THE EARTH'S SURFACE AND THE ATMOSPHERE WITH AN AIRBORNE LASER SPECTROMETER

W WIESEMANN (Battelle Institut, Frankfurt am Main, West Germany), F LEHMANN (Muenchen, Universitaet, Munich, West Germany), and CH WERNER (Deutshe Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen, West Germany) (European Physical Society, International Conference on Infrared Physics, 3rd, Zurich, Switzerland, July 23-27, 1984) Infrared Physics (ISSN 0020-0891), vol 25, Feb 1985, p 467-474 Research supported by the Bundesministerium fuer Forschung und Technologie refs

The principle of operation and results of laboratory measurements and flight implementation of an airborne coherent CW CO2-laser sensor are reported. The spectrometer comprises an analog data processor and an optical arrangement, comparable to a Michelson interferometer, for transmission and heterodyne reception of two laser beams. Spectral albedo measurements were performed in laboratory and in flights for different topographic targets, including grass, plowed farmland, and enhanced surface.

moisture due to irrigation. The mean deviation among different data sets is noted to be less than 15 percent. The differential albedo and absorption measurements indicate the feasibility of remote detection of minerals, soil moisture, oil spills, and atmospheric trace gases. A block diagram of the optical arrangement of the instrument is included.

#### A85-31478

STUDY OF SPECTRAL-POLARIZATION CHARACTERISTICS OF NATURAL SURFACES FROM VARIOUS HEIGHTS [ISSLEDOVANIE SPEKTROPOLIARIZATSIONNYKH KHARAKTERISTIK PRIRODNYKH POVERKHNOSTEI S RAZLICHNYKH VYSOT]

V A ZAITSEVA, A E KRAVCHENKO, V E PLIUTA, I G SPITSYN, E A IANOVSKAIA, and A F IANOVSKII Zhurnal Prikladnoi Spektroskopii (ISSN 0514-7506), vol 42, Feb 1985, p 235-239 In Russian refs

Polarization characteristics of several types of natural formations in the regions of the Caspian Sea, Middle Asia, and Belorussia were studied from altitudes of 100-500 m with sighting angles between 0 and 50 deg at solar zenith angles between 40 and 60 deg Furthermore, the dependence of the degree and azimuth angle of polarization on the sighting azimuth angle was examined for water surfaces. The results of these measurements are presented together with a description of the spectropolarimeter Nadir used for the observations. The apparatus operated in the spectral region of 0.4-0.75 micron and used four interference filters with bandwidths between 4 and 6 nm.

#### A85-32101

CANADIAN SYMPOSIUM ON REMOTE SENSING, 8TH, AND ASSOCIATION QUEBECOISE DE TELEDETECTION, CONGRESS, 4TH, MONTREAL, CANADA, MAY 3-6, 1983, PROCEEDINGS [SYMPOSIUM CANADIEN DE TELEDETECTION, 8TH, AND ASSOCIATION QUEBECOISE DE TELEDETECTION, CONGRES, 4TH, MONTREAL, CANADA, MAY 3-6, 1983, ACTES]

K P B THOMSON, ED (Canada Centre for Remote Sensing, Ottawa, Canada) and F BONN, ED (Sherbrooke, Universite, Sherbrooke, Canada) Symposium and Congress sponsored by the Association Quebecoise de Teledetection and Canada Centre for Remote Sensing Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, 855 p In French and English For individual items see A85-32102 to A85-32149

Selected papers covering a wide variety of earth-science applications and technical advances in remote sensing are presented. The topics discussed include the influence of viewing geometry on vegetation measurements, current limitations on quantitative airborne thermography, video-image analysis, and stereoscopic accentuation of SPOT images. Consideration is also given to remotely piloted aircraft for small-format aerial photography, the estimation of global solar radiance at ground level using METEOSAT visible-band data, and the mapping of land/soil degradation using multispectral data.

#### A85-32119

CLOUDS - A FUNDAMENTAL LIMITATION TO SATELLITE REMOTE SENSING IN THE VISIBLE SPECTRAL REGION

S PETEHERYCH, B GOODISON, V SWAIL, and A SAULESLEJA (Department of the Environment, Atmospheric Environment Service, Downsview, Ontario, Canada) IN Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings Sainte-Foy, Quebec, Canada, Association Quebecoise de Teledetection, 1984, p. 223-228

Operational uses of satellite remote sensing capabilities in activities such as agriculture, meteorology, oceanography and hydrology are constrained temporally by the presence of cloud cover. These endeavors require data at intervals which may encounter sufficient cloudiness to degrade the ability of gathering valid information. The opportunities for clear viewing are also determined by the altitude and orbital inclination of the satellite Synoptic weather data can be analyzed statistically to define the

number of viewings necessary from a given remote sensor to ensure a high probability of capturing useful data during a preferred interval. Cloud cover statistics are provided for various Canadian areas. The persistence of cloud cover over most of Canada makes questionable the usefulness of VHR visible and IR sensors, imploying that alternative sensors must be identified.

M.S.K.

A85-32211\* Jet Propulsion Lab , California Inst of Tech , Pasadena

## THE USE OF MULTISENSOR IMAGES FOR EARTH SCIENCE APPLICATIONS

D EVANS and B STROMBERG (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p. 271-275

The use of more than one remote sensing technique is particularly important for Earth Science applications because of the compositional and textural information derivable from the images. The ability to simultaneously analyze images acquired by different sensors requires coregistration of the multisensor image data sets. In order to insure pixel to pixel registration in areas of high relief, images must be rectified to eliminate topographic distortions. Coregistered images can be analyzed using a variety of multidimensional techniques and the acquired knowledge of topographic effects in the images can be used in photogeologic interpretations.

#### A85-32212\* Arizona Univ , Tucson

#### SHORT SUMMARY OF MULTISPECTRAL IMAGING SYSTEMS

P N SLATER (Arizona, University, Tucson, AZ) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p 276-279 (Contract NAG5-196)

This paper summarizes a survey of over 40 multispectral imaging systems that have been used during the past decade for earth resources studies from aircraft or spacecraft, or are presently in the proposal or design and development stage. In addition, some short wave infrared systems are described including a recent NASA suggestion for a research remote sensing system for the 1990's

Author

A85-32214\* Jet Propulsion Lab, California Inst of Tech, Pasadena

## A SHUTTLE IMAGING SPECTROMETER EXPERIMENT FOR THE LATE 1980'S

J B WELLMAN, A F H GOETZ, M HERRING, and G VANE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p. 286-292 NASA-supported research refs

The Shuttle Imaging Spectrometer Experiment proposed as a next experimental step in the development of advanced\_earth\_remote\_sensing\_technology, is capable of imaging the earth's surface simultaneously in 128 spectral bands covering the range from 0 4 to 25 micrometers Laboratory and field measurements have suggested the utility of high-spectral-resolution remote sensing, and an aircraft-borne precursor to the SISEX has demonstrated the ability to distinguish among differing vegetation and rock types - in certain cases making unique identifications The SiSEX instrument utilizes an area-array focal plane, populated by visual- and infrared-sensitive detectors, to acquire simultaneous spatial and spectral information on a line-by-line basis. The spectrum is dispersed by means of a prism spectrometer. The performance analysis indicates that the scientific requirements for radiometric precision can be achieved using optics with an effective circular aperture of 11 cm Author A85-32228\*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va

# A CONCEPT FOR AN ADVANCED EARTH OBSERVATION SPACECRAFT

U M LOVELACE (NASA, Langley Research Center, Hampton, VA) IN NTC '83, Proceedings of the National Telesystems Conference, San Francisco, CA, November 14-16, 1983 New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p 384-391

Remote sensing missions have been synthesized which could contribute significantly to the understanding of global environmental parameters Instruments capable of sensing important land and sea parameters are combined with a large antenna designed to passively quantify surface emitted radiation at several wavelengths A conceptual design for this large deployable antenna has been developed All subsystems required to make the antenna an autonomous spacecraft have been conceptually designed. The entire package, including necessary orbit transfer propulsion, is folded to package within the Space Transportation System (STS) cargo bay After separation the antenna, its integral feed mast, radiometer receivers, power system, and other instruments are automatically deployed and transferred to the operational orbit The design resulted in an antenna with a major antenna dimension of 120 meters, weighting 7650 kilograms, and operating at an attitude of 700 kilometers Author

A85-32853\* Jet Propulsion Lab , California Inst of Tech , Pasadena

### REMOTE SENSING AND CLIMATE PARAMETERS

M T CHAHINE (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), R HASKINS (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA, Institute for Atmospheric Optics and Remote Sensing, Hampton, VA), J SUSSKIND (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, MD), and D REUTER (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Universities Space Research Association, Columbia, MD) IN Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p 10-16 NASA-supported research refs

The fundamental problem in deriving weather and climate procedures from satellite data lies in the proper selection of sets of sounding frequencies, and in the derivation of accurate algorithms that are capable of uncoupling the effects of these variables to retrieve the true value of each unknown parameter separately. This uncoupling is presently based on the relaxation principle of Chahine (1968, 1970), which allows each parameter to be retrieved analytically without a priori assumptions as to the properties of the other unknowns in the field of view. Attention is given to work conducted with the High Resolution IR Sounder and the Microwave Sounding Unit instruments carried by the NOAA Weather Satellite.

#### A85-32863

# EFFECTS OF WIND SPEED AND RAIN ON PRECIPITABLE WATER AND CLOUD LIQUID WATER BASED ON SCAMS DATA

W C SHEN, N C GRODY, and A GRUBER (NOAA, National Environmental Satellite, Data, and Information Service, Washington, DC) IN Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p 58-61 refs

The Nimbus-6 satellite's scanning microwave spectrometer (SCAMS) encompasses both a 22 23 GHz water vapor channel and a 31 65 GHz window channel, for deriving values of precipitable water and cloud liquid water content over the oceans. A technique is presently developed for the estimation of errors introduced into precipitable water and cloud liquid water readings that are due to rain attenuation and high wind conditions. This algorithmic method is applied to the actual cases of the 1975 storms, Typhoon Rita and Hurricane Caroline.

#### A85-32871

### ANGLE DEPENDENCE OF RADIANCES IN THE OZONE-SENSING CHANNEL OF THE HIRS

M P WEINREB (NOAA, National Environmental Satellite, Data, and Information Service, Washington, DC), D S CROSBY (NOAA, National Environmental Satellite, Data, and Information Service, American University, Washington, DC), and J C DEROSE (NOAA, National Environmental Satellite, Data, and Information Service, Washington, DC, Michigan, University, Ann Arbor, MI) IN Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p 87-89 refs

The results of implementation of the LOWTRAN algorithm, intended for correction of the angle dependence of radiances in the ozone-sensing channel 9 (9.6 microns) of the high-resolution IR radiation sounder (HIRS), are presented. It is found that application of LOWTRAN caused considerable improvements in the magnitudes of the calculated radiances, at a zenith angle of 49 deg, for instance, the LOWTRAN produced a value almost coincident with in situ observations, whereas the original HIRS value of the limb darkening was 2.2 C less. It is inferred from the analysis that the values of empirically derived parameters are not transferrable from one satellite instrument to another.

#### A85-32936

## MULTISPECTRAL IDENTIFICATION OF CLOUDS AND EARTH SURFACES USING AVHRR RADIOMETRIC DATA

I RUFF and A GRUBER (NOAA, National Environmental Satellite, Data, and Information Service, Washington, DC) IN Conference on Atmospheric Radiation, 5th, Baltimore, MD, October 31-November 4, 1983, Preprints Boston, MA, American Meteorological Society, 1983, p 475-478

An evaluation is conducted of the use of the Advanced Very High Resolution Radiometer (AVHRR) for the identification of various earth surface and cloud types within single observational fields. The AVHRR is a multispectral cross-track scanner carried by the Tiros-N series satellites, furnishing an instantaneous field of view of about 1 km ground resolution at nadir. It is found that a combination of observations from the various AVHRR channels can unambiguously differentiate broad categories of homogeneous surfaces, as well as many cases of mixed-surface types.

A85-35124\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

# RETRIEVAL OF CLOUD COVER PARAMETERS FROM MULTISPECTRAL SATELLITE IMAGES

A ARKING (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, MD) and J D CHILDS (Systems and Applied Sciences Corp , Vienna, VA) Journal of Climate and Applied Meteorology (ISSN 0733-3021), vol 24, April 1985, p 322-333 refs

A technique is described for extracting cloud cover parameters from multispectral satellite radiometric measurements. Utilizing three channels from the AVHRR (Advanced Very High Resolution Radiometer) on NOAA polar orbiting satellites, it is shown that one can retrieve four parameters for each pixel cloud fraction within the FOV, optical thickness, cloud-top temperature and a microphysical model parameter. The last parameter is an index representing the properties of the cloud particle and is determined primarily by the radiance at 3.7 microns. The other three parameters are extracted from the visible and 11 micron infrared radiances, utilizing the information contained in the two-dimensional scatter plot of the measured radiances. The solution is essentially one in which the distributions of optical thickness and cloud-top temperature are maximally clustered for each region, with cloud fraction for each pixel adjusted to achieve maximal clustering

Author

A85-36248\* Jet Propulsion Lab , California Inst. of Tech , Pasadena

#### IMAGING SPECTROMETRY FOR EARTH REMOTE SENSING

A F H GOETZ, G VANE, J. E SOLOMON, and B N ROCK (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Science (ISSN 0036-8075), vol 228, June 7, 1985, p 1147-1153 NASA-supported research refs

Initial results of the novel remote earth sensing technique of imaging spectrometry, which is technically feasible from both spacecraft and aircraft platforms, indicate that the direct identification of surface materials on a picture-element basis is possible through proper sampling of absorption features in the reflectance spectrum. Sensors of this type are able to acquire images simultaneously in 100-200 contiguous spectral bands. Computerized data reduction and storage techniques are available for the large data sets thus generated, and novel analytic techniques are under development to maximize information content extraction.

#### A85-36284

### NAVIGATION AND SENSOR ORIENTATION SYSTEMS IN AERIAL PHOTOGRAPHY

F L J H CORTEN ITC Journal (ISSN 0303-2434), no 4, 1984, p 296-304

The principles of such navigation approaches as deduced reckoning, position fixing, and inertial navigation are reviewed, centering on the potential improvements to their accuracy in aerial photography. The in-flight performance of several systems is discussed, including distance measuring equipment and VOR stations, airborne tellurometer or aerodist, microwave beacon systems, computer controlled photo navigation system, and Doppler radar for planimetric position determination, and laser altimeter, statoscope, hypsometer, and airborne profile recorders for altitude determination Consideration is also given to the Global Positioning System Navstar, which consists of 18 orbiters (three satellites in each orbital plane) and is expected to provide an accuracy of + or - 3.5 m horizontally, 4.5 m vertically, and 0.05 m/s in speed Finally, the applications of the systems and the economic aspects of their operation are detailed.

#### A85-36286

#### SURVEYING AND MAPPING WITH SPACE DATA

F J DOYLE (U.S. Geological Survey, Reston, VA) ITC Journal (ISSN 0303-2434), no. 4, 1984, p. 314-321

#### A85-36287

## EXPECTATIONS FOR AERIAL PHOTOGRAPHY AS SEEN FROM THE SIDE OF THE USER

E A FLEMING (Department of Energy, Mines and Resources, Surveys and Mapping Branch, Ottawa, Ontano, Canada) ITC Journal (ISSN 0303-2434), no 4, 1984, p 322-326 refs

The work outlines some of the constraints and requirements to aerial photography systems posed by users, taking into consideration basic sensor and camera parameters and such factors as time, costs, and weather conditions Recent technological advances are illustrated through examples of a super wide-angle lens with an increased maximum aperture of f/4 and

radial distortion of less than 10 microns, a redesigned wide-angle lens, which offers a 60-percent increase in its information transfer capacity in the visible spectral region, and a fine-grain high-resolution film with an aerial film speed of 40. The U.S. National High-Altitude Photography Program, defined in 1978, is also discussed.

#### A85-36993

#### PHOTOMETRY AND POLARIZATION IN REMOTE SENSING

W G EGAN (Grumman Aerospace Corp, Bethpage, Lamont-Doherty Geological Observatory, Palisades, NY) New York, Elsevier, 1985, 514 p refs

Optical remote sensing in the 0 185-12 micron wavelength region is studied with particular focus on the spectral region between 04 and 10 micron wavelength Optical fundamentals are addressed, including the photometric and polarimetric properties of targets, sensor systems, contrast, calibration. atmospheric effects, data handling and analysis, and interpretation and information. Applications are treated, presenting specific photometric, polarimetric, and Stokes parameter determinations from laboratory measurement and remote sensing. The effect of the atmosphere on polarization and photometry is described, as is the determination of the absorption and scattering properties of the atmosphere given the aerosol and molecular loading. The specific applications considered are hydrology, marine biology and water quality, agriculture, forestry, planetary astronomy, stellar oceanography, astronomy, atmospheric constituents, depolarization, and radiative transfer

#### A85-37199#

#### **ORBITS FOR EARTH OBSERVATION**

J MASS and J SARTIEL (Radio Observatory, Haifa, Israel) IN Israel Annual Conference on Aviation and Astronautics, 26th, Haifa, Israel, February 8, 9, 1984, Collection of Papers Haifa, Israel, Technion - Israel Institute of Technology, 1984, p 179-194 refs

Some satellite orbits which enable daylight observation, once or twice daily, of certain areas under good viewing conditions are reviewed. The orbits include medium-altitude circular or elliptic heliosynchronous orbits and either geosynchronous or doubly geosynchronous and high-altitude orbits, and can yield high-resolution imagery equivalent to Landsat or SPOT with state-of-the-art optics. The duration of observation, the geographic coverage limitations, and the number of usable passes per day are given for each orbit. It is shown that all orbits require accurate angular pointing and slewing of the satellite or its viewing axis.

M D

#### A85-37726

CONFERENCE ON SATELLITE/REMOTE SENSING AND APPLICATIONS, CLEARWATER BEACH, FL, JUNE 25-29, 1984, PREPRINTS

Conference sponsored by the American Meteorological Society Boston, MA, American Meteorological Society, 1984, 307 p For individual items see A85-37727 to A85-37782.

The technology of meteorological remote-sensing satellites and the processing and application of the data obtained are discussed in reviews and reports. Topics examined include new satellite observations and techniques, retrieval techniques, estimation of surface and atmospheric properties, mesoscale cloud and water-related studies, diagnosis of weather systems, information retrieval, ground truth and validation, data assimilation and diagnostics, wind-simulation studies, and simulations of observing systems. Graphs, diagrams, maps, and photographs are provided

FΚ

### A DECADE OF REMOTE SENSING IN INDIA - SOME SALIENT RESULTS

Y S RAJAN and V R RAO (Indian Space Research Organization, Earth Observation Systems Programme Office, Bangalore, India) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 3-11 refs

Results of remote sensing activities in India over the past decade are presented Important applications such as for agriculture and soil surveys, forestry and vegetation cover, water resources, flood mapping, and geology, are explained. The development of remote sensing spacecraft, sensors, and a ground segment is discussed. Some facilities for remote sensing applications including the development of low-cost interpretative equipment are described. The Indian National Satellite System and the National Natural-Resources Management System under evolution are outlined.

#### A85-37953

## RESPONSES TO SATELLITE REMOTE SENSING OPPORTUNITIES IN EAST AND SOUTHERN AFRICA

A FALCONER and V A O ODENYO (Regional Remote Sensing Facility, Nairobi, Kenya) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 19-29 refs

#### A85-37956

# DEVELOPMENT AND APPLICATION OF THE INTERACTIVE PLANETARY IMAGE PROCESSING SYSTEM (IPIPS) IN SUPPORT OF REMOTE SENSING STUDIES AT IMPERIAL COLLEGE

G E HUNT (Imperial College of Science and Technology, London, England) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 75-84 Research supported by the Science and Engineering Research Council refs

The Interactive Planetary Image Processing System (IPIPS) which was developed originally for studies of planetary meteorology and oceanography and is now used to support remote-sensing studies in all areas of earth sciences is described. The computing machinery, the image-display systems, and the programming tunites them into an interactive research and analysis tool are discussed. Some results from research activities are presented, and the role of IPIPS in the Imperial College and University of London teaching program is outlined.

#### A85-37957

# MAIN RESULTS AND PERSPECTIVES OF SOME CHILEAN EXPERIENCES DEVELOPED WITH LOW COST AND ACCURATE SPATIAL REMOTE SENSING TECHNOLOGY

M F ARAYA (Universidad de Chile, Santiago, Chile) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 85-90 refs

A summary of the main results and perspectives of several Chilean programs developed by using low-cost and accurate remote-sensing techniques is presented. Three main applications including the use of satellite-data collection systems in the Antarctic Peninsula to measure meteorological data, the study of geothermal resources in the Los Andes range in Chile by using Landsat multispectral and multitemporal satellite images, and snowmelt runoff forecasting for Andean watersheds by using Landsat data, are considered. It is shown that important and useful results, as well as low-cost, reliable, and accurate methodologies are obtained from the studies.

#### A85-37959

### DIELECTRIC PROPERTIES AND MICROWAVE REMOTE SENSING

R P SINGH (Alberta, University, Edmonton, Canada) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 97-101 refs

The importance of the dielectric properties of earth, ocean and snow surfaces in microwave remote sensing is reviewed. Data on dielectric properties of materials in the microwave frequency range are very scarce and their behavior is not fully understood. In this paper the need for dielectric properties of ocean and snow surfaces, the earth's surface and subsurface materials is discussed for the quantitative and qualitative interpretation of microwave remote sensing data of developing countries.

#### A85-37962

### MERGING LANDSAT AND SPACEBORNE RADAR DATA OVER TUNISIA

PH REBILLARD, P N PASCAUD, and D SARRAT (Societe Europeenne de Propulsion, Division de Traitement d'Images, Puteaux, Hauts-de-Seine, France) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 133-138 refs

The registration of Seasat, SIR-A, and Landsat MSS data over a low-relief area with subdesertic climatic conditions located in northern Tunisia is presented Synthetic aperture radar data, acquired over Tunisia by Seasat in August 1978 and by SIR-A in November 1981, both of which provide perpendicular radar illumination directions, are contrasted to the Landsat scenes, overlapping the same area, taken in August 1978 and in September 1981. It is shown that the multispectral and multitemporal coregistered data set enables comparisons between the systems (radar vs MSS and Seasat vs SIR-A) and change detection in the desertification processes and on the surface of the playas.

A85-37983\* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

### SPECTRAL CHARACTERIZATION OF THE LANDSAT THEMATIC MAPPER SENSORS

B L MARKHAM and J L BARKER (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, MD) International Journal of Remote Sensing (ISSN 0143-1161), vol 6, May 1985, p 697-716 Previously announced in STAR as N85-20514 refs

Relative spectral response data for the Landsat-4 and Landsat-4 backup multispectral scanner subsystems (MSS), the protoflight and flight models, are presented and compared to similar data for the Landsat 1, 2 and 3 scanners Channel (six channels per band) outputs for soil and soybean targets were simulated and compared within each band and between scanners The principal differences between the spectral responses of the Landsat-4 scanners and previous scanners are discussed. The simulated Landsat-4 scanner outputs were 3 to 10 percent lower in the red band and 3 to 11 percent higher in the first near-IR band than previous scanners for the soybeans targets. The Landsat-4 scanners were generally more uniform from channel to channel within bands than previous scanners In the upper-band edge of the red band of the protoflight scanner, one channel was markedly different (12 nm) from the rest For a soybeans target, this nonuniformity resulted in a within-band difference of 6.2 percent in simulated outputs between ARH

### VERSATILE AIRBORNE LASER SYSTEM FOR REMOTE PROBING OF OCEAN, ATMOSPHERE, AND FARMLAND

A F BUNKIN, D V VLASOV, A S GALUMIAN, D V MALTSEV, D M MIRKAMILOV, and V P SLOBODIANIN (Akademiia Nauk SSSR, Institut Obshchei Fiziki, Moscow, USSR) (Zhurnal Tekhnicheskoi Fiziki, vol. 54, Nov. 1984, p. 2190-2195) Soviet Physics - Technical Physics (ISSN 0038-5662), vol. 29, Nov. 1984, p. 1284-1287 Translation refs

Remote airborne laser probing from heights of about 1000 m is used to record echo-signal spectra from sea surfaces and depths. These signals contain information concerning the surface and depth distributions of chlorophyll, dissolved organic materials, ocean turbidity, etc. The airborne apparatus is described in detail, and the potential of the method in environmental-conservation, oceanographic, and agricultural studies is discussed.

#### A85-38701

**PROBLEMS** THE COLLECTION. RELATED TO SYSTEMATIZATION AND USE OF A PRIORI DATA DURING THE DIGITAL PROCESSING OF MULTISPECTRAL DATA SPACE [VOPROSY **OBTAINED FROM** SBORA. SISTEMATIZATSII I ISPOL'ZOVANIIA APRIORNYKH DANNYKH **TSIFROVO! OBRABOTKE** MNOGOZONAL'NOI KOSMICHESKOI VIDEOINFORMATSI]

A P TISHCHENKO, ED Leningrad, Gidrometeoizdat (Gosudarstvennyi Nauchno-Issledovatel'skii Tsentr Izucheniia Prirodnykh Resursov, Trudy, No 17), 1984, 126 p In Russian. For individual items see A85-38702 to A85-38719

The methods used in the collection of a priori information and their application in analyses of space multispectral images are detailed with a focus on the development of models for remote sensing data processing. Mathematical aspects of evaluating the parameters of natural phenomena by remote sensing are considered. In addition, various approaches to aerial photography are discussed, including the feasibility of small unmanned aircraft for sensing and combined aerial and ground-based observations.

L٦

#### A85-38702

THE POSSIBILITY OF USING SMALL UNMANNED AIRCRAFT FOR STUDIES OF TERRESTRIAL NATURAL RESOURCES [VOZMOZHNOSTI ISPOL'ZOVANIIA MALORAZMERNYKH BESPILOTNYKH LETATEL'NYKH APPARATOV DLIA IZUCHENIIA PRIRODNYKH RESURSOV ZEMLI]

G S GORIN and V G DANILIUK IN Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 3-10 in Russian

The feasibility of using lightweight remotely piloted aircraft to carry up to approximately 20 kg of remote sensing equipment is analyzed by a comparison of the economic characteristics of two models with those of Ka-26, Mi-2, An-2, and II-14 aircraft currently used for remote sensing. The two models are characterized by payloads of 27 2 and 6 8 kg, cruising speeds of 102 and 80 km/h, ceilings of approximately 4000 m, and a radius of 10-15 km. The aircraft can be launched from either an ejector vehicle or, with minor modifications, from a runway. It is noted that due to its lower speeds, the unmanned aircraft can provide a better quality of photography at scales of the order of 1 2000.

#### A85-38703

FEATURES OF EXPOSURE CONDITIONS AND PHOTOLAB PROCESSING OF MATERIALS OBTAINED FROM AERIAL PHOTOGRAPHY USING THE MKF-6M CAMERA [OSOBENNOSTI USLOVII EKSPONIROVANIIA I FOTOLABORATORNOI OBRABOTKI MATERIALOV AEROS'EMKI KAMEROI MKF-6M] M. M AFANASOV, L V BONDARENKO, E V. GUNCHENKO, and E D TAMITSKII IN Problems related to the collection, systematization and use of a prior data during the digital processing of multispectral video information obtained from space Leningrad, Gidrometeoizdat, 1984, p 10-14 In Russian

The study outlines the methods used for and results of an experimental optimization of exposure for the six-channel aerospace instrument MKF-6M. The trial and error approach was used for the optimization, for each channel a full range of diaphragms and exposures was tried. An analysis of film matrices with respect to the developing intensity reveals that the film of the first channel is to be developed up to large contrast coefficients (gamma = 25-30), in conjunction with the use of higher-contrast film. It is also emphasized that the choice of optimal diaphragms depends considerably on the properties of the surface being photographed and on the time of the year. Several specific areas of improvement for the system are identified.

#### A85-38801

MACHINE PROCESSING OF REMOTELY SENSED DATA: THEMATIC MAPPER DATA AND GEOGRAPHIC INFORMATION SYSTEMS; PROCEEDINGS OF THE TENTH INTERNATIONAL SYMPOSIUM, PURDUE UNIVERSITY, WEST LAFAYETTE, IN, JUNE 12-14, 1984

M M KLEPFER, ED and D B MORRISON, ED Symposium sponsored by the American Society of Agronomy, Crop Science Society of America, IEEE, et al. New York, Institute of Electrical and Electronics Engineers, 1984, 478 p. For individual items see A85-38802 to A85-38846

Topics related to TM data quality analysis are examined, taking into account a Thematic Mapper (TM) geometric correction performance evaluation, Thematic Mapper radiometric characterization, algorithms for the estimation of failed detector data, a comparison between multispectral classification accuracy of Landsat-4 MSS and TM in Hartford and Miami, a single class stepwise linear discriminant analysis of Landsat-4 Thematic Mapper data, and an information content comparison of Thematic Mapper, Multispectral Scanner (MSS), and airborne Thematic Mapper data Other subjects explored are related to trends in geobotanical remote sensing, vegetative cover analysis via remote sensing, applications of remote sensing for land cover/land use evaluation, TM applications to physical components of the environment, preprocessing and analysis techniques, vegetation characteristics geographic information system and characteristics, needs, and applications. Attention is given to wetlands classification, an automatic cloud cover assessment, and data for crop area estimation GR

#### A85-38830

## EXPERIENCE WITH THE USE OF SUPERCOMPUTERS TO PROCESS LANDSAT DATA

M OZGA (U.S. Department of Agriculture, Washington, DC) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 276-280 refs

Attention is given to the computing requirements of a United States Department of Agriculture (USDA) program to compile crop acerage estimates for the entire country based on Landsat data. The basic architecture and computing capacities of three supercomputer systems, in use at USDA over the last five years, are described. The specific systems include the ILLIAC-IV pipelined supercomputer; the CRAY-1 S supercomputer; and the CYBER 200 system. Preliminary results of an experiment to process Landsat Thematic Mapper (TM) data using a Massively Parallel Processor (MPP) system are also discussed.

ON THE USE OF SATELLITE ESTIMATES OF PRECIPITATION ANALYSES FOR NUMERICAL WEATHER INITIAL **PREDICTION** 

M DANARD (Atmospheric Dynamics Corp., Victoria, University, Victoria, British Columbia, Canada) Atmosphere - Ocean (ISSN 0705-5900), vol 23, March 1985, p 23-42 Research supported by the Atmospheric Environment Service and Natural Sciences and Engineering Research Council refs

A four-dimensional data assimilation procedure which, by improving the first-guess fields for the next analysis time, incorporates satellite estimates of precipitation into the initialization of operational numerical weather prediction models, is described Using an adaptation of the method of Richards and Arkin (1981), precipitation is estimated from infrared satellite photographs Predictions are made with and without satellite estimates of precipitation for five 24-h periods in the development of two intense North Pacific cyclones, in order to test the effectiveness of the technique. The results indicate that the average 1000-mb mean error is reduced from 38 to 11 m by the addition of satellite data, the standard error is diminished from 57 to 41 m, and the S1 score is lowered from 57 to 43

N85-23222\*# Jet Propulsion Lab, California Inst of Tech, Pasadena

**SCIENCE OPPORTUNITIES** USING THE NASA SCATTEROMETER ON N-ROSS

M H FREILICH 1 Feb 1985 44 p refs

(Contract NAS7-918)

(NASA-CR-175639, JPL-PUB-84-57, NAS 1 26 175639) Avail NTIS HC A03/MF A01 CSCL 14B

The National Aeronautics and Space Administration scatterometer (NSCAT) is to be flown as part of the Navy Remote Ocean Sensing System (N-ROSS) scheduled for launch in 1989 The NSCAT will provide frequent accurate and high-resolution measurements of vector winds over the global oceans NSCAT data will be applicable to a wide range of studies in oceanography, meteorology, and instrument science. The N-ROSS mission, is outlined, are described The capabilities of the NSCAT flight instrument and an associated NASA research ground data-processing and distribution system, and representative oceanographic meteorological, and instrument science studies that may benefit from NSCAT data are surveyed

N85-23855\*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va

DETERMINATION OF ELECTROMAGNETIC PROPERTIES OF MATERIAL USING ADVANCED RADIOMETER **TECHNIQUES** 

R F ARRINGTON and H J C BLUME In its Large Space Antenna Systems Technol, 1984, Pt 2 p 737-756

Avail NTIS HC A21/MF A01 CSCL 20N

The need for a large diameter deployable antenna to map soil moisture with a 10 kilometer or better resolution using a microwave radiometer is discussed A 6 meter deployable antenna is also needed to map sea surface temperature on the Navy Remote Ocean Sensor System (NROSS) Both of these deployable antennas require a mesh membrane material as the reflecting surface The determination of the electromagnetic properties of mesh materials is a difficult problem. The Antenna and Microwave Research Branch (AMRB) of Langley Research Center was asked to measure the material to be used on MROSS by NRL A cooperative program was initiated to measure this mesh material using two advanced radiometer techniques

N85-23869# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

DATA COLLECTION AND PLATFORM LOCATION SATELLITE: ARGOS USERS' CONFERENCE

1980 137 p refs Partly in ENGLISH and FRENCH Conf held in Quebec, 1-2 Oct 1980 Avail NTIS HC A07

Operational reliability of the ARGOS system, system performance, data distribution, and technical files, platform transmitter terminals, the PAPA meteorological buoy project, ARGOS operation in Arctic regions and ice environments, the BALSAMINE monsoon monitoring experiment, fishery collection, and hydrological uses of ARGOS are discussed

N85-23870# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

THE ARGOS SYSTEM STATUS REPORT AFTER 2 YEARS **OPERATION** 

J L BESSIS In its Data Collection and Platform Location by Satellite 23 p 1980 In FRENCH; ENGLISH summary Avail NTIS HC A07/MF A01

The ARGOS data collection and platform location contribution to the NOAA-TIROS program is reviewed. Of 100 platforms seen during each orbit, 60 are correctly located Location error is 100 m Environmental data collection for atmospheric, oceanographic, and Earth sciences is increasing with each year of system operation Apart from real time demands for meteorology, it is not possible to meet all user requirements by the sole implementation of direct readout stations Author (ESA)

N85-23871# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

SYSTEM PERFORMANCE, DATA DISTRIBUTION **TECHNICAL FILES** 

A GOASGUEN In its Data Collection and Platform Location by Satellite 7 p 1980 In FRENCH, ENGLISH summary Avail NTIS HC A07/MF A01

The performance and mode of operation of the ARGOS platform location function, means of resolving the ambiguity in the case of one-pass position calculations, and method for the calculation of platform position and speed using data acquired during two passes are discussed Operational status of the data distribution system and means of access to experiment data are described Practical aspects of the filling out ARGOS technical files once a program is admitted to the system are covered

N85-23872# Electronique Marcel Dassault, St Cloud (France) THE ARGOS PLATFORM TRANSMITTER TERMINALS (PTTS) M PEBERAY In CNES Data Collection and Platform Location by Satellite 8 p 1980 In FRENCH, ENGLISH summary Avail NTIS HC A07/MF A01

Location and data collection platforms for use on ARGOS buoys, boats and balloons, and data collection only types for stations were developed. With the standard versions the sensor signals must be in serial binary form. However, an interface can be inserted between the sensors and electronics to meet specific requirements The platforms operate at 406 1 MHz Almost 500 platforms are in Author (ESA)

N85-23884# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

THE ARGOS SYSTEM STATUS REPORT

J L BESSIS In its Data Collection and Platform Location by Satellite 19 p 1981

Avail NTIS HC A05/MF A01

The ARGOS data collection and platform location contribution to the NOAA-TIROS program is reviewed. Of 100 platforms seen during each orbit, 60 are correctly located Location error is 100 m Environmental data collection for atmospheric, oceanographic, and Earth sciences is increasing with each year of system operation Apart from real time demands for meteorology, it is not possible to meet all user requirements by the sole implementation of direct readout stations Author (ESA)

N85-23895# National Oceanic and Atmospheric Administration, Washington, D C. National Environmental Satellite, Data and Information Service

# UTILIZATION OF THE POLAR PLATFORM OF NASA'S SPACE STATION PROGRAM FOR OPERATIONAL EARTH OBSERVATIONS

J H. MCELROY and S. R SCHNEIDER Sep 1984 76 p refs (PB85-152502; NOAA/TR/NESDIS-12) Avail NTIS HC A05/MF A01 CSCL 22B

Principal elements concerning the development of NASA's polar platform are discussed. The utilization of the platform in operational monitoring of the Earth's atmosphere, oceans, and land masses is discussed. The payload for the platform would include instruments derived from the current operational environmental satellities, ocean satellities that will be flown by several countries during the next decade, research programs and land satellities systems -- both governmental and commercial. These instruments may justify two polar-orbiting, Sun-synchronous, astronaut-serviced platforms. The platforms would be at an altitude in the range from 700 to 900 kilometers and be at two equatorial crossing times, one early in the morning between 8.30 and 10.30 A.M. southbound and the second near noon, perhaps at 1.00 P.M. northbound.

N85-24269\*# Jet Propulsion Lab , California Inst of Tech , Pasadena

## GEOMETRIC ERROR ANALYSIS FOR SHUTTLE IMAGING SPECTROMETER EXPERIMENT

S J WANG and C H C IH 15 Dec 1984 172 p refs (Contract NAS7-918)

(NASA-CR-175665, JPL-PUB-85-2, NAS 1 26 175665) Avail NTIS HC A08/MF A01 CSCL 14B

The demand of more powerful tools for remote sensing and management of earth resources steadily increased over the last decade. With the recent advancement of area array detectors, high resolution multichannel imaging spectrometers can be realistically constructed. The error analysis study for the Shuttle Imaging Spectrometer Experiment system is documented for the purpose of providing information for design, tradeoff, and performance prediction. Error sources including the Shuttle attitude determination and control system, instrument pointing and misalignment, disturbances, ephemenis, Earth rotation, etc., were investigated. Geometric error mapping functions were developed, characterized, and illustrated extensively with tables and charts. Selected ground patterns and the corresponding image distortions were generated for direct visual inspection of how the various error sources affect the appearance of the ground object images.

N85-24348# Centre National d'Etudes Spatiales, Toulouse (France) Service ARGOS

### PROCEEDINGS OF THE ARGOS USERS CONFERENCE ON DATA COLLECTION AND LOCATION BY SATELLITE

1981 152 p refs Proc held in San Francisco, 28-29 Oct 1981

Avail NTIS HC A08

Equipment used in the ARGOS data collection and location system, ARGOS oceanography/offshore projects, glaciology, meteorology, hydrology, and bear and dolphin tracking were discussed

N85-24353# Toyo Communication Equipment Co Ltd , Kanagawa (Japan)

## THE DEVELOPMENT OF PLATFORM TRANSMITTER TERMINAL (PTT) AND ITS APPLICATION FOR DRIFTING BUOYS

M TSUTSUMI In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 9 p 1981

Avail NTIS HC A08/MF A01

A PCM-PSK transmitter to be incorporated into a drifting buoy used in the ARGOS localization and data collection system was designed It transmits 2 W at 401 65 MHz. A high-stability oscillator and a phase-locked loop circuit provide high frequency stability and enable the platform to be localized to within 1 km. The

transmitter consists of two 25 x 9 cm printed circuit boards, a transmission board and a logic control board, weighing together 600 g. Current drain during transmission is 0.7 A. Average power consumption is 0.3 W Author (ESA)

N85-24355# National Oceanic and Atmospheric Administration, Rockville, Md.

## US PROGRAMS USING THE ARGOS DATA COLLECTION AND PLATFORM LOCATION SYSTEM

T E BRYAN *In* CNES Proc of the ARGOS Users Conf on Data Collection and Platform 9 p 1981 Sponsored in part by NOAA, US Coast Guard and NSF

Avail NTIS HC A08/MF A01

Drifting buoy, constant level balloon, and moored, shipboard and animal tracking system experiments carried out by NOAA, the US Coast Guard, the Office of Naval Research, and the National Science Foundation using the ARGOS data collection and platform location system are summarized. The experiments cover oceanographic, meteorological, pollution monitoring, Arctic region, and atmospheric studies.

Author (ESA)

### N85-24360# Wisconsin Univ , Madison Dept of Meteorology AUTOMATIC WEATHER STATIONS IN ANTARCTICA

M L SAVAGE, C R STEARNS, and C TEAGUE (Stanford University, California) In CNES Proc of the ARGOS Users Conf on Data Collection and Platform 10 p 1981 refs Sponsored by NSF

Avail NTIS HC A08/MF A01

Twelve automatic weather stations to measure surface air temperature, pressure, wind speed, and wind direction were deployed in Antarctica. The stations utilize the ARGOS data system aboard TIROS-N and NOAA satellites for data delivery. Each station consists of a 3m tower supporting the sensors and an electronics enclosure containing a microcomputer and the ARGOS transmitter. Six stations use radiosotope thermoelectric generators for power. The others use storage batteries and a solar panel for battery charging. The stations transmit 256 bits of data every 200 sec. The sensors are interrogated every 10 min and 50 min of stored data is contained in each transmission. Each station is visible to the satellite for 10 min of the 101 min orbit. The stations, operating since 1979, successfully endure temperatures of -75 C and winds of 39 m/sec. The station located at Dome Charlie performs flawlessly despite the mean annual temperature of -52 C.

Author (ESA)

**N85-24775** Centre National d'Etudes Spatiales, Toulouse (France).

#### THE ARGOS PROGRAM [LE PROGRAMME ARGOS]

M. TAILLADE and D LUDWIG In its Space Math for the Prepn and the Develop of Satellite Exploit p 843-864 1984 refs In FRENCH

Avail CEPADUES, Toulouse, France

The ARGOS satellite based localization system is described. The user-platform-weighs-only-2-kg, so-can be carried by a-wide range of targets, e.g., balloons, icebergs or animals. The platforms are linked to NOAA satellites, which act as relay stations for platform and satellite environmental and experiment data. Special ground stations were built for direct data collection. The localization system is based on Doppler positioning, with 60% of platforms located at each satellite passage. Accuracy is within 100 m. The data processing system assures 99% availability of data, 66% of the data are available. 3 hr after measurement, 87.5% 6 hr information includes raw and converted sensor data, and position, speed, and last localization date of platforms. Real time data transmission is assured by the Global Telecommunication System. Data are used in atmospheric science, oceanography and Earth sciences.

N85-25988\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

HURRICANE STRUCTURE AND DYNAMICS FROM STEREOSCOPIC AND INFRARED SATELLITE OBSERVATIONS AND RADAR DATA

A HASLER and R MORRIS (GSC) In its Mesoscale Atmospheric Processes Res Program Sci Rev 2 p 1985
Avail NTIS HC A06/MF A01 CSCL 04B

The objectives, significant accomplishments, and future plans of a project to determine the relation of tropical cyclone cloud characteristics and structure to storm rainfall and dynamics are summarized The project emphasis is on special data sets where geosynchronous satellite observations (visible, infrared, and stereo) of clouds are available along with cloud track winds (with stereo height assignment) and ground-based or aircraft-based radar reflectivity data. Infrared and stereoscopic visible satellite data from GOES-East and West were combined with ground-based radar data from Hurricane Frederic (1979) and time-composited airborne radar from Hurricane Allen (1980) to investigate hurricane cloud and precipitation structure. Cloud winds with stereoscopic cloud top height assignments were measured within a ten degree latitude radius of Hurricane Frederic using 75 min interval GOES data and were combined with rawinsonde and low-level aircraft wind data It was observed that stereoscopically measured cloud top heights in these hurricanes are not nearly as closely correlated to radar reflectivity at lower levels as they are in intense thunderstorms over land МG

N85-25989\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

MONITORING TROPICAL CYCLONE GROWTH USING GOES VISSR/VAS AND NIMBUS-7 TOMS DATA

E RODGERS, J STERANKA (GSC), and J STOUT (GSC) In Its Mesoscale Atmospheric Processes Res Program Sci Rev 5 p 1985 refs

Avail NTIS HC A06/MF A01 CSCL 04B

The objectives, accomplishments, and future research of a project to monitor and possibly predict tropical cyclone intensity change (maximum winds or minimum pressure), strength change (average wind speed at radii between 100 and 300 km), and outer circulation change (average wind speed beyond 400 km) using satellite data are discussed Tropical cyclone growth changes are dependent upon the inertial stability of the storm's circulation Since the storm's lower and middle troposphere is highly stable while the upper troposphere is weakly stable, strength and outer circulation changes are monitored by examining the lower- and middle-tropospheric forcing and intensity changes are monitored by examining the upper-tropospheric forcing Multiple linear regression equations were derived to retrieve geopotential height, layer thickness, and precipitable water content from GOES vertical atmospheric sounder (VAS) every 3 h in clear regions surrounding tropical cyclones Beryl and Debbie Advective and mass adjustment processes associated with changes in the upper-tropospheric circulation surrounding tropical cyclone Irene were examined using the GOES visible/infrared spin-scan radiometer (VISSR) and Nimbus-7 total ozone monitoring system (TOMS) data

# N85-25990\*# Pennsylvania State Univ , University Park ANALYSIS OF THE INFLOW AND AIR-SEA INTERACTIONS IN HURRICANE FREDERIC

W FRANK *In* NASA Goddard Space Flight Center Mesoscale Atmospheric Processes Res Program Sci Rev 3 p 1985 refs

Avail NTIS HC A06/MF A01 CSCL 04B

Significant accomplishments and future plans of a project to study the properties of Hurrican Frederic are summarized. The specific objectives of the study are to (1) determine the effective heights of the satellite wind vectors, (2) integrate satellite, aircraft, rawinsonde, and surface wind measurements into a three-dimensional analysis of the storm inflow layer over water, (3) construct similar analyses of the thermodynamic fields in the inflow layer, (4) perform diagnostic budget analyses of moisture, sensible heat, kinetic energy, and momentum in the inflow layer,

and (5) examine air-sea interactions from residuals in the budget analyses M G

N85-26001\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

#### MESOSCALE ANALYSIS AND MODELING GROUP

L UCCELLINI  $\it In \ its$  Mesoscale Atmospheric Processes Res Program Sci Rev 3 p 1985

Avail NTIS HC A06/MF A01 CSCL 04B

The specific objectives of the Mesoscale Analysis and Modeling Group are (1) detailed studies of the SESAME-, VAS-, and CCOPE-related cases and other cases as well emphasizing the role of gravity waves, jet streaks, and frontogenesis in severe local and winter storms, (2) studies emphasizing the interactions between larger-scale dynamics-boundary layer, atmosphere-ocean and stratosphere-troposphere during severe weather events, (3) numerical simulations of specific cases to better understand the scale interaction associated with fronts and jets, the synergistic relationship between large-scale dynamics and physical processes in the pre-storm environment, and the sensitivity of the forecasts to initial state perturbations, (4) the assessment of total ozone analysis from TOMS and water vapor imagery for the study of jet streak circulations, tropopause folds, and associated severe weather events, and (5) an evaluation of mesoscale models over a large number of cases to determine the utility of the models for satellite impact

N85-26013\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

EAST COAST SNOWSTORM SURVEY

P KOCIN and L UCCELLINI In its Mesoscale Atmospheric Processes Res Program Sci Rev 3 p 1985
Avail NTIS HC A06/MF A01 CSCL 04B

The temporal and spatial characteristics of a large sample of major winter snowstorms that paralyzed the heavily urbanized centers of the Northeast are described by utilizing snowfall, surface and upper-air rawinsonde observations, model simulations, and satellite imagery. The current literature on East Coast storms is surveyed. An atlas of cases is of use to the research community (especially with regard to upcoming GALE and STORM projects) and to operational and university needs (especially geared to forecasters and students) is constructed.

N85-27325\*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md SIMULTANEOUS EARTH OBSERVATIONS FROM 2 SATELLITES

H E MONTGOMERY Mar 1985 7 p refs (NASA-TM-86204, REPT-85B0288, NAS 1 15 86204) Avail NTIS HC A02/MF A01 CSCL 05B

Simultaneous co-located observations from two different orbits lead to several advantages (i.e., cross calibration of sensors and a wider range of solar-zenith and sensor look angles). The question was asked how many times per year (on the average) do the sub-satellite points of two satellites simultaneously come within D kilometers of each other? For the Space Station (altitude 500 km, inclination 28 deg) and a Sun synchronous satellite (altitude 705 km, inclination 98 21 deg) the answers are 16, 41 and 82 times per year for encounter distances D of 20, 50, and 100 km espectively. The relationship between encounters per year and distance D is linear. The answers were obtained in two ways (1) a closed form statistical approach which led to a simple algebraic expression, and (2) a Monte Carlo type computer solution. The largest difference between the two solutions was less than 12%

Author

N85-27329# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

FUNCTION OF REMOTE SENSING IN BRAZIL [O EMPREGO DE SENSORIAMENTO REMOTO NO BRASIL]

N D J PARADA and R A NOVAES Oct 1984 11 p In PORTUGESE Submitted for publication

(INPE-3314-PRE/621) Avail. NTIS HC A02/MF A01

The 1984 annual review of the Latin American Society of Remote Sensing Specialists (SELPER) is presented Emphasis is placed on the application of remote sensing to agriculture geology, image processing, horticulture, meteorology and oceanography, water resources, land use, development of sensory systems, geomorphology, and soil classification. The development of foreign programs involving remote sensing satellites also is discussed.

Transl by B G.

N85-27463\*# Pacific Northwest Lab , Richland, Wash ANALYSIS OF THE NASA/MSFC AIRBORNE DOPPLER LIDAR RESULTS FROM SAN GORGONIO PASS, CALIFORNIA Contractor Report, 1 Oct. 1982 - 31 Dec. 1984

W C CLIFF, J R SKARDA, D S. RENNE, and W F SANDUSKY Washington NASA May 1985 71 p refs (Contract NAS8-34733)

(NASA-CR-3901, NAS 1 26 3901, M-489) Avail NTIS HC A04/MF A01 CSCL 04B

The NASA/MSFC Airborne Doppler Lidar System was flown in July 1981 aboard the NASA/Ames Convair 990 on the east side of San Gorgonio Pass California, near Palm Springs, to measure and investigate the accelerated atmospheric wind field discharging from the pass. At this region, the maritime layer from the west coast accelerates through the pass and spreads out over the valley floor on the east side of the pass. The experiment was selected in order to study accelerated flow in and at the exit of the canyon Ground truth wind data taken concurrently with the flight data were available from approximately 12 meteorological towers and 3 tala kites for limited comparison purposes. The experiment provided the first spatial data for ensemble averaging of spatial correlations to compute lateral and longitudinal length scales in the lateral and longitudinal directions for both components. and information on atmospheric flow in this region of interest from wind energy resource considerations Author

N85-27491# National Oceanic and Atmospheric Administration, Miami, Fla Oceanographic and Meteorological Labs HURRICANE RESEARCH DIVISION, FISCAL YEAR 1984 PROGRAMS, FISCAL YEAR 1985 PROJECTIONS

Jan 1985 58 p refs Avail NTIS HC A04/MF A01 CSCL 04B

The Hurricane Research Division (HRD) is NOAA's primary focus for research on hurricanes and tropical meteorology HRD's research is directed at improved hurricane prediction through improved physical understanding of the structure and dynamics of these storms HRD's annual hurricane field program uses the highly instrumented NOAA WP-3D research aircraft to acquire data sets that are analyzed to describe and understand the dynamics and energetics of hurricanes HRD interacts with the National Hurricane Center in all phases of its program HRD also interacts with the National Meteorological Center on problems of hurricane prediction and modeling, and with the National Center for Atmospheric Research on investigations of the hurricane's inner core GRA

N85-28286\*# Jet Propulsion Lab , California Inst. of Tech , Pasadena

THERMAL INFRARED MULTISPECTRAL SCANNER (TIMS): AN INVESTIGATOR'S GUIDE TO TIMS DATA

F D PALLUCONI and G R MEEKS (NASA Earth Resources Lab ) 1 Jun 1985 32 p (Contract NAS7-918)

(NASA-CR-175875, JPL-PUB-85-32; NAS 1 26 175875) Avail

(NASA-CR-175875, JPL-PUB-85-32; NAS 1 26 175875) Avail NTIS HC A03/MF A01 CSCL 14B

The Thermal Infrared Multispectral Scanner (TIMS) is a NASA aircraft scanner providing six channel spectral capability in the thermal infrared region of the electromagnetic spectrum. Operating

in the atmospheric window region (8 to 12 micrometers) with a channel sensitivity of approximately 0.1 C, TIMS may be used whenever an accurate measure of the Earth's surface is needed A description of this scanner is provided as well as a discussion of data acquisition and reduction

N85-28508\*# Wisconsin Univ, Madison
TEST AND EVALUATION PLAN FOR THE CENTRALIZED
STORM INFORMATION SYSTEM Final Report

In its Centralized Storm Information System (CSIS) 30 p Apr. 1985

Avail NTIS HC A08/MF A01 CSCL 04B

The installation of the Centralized Storm Information System (CSIS) at the NOAA operational complex in Kansas City, Missouri is described. This complex includes the National Severe Storms Forecast center and a Satellite Field Service Station which is denoted in this research plan as NSSFC CSIS computers will act in concert to merge analyze the many data sets needed to forecast severe convective storms. Specific aspects of CSIS are evaluated against the CSIS objectives. The functions to be evaluated characterize the attributes of a generalized interactive computer system. A major development in the CSIS program will allow communication between CSIS and the NSSFC Eclipse computer.

N85-28511\*# Simpson Weather Associates, Charlottesville, Va CONVECTIVE STORM DOWNDRAFT OUTFLOWS DETECTED BY NASA/MSFC'S AIRBORNE 10.6 MICRON PULSED DOPPLER LIDAR SYSTEM Contractor Rept., 30 Jul. 1984 - 29 Jul. 1985 G D EMMITT Washington NASA May 1985 50 p refs (Contract NAS8-35597) (NASA-CR-3898, NAS 1 26 3898) Avail NTIS HC A04/MF A01 CSCL 04B

The capability of a unique Airborne Doppler Lidar System to measure the horizontal winds in the vicinity of severe storm activity is demonstrated. The Airborne Doppler Lidar System (ADLS), developed at NASA/MSFC, was flown on a CV990 research aircraft during the CCOPE (Cooperative Convective Precipitation Experiments, Montana, Summer 1981). Flown between 400 and 600 m AGL, the lidar probed the subcloud regions of several deep convection storms. ADLS data collected near storms on 21 and 23 July 1981 are presented along with satellite imagery, radar echo maps and surface station measurements. These case studies are evidence of the successful performance of an airborne remote wind sensing system and the advantages of two dimension flow visualization of storm outflow structures and interactions.

09

#### **GENERAL**

Includes economic analysis

A85-30746

INDIAN REMOTE-SENSING SATELLITE - UTILIZATION PLAN
P D BHAVSAR (Indian Space Research Organization, Space
Applications Centre, Ahmedabad, India) International Journal of
Remote Sensing (ISSN 0143-1161), vol 6, Mar -Apr 1985, p

91-597 refs

A very densely populated large country such as India requires a very efficient and reliable system for the collection of resources information so that timely managerial decisions can be taken Realizing this need and based on the experience over several years past, it has been decided that India should have its own remote-sensing satellite program for this purpose. This experience has been gained over more than half a century, first through black-and-white panchromatic aerial surveys, then through the use of Landsat data and false-color photographic and multispectral scanner aerial surveys and finally through conducting end-to-end result-oriented experiments proving the feasibility of using remote

sensing in crucial information requirements of the country A comprehensive utilization plan for a decade, in collaboration with the users in the country, has been formulated. The salient features of this utilization plan are presented.

Author

#### A85-34218

#### REMOTE SENSING - A TORTUOUS TRIP TO MARKETPLACE

P MANN Commercial Space (ISSN 8756-4831), vol 1, Spring 1985, p 32, 33, 35-37

Remote sensing represents a thirteen-year old U S government experiment in gathering earth surface images by satellite in outer space. If the experiment is transferred successfully from government to private sector, it might develop in the next decade into a data market worth billions of dollars. According to the more recent estimates, remote sensing's gross revenues might reach \$2 billion annually by the year 2000 for raw data sales alone. In 1983, President Reagan made the decision to accelerate transfer of remote sensing operations ahead of the schedule set forth by President Carter. This decision was partly the result of Reagan's philosophy of removing government from the private economy, another factor was the need to reduce federal expenditures. The present status of remote sensing is discussed along with the services which are provided. A description of future developments is also presented.

#### A85-37954

# THE PRIVATE SECTOR - A GLOBAL POOL OF TECHNICAL TALENT FOR REMOTE SENSING TRAINING AND PROGRAM SUPPORT

W D CARTER (Globex, Inc., Reston, VA) (COSPAR, IUGS, COSTED, and United Nations, Workshops on Remote Sensing from Satellites, 1st and 9th, and Topical Meeting, Graz, Austria, June 25-July 7, 1984) Advances in Space Research (ISSN 0273-1177), vol 4, no 11, 1984, p 49-57

An overview of what has happened in space research and technology over the past 25 years, and an outlook for the future are presented Consideration is given to weather, communications, and earth-resource satellites. It is demonstrated that there is a change from government-financed programs toward greater diversification and development of initiatives in the private sector resulting in cheaper products that are more available to the potential users of space-derived information. The private sector and its various elements and capabilities are discussed. A list of 150 space technology companies, their locations and products and/or services is given.

 ${\bf A85\text{-}38802^*}$  National Aeronautics and Space Administration, Washington, D C

### THE NASA LAND PROCESSES PROGRAM - STATUS AND FUTURE DIRECTIONS

R E MURPHY (NASA, Land Processes Branch, Washington, DC) IN Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, West Lafayette, IN, June 12-14, 1984. New York, Institute of Electrical and Electronics Engineers, 1984, p. 9-12 refs

For most of the past decade, NASA focused its efforts on the immediate exploitation of space-based sensors in earth-oriented programs After an assessment of the current situation with respect to the conducted programs, NASA has restructured its earth-oriented programs to concentrate on the scientific use of its satellites while other agencies and private enterprise have assumed responsibility for programs of interest to them. In making this change of direction, NASA has conducted a series of studies to obtain information as a basis for its planning activities regarding future programs Attention is given to a plan for Land Global Habitability, the development of a basic structure for the land program, a program plan for global biology, and a study on the role of biochemical cycles. The three major facets of the land processes program are discussed along with some examples of current work GR

 $\textbf{N85-23224}^{*}\#$  National Aeronautics and Space Administration, Washington, D  $\,$  C

#### NASA'S LAND REMOTE SENSING PLANS FOR THE 1980'S

H C HIGG, K M BUTERA, and M SETTLE *In* NASA Goddard Space Flight Center Remote Sensing of Snow and Evapotranspiration p 1-5 Feb 1985

Avail NTIS HC A09/MF A01 CSCL 05A

Research since the launch of LANDSAT-1 has been primarily directed to the development of analysis techniques and to the conduct of applications studies designed to address resource information needs in the United States and in many other countries The current measurement capabilities represented by MSS, TM, and SIR-A and B, coupled with the present level of remote sensing understanding and the state of knowledge in the discipline earth sciences, form the foundation for NASA's Land Processes Program Science issues to be systematically addressed include energy balance, hydrologic cycle, biogeochemical cycles, biological productivity, rock cycle, landscape development, geological and botanical associations, and land surface inventory, monitoring, and modeling. A global perspective is required for using remote sensing technology for problem solving or applications context. A successful model for this kind of activity involves joint research with a user entity where the user provides a test site and ground truth and NASA provides the remote sensing techniques to be tested

ARH

N85-29405# Woodrow Wilson International Center for Scholars, Washington, D.C. American Society and Politics Program ENVIRONMENTAL MANAGEMENT NEEDS Final Report, 19 Sep. 1983 - 31 Dec. 1984

1984 674 p refs Proc of the Conf on the Evolution of Am Environ Politics, Washington, D.C., 28 Jul 1984 (Contract DE-FG01-83EP-16032)

(DE85-007859, CONF-8406246) Avail NTIS HC A99/MF E03

The origins, evolution, and current circumstances of some of the most important institutions and public policies at the national level in the field of environmental affairs were investigated from a historical perspective Selected topics in both the regulatory area and in the area of preservation and management of resources were covered DOE

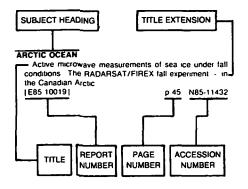
N85-29497# European Space Agency, Paris (France)
LOOKING DOWN LOOKING FORWARD: EARTH
OBSERVATION, SCIENCES AND APPLICATIONS, A
PERSPECTIVE

B BATTRICK, ed Jan 1985 54 p refs Original contains color illustrations

(ESA-SP-1073, ISSN-0396-566) Avail NTIS HC A04/MF A01

Achievements and applications of Earth observations (from space) in atmosphere, oceans/ice, land, solid Earth, and climate and environment studies are reviewed and an ESA Earth observation program is proposed. The program comprises continuation and improvement of European involvement in satellites for meteorological applications, and in particular the development of a second-generation METEOSAT to be placed in geostationary orbit, the establishment, following ERS-1, of a program with a research and development and an operational element in ocean/ice observation, all weather monitoring and optical observation of the land surface, and a mission exploiting precise measurement techniques for solid Earth geophysics.

#### Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section (of this supplement) If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first

#### ADAPTIVE FILTERS

Adaptive filtering and image segmentation for SAR analysis p 62 A85-38833

#### **AERIAL PHOTOGRAPHY**

Evaluation of Landsat and airborne multispectral data and aenal photographs for mapping forest features and phenomena in a part of the Godavan basin

p 1 A85-30729 Inundation mapping of the Sahibi river flood of 1977 p 47 A85-30731

The evaluation of hydrogeological conditions in the southern part of Tamil Nadu using techniques p 48 A85-30732 Land-use survey of Idukki District p 16 A85-30737

Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741 region

Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the Kerala coast p 23 A85-30742

Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and University of Florida, Lake Alfred, FL November 15-17, 1983 p 1 A85-30826

A history of the Everglades and future implications of aenal photography p 2 A85-30827

Aerial photo coverage planning - Programs to help p 55 A85-30828 determine mission specifications Acquisition, processing and photo interpretation of an

aerial color infrared photograph p 2 A85-30829 Training and testing interpreters of small-scale CIR photography - A digitizer-aided approach

p 2 A85-30830 forest stress with Detection of 35mm

photographs p 2 A85-30831 The interpretability of small and medium scale aerospace imagery for wildland environments of California and Colorado p 2 A85-30833

Alaska meander lines determined by vegetation appearance on color intrared photographs

p 2 A85-30834 Using aenal photography to detect vegetation damage

in a large-scale air quality monitoring program p 3 A85-30835 Pubescence of Texas tantana affects leaf spectra and

ımagery p 3 A85-30836 Spectral densitometer application to stress detection in p 3 A85-30837

The devastation of a vineyard by phylloxera p 3 A85-30838

Estimation of woody biomass in slash pine plantations using color aenal photography - A feasibility study p 3 A85-30839

p 3 A85-30841 Inventorying Florida's citrus groves Video color infrared imagery - A future natural resource management tool p 56 A85-30844 p 3 A85-30845

Utility guide for aerial photography Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques Extraction of Information from Remotely Sensed Images, Rochester Institute of Technology, Rochester, NY, August p 56 A85-30951 16-19, 1983 A companson of techniques for radiometric calibration

p 56 A85-30956 of aenal infrared thermal images Stereo models from synthetic aperture radar

p 68 A85-30961 Remotely Piloted Aircraft for small format aenal p 16 A85-32110 photography Estimating phytomass of sagebrush habitat types from

p 6 A85-33450 microdensitometer data Processes and imagery of first-year fast sea ice during p 33 A85-35172 the melt season

Navigation and sensor orientation systems in aerial photography p 71 A85-36284 Expectations for aerial photography as seen from the

side of the user p 71 A85-36287 The application of computerized space image processing techniques to data from large scale aera p 7 A85-37119 surveys of forests

Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan

p 8 A85-37967 Hydrologic appraisal of rivers plan-form at confluence zone A case study using Landsat MSS data

p 50 A85-37977 Evaluation of sensitivity decay of Coastal Zone Colour Scanner (CZCS) detectors by comparison with in situ near-surface radiance measurements

p 35 A85-37986 A combined photogrammetric and Doppler adjustment

p 60 A85-38271 The possibility of using small unmanned aircraft for studies of terrestrial natural resources

p 73 A85-38702 of exposure conditions and photolab processing of materials obtained from aerial photography using the MKF-6M camera p 73 A85-38703

A preliminary method for complex aerovisual and around-based subsatellite observations agrophytocenosis status (through the example of winter p 9 A85-38708 Assessment of the study and mapping of pastures in

semiand zones using remote sensing methods

p 9\_A85<u>-</u>387<u>1</u>9 Information content comparison of Thematic Mapper. multispectral scanner and airborne Thematic Mapper p 61 A85-38807

Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminary p 10 A85-38812 results

Identifying vegetative land use classes during each of the four seasons on aenal photographs and Landsat imagery in coastal South Carolina p 10 A85-38815

Complex aenal and space remote-sensing studies of bena --- Russian book p 27 A85-38896 Sibena --- Russian book

Utilization of aenal and space remote-sensing data studies of land water --- Russian book

p 52 A85-39347 Identification of structure of soil-vegetation cover using p 15 N85-26826 aerial and space photographs

Diffusion coefficients for coastal water determined from aenal photographs [INPE-3413-PRE/679]

p 44 N85-27331

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms

(INPE-3359-PRE/6371 p 15 N85-27545 Airphoto interpretation of vegetation and landforms for soil mapping p 15 N85-28436

Air photo analysis, photo interpretation logic, and feature extraction

[AD-A153926] p 67 N85-29347

#### **AEROSOLS**

Remote sensing of the atmospheric aerosol from space p 16 A85-31882 --- Russian book Investigation of the atmospheric aerosols and water vapor by the AVHRR radiometer (visible and IR) on board NOAA-7 o 32 A85-32872

Manne aerosol optical depth from satellite-detected p 35 A85-37729

### **AEROSPACE TECHNOLOGY TRANSFER**

Remote sensing - A tortuous trip to marketplace

#### p 78 A85-34218 **AGRICULTURE**

Monitoring environmental resources through NOAA's polar orbiting satellites p 17 A85-36282 Versatile airborne laser system for remote probing of ocean, atmosphere, and farmland p 73 A85-38336 A concept for establishing a database for a support databank (through an example of an agricultural block)

p 60 A85-38707 Remote sensing of the agrochemical properties of p 9 A85-38809 soils

Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study p 11 A85-38841 Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural resources --- Central Valley p 12 N85-23190

Atlas of archived vegetation, land-use and seasonal Albedo data sets [NASA-TM-86199] p 14 N85-24508

Function of remote sensing in Brazil N85-27329

#### [INPE-3314-PRE/621]

AGRISTARS PROJECT

Thematic Mapper data quality and performance assessment in renewable resources/agriculture/remote p 12 N85-23201 sensing Supplement to evaluation of satellite derived estimates

of solar radiation p 14 N85-24506 [E85-10086] Evaluation of satellite derived estimates of solar

p 14 N85-24507 [E85-10087]

### AGROCLIMATOLOGY

Meteorological satellite data useful for agroclimate p 7 A85-37730

AIR NAVIGATION Navigation and sensor orientation systems in aerial

photography p 71 A85-36284 AIR POLLUTION

Remote sensing of the atmospheric aerosol from space p 16 A85-31882 Russian book

Using aerial photography to detect vegetation damage in a large-scale air quality monitoring program

p 3 A85-30835

#### AIR SEA ICE INTERACTIONS

Arctic atmosphere - Ice interaction studies using Nimbus-7 SMMR p 35 A85-37752 Large space antenna technology applied to radar-maging, rain-rate measurements, and ocean wind p 37 N85-23820

#### AIR WATER INTERACTIONS

Comment on 'Seasonal variation in wind speed and sea state from global satellite measurements' by D Sandwell and R Agreen p 33 A85-35169 On the microwave reflectivity of small-scale breaking

p 34 A85-36570 Satellite denved atmosphere water vapor as a tracer of large scale interactions between the atmosphere and p 35 A85-37754 **AIRBORNE EQUIPMENT** SUBJECT INDEX

A large-scale air sea interaction project over the Pacific p 39 N85-24373 basın The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 The Tropical Ocean and Global Atmosphere program (TOGA) p 42 N85-24411 Applications of ARGOS measurements in equatorial Pacific Ocean-atmosphere interaction studies

p 42 N85-24414 An overview of NDBC drifting buoy development programs --- NOAA Data Buoy Center (DBC)

p 43 N85-24422 Analysis of the inflow and air-sea interactions in p 76 N85-25990 umcane Frederic

#### AIRBORNE EQUIPMENT

Remote sensing of surface and near surface temperature from remotely piloted aircraft

p 68 A85-30543 Probing of the earth's surface and the atmosphere with an airborne laser spectrometer p 68 A85-31397 Inference of rain rate profile and path-integrated rain rate by an airborne microwave rain scatterometer

p 49 A85-36565 Assessment of some methods for increasing the information content of an active-passive microwave remote p 36 A85-38578 sensing system Convective storm downdraft outflows detected by NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar System

INASA-CR-38981 p 77 N85-28511 Dynamic rectification of airborne scanner digital image p 67 N85-29344 recordings

#### AIRBORNE LASERS

Versatile airborne laser system for remote probing of p 73 A85-38336 ocean, atmosphere, and farmland **ALBEDO** 

Reflectance measurements from Landsat Thematic p 62 A85-38824

Mapper over rugged terrain Snow reflectance from Thematic Mapper p 52 N85-23205

Atlas of archived vegetation, land-use and seasonal Albedo data sets

p 14 N85-24508 [NASA-TM-86199] ALGAE

Characteristic vector analysis of inflection ratio spectra New technique for analysis of ocean color data

p 37 N85-23237 [NASA-TP-2428] AL GORITHMS

Region-based modeling algorithms for remotely-sensed p 18 A85-38823 data

Scene segmentation through region growing p 62 A85-38832

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms [INPE-3359-PRE/637]

p 15 N85-27545 AUPHANUMERIC CHARACTERS

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms [INPE-3359-PRE/637]

p 15 N85-27545

#### **ALPINE METEOROLOGY**

Measurement of water equivalent of mountain snow cover --- ARGOS system p 54 N85-24386

### ALTIMETERS

Transient sea surface height variation and the Seasat-altimeter data application p 31 A85-32121 Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the Antarctic circumpolar current p 33 A85-35166

AMAZON REGION (SOUTH AMERICA)

The ARGOS system in Brazil --- hydrology

p 55 N85-27349

#### ANALOG SIMULATION Analog simulation for radiometric correction for solar

p 68 A85-30957

#### **ANNUAL VARIATIONS**

Seasonal and interannual evolution of the spectral signature in forest environments using Landsat data p 6 A85-32139

Comment on 'Seasonal variation in wind speed and sea state from global satellite measurements' by D. Sandwell and R Agreen p 33 A85-35169

The Tropical Ocean and Global Atmosphere program (TOGA) p 42 N85-24411

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and satellite observations p 43 N85-25354

#### **ANOMALIES**

seamounts

Temperature anomalies above ore bodies

p 28 N85-24500 On geoid heights and flexure of the lithosphere at

(AD-A151220) p 21 N85-26050

#### **ANOMALOUS TEMPERATURE ZONES**

Temperature anomalies above ore bodies

p 28 N85-24500

p 22 N85-29342

#### ANTARCTIC REGIONS

Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the p 33 A85-35166 Antarctic circumpolar current

A method for determining Antarctic land ice parameters from satellite multichannel microwave measurements p 35 A85-37511

Automatic weather stations in Antarctica

p 75 N85-24360 Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and

p 43 N85-25354 satellite observations Digital image mapping of Antarctica using NOAA-7

p 67 N85-29340 AVHŘR imagery German contributions to the cartography of Antarctica by means of photogrammetry and remote sensing

#### **ANTENNAS**

Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind sensing p 37 N85-23820

#### AQUICULTURE

Comparison of Meteosat-2 and NOAA-7 data used for understanding the environment of albacore in the east p 31 A85-32118

Arabian gulf circulation --- pollution monitoring p 42 N85-24412

#### ARCTIC OCEAN

Arctic mixed layer dynamics p 46 N85-29505 (AD-A153582)

#### ARCTIC REGIONS

Summer Arctic sea ice character from satellite microwave data p 33 A85-35170 Active microwave measurements of Arctic sea ice under

summer conditions p 33 A85-35171

Processes and imagery of first-year fast sea ice during the melt season p 33 A85-35172

Temporal variations of the microwave signatures of sea ice during the late spring and early summer near Mould p 34 A85-35173 Bay, NWT

Arctic atmosphere - Ice interaction studies using Nimbus-7 SMMR p.35 A85-37752 Applications of ARGOS data collection systems in Arctic

p 37 N85-23875 Applications of ARGOS data collection system for automatic meteorological observatories in Arctic regions p 38 N85-23893

Operational experiences with the ARGOS system in p 45 N85-27353

#### ARID LANDS

Estimating canopy cover in drylands with Landsat MSS p 8 A85-37966 Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan

p 8 A85-37967 Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984

A85-38391

р9 Assessment of the study and mapping of pastures in semiarid zones using remote sensing methods р9 A85-38719

#### ARTIFICIAL SATELLITES

Simultaneous Earth observations from 2 satellites (NASA-TM-86204) p 76 N85-27325

### ATLANTIC OCEAN

The imaging of internal waves by the SEASAT-A ynthetic aperture radar

[ARE(PORTLAND)TN-720/841 p.36 N85-22860 Automatic buoys to assist the tuna fishery off the p 37 N85-23879 Circulation pattern of the North Atlantic, part of the warmwater sphere research effort at Kiel University

p 38 N85-23888 The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 ARGOS-tracked drifters in the Rockall Trough

p 44 N85-27340 Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic p 46 N85-27355

#### ATMOSPHERIC BOUNDARY LAYER

Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation p 50 A85-37973

#### ATMOSPHERIC CIRCULATION

Monitoring tropical cyclone grow VISSR/VAS and Nimbus-7 TOMS data growth using GOES

p 76 N85-25989 Analysis of the inflow and air-sea interactions in p 76 N85-25990

#### ATMOSPHERIC CORRECTION

The sensitivity of the computational scheme for taking into account the contribution of atmospheric haze to variations in initial data --- image brightness correction

p 61 A85-38716 Reflectance measurements from Landsat Thematic p 62 A85-38824 Mapper over rugged terrain

ATMOSPHERIC DIFFUSION Santa Ana airflow observed from wildfire smoke patterns

p 7 A85-37868 ın satellite imagery ATMOSPHERIC EFFECTS Thematic Mapper data quality and performance

#### assessment in renewable resources/agriculture/remote

ATMOSPHERIC MODELS Mesoscale analysis and modeling group

p 76 N85-26001

Research Review, 1983 p 46 N85-29433

#### ATMOSPHERIC MOISTURE

Effects of wind speed and rain on precipitable water and cloud liquid water based on SCAMS data --- SCAnning p 70 A85-32863 Microwave Spectrometer

An evaluation of the use of atmospheric radiances for water vapor retneval in a global retneval system p 59 A85-32868

Satellite derived atmosphere water vapor as a tracer of large scale interactions between the atmosphere and p 35 A85-37754 ocean

#### ATMOSPHERIC RADIATION

An evaluation of the use of atmospheric radiances for water vapor retneval in a global retneval system p 59 A85-32868

p 12 N85-23201

#### ATMOSPHERIC SOUNDING

Probing of the earth's surface and the atmosphere with an airborne laser spectrometer p 68 A85-31397 Remote sensing of the atmospheric aerosol from space p 16 A85-31882 --- Russian book

Remote sensing and climate parameters p 70 A85-32853 Angle dependence of radiances in the ozone-sensing channel of the HIRS --- High Resolution Infrared Radiation

p 70 A85-32871 Applications of GOES VAS data to NOAA's interactive flash flood analyzer p 49 A85-35985 Mesoscale analysis and modeling group

p 76 N85-26001

#### ATMOSPHERIC TURBULENCE

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

[NASA-CR-3901] p 77 N85-27463

AUSTRALIA

MAGSAT anomaly field data of the crustal properties of Australia p 20 N85-23215 [E85-10100]

An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of p 20 N85-23216 MAGSAT anomaly field data Data selection techniques in the interpretation of MAGSAT data over Australi

**AUTOMATIC WEATHER STATIONS** 

Project PAPA The integration of drifting buoy data into an operational meteorological service p 37 N85-23874

Applications of ARGOS data collection systems in Arctic p 37 N85-23875 regions Applications of ARGOS data collection system for automatic meteorological observatories in Arctic regions p 38 N85-23893

Automatic weather stations in Antarctica

p 75 N85-24360 automated The development of p 39 N85-24362 at the EERM meteorological data system Meteorological buoys developed p 40 N85-24374

Drifting buoy studies for weather applications p 40 N85-24396 Collecting meteorological reports with the ARGOS p 40 N85-24398 system

Telemetered meteorological and engineering data from a deep sea moored body in the Long Term Upper Ocean Study (LOTUS) p 41 N85-24402 Practical considerations when using water quality and

structure monitoring sensors as applied to portable ARGOS satellite transmitter equipment p 41 N85-24405

Applications of ARGOS measurements in equatorial Pacific Ocean-atmosphere interaction studies p 42 N85-24414

Overview of data processing at AES local user terminals --- Canadian Atmospheric Environment Service (AES)

p 43 N85-24418 --- buoys DB2 and DB3 The next generation

p 44 N85-27337 An operational buoy network collecting meteorological p 45 N85-27351

Operational expenences with the ARGOS system in General report of the researches of snowpack properties, snowmelt runoff and evapotranspiration in AUTOMATION Japan p 53 N85-23225 C BAND Description of techniques for automation of regional Microwave radiometer observations of snowpack Preliminary results of an examination of C-hand synthetic roperties and companson of U.S. Japanese results --aperture radar for forestry applications p 4 A85-32113 natural resource inventories p 57 A85-30964 Hokkaido, Japan and Vermont and North Dakota test CADASTRAL MAPPING Experience in automation of data processing in p 53 N85-23230 interpretation and defining of linear elements from space The world's topographic and cadastral mapping Studies on physical properties of snow based on multi p 20 A85-33448 p 66 N85-25349 operation photographs p 54 N85-23231 channel microwave radiometer The significance of orthophoto maps for developing AVAILABILITY Analysis of NIMBUS-7 SMMR data - Hokkaido, Japan n 21 N85-29341 countres Modelling forest biomass accessibility in South Carolina p 54 N85-23232 CALIBRATING with digital terrain data p 11 A85-38842 Estimation of regional evapotranspiration using remotely A comparison of techniques for radiometric calibration **AVALANCHES** sensed land surface temperature Part 1 Measurement Avalanche hazard mapping integrating Landsat digital of aenal infrared thermal images p 56 A85-30956 of evapotranspiration at the Environmental Research data and digital topographic data p 58 A85-32120 Center and determination of Priestley-Taylor parameter p 13 N85-23233 Application of hierarchical data structures to geographical information systems В Digital processing of passive Ka-band microwave images AD-A1521691 p 67 N85-27753 for sea-ice classification CAMERAS [AD-A150686] p 43 N85-24511 BACKSCATTERING Features of exposure conditions and photolab BUOYS processing of materials obtained from aerial photography The microwave propagation and backscattering Project PAPA The integration of drifting buoy data into characteristics of vegetation --- wheat, sorghum, soybeans using the MKF-6M camera p 73 A85-38703 an operational meteorological service CANADA and corn fields in Kansas [E85-10088] p.37 N85-23874 Cobalt-abitibi project - Landsat image analysis in the p 13 N85-23213 Automatic buoys to assist the tuna fishery off the Microwave remote sensing of soil moisture Canadian Shield application of the geological analysis aid p 37 N85-23879 p 13 N85-23235 p 23 A85-32144 package Fourier transform of wave data on ARGOS buovs Hydrometric telemetry in Canada p 54 N85-23882 Modeling the backscattering and transmission properties p 38 N85-24351 of vegetation canopies CANOPIES (VEGETATION) The development of Platform Transmitter Terminal (PTT) [E85-10099] p 15 N85-27320 A method for enhancing Landsat images for classifying p 75 N85-24353 BAND RATIOING and its application for drifting buoys plant cover p 5 A85-32134 Surface currents in the tropical Pacific during 1979-1980 Reducing Landsat MSS scene variability The significance of scale in geobotanical applications p 38 N85-24354 p 59 A85-34429 using drifting buoys for lithologic discrimination and mineral exploration p 26 A85-35119 BATHYMETERS Inferences of future operations drawn from past and Estimating canopy cover in drylands with Landsat MSS present applications of drifting buoys p 38 N85-24356 An assessment of the potential role of multispectral imagery in bathymetric charting US program in anchored data buoy and the other fixed p 8 A85-37966 AD-A1524601 p 46 N85-28438 p 39 N85-24358 A test of the Suits vegetative-canopy reflectance model observation platforms BEARING (DIRECTION) with LARS soybean-canopy reflectance data One thousand days in the brine --- platform transmitter Wave directional spectra via ARGOS p 39 N85-24359 р8 A85-37981 terminals p 45 N85-27343 Estimation of total above-ground phytomass production sing remotely sensed data p 8 A85-38389 The development of automated manne BEAUFORT SEA (NORTH AMERICA) using remotely sensed data p 39 N85-24362 meteorological data system Spectral estimators of absorbed photosynthetically The analysis of Landsat MSS data for characterizing at the EERM Meteorological buoys developed sediment dispersal in the Beaufort Sea active radiation in corn canonies. ctive radiation in corn canopies p 8 A85-38390
Collection of in situ forest canopy spectra using a p 40 N85-24374 laboratory p 48 A85-32122 The ARGOS contribution to the successful dredging of helicopter - A discussion of methodology and preliminary p 40 N85-24381 a deep moored current meter Estimation of woody biomass in slash pine plantations results p 10 A85-38812 Onfting buoy studies for weather applications Spectral response curve models applied to forest using color aerial photography - A feasibility study p 40 N85-24396 A85-30839 p 10 A85-38820 cover-type discrimination Collecting meteorological reports with the ARGOS Estimation of leaf area index from bidirectional spectral Estimating phytomass of sagebrush habitat types from p 6 A85-33450 p 40 N85-24398 reflectance data by inverting a canopy reflectance model microdensitometer data system Estimation of total above-ground phytomass production p 11 A85-38836 The French Ocean Climate in Equatorial Atlantic p 8 A85-38389 p 40 N85-24399 using remotely sensed data (FOCAL) Drifter Program, 1983-1984 Spectral estimates of agronomic characteristics of Satellite remote sensing of total herbaceous biomass crops p 11 A85-38837 The Deep Drifter Program --- deep ocean sensors production in the Senegalese Sahel - 1980-1984 Remote sensing of coastal wetlands biomass using p 40 N85-24400 n 9 A85-38391 Thematic Mapper wavebands --- Lewes, Delaware Telemetered meteorological and engineering data from p 12 N85-23198 Influence of rock-soil spectral variation on the a deep sea moored body in the Long Term Upper Ocean assessment of green biomass p 9 A85-38393 The microwave propagation and backscattering Study (LOTUS) p 41 N85-24402 characteristics of vegetation --- wheat, sorghum, soybeans Role of vegetation in the biosphere Drifting buoy development and future programs and corn fields in Kansas p 10 A85-38834 Japanese ARGOS program p 41 N85-24406 Modelling forest biomass accessibility in South Carolina [E85-10088] p 13 N85-23213 Development of a low cost drifting buoy p 11 A85-38842 Use of space photographic information to map plant with digital terrain data p 41 N85-24408 Remote sensing of coastal wetlands biomass using p 14 N85-25359 Arabian gulf circulation --- pollution monitoring Thematic Mapper wavebands -- Lewes, Delaware Identification of structure of soil-vegetation cover using p 42 N85-24412 p 15 N85-26826 p 12 N85-23198 aenal and space photographs p 15 N85-26826 Modeling the backscattering and transmission properties BIOMETEOROLOGY A report on the DRIFTERS program --- buoys Applied Geographic Information System techniques for assessing agricultural production potential in developing p 42 N85-24413 of vegetation canopies IE85-100991 p 15 N85-27320 Drifting buoys on the Labrador shelf countries - A Honduran case study CARBON DIOXIDE LASERS p 11 A85-38841 p 42 N85-24415 BIOPHYSICS CO2 laser reflectance of rocks for geological remote Moored buoy stationkeeping and location system SPOT and Landsat-4 simulations Generalization of MRC p 26 A85-35116 p 42 N85-24416 sensing biophysical-inventory data on the upper St Lawrence **CELESTIAL BODIES** Overview of data processing at AES local user terminals Preliminary analysis p 48 A85-32131 Theory of single space photographs --- Russian book --- Canadian Atmospheric Environment Service (AES) p 43 N85-24418 Assessing biophysical characteristics of grassland from p 57 A85-31893 spectral measurements A85-38838 CENSUS An overview of NDBC drifting buoy development RIOSPHERE Landsat data for population estimates - Approaches to programs --- NOAA Data Buoy Center (DBC) Role of vegetation in the biosphere inter-censal counts in the rural Sudan p 43 N85-24422 p 10 A85-38834 p 17 A85-37955 DB2 and DB3 The next generation --- buoys **CENTRAL ATLANTIC REGION (US)** RLIGHT p 44 N85-27337 p 76 N85-26013 A georeferenced Landsat digital database for forest East coast snowstorm survey p 8 A85-37980 Development of a Lagrangian drifting buoy insect-damage assessment **CENTRAL EUROPE** \_p\_44\_\_N85-27338 BRAZIL Two satellite image maps of Central Europe: CNPq/INPE LANDSAT system Report of activities from Long term drifting float for measuring mean oceanic p 21 N85-29339 p 44 N85-27339 October 1, 1983 to September 30, 1984 --- Brazil circulation using ARGOS system CHANGE DETECTION ARGOS-tracked drifters in the Rockall Trough [E85-10097] p 66 N85-27318 Land-use and land-cover mapping and change detection in Tripura using satellite Landsat data Study of the urban evolution of Brasilia with the use of N85-27340 p 44 p 16 A85-30738 LANDSAT data p 44 N85-27341 Monitoring of marine environment [E85-10101] p 19 N85-27321 Urban change detection and land-use mapping of Wave directional spectra via ARGOS The ARGOS system in Brazil --- hydrology p 16 A85-30739 p 45 N85-27343 p 55 N85-27349 A practical method for monitoring and mapping cutovers Routine wave and meteorological measurements in **BRIGHTNESS DISTRIBUTION** based on the digital analysis of Landsat data and offshore areas using ARGOS data surveillance The sensitivity of the computational scheme for taking automated map production p 5 A85-32135 p 45 N85-27344

Results of an initial trial of a satellite telemeterno buoy

An operational buoy network collecting meteorological

Checking on the position of navigation marker buoys

measuring near surface current

by the ARGOS system

p 45 N85-27345

p 45 N85-27351

p 46 N85-27354

into account the contribution of atmospheric haze to

Capability of Bhaskara-II satellite microwave radiometer

brightness temperature data to discriminate soil moisture

p 61

A85-38716

p 7 A85-37958

variations in initial data -- image brightness correction

BRIGHTNESS TEMPERATURE

conditions of Indian landmass

p 59 A85-32140

p 47 N85-29507

Landsat study of changes in surface cover

Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical

CHEMICAL PROPERTIES

(AD-A153765)

dynamics in ocean frontal areas

CHESAPEAKE BAY (US)

SUBJECT INDEX

**CHESAPEAKE BAY (US)** Hurricane structure and dynamics from stereoscopic and COMPUTER NETWORKS Comparison of MSS and TM data for landcover infrared satellite observations and radar data Standards and specifications for geodetic control classification in the Chesapeake Bay area A prelimin p 76 N85-25988 etworks p 65 N85-23210 report --- Taylor's Island, Maryland [PR85-166478] p 21 N85-27374 Cloud physics studies in the SCPP (Sierra Cooperative CHLOROPHYLLS COMPUTER PROGRAMS Pilot Project) The RMS TM resource measurement system, Estimating ocean production from satellite-derived [PB85-163095] p 55 N85-27501 chlorophyll - Insights from the EASTROPAC data set description and applications --- Resource Management COASTAL CURRENTS p 32 A85-35047 Comparison of a diffusion model with dye dispersion p 56 A85-30842 COMPUTER TECHNIQUES An evaluation of 685 nm fluorescence imagery of coastal measurements to study turbulence in coastal waters p 35 A85-37269 [INPE-3492-PRE/729] Computer-assisted synthesis of information from waters Characteristic vector analysis of inflection ratio spectra p 68 A85-30960 multispectral imagery COASTAL WATER New technique for analysis of ocean color data 7 1/2' map-image extraction from pi An evaluation of 685 nm fluorescence imagery of coastal p 37 N85-23237 INASA-TP-24281 p 35 A85-37269 Landsat multispectral scanner (MSS) and Thematic CITIES Mapper (TM) imagery using a microcomputer and EROS Mapping of coastal-water turbidity using LANDSAT computer compatible tapes Urban change detection and land-use mapping of p 57 A85-30962 p 35 A85-37979 ımagerv p 16 A85-30739 Delhi Analysis of hydrometeorological conditions in Antarctic The application of computerized space image processing techniques to data from large scale aerial Use of the TM tasseled cap transform for interpretation coastal waters according to data from hydrological and p 7 A85-37119 of spectral contrasts in an urban scene satellite observations p 43 N85-25354 p 18 A85-38811 Expenence with the use of supercomputers to process Diffusion coefficients for coastal water determined from Analysis methods for Thematic Mapper data of urban aenal photographs Landsat data p 73 A85-38830 COMPUTERIZED SIMULATION regions p 18 A85-38816 [INPE-3413-PRE/679] p 44 N85-27331 Evaluation of atmospheric particulate concentrations derived from analysis of ratio Thematic Mapper data Comparison of a diffusion model with dye dispersion Simulation of errors in a Landsat based crop estimation p 6 A85-33556 measurements to study turbulence in coastal waters р 19 A85-38825 [INPE-3492-PRE/7291 p 46 N85-27504 Modeling of spatially distributed objects using remote p 51 A85-38709 sensing data --- in hydrology CONCENTRATION (COMPOSITION) The use of Thematic Mapper data for land cover COASTAL ZONE COLOR SCANNER discrimination Preliminary results from the UK SATMaP Evaluation of sensitivity decay of Coastal Zone Colour p 64 N85-23207 Scanner (CZCS) detectors by companson with in situ Determination of sea-ice concentration according to Expenence of the Institute of Space Research with the satellite imagery p 34 A85-37114 near-surface radiance measurements use of remote sensing in urban planning studies n 35 A85-37986 CONFERENCES [INPE-3159-PRE/533] p 19 N85-27770 Color aerial photography in the plant sciences and COASTS CITRUS TREES related fields, Proceedings of the Ninth Biennial Workshop, Coastal morphology - A case study of the Gulf of Spectral densitometer application to stress detection in Khambhat (Cambay) p 48 A85-30743 Orlando and University of Florida, Lake Alfred, FL p 3 A85-30837 Identifying vegetative land use classes during each of p 1 A85-30826 November 15-17, 1983 Inventorying Florida's citrus groves p 3 A85-30841 the four seasons on aerial photographs and Landsat Extraction of information from remotely sensed images, CLASSIFICATIONS imagery in coastal South Carolina p 10 A85-38815 Proceedings of the Conference on Techniques for Multi-band image classification with a distributed Spaceborne and airborne radar, infrared and thermal Extraction of Information from Remotely Sensed Images, p 57 architecture A85-30963 Rochester Institute of Technology, Rochester, NY, August studies of coastal processes at the Mississippi Delta, Comparison of classification schemes for MSS and TM Louisiana p 52 A85-38827 A85-30951 p 56 data p 62 A85-38821 Operation guiding light-scientific program and field plan Canadian Symposium on Remote Sensing, 8th, and Discrimination of tropical forest cover types using The pilot field experiment for NORDA project chemical Association Quebecoise de Teledetection, Congress, 4th, p 12 A85-38843 Landsat MSS data dynamics in ocean frontal areas Montreal, Canada, May 3-6, 1983, Proceedings Impact of Thematic Mapper sensor characteristics on [AD-A153765] p 47 N85-29507 p 69 A85-32101 classification accuracy --- suburban Washington, D.C. Maryland, and the Chesapeake Bay p 63 N85-23188 COLOR Remote sensing for geological mapping, Proceedings p 63 N85-23188 A concept for the processing and display of Thematic of the Seminar, Orleans, France, February 2-4, 1984 Quick look analysis of TM data of the Washington, Mapper data p 63 N85-23196 p 24 A85-35101 District of Columbia, area p 64 N85-23197 COLOR INFRARED PHOTOGRAPHY Conference on Satellite/Remote Sensing and Digital processing of passive Ka-band microwave images Color aerial photography in the plant sciences and Applications, Clearwater Beach, FL, June 25-29, 1984, related fields, Proceedings of the Ninth Biennial Workshop, for sea-ice classification p 71 A85-37726 [AD-A150686] p 43 N85-24511 Preprints Orlando and University of Florida, Lake Alfred, FL Remote sensing from satellites, Proceedings of the First Comparative study of the digital analysis of areas of November 15-17, 1983 p 1 A85-30826 and Ninth Workshops and Topical Meeting, Graz, Austria, Alaska meander lines determined by vegetation the Earth's surface prepared for planting using different June 25-July 7, 1984 p 49 A85-37951 classification algorithms appearance on color infrared photographs [INPE-3359-PRE/637] p 2 A85-30834 Machine processing of remotely sensed data. Thematic p 15 N85-27545 Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, Purdue Spectral densitometer application to stress detection in Air photo analysis, photo interpretation logic, and feature p 3 A85-30837 citrus extraction University, West Lafayette, IN, June 12-14, 1984 Color and color-IR photography for assessing forest pest [AD-A153926] p 67 N85-29347 p 73 A85-38801 CLIMATE management tactics р3 The World Ocean Circulation Experiment Video color infrared imagery - A future natural resource LANDSAT-4 Science Characterization Early Results Volume 4 Applications --- agriculture, soils land use. p 56 A85-30844 A85-32166 management tool Estimating phytomass of sagebrush habitat types from geology, hydrology, wetlands, water quality, biomass Earth and space science - Oceans p 32 A85-32215 identification, and snow mapping p 6 A85-33450 microdensitometer data CLIMATOLOGY **COLOR PHOTOGRAPHY** [E85-10070] p 63 N85-23186 Monitoring environmental resources through NOAA's Estimation of woody biomass in slash pine plantations Remote Sensing of Snow and Evapotranspiration polar orbiting satellites p 17 A85-36282 using color aerial photography - A feasibility study [NASA-CP-2363] p 53 N85-23223 Atlas of archived vegetation, land-use and seasonal p 3 A85-30839 Data Collection and Platform Location by Satellite Albedo data sets Color and color-IR photography for assessing forest pest p 74 N85-23869 ARGOS Users' Conference p 14 N85-24508 [NASA-TM-86199] p 3 A85-30840 management tactics Data Collection and Platform Location by Satellite Research Review, 1983 COMPUTER AIDED MAPPING p 38 N85-23883 ARGOS Users' Conference p 46 N85-29433 [NASA-TM-86219] Image processing applications for geologic mapping Proceedings of the ARGOS Users Conference on Data CLOUD COVER p 23 A85-31736 p 75 N85-24348 Collection and Location by Satellite Clouds - A fundamental limitation to satellite remote First steps towards integration of remote sensing and Data Collection and Platform Location by Satellite sensing in the visible spectral region p 69 A85-32119 p 58 A85-32115 p 39 N85-24366 ARGOS Users' Conference A practical method for monitoring and mapping cutovers Retrieval of cloud cover parameters from multispectral Data Collection and Platform Location by Satellite based on the digital analysis of Landsat data and satellite images p 70 A85-35124 automated map production p 5 A85-32135 ARGOS users' Conference p 40 N85-24391 Digital processing of meteorological satellite imagery Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Data Collection and Platform Location by Satellite RGOS Users' Conference p 41 N85-24409 p 60 A85-37121 ARGOS Users' Conference **CLOUD PHOTOGRAPHY** p 28 N85-23195 Valley, California Data Collection and Platform Location by Satellite Technique that uses satellite, radar, and conventional An investigation of the crustal properties of Australia ARGOS Users' Conference p 44 N85-27333 data for analyzing and short-range forecasting of precipitation from extratropical cyclones and surrounding regions derived from interpretation of Airphoto interpretation of vegetation and landforms for p 20 N85-23216 MAGSAT anomaly field data p 15 N85-28436 [PB85-164994] p 55 N85-27499 soil mapping Information relative to cartography and geodesy Senes **CLOUD PHYSICS** Environmental management needs Translations, number 42, volume 1 p 78 N85-29405 Cloud physics studies in the SCPP (Sierra Cooperative [DE85-007859] [ISSN-0469-4244] p 21 N85-29338 Pilot Project) CONIFERS Two satellite image maps of Central Europe [PB85-163095] p 55 N85-27501 Estimation of woody biomass in slash pine plantations p 21 N85-29339 **CLOUD SEEDING** using color aerial photography - A feasibility study Digital image mapping of Antarctica using NOAA-7 p 3 A85-30839 Cloud physics studies in the SCPP (Sierra Cooperative AVHRR imagery p 67 N85-29340 Pilot Project) Remote sensing of the leaf area index of temperate COMPUTER GRAPHICS

MAGSAT anomaly field data of the crustal properties

Data selection techniques in the interpretation of

Two satellite image maps of Central Europe

p 20 N85-23215

p 28 N85-23218

p 21 N85-29339

coniferous forests

vegetated terrain

in a workbench database

[E85-10102]

CONSISTENCY

p 11 A85-38839

p 15 N85-27322

p 65 N85-23220

Microwave model prediction and verifications for

Precedency control and other semantic integrity issues

[PB85-163095]

CLOUDS (METEOROLOGY)

using AVHRR radiometric data

Snow reflectance from Thematic Mapper

Multispectral identification of clouds and earth surfaces

CLOUDS

p 55 N85-27501

p 52 N85-23205

p 70 A85-32936

of Australia

[E85-10100]

MAGSAT data over Australia

CONTINENTAL SHELVES			
An assessment of the potential	role	ot	multispectral
imagery in bathymetric charting			
[AD-A152460]	٥	46	N85-28438

CONTOURS

Application of hierarchical data structures to geographical information systems [AD-A152169] p 67 N85-27753

CONTROL DATA (COMPUTERS)

Structures for geo-information and their application in selective sampling of digital terrain models

p 60 A85-36283

COORDINATES

Derivation of model topography p 22 N85-29449 CORN

Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada p 4 A85-32126

Spectral estimators of absorbed photosynthetically active radiation in corn canopies p 8 A85-38390 Modeling the backscattering and transmission properties of vegetation canopies

p 15 N85-27320 [E85-10099]

COTTON

Diurnal movements of cotton leaves expressed as thermodynamic work and entropy changes p 8 A85-38273

**CROP CALENDARS** 

Operational planning for a remote-sensing space p 9 A85-38704 system

**CROP GROWTH** 

Estimation of total above-ground phytomass production p 8 A85-38389 using remotely sensed data Spectral estimators of absorbed photosynthetically p 8 A85-38390 active radiation in corn canonies A preliminary method for complex aerovisual and

ground-based subsatellite observations agrophytocenosis status (through the example of winter

Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study p 11 A85-38841 CROP IDENTIFICATION

Acquisition, processing and photo interpretation of an erial color infrared photograph p 2 A85-30829 Evaluation of the TM, MSS, and HRV sensors in aerial color infrared photograph estimating the surface area of corn within Canada

p 4 A85-32126 Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural p 12 N85-23190 resources --- Central Valley

An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetlands, and urban land cover --- Poinsett County, Arkansas, and Reelfoot Lake and Union City, Tennessee

p 12 N85-23193 Preliminary evaluation of Thematic Mapper image data p 63 N85-23194

quality CHOP INVENTORIES

Inventorying Flonda's citrus groves p 3 A85-30841 Global crop condition assessment using remotely p 4 A85-32114 sensed satellite data

Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates p 5 A85-32129 Overcoming technical problems to make Landsat useful for timely crop area estimates

Simulation of errors in a Landsat based crop estimation p 6 A85-33556 Estimation of total above-ground phytomass production p 8 A85-38389 using remotely sensed data

Operational planning for a remote-sensing space p 9 A85-38704 Techniques for the estimation of leaf area index using p 10 A85-38835 spectral data Thematic Mapper data quality and performance

assessment in renewable resources/agriculture/remote p 12 N85-23201 sensing **CROP VIGOR** 

Assessment of water-stress effects on crops p 1 A85-30745 The devastation of a vineyard by phylloxera

p 3 A85-30838 Operational crop forecasting using remotely sensed p 4 A85-32125

CRUDE OIL

Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil exploration in Gujarat, India p 22 A85-30736 Analysis of mesofissuring on space photographs. New technique for study of petroleum and gas deposits

p 29 N85-26828

CRUSTAL FRACTURES

Fracture mapping of part of northern Ontano using Landsat imagery p 23 A85-32145 CYCLONES

Rain estimation in extratropical cyclones using GMS p 49 A85-37855 Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data

p 76 N85-25989 Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones [PB85-164994] p 55 N85-27499

D

DATA ACQUISITION

Acquisition, processing and photo interpretation of an aerial color infrared photograph p 2 A85-30829 Analysis of the inflow layer and air-sea interactions in Humcane Frederic (1979)

[NASA-CR-175616] p 37 N85-23271 Automatic hydrological data collection facility using RGOS p 54 N85-24363 Hydrological data collection from Swedish mountain p 54 N85-24388

Space methods in oceanology

[NASA-TM-77652] p 44 N85-26047 CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 --- Brazil

p 66 N85-27318 [E85-10097] Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data p 55 N85-27348 collection

Test and evaluation plan for the Centralized Storm Information System p 77 N85-28508

DATA BASE MANAGEMENT SYSTEMS

issues in designing geographic information systems under conditions of inexactness p 18 A85-38822 GADB A database facility for modelling naturally occurring geophysical fields p 28 N85-23217 Precedency control and other semantic integrity issues in a workbench database p 65 N85-23220

Application of hierarchical data structures geographical information systems

[AD-A152169] p 67 N85-27753

Description of techniques for automation of regional natural resource inventories p 57 A85-30964 Applications of Landsat data and the data base p 59 A85-32210 A concept for establishing a database for a support databank (through an example of an agricultural block)

p 60 A85-38707 Precedency control and other semantic integrity issues ın a workbench database p 65 N85-23220 Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing experiments with remotely sensed data

p 67 N85-28877 [NASA-TM-850091

DATA COLLECTION PLATFORMS

Data Collection and Platform Location by Satellite ARGOS Users' Conference ρ 74 N85-23869 The ARGOS Platform Transmitter Terminals (PTTs)

p 74 N85-23872 Project PAPA The integration of drifting buoy data into an operational meteorological service

p 37 N85-23874 Applications of ARGOS data collection systems in Arctic Data Collection and Platform Location by Satellite RGOS Users' Conference p 38 N85-23883 ARGOS Users' Conterence Applications of ARGOS data collection system for automatic meteorological observatories in Arctic regions p 38 N85-23893

Proceedings of the ARGOS Users Conference on Data Collection and Location by Satellite p 75 N85-24348 New directions in ARGOS instrumentation at Polar Research Lab (PRL) p 38 N85-24350

The development of Platform Transmitter Terminal (PTT) and its application for drifting buoys p 75 N85-24353 US programs using the ARGOS data collection and

p 75 N85-24355 platform location system US program in anchored data buoy and the other fixed observation platforms p 39 N85-24358 One thousand days in the brine --platform transmitter

p 39 N85-24359 Data Collection and Platform Location by Satellite p 39 N85-24366 ARGOS Users' Conference

Data Collection and Platform Location by Satellite ARGOS users' Conference p 40 N85-24391 Collecting meteorological reports with the ARGOS

p 40 N85-24398 US programs using the ARGOS data collection and p 41 N85-24401 platform location system

Data Collection and Platform Location by Satellite ARGOS Users' Conference n 41 N85-24409

US program using the ARGOS data collection and p 41 N85-24410 platform location system A new versatile ARGOS PTT for oceanographic applications -- Platform Transmit Terminal (PTT)

p 42 N85-24417

Data Collection and Platform Location by Satellite ARGOS Users' Conference p 44 N85-27333

DB2 and DB3 The next generation --- buoys p 44 N85-27337

A seismic ARGOS data collection platform p 29 N85-27350 An operational buoy network collecting meteorological

p 45 N85-27351 Operational expenences with the ARGOS system in Greenland p 45 N85-27353

DATA CORRELATION

An algorithm for reconstructing correlating series of ground-based and remote observations

p 61 A85-38711

DATA PROCESSING

Simulation of errors in a Landsat based crop estimation ystem p 6 A85-33556

Digital processing of meteorological satellite imagery p 60 A85-37121

Analysis and evaluation of the LANDSAT-4 MSS and TM sensors and ground data processing systems Early p 63 N85-23189

Geologic utility of LANSDAT-4 TM data --- Death Valley, California and the Silver Bell area of southern Arizona p 28 N85-23192

Scientific experiments Preprocessing of scientific data p 66 N85-24779 - spaceborne experiments

Experience in automation of data processing in interpretation and defining of linear elements from space photographs p 66 N85-25349

Developments in remote sensing [B8580069]

p 67 N85-28441

DATA PROCESSING TERMINALS

The ARGOS Platform Transmitter Terminals (PTTs) p 74 N85-23872 A new versatile ARGOS PTT for oceanographic

applications --- Platform Transmit Terminal (PTT) p 42 N85-24417 Overview of data processing at AES local user terminals

--- Canadian Atmospheric Environment Service (AES) p 43 N85-24418

DATA REDUCTION

MAGSAT anomaly field data of the crustal properties of Australia

[E85-10100] p 20 N85-23215 An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of MAGSAT anomaly field data p 20 N85-23216 Data selection techniques in the interpretation of

MAGSAT data over Australia p 28 N85-23218 Scientific experiments Preprocessing of scientific data spaceborne experiments p 66 N85-24779 Shuttle imaging radar-A (SIR-A) data analysis --- geology

of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia [NASA-CR-175785] p 15 N85-27324

DATA SAMPLING

Structures for geo-information and their application in selective sampling of digital terrain models

p 60 A85-36283

DATA SIMULATION

An evaluation of simulated Thematic Mapper data and Landsat MSS data for discriminating suburban and regional p 17 A85-33557 land use and land cover Algorithms for the estimation of failed detector data ---

for replacement of Landsat-4 thematic mapping missing data p 61 A85-38806 Comparison of land cover information from LANDSAT

Multispectral Scanner (MSS) and airborne Thematic Mapper-simulator-(TMS)-data-for-hydrologic applications
--- Clinton River Basin, Michigan p 52 N85-23211 DATA STRUCTURES

GADB A database facility for modelling naturally curring geophysical fields p 28 N85-23217 occurring geophysical fields DATA SYSTEMS

Applications of ARGOS data collection systems in Arctic p 37 N85-23875 regions Applications of ARGOS data collection system for automatic meteorological observatories in Arctic regions p 38 N85-23893

DATA TRANSMISSION

The ARGOS system and hydrology Results obtained by ORSTROM and benefits of a degree of t a degree of p 54 N85-23881 standardization The ARGOS communications performance trials

p 40 N85-24376 Measurement of water equivalent of mountain snow cover -- ARGOS system p 54 N85-24386 **DEATH VALLEY (CA)** SUBJECT INDEX

The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service p 55 N85-24389

DEATH VALLEY (CA)

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California p 28 N85-23195 **DECIDUOUS TREES** 

Changes in spectral properties of detached birch Microwave model prediction and verifications for vegetated terrain

[E85-10102] p 15 N85-27322

#### DEFORESTATION

Land use and forestry studies of Himachal Pradesh p 1 A85-30740

#### DELINEATION

An objective technique for the delineation and extrapolation of thunderstorms from GOES satellite data p 19 A85-39537

**DELTAS** 

Geological interpretation of Landsat imagery of the Bangladesh Ganges delta p 24 A85-33875 Study of Volga river delta using space photosurvey p 55 N85-25340 DEMOGRAPHY

Landsat data for population estimates - Approaches to inter-censal counts in the rural Sudan

p 17 A85-37955 Experience of the Institute of Space Research with the use of remote sensing in urban planning studies [INPE-3159-PRE/533] p 19 Ni p 19 N85-27770

DENSITOMETERS

Spectral densitometer application to stress detection in citrus p 3 A85-30837

#### DENSITY MEASUREMENT

An evaluation of the use of atmosphene radiances for water vapor retrieval in a global retrieval system

p 59 A85-32868

#### DESTH

Microwave radiometer observations of snowpack properties and comparison of U.S. Japanese results -Hokkaido, Japan and Vermont and North Dakota test p 53 N85-23230

Studies on physical properties of snow based on multi p 54 N85-23231 channel microwave radiometer p 54 N85-23231 Analysis of NIMBUS-7 SMMR data --- Hokkaido, Japan p 54 N85-23232

#### **DEPTH MEASUREMENT**

An assessment of the potential role of multispectral imagery in bathymetric charting

[AD-A152460] p 46 N85-28438

#### DESERTIFICATION

Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan

p 8 A85-37967

#### DESERTS

Merging Landsat and spaceborne radar data over Tunisia p 72 A85-37962

#### DEVELOPING NATIONS

Responses to satellite remote sensing opportunities in p 72 A85-37953 east and southern Africa The significance of orthophoto maps for developing p 21 N85-29341 countries

#### DIELECTRIC PROPERTIES

Dielectric properties and microwave remote sensing p 72 A85-37959

#### DIFFUSION

Comparison of a diffusion model with dve dispersion easurements to study turbulence in coastal waters p 46 N85-27504 [INPE-3492-PRE/729]

#### **DIFFUSION COEFFICIENT**

Diffusion coefficients for coastal water determined from aerial photographs

p 44 N85-27331 [INPE-3413-PRE/679]

#### **DIGITAL DATA**

Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120

Seasonal and interannual evolution of the spectral signature in forest environments using Landsat data

p 6 A85-32139 Applications of Landsat data and the data base p 59 A85-32210

The use of Landsat-4 MSS digital data in temporal data sets and the evaluation of scene-to-scene registration accuracy p 59 A85-33449

Structures for geo-information and their application in selective sampling of digital terrain models

p 60 A85-36283 Digital processing of meteorological satellite imagery

p 60 A85-37121 Modelling forest biomass accessibility in South Carolina p 11 A85-38842 with digital terrain data

LANDSAT-4 Science Characterization Early Results Volume 4 Applications --- agriculture, soils land use, geology, hydrology, wetlands, water quality, biomass identification, and snow mapping

p 63 N85-23186 Overview of TM applications research reports

p 63 N85-23187 A preliminary comparison of the information content of data from the LANDSAT 4 Thematic Mapper and p 64 N85-23199 Multispectral Scanner --- Arkansas

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications Washington, D.C. p 64 N85-23200

Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory --- Washington, p 65 N85-23212 DC

CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 --- Brazil [E85-10097] p 66 N85-27318

Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing experiments with remotely sensed data [NASA-TM-85009]

p 67 N85-28877

#### DIGITAL SIMULATION

Digital image mapping of Antarctica using NOAA-7 AVHAR imagery p 67 N85-29340

#### DIGITAL SYSTEMS

Digital processing of passive Ka-band microwave images for sea-ice classification

[AD-A150686] p 43 N85-24511

#### **DIGITAL TECHNIQUES**

Resource inventory through instructionally-based digital processing system p 56 A85-30953 Digital processing to improve forest classification results at resolutions of 5 to 50 metres p 4 A85-30965 quantitative Current limitations on airborne p 57 A85-32105

thermography First steps towards integration of remote sensing and digital mapping p 58 A85-32115 SPOT and Landsat-4 simulations Generalization of MRC

biophysical-inventory data on the upper St Lawrence Preliminary analysis p 48 A85-32131 Correlations between satellite data and radar, surveys for the thermographic, and multispectral

geomorphological characterization of a region of southern p 48 A85-32146 Machine classification of freshwater ice types from

Landsat-1 digital data using ice albedos as training sets p 51 A85-38392

Application of digital image enhancement processing of Landsat data for terrain mapping of southern Huairou p 61 A85-38813 County of Beijing (Peking), China Digital processing of single-band (33 6 GHz) microwave nagery for sea ice classification p 36 A85-38819 An analysis of the utility of Landsat Thematic Mapper imagery for sea ice classification

data and digital elevation model data for predicting soil p 10 A85-38828

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California p 28 N85-23195

Comparative techniques used to evaluate Thematic Mapper data for land cover classification in Logan County, West Virginia p 65 N85-23209

#### DISTRIBUTED PROCESSING

Multi-band image classification with a distributed p 57 A85-30963 architecture

### **DISTRIBUTION MOMENTS**

p 22 N85-29449 Derivation of model topography

#### **DIURNAL VARIATIONS**

Diurnal movements of cotton leaves expressed as

thermodynamic work and entropy changes A85-38273

#### **DOLPHINS**

Tracking pelagic dolphins by satellite p 39 N85-24364

#### DOPPLER RADAR

Airborne Doppler radar velocity measurements of

precipitation seen in ocean surface reflection p 36 A85-38866

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

p 77 N85-27463 INASA-CR-39011

### **DRAINAGE PATTERNS**

Hydrologic appraisal of rivers plan-form at confluence zone A case study using Landsat MSS data

p 50 A85-37977

Drainage network analysis of Landsat images of the Olympus-Pieria mountain area, northern Greece p 51 A85-37982

Geologic utility of LANSDAT-4 TM data --- Death Valley, California and the Silver Bell area of southern Anzona

p 28 N85-23192 Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of North Zeravshan seismogenic faults p 29 N85-25342

#### DROUGHT

Assessment of water-stress effects on crops

p 1 A85-30745 Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan

p 8 A85-37967

Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters [INPE-3492-PRE/7291 p 46 N85-27504

DYNAMIC CHARACTERISTICS

Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical dynamics in ocean frontal areas [AD-A153765] p 47 N85-29507

E

#### EARTH (PLANET)

The development and current state of earth expansion and fluctuation problems p 20 A85-37302 **EARTH CRUST** 

Vertical component Magsat anomalies and Indian p 26 A85-37150 tectonic boundaries MAGSAT anomaly field data of the crustal properties of Australia

[E85-10100] p 20 N85-23215 An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of MAGSAT anomaly field data p 20 N85-23216

Remanent magnetization model for the broken ridge p 20 N85-23219

### satellite magnetic anomaly p EARTH OBSERVATIONS (FROM SPACE)

The evolution of satellite-based remote-sensing capabilities in India p 68 A85-30726 Remote sensing of the atmospheric aerosol from space p 16 A85-31882 Russian book earth observation p 70 A85-32228 A concept for an advanced spacecraft The use of space photographs for landscape mapping

p 59 A85-33598 Applications of space images for neotectonic studies

p 24 A85-35104 Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory

p 26 A85-35117 Imaging spectrometry for earth remote sensing

p 71 A85-36248 p 71 A85-37199 Orbits for earth observation Conference on Satellite/Remote Sensing and 1984 Applications, Clearwater Beach, FL, June 25-29, p 71 A85-37726

Meteorological satellite data useful for agroclimate

A85-37730 Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, June 25-July 7, 1984 p 49 A85-37951 A decade of remote sensing in India - Some salient

p 72 A85-37952 Main results and perspectives of some Chilean experiences developed with low cost and accurate spatial p 72 A85-37957 remote sensing technology

Pilot land data system --- for satellite imagery

p 17 A85-38274 Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space

p 73 A85-38701 Operational planning for a remote-sensing space p 9 A85-38704

Geographic regionalization and the problems related to p 18 A85-38705 space-based monitoring An algorithm for reconstructing correlating series of

ground-based and remote observations p 61 A85-38711

Algorithms for the estimation of failed detector data --for replacement of Landsat-4 thematic mapping missing

p 61 A85-38806 NASA's land remote sensing plans for the 1980's

p 78 N85-23224 Utilization of the polar platform of NASA's Space Station

Program for operational Earth observations [PB85-152502] p 75 N85-23895

Environmental satellites p 19 N85-24392 Use of space photographic information to map plant p 14 N85-25359 cover

Space methods in oceanology

p 44 N85-26047 [NASA-TM-77652]

Shuttle imaging radar-A (SIR-A) data analysis --- geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station Australia

p 15 N85-27324 [NASA-CR-175785]

SUBJECT INDEX **FISHERIES** 

The private sector - A global pool of technical talent

ERROR ANALYSIS

shuttle imaging

Experimental philosophy leading to a small scale digital

Geometric error analysis for spectrometer experiment data base of the conterminous United States for designing for remote sensing training and program support experiments with remotely sensed data [NASA-TM-85009] p 67 N85-28877 [NASA-CR-175665] **EGYPT** p 75 N85-24269 Looking down looking forward Earth observation, Space-borne imagery interpretation - Earthquake studies FUROPEAN SPACE PROGRAMS p 27 A85-39095 ın Aswan Earth observation, sciences and applications, a perspective Looking down looking forward **ELECTRIC POWER TRANSMISSION** [ESA-SP-1073] p 78 N85-29497 sciences and applications, a perspective The use of Landsat images in the selection of p 78 N85-29497 IESA-SP-10731 EARTH ORBITS hydroelectric-transmission corridors on the North Shore Simultaneous Earth observations from 2 satellites ERS economic impace study Preliminary study of the principal surface-material types p 47 N85-29847 p 76 N85-27325 INASA-TM-862041 IESA-CR(P)-19791 p 48 A85-32138 EARTH RESOURCES **EVALUATION ELECTROMAGNETIC PROPERTIES** Targeting areas for mineral exploration - A case study Test and evaluation plan for the Centralized Storm Determination of electromagnetic properties of mesh p 22 A85-30734 p 77 N85-28508 from Onssa, India Information System material using advanced radiometer techniques Project indravati 1 - An appraisal of the natural resources **EVAPOTRANSPIRATION** p 74 N85-23855 Modelling the atmospheric boundary layer for remotely of the Indravati basin, Orissa, Madhya Pradesh and **FLEVATION** p 22 A85-30735 Maharashtra, India sensed estimates of daily evaporation Derivation of model topography p 22 N85-29449 p 50 A85-37973 Resource inventory through instructionally-based digital **EMISSIVITY** p 56 A85-30953 Remote Sensing of Snow and Evapotranspiration processing system Calculation of the emissivity of ice and snow covers in (NASA-CP-2363) p 53 N85-23223 Radiometric characterization of thematic mapper p 51 A85-38587 the microwave region p 57 A85-30958 General report of the researches of snowpack full-frame imagery **ENDANGERED SPECIES** properties, snowmelt runoff and evapotranspiration in Description of techniques for automation of regional Environmental management needs p 53 N85-23225 natural resource inventories p 57 A85-30964 p 78 N85-29405 **ENERGY POLICY** Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement Monitoring earth resource and environmental change -Some limitations and potentials of satellite data Environmental management needs of evapotranspiration at the Environmental Research p 17 A85-32137 IDE85-0078591 p 78 N85-29405 ENVIRONMENT MANAGEMENT Center and determination of Priestley-Taylor parameter p 13 N85-23233 The use of multisensor images for Earth Science Environmental management needs p 69 A85-32211 applications [DE85-007859] p 78 N85-29405 Estimation of regional evapotranspiration using remotely Short summary of multispectral imaging systems ENVIRONMENTAL MONITORING sensed land surface temperature Part 2 Application of A85-32212 p 69 Forest-type stratification and delineation of shifting estimate evaporation model to Landsat data for operational mineral exploration - The evapotranspiration by remote sensing technique cultivation areas in the eastern part of Arunachal Pradesh Canadian experience p 24 A85-35106 using Landsat MSS data p 13 N85-23234 p 1 A85-30728 Monitoring environmental resources through NOAA's Land-use and land-cover mapping and change detection EVERGLADES (FL) polar orbiting satellites p 17 A85-36282 in Tripura using satellite Landsat data A history of the Everglades and future implications of aerial photography p 2 A85-30827 The possibility of using small unmanned aircraft for p 16 A85-30738 studies of terrestrial natural resources Remote sensing of the atmospheric aerosol from space **EVOLUTION (DEVELOPMENT)** p 73 A85-38702 p 16 A85-31882 --- Russian book Monitoring tropical cyclone growth using GOES Features of exposure conditions and photolab Remotely Piloted Aircraft for small format aenal VISSR/VAS and Nimbus-7 TOMS data processing of materials obtained from aerial photography p 16 A85-32110 photography p 76 N85-25989 using the MKF-6M camera p 73 A85-38703 Landsat information as basis for a permanent monitoring **EXPANSION** A concept for establishing a database for a support of ecology and agricultural situations in tropical zones The development and current state of earth expansion p 5 A85-32128 databank (through an example of an agricultural block) p 20 A85-37302 and fluctuation problems p 60 A85-38707 Monitoring earth resource and environmental change -EXPOSURE The NASA land processes program - Status and future Some limitations and potentials of satellite data Features of exposure conditions and photolab directions p 78 A85-38802 p 17 A85-32137 processing of materials obtained from aerial photography Mapping of wolframite region in the Sirohi district Monitoring environmental resources through NOAA's p 73 A85-38703 using the MKF-6M camera (Rajasthan) in India from different digitally enhanced data polar orbiting satellites p 17 A85-36282 **EXTRAPOLATION** p 26 A85-38808 products of Landsat The utility of Thematic Mapper sensor characteristics An objective technique for the defineation and Spectral response curve models applied to forest for surface mine monitoring p 27 A85-38810 extrapolation of thunderstorms from GOES satellite data p 10 A85-38820 cover-type discrimination Complex aerial and space remote-sensing studies of beria -- Russian book p 27 A85-38896 Data Collection and Platform Location by Satellite p 19 A85-39537 p 74 N85-23869 ARGOS Users' Conference **EXTREMELY HIGH FREQUENCIES** Siberia --- Russian book The ARGOS system status report after 2 years Digital processing of passive Ka-band microwave images Investigation of the earth by means of neutrinos p 74 N85-23870 for sea-ice classification Neutrino geology p 27 A85-39825 operation p 43 N85-24511 [AD-A150686] Remote sensing used for study of forest resources System performance, data distribution and technical files p 12 N85-22440 p 74 N85-23871 --- ARGOS project Comparative study of the digital analysis of areas of p 74 N85-23884 The ARGOS system status report the Earth's surface prepared for planting using different The ARGOS system main characteristics -- satellite classification algorithms based localization p 39 N85-24367 [INPE-3359-PRE/637] p 15 N85-27545 **FARM CROPS** The ARGOS system after 3 years operation Thermal Infrared Multispectral Scanner (TIMS) An Meteorological satellite data useful for agroclimate p 39 N85-24368 investigator's guide to TIMS data [NASA-CR-175875] p 7 A85-37730 Environmental satellites p 19 N85-24392 Experience with the use of supercomputers to process p 77 N85-28286 The ARGOS program --- satellite based localization EARTH SURFACE Landsat data p 73 A85-38830 p 75 N85-24775 Spectral estimates of agronomic characteristics of Theory of single space photographs --- Russian book Shuttle imaging radar-A (SIR-A) data analysis -- geology of the Ozark Plateau of southern Missouri, land use in rops p 11 A85-38837 Characterization of LANDSAT-4 TM and MSS image p 57 A85-31893 Multispectral identification of clouds and earth surfaces using AVHRR radiometric data p 70 A85-32936 western Illinois, and vegetation types at Koonamore quality for the interpretation of California's agricultural The world's topographic and cadastral mapping Station, Australia resources --- Central Valley p 12 N85-23190 INASA-CR-1757851 p 15 N85-27324 operation p 20 A85-33448 **FARMLANDS** Imaging spectrometry for earth remote sensing Monitoring of marine environment p 44 N85-27341 Modelling the atmospheric boundary layer for remotely p 71 A85-36248 sensed estimates of daily evaporation Contribution of the NOAA-7 and 8 and ARGOS **EARTH TIDES** partnership to white tuna fishing in the northeast Atlantic p 50 A85-37973 Characterization of LANDSAT-4 TM and MSS image Results of a study of nontidal gravity variations p 46 N85-27355 p 20 A85-37310 quality for the interpretation of California's agricultural resources --- Central Valley p 12 N85-23190 Location and data collection satellite system ARGOS **EARTHQUAKES** User's guide --- satellite based localization An initial analysis of LANDSAT-4 Thematic Mapper data Space-borne imagery interpretation - Earthquake studies p 66 N85-27371 Aswan p 27 A85-39095
A seismic ARGOS data collection platform in Aswan for\_the\_discrimination\_of\_agnicultural,\_forested\_wetlands, EQUATORIAL-REGIONSand urban land cover --- Poinsett County, Arkansas, and The French Ocean Climate in Equatonal Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 p 29 N85-27350 Reelfoot Lake and Union City, Tennessee p 12 N85-23193 **FCCENTRIC ORBITS** Applications of ARGOS measurements in equatorial Preliminary evaluation of TM for soils information Orbits for earth observation p 71 A85-37199 Pacific Ocean-atmosphere interaction studies ECOLOGY p 13 N85-23206 p 42 N85-24414 Ecological studies in the Ukai command area The use of Thematic Mapper data for land cover **EQUIPMENT SPECIFICATIONS** discrimination Preliminary results from the UK SATMaP p 1 A85-30727 Practical considerations when using water quality and Monitoring changes in ecology in the Kudremukh mining p 64 N85-23207 structure monitoring sensors as applied to portable p 22 A85-30741 FEASIBILITY ANALYSIS ARGOS satellite transmitter equipment **ECONOMIC ANALYSIS** Remotely Piloted Aircraft for small format aenal p 41 N85-24405 ERS economic impace study [ESA-CR(P)-1979] hotography p 16 A85-32110 **EROSION** p 47 N85-29847 FISHERIES Assessment of the role of remote sensing techniques ECONOMIC IMPACT Automatic buoys to assist the tuna fishery off the ERS economic impace study zores p 37 N85-23879 Contribution of the NOAA-7 and 8 and ARGOS in monitoring shoreline changes - A case study of the [ESA-CR(P)-1979] p 23 A85-30742 p 47 N85-29847 partnership to white tuna fishing in the northeast Atlantic EDUCATION Coastal morphology - A case study of the Gulf of p 46 N85-27355 Geography in the space age p 17 A85-34534 Khambhat (Cambay) p 48 A85-30743

SUBJECT INDEX

**FISHES FOURIER TRANSFORMATION** GEOIDS FISHES Joint experiments programme in remote sensing of Fourier transform of wave data on ARGOS buoys On goold heights and flexure of the lithosphere at p 30 A85-30744 p 38 N85-24351 seamounts marine fish resources [AD-A151220] FISSURES (GEOLOGY) FRANCE Interpretation of space photolineaments The ARGOS system and hydrology The use of Platform GEOLOGICAL FAULTS p 29 N85-25353 Fracture mapping of part of northern Ontario using Terminal Transmitter (PTT) with built-in memory and direct FLEXING reception by the Seine basin hydrology service Landsat imagery On good heights and flexure of the lithosphere at GEOLOGICAL SURVEYS p 55 N85-24389 Application of digitally processed and enhanced Landsat seamounts **FUZZY SETS** p 21 N85-26050 imagery for geological mapping and mineral targeting in [AD-A151220] Issues in designing geographic information systems Precambrian mineralized Singhbhum FLIGHT PLANS under conditions of inexactness p 18 A85-38822 Aerial photo coverage planning - Programs to help Ribar-Orissa p 55 A85-30828 Project Indravati 1 - An appraisal of the natural resources determine mission specifications G of the Indravati basin, Orissa, Madhya Pradesh and **FLIGHT TESTS** On a verification plane for MOS-1 (Marine Observation Maharashtra, India p 31 A85-32149 Assessment of the role of remote sensing techniques Satellite-1) **GEOBOTANY** in monitoring shoreline changes - A case study of the Kerala coast p 23 A85-30742 **FLOOD PLAINS** Geobotany in geological mapping and mineral Application of hierarchical data structures to Kerala coast p 26 A85-35118 exploration geographical information systems Probing of the earth's surface and the atmosphere with The significance of scale in geobotanical applications p 67 N85-27753 an airborne laser spectrometer [AD-A152169] for lithologic discrimination and mineral exploration FLOOD PREDICTIONS Image processing applications for geologic mapping p 26 A85-35119 Applications of GOES VAS data to NOAA's interactive Remote detection of geobotanical anomalies associated p 49 A85-35985 Mapping surficial geology by Landsat - An investigation flash flood analyzer with hydrocarbon microseepage using thematic mapper A graphic approach to the modeling of river discharge into variations in spectral response patterns simulator (TMS) and airborne imaging spectrometer (AIS) p 51 A85-38710 using remote sensing data p 7 A85-35120 Remote sensing for geological mapping, Proceedings FLOODS NASA's land remote sensing plans for the 1980's of the Seminar, Orleans, France, February 2-4, 1984 Inundation mapping of the Sahibi river flood of 1977 p 78 N85-23224 p 47 A85-30731 GEOCHEMISTRY Remote sensing in geology - A decade of progress FLOW CHARACTERISTICS Analysis of the NASA/MSFC airborne Doppler lidar Correlations between spatial remote sensing, results from San Gorgonio Pass, California geochemical and geophysical data in Western France -Importance of pattern recognition for geological remote p 77 N85-27463 An integrative and orientation technique for geological sensing applications and new look at geological maps [NASA-CR-3901] p 24 A85-35105 FLOW VISUALIZATION mapping and ore exploration Convective storm downdraft outflows detected by between spatial **GEODESY** NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar geochemical and geophysical data in Western France -An integrative and orientation technique for geological The development and current state of earth expansion System and fluctuation problems p 20 A85-37302 [NASA-CR-3898] p 77 N85-28511 Standards and specifications for geodetic control mapping and ore exploration Remote sensing systems companisons for geological happing in Brazil p 24 A85-35107 FLUORESCENCE p 21 N85-27374 mapping in Brazil An evaluation of 685 nm fluorescence imagery of coastal [PB85-166478] Geological cartography of Gabon using side-looking p 35 A85-37269 waters Information relative to cartography and geodesy Senes radar imagery - An example of an integrated mapping project p 25 A85-35108 FOLDS (GEOLOGY) Translations, number 42, volume 1 Fracture mapping of part of northern Ontario using p 21 N85-29338 [ISSN-0469-4244] p 23 A85-32145 Reports on cartography and geodesy Series 1 Original Landsat imagery **FOREST FIRES** Santa Ana airflow observed from wildfire smoke patterns p 22 N85-29343 USSN-0469-42361 in satellite imagery p 7 A85-37868 **GEODETIC ACCURACY** FOREST MANAGEMENT An investigation of several aspects of LANDSAT-5 data in North Africa p 3 A85-30845 Utility guide for aerial photography quality --- Palmer County, Shelby, mt, White sands, NM, Preliminary results of an examination of C-band synthetic Great Salt Lake, UT, San Matted Bridge and Sacramento, aperture radar for forestry applications p 4 A85-32113 Venezuela A practical method for monitoring and mapping cutovers [F85-10096] p 65 N85-23214 based on the digital analysis of Landsat data and Minimizing influence of Earth's curvature in projective sensing data automated map production p 5 A85-32135 rectification of space photographs into photoplans and Remote sensing of the leaf area index of temperate photomaps p 21 N85-26829 coniferous forests p 11 A85-38839 **GEODETIC SURVEYS** Remote sensing used for study of forest resources Preliminary processing of laser ranging data from sensing p 12 N85-22440 LAGEOS artificial Earth satellite during short ment program Geobotany ın p 21 N85-25355 exploration **FORESTS** observation period Evaluation of Landsat and airborne multispectral data p 22 N85-29449 Derivation of model topography Geological and aerial photographs for mapping forest features and GEODYNAMICS phenomena in a part of the Godavari basin Example of joint use of data from surface studies and Gobi-Khangai A85-30729 p 1 space photographs in investigating dynamics of zone of North Zeravshan seismogenic faults p 29 N85-25342 Gurvan-Bogd) Land use and forestry studies of Himachal Pradesh p 1 A85-30740 GEOGRAPHIC INFORMATION SYSTEMS Training and testing interpreters of small-scale CIR Computer-assisted synthesis of information from photography - A digitizer-aided approach multispectral imagery p 68 A85-30960 --- Russian book p 2 A85-30830 Avalanche hazard mapping integrating Landsat digital Analysis of photo interpretation test results for seven data and digital topographic data p 58 A85-32120
Structures for geo-information and their application in occurring geophysical fields aerospace image types on the Mendocino National Forest, o 2 A85-30832 selective sampling of digital terrain models p 60 A85-36283 Color and color-IR photography for assessing forest pest p 3 A85-30840 management tactics Pilot land data system --- for satellite imagery Digital processing to improve forest classification results p 17 A85-38274 p 4 A85-30965 at resolutions of 5 to 50 metres Geographic regionalization and the problems related to Seasonal and interannual evolution of the spectral p 18 A85-38705 space-based monitoring signature in forest environments using Landsat data The use of Meteor satellite images for geographic p 6 A85-32139 regionalization of the Soviet Union gionalization of the Soviet Union p 18 A85-38706 Machine processing of remotely sensed data. Thematic **GEOLOGY** p 6 A85-32142 Timber inventory using Landsat The application of computerzed space image Mapper data and geographic information systems, Neutrino geology processing techniques to data from large scale aenal surveys of forests p 7 A85-37119 Proceedings of the Tenth International Symposium, Purdue Use of space University, West Lafayette, IN, June 12-14, 1984 surveys of forests p 73 A85-38801 A georeferenced Landsat digital database for forest p 8 A85-37980 insect-damage assessment

Geologic interpretation of Seasat SAR imagery near the Rio Lacantum, Mexico p 25 A85-35109 Medium to small scale geological maps based on Landsat MSS and RBV data - Case histories of projects p 25 A85-35110 Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin p 25 A85-35111 Recent developments in lithologic mapping using remote p 25 A85-35112 Recent advances in geologic mapping by radar p 25 A85-35114 CO2 laser reflectance of rocks for geological remote p 26 A85-35116 geological mapping and mineral p 26 A85-35118 information content of space images obtained in different spectral bands during the experiment (Mushugai test range p 26 A85-37118 Registering Thematic Mapper imagery to digital elevation p 27 A85-38846 Methods of structural geology and geological mapping p 27 A85-39341 GADB A database facility for modelling naturally courning geophysical fields p 28 N85-23217 NASA's land remote sensing plans for the 1980's p 78 N85-23224 Temperature anomalies above ore bodies p 28 N85-24500 Experience in automation of data processing in interpretation and defining of linear elements from space p 66 N85-25349 Investigation of the earth by means of neutrinos p 27 A85-39825 information petroleum- and ın gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341 Issues in designing geographic information systems GEOMAGNETISM under conditions of inexactness p 18 A85-38822 MAGSAT anomaly field data of the crustal properties Region-based modeling algorithms for remotely-sensed ata p 18 A85-38823 An analysis of the utility of Landsat Thematic Mapper data [E85-101001 p 20 N85-23215 GADB A database facility for modelling naturally data and digital elevation model data for predicting p 28 N85-23217 occurring geophysical fields p 10 A85-38828 erosion Data selection techniques in the interpretation of Experience with the use of supercomputers to process MAGSAT data over Australia p 28 N85-23218 Landsat data p 73 A85-38830 GEOMETRIC ACCURACY Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study p 11 A85-38841 Influence of the viewing geometry on vegetation neasures p 4 A85-32102 measures **GEOGRAPHY** Edge- and shape-based geometric registration p 59 A85-34351 Geography in the space age p 17 A85-34534

p 21 N85-26050

p 23 A85-32145

p 22 A85-30733

p 22 A85-30735

p 68 A85-31397

p 23 A85-31736

p 24 A85-35101

p 24 A85-35102

p 24 A85-35103

p 24 A85-35105

sensing,

p 23

remote

results

cover-type discrimination

with digital terrain data

Landsat MSS data

programme

Collection of in situ forest canopy spectra using a

Spectral response curve models applied to forest

Modelling forest biomass accessibility in South Carolina

Discrimination of tropical forest cover types using

The use of Thematic Mapper data for land cover

discrimination Preliminary results from the UK SATMaP

D 10 A85-38812

p 10 A85-38820

p 11 A85-38842

p 12 A85-38843

p 64 N85-23207

helicopter - A discussion of methodology and prelimin

**GEOMETRIC RECTIFICATION (IMAGERY)** 

The use of multisensor images for Earth Science p 69 A85-32211 applications Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845 Analysis and evaluation of the LANDSAT-4 MSS and TM sensors and ground data processing systems Early p 63 N85-23189

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and photomaps p 21 N85-26829

Reports on cartography and geodesy Series 1 Onginal

reports, number 93 [ISSN-0469-4236] p 22 N85-29343 Dynamic rectification of airborne scanner digital image p 67 N85-29344 recordings

GEOMORPHOLOGY

Coastal morphology - A case study of the Gulf of p 48 A85-30743 Khambhat (Cambay) Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116

Correlations between satellite data and radar, thermographic, and multispectral surveys for the geomorphological characterization of a region of southern p 48 A85-32146 Quebec Mapping surficial geology by Landsat - An investigation

into variations in spectral response patterns p 23 A85-32148

GEOPOTENTIAL HEIGHT

On goold heights and flexure of the lithosphere at seamounts

(AD-A151220) p 21 N85-26050 GEOSYNCHRONOUS ORBITS

Orbits for earth observation p 71 A85-37199 GEOTEMPERATURE

Temperature anomalies above ore bodies

p 28 N85-24500 GEOTHERMAL RESOURCES

Use of satellite images to obtain accurate snowmelting runoff forecasts and to survey geothermal activity alor

o 50 A85-37975 Los Andes range, Chile GLACIERS

Synthetic aperture radar capabilities for snow and glacie monitoring p 50 A85-37976

**GOES SATELLITES** 

Applications of GOES VAS data to NOAA's interactive p 49 A85-35985 flash flood analyzer A case study on the application of geosynchronous satellite infrared data to estimate soil moisture

p 7 A85-37742
An objective technique for the delineation and extrapolation of thunderstorms from GOES satellite data p 19 A85-39537

GOVERNMENT/INDUSTRY RELATIONS

Remote sensing - A tortuous trip to marketplace

p 78 A85-34218

**GRAPH THEORY** A graphic approach to the modeling of river discharge

p 51 A85-38710 using remote sensing data **GRASSLANDS** New remote sensing techniques for monitoring the

fescue grasslands of Alberta p 5 A85-32133 Estimating canopy cover in drylands with Landsat MSS p 8 A85-37966 Assessing biophysical characteristics of grassland from p 11 A85-38838 spectral measurements

Standards and specifications for geodetic control

networks

[PB85-166478] p 21 N85-27374 **GRAVITY ANOMALIES** 

Results of a study of nontidal gravity variations

p 20 A85-37310

**GREAT LAKES (NORTH AMERICA)** -Machine-classification-of-freshwater ice-types-from

Landsat-1 digital data using ice albedos as training sets p 51 A85-38392

GREENLAND

GRAVIMETRY

Operational experiences with the ARGOS system in p 45 N85-27353 Greenland

**GROUND TRUTH** 

Simulation of errors in a Landsat based crop estimation p 6 A85-33556

A preliminary method for complex aerovisual and subsatellite observations ground-based agrophytocenosis status (through the example of winter p 9 A85-38708 wheat) An algorithm for reconstructing correlating senes of ground-based and remote observations

p 61 A85-38711 Simultaneous Earth observations from 2 satellites [NASA-TM-86204] p 76 N85-27325 **GROUND WATER** 

Ground water exploration in the Saurashtra geninsula p 47 A85-30730 The evaluation of hydrogeological conditions in the southern part of Tamil Nadu using remote-sensing p 48 A85-30732

Landsat model for groundwater exploration in Nuba Mountains, Sudan p 49 A85-37961 GULF STREAM

Circulation pattern of the North Atlantic, part of the warmwater sphere research effort at Kiel University p 38 N85-23888

Coastal morphology - A case study of the Gulf of Khambhat (Cambay) p 48 A85-30743

Н

HABITABILITY

NASA's land remote sensing plans for the 1980's p 78 N85-23224

Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120

The sensitivity of the computational scheme for taking into account the contribution of atmospheric haze to variations in initial data --- image brightness correction p 61 A85-38716

HEAT CAPACITY MAPPING MISSION

The contribution of the heat capacity mapping mission to the interpretation of thermal infrared data

p 56 A85-30955 Image processing applications for geologic mapping p 23 A85-31736
Testing the radiometric stability of HCMM thermal

p 58 A85-32109 A thermal study of the waters of the St Lawrence estuary

by means of the HCMM satellite - Preliminary results p 48 A85-32124

HEIGHT

Transient sea surface height variation and the p 31 A85-32121 Seasat-altimeter data application p 31 A85-32121
Analysis of the inflow layer and air-sea interactions in Hurncane Frederic (1979)

p 37 N85-23271 [NASA-CR-175616] HELICOPTER PERFORMANCE

Collection of in situ forest canopy spectra using a

helicopter - A discussion of methodology and preliminary results p 10 A85-38812 HIERARCHIES

Application of hierarchical data structures to geographical information systems p 67 N85-27753 AD-A1521691

HIGH RESOLUTION

A Shuttle Imaging Spectrometer Experiment for the late p 69 A85-32214 1980's Angle dependence of radiances in the ozone-sensing channel of the HIRS --- High Resolution Infrared Radiation Sounder p 70 A85-32871 Impacts of high resolution data on an operational remote

sensing program p 62 A85-38814

HISTORIES

A history of the Everglades and future implications of aenal photography p 2 A85-30827 Environmental management needs

[DE85-007859] p 78 N85-29405

**HONDURAS** 

Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study p 11 A85-38841 HURRICANES

Analysis of the inflow layer and air-sea interactions in Humcane Frederic (1979)

p 37 N85-23271 [NASA-CR-175616]

Hurncane structure and dynamics from stereoscopic and

infrared satellite observations and radar data p 76 N85-25988

Analysis of the inflow and air-sea interactions in humcane Frederic p 76 N85-25990 Hurncane Research Division, fiscal year 1984 programs, fiscal year 1985 projections p 77 N85-27491

HYDROCARBONS

Remote detection of geobotanical anomalies associated with hydrocarbon microseepage using thematic mapper simulator (TMS) and airborne imaging spectrometer (AIS) p 7 A85-35120

HYDROCLIMATOLOGY

Hydrometric telemetry in Canada p 54 N85-23882 HYDROELECTRICITY

The use of Landsat images in the selection of hydroelectric-transmission comdors on the North Shore Preliminary study of the principal surface-material types p 48 A85-32138

HYDROGEOLOGY

Ground water exploration in the Saurashtra peninsula p 47 A85-30730

The evaluation of hydrogeological conditions in the southern part of Tamil Nadu using remote-sensing techniques p 48 A85-30732

**HYDROGRAPHY** 

A thermal study of the waters of the St. Lawrence estuary by means of the HCMM satellite - Preliminary results p 48 A85-32124

Study of Volga river delta using space photosurvey p 55 N85-25340 HYDROLOGY

Use of Landsat imagery to detect hydrologic indicators the Niger river regime p 49 A85-33874 of the Niger river regime

Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, June 25-July 7, 1984 p 49 A85-37951

Application of space sciences to hydrology and water resources - The potential and practical use as reflected p 49 A85-37969 by WMO expenence

Review of remote sensing applications in hydrology and water resources management in India

p 49 A85-37970 Landsat Thematic Mapper studies of land cover spatial p 50 A85-37972 vanability related to hydrology

Hydrologic appraisal of rivers plan-form at confluence zone A case study using Landsat MSS data

p 50 A85-37977 Utilization of aerial and space remote-sensing data

studies of land water --- Russian book p 52 A85-39347

Snow reflectance from Thematic Mapper

p 52 N85-23205 The ARGOS system and hydrology Results obtained ORSTROM and benefits a degree of p 54 N85-23881 standardization Automatic hydrological data collection facility using

p 54 N85-24363 ARGOS Hydrological data collection from Swedish mountain p 54 N85-24388

The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service

p 55 N85-24389 Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data p 55 N85-27348 collection

The ARGOS system in Brazil --- hydrology p 55 N85-27349

HYDROLOGY MODELS

Remote sensing based continuous hydrologic p 50 A85-37971 Modeling of spatially distributed objects using remote sensing data --- in hydrology p 51 A85-38709 A graphic approach to the modeling of river discharge using remote sensing data p 51 A85-38710

Remote Sensing of Snow and Evapotranspiration p 53 N85-23223 INASA-CP-23631 Snowmelt-runoff model utilizing remotely-sensed data p 53

Snowmelt runoff model in Japan p 53 N85-23227 Application of Martinec-Rango model to river basin in p 53 N85-23228

**HYDROMETEOROLOGY** 

On the use of satellite estimates of precipitation in initial analyses for numerical weather prediction

p 74 A85-39829 Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and satellite observations p 43 N85-25354

Calculation of the emissivity of ice and snow covers in the microwave region p 51 A85-38587

ICE FORMATION

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and atellite observations p 43 N85-25354

ICE MAPPING

Synthetic aperture radar capabilities for snow and glacier nonitoring p 50 A85-37976 Analysis of hydrometeorological conditions in Antarctic monitoring coastal waters according to data from hydrological and p 43 N85-25354 satellite observations

ICE REPORTING Summer Arctic sea ice character from satellite microwave data p 33 A85-35170 Active microwave measurements of Arctic sea ice under

p 33 A85-35171 summer conditions Processes and imagery of first-year fast sea ice during p 33 A85-35172 the melt season

IMAGE ANALYSIS SUBJECT INDEX

Analysis and evaluation of the LANDSAT-4 MSS and Temporal variations of the microwave signatures of sea Resource inventory through instructionally-based digital ice during the late spring and early summer near Mould processing system p 56 A85-30953 TM sensors and ground data processing systems Early results p 63 N85-23189 p 34 A85-35173 Computer-assisted synthesis of information from Characterization of LANDSAT-4 TM and MSS image Arctic atmosphere - Ice interaction studies using p 68 A85-30960 multispectral imagery Nimbus-7 SMMR p 35 A85-37752 quality for the interpretation of California's agricultural 7 1/2' map-image extraction from precision processed resources --- Central Valley Digital processing of single-band (33 6 GHz) microwave p 12 N85-23190 Landsat multispectral scanner (MSS) and Thematic p 36 A85-38819 Preliminary evaluation of Thematic Mapper image data magery for sea ice classification Mapper (TM) imagery using a microcomputer and EROS IMAGE ANALYSIS p 63 N85-23194 computer compatible tapes p 57 A85-30962 p 57 A85-32107 Video image analysis IMAGERY with a distributed p 57 A85-30963 Multi-band image classification Automated computer monitoring sea-ice temperature by An assessment of the potential role of multispectral architecture use of NOAA satellite data p 31 A85-32112 magery in bathymetric charting Digital processing to improve forest classification results First steps towards integration of remote sensing and [AD-A152460] p 46 N85-28438 at resolutions of 5 to 50 metres p 4 A85-30965 p 58 A85-32115 **IMAGING TECHNIQUES** digital mapping Image processing applications for geologic mapping Short summary of multispectral imaging systems Avalanche hazard mapping integrating Landsat digital p 23 A85-31736 data and digital topographic data p 58 A85-32120
The analysis of Landsat MSS data for characterizing p 69 A85-32212 Current limitations quantitative airborne Utility of some image enhancement techniques for p 57 A85-32105 sediment dispersal in the Beaufort Sea thermography reconnaissance soil mapping - A case study from southern p 48 A85-32122 Automated cartography and geomorphological p 10 A85-38829 Dryland salinity mapping in southern Alberta from boundary-unit detection in the Mopti-Bandiagara (Mali) Digital image mapping of Antarctica using NOAA-7 Landsat data - A semioperational program region using multisatellite data from Landsat, SIR-A radar AVHRR imagery p 67 N85-29340 p 58 A85-32116 INDIAN OCEAN p 5 A85-32132 and SPOT simulation The use of Landsat images in the selection of SPOT and Landsat-4 simulations Generalization of MRC Remanent magnetization model for the broken ndge hydroelectric-transmission corndors on the North Shore satellite magnetic anomaly p 20 N85-23219 biophysical-inventory data on the upper St Lawrence INDIAN SPACE PROGRAM Preliminary study of the principal surface-material types Preliminary analysis p 48 A85-32131 The evolution of satellite-based remote-sensing capabilities in India p 68 A85-30726 p 48 A85-32138 Edge- and shape-based geometric registration apabilities in India p 68 A85-30726
A decade of remote sensing in India - Some salient of bidirectional reflectances p 59 A85-34351 Landsat-image analysis - Problems and possible Imaging spectrometry for earth remote sensing p 71 A85-36248 p 59 A85-32141 p 72 A85-37952 results solutions Cobalt-abitibi project - Landsat image analysis in the Review of remote sensing applications in hydrology and Determination of sea-ice concentration according to Canadian Shield application of the geological analysis aid water resources management in India satellite imagery p 34 A85-37114 D 23 A85-32144 p 49 A85-37970 package The application of computenzed space image Texture analysis and classification of airborne radar data INDIAN SPACECRAFT processing techniques to data from large scale aerial surveys of torests p 7 A85-37119 with synthetic aperture p 60 A85-34865 Indian remote-sensing satellite - Utilization plan Recent advances in geologic mapping by radar p 77 A85-30746 Development and application of the Interactive Planetary p 25 A85-35114 Capability of Bhaskara-II satellite microwave radiometer Image Processing System (IPIPS) in support of remote Merging Landsat and spaceborne radar data over brightness temperature data to discriminate soil moisture p 72 A85-37956 p 72 A85-37962 sensing studies at Imperial College p 7 A85-37958 conditions of Indian landmass Region-based modeling algorithms for remotely-sensed Machine processing of remotely sensed data. Thematic INFESTATION Mapper data and geographic information systems, data p 18 A85-38823 Training and testing interpreters of small-scale CIR Spaceborne and airborne radar, infrared and thermal Proceedings of the Tenth International Symposium, Purdue photography - A digitizer-aided approach studies of coastal processes at the Mississippi Delta, University, West Lafayette, IN, June 12-14, 1984 p 2 A85-30830 p 52 A85-38827 p 73 A85-38801 Louisiana Detection of forest stress 35mm color Space-borne imagery interpretation - Earthquake studies Use of the TM tasseled cap transform for interpretation photographs p 2 A85-30831 ın Aswan Aswan p 27 A85-39095 An investigation of several aspects of LANDSAT-5 data of spectral contrasts in an urban scene The devastation of a vineyard by phylloxera p 18 A85-38811 p 3 A85-30838 quality --- Palmer County, Shelby, mt, White sands, NM, Digital processing of single-band (33 6 GHz) microwave Color and color-IR photography for assessing forest pest Great Salt Lake, UT, San Matted Bridge and Sacramento, magery for sea ice classification p 36 A85-38819 p 3 A85-30840 California management tactics Region-based modeling algorithms for remotely-sensed [E85-10096] p 65 N85-23214 p 18 A85-38823 A georeferenced Landsat digital database for forest data Air photo analysis, photo interpretation logic, and feature An analysis of the utility of Landsat Thematic Mapper insect-damage assessment p 8 A85-37980 extraction INFORMATION RETRIEVAL data and digital elevation model data for predicting soil p 67 N85-29347 (AD-A1539261 p 10 A85-38828 Precedency control and other semantic integrity issues erosion IMAGE CONTRAST Scene segmentation through region growing ın a workbench database p 65 N85-23220 The sensitivity of the computational scheme for taking p 62 A85-38832 INFORMATION SYSTEMS into account the contribution of atmospheric haze to Adaptive filtering and image segmentation for SAR Test and evaluation plan for the Centralized Storm Information System p 77 N85-28508 variations in initial data --- image brightness correction p 62 A85-38833 p 61 A85-38716 LANDSAT-4 Science Characterization Early Results INFORMATION THEORY **IMAGE CORRELATORS** Volume 4 Applications --- agriculture, soils land use, Assessment of some methods for increasing the Correlations between satellite data and radar, thermographic, and multispectral surveys for the geology, hydrology, wetlands, water quality, biomass information content of an active-passive microwave remote identification, and snow mapping sensing system p 36 A85-38578 geomorphological characterization of a region of southern [E85-10070] p 63 N85-23186 Issues in designing geographic information systems under conditions of inexactness p 18 A85-38822 Quebec p 48 A85-32146 A concept for the processing and display of Thematic p 18 A85-38822 IMAGE ENHANCEMENT Mapper data p 63 N85-23196 A preliminary comparison of the information content of The stereoscopic accentuation of SPOT images Early results of investigations of LANDSAT 4 Thematic data from the LANDSAT 4 Thematic Mapper and Multispectral Scanner --- Arkansas p 64 N85-23199 p 58 A85-32108 Mapper and Multispectral Scanner applications p 64 N85-23199 A method for enhancing Landsat images for classifying Washington, D.C. p 64 N85-23200 p 5 A85-32134 INFRARED IMAGERY Comparative techniques used to evaluate Thematic Mapping of wolframite region in the Sirohi district Remote sensing of surface and near surface Mapper data for land cover classification in Logan County, (Rajasthan) in India from different digitally enhanced data temperature from remotely piloted aircraft West Virginia p 65 N85-23209 p 26 A85-38808 products of Landsat p 68 A85-30543 Comparison of MSS and TM data for landcover Video color infrared imagery - A future natural resource classification in the Chesapeake Bay area A preliminary report --- Taylor's Island, Maryland p 65 N85-23210 Application of digital image enhancement processing of Landsat data for terrain mapping of southern Huairou management tool p 56 A85-30844 Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day County of Beijing (Peking), China p 61 A85-38813 The contribution of the heat capacity mapping mission Utility of some image enhancement techniques for to the interpretation of thermal infrared data p 56 A85-30955 p 53 N85-23229 reconnaissance soil mapping - A case study from southern p 10 A85-38829 Identifying land use structures of multizonal aerospace A comparison of techniques for radiometric calibration photographs using digital data processing
p 66 N85-25348 A concept for the processing and display of Thematic of aenal infrared thermal images p 56 A85-30956 p 63 N85-23196 Testing the radiometric stability of HCMM thermal CNPq/INPE LANDSAT system Report of activities from First results of oceanography utilization of infrared high infrared data p 58 A85-32109 October 1, 1983 to September 30, 1984 --- Brazil resolution picture transmission images A cool anomaly off northern California - An investigation [E85-10097] p 66 N85-27318 [KNMI-TR-59] p 47 N85-29511 using IR imagery and in situ data p 33 A85-35167 Noise correction on LANDSAT images using a spline-like IMAGE INTENSIFIERS A case study on the application of geosynchronous algorithm satellite infrared data to estimate soil moisture A method for enhancing Landsat images for classifying [E85-10098] p 66 N85-27319 p 5 A85-32134 plant cover p 7 A85-37742 Study of the urban evolution of Brasilia with the use of IMAGE PROCESSING Hurricane structure and dynamics from stereoscopic and LANDSAT data Acquisition, processing and photo interpretation of an infrared satellite observations and radar data [E85-10101] p 19 N85-27321 aerial color infrared photograph p 2 A85-30829 p 76 N85-25988 Reports on cartography and geodesy Series 1 Original The RMS TM resource measurement system, Technique that uses satellite, radar, and conventional reports, number 93 description and applications --- Resource Management [ISSN-0469-4236] data for analyzing and short-range forecasting of p 22 N85-29343 System p 56 A85-30842 Air photo analysis, photo interpretation logic, and feature precipitation from extratropical cyclones

[PB85-164994]

**INFRARED RADIATION** 

p 67 N85-29347

p 63 N85-23187

p 55 N85-27499

p 11 A85-38836

Estimation of leaf area index from bidirectional spectral

reflectance data by inverting a canopy reflectance model

16-19, 1983

Extraction of information from remotely sensed images.

Proceedings of the Conference on Techniques for

Extraction of Information from Remotely Sensed Images,

Rochester Institute of Technology, Rochester, NY, August

p 56 A85-30951

extraction

[AD-A153926]

**IMAGE RESOLUTION** 

Overview of TM applications research reports

#### INFRARED RADIOMETERS

Angle dependence of radiances in the ozone-sensing channel of the HIRS --- High Resolution Infrared Radiation p 70 A85-32871 Monitoring global vegetation dynamics using the NOAA/AVHER A85-38840 p 11 INFRARED REFLECTION

Influence of rock-soil spectral on the variation p 9 A85-38393 assessment of green biomass INFRARED SCANNERS

Changes in vegetation spectra with leaf detenoration nder two methods of preservation p 6 A85-33558 Thermal Infrared Multispectral Scanner (TIMS) An under two methods of preservation investigator's guide to TIMS data

[NASA-CR-175875] p 77 N85-28286 Developments in remote sensing [B8580069] p 67 N85-28441 INFRARED SPECTRA

A method for estimating soil moisture availability [NASA-CR-175606] p 14 N85p 14 N85-23238 INLAND WATERS

Alaska meander lines determined by vegetation appearance on color infrared photographs p 2 A85-30834 Utilization of aerial and space remote-sensing data

studies of land water --- Russian book p.52 A85-39347

INSOLATION

Evaluation of satellite derived estimates of solar radiation (E85-10087) p 14 N85-24507

INSTRUMENT ORIENTATION

Navigation and sensor orentation systems in aerial p 71 A85-36284 photography INTERNAL WAVES

Theory of radar imaging of internal waves p 30 A85-30980 The imaging of internal waves by the SEASAT-A

synthetic aperture radar [ARE(PORTLAND)TN-720/84] p 36 N85-22860 IONOSPHERIC PROPAGATION

Measurement of the condition of the sea by ionospheric backscatter radar p 34 A85-36427 **IRON ORES** 

Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741 region

IRRIGATION Ecological studies in the Ukai command area

p 1 A85-30727

#### **JAPAN**

General report of the researches of snowpack properties, snowmelt runoff and evapotranspiration in Japan p 53 N85-23225 Snowmelt runoff model in Japan p 53 N85-23227 Application of Martinec-Rango model to river basin in p 53 N85-23228 Japan Analysis of NIMBUS-7 SMMR data --- Hokkaido, Japan p 54 N85-23232 snow cover Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of evaporation model to estimate equilibrium evapotranspiration by remote sensing technique p 13 N85-23234

On a verification plane for MOS-1 (Marine Observation p 31 A85-32149

### K

#### KANSAS

Modeling the backscattering and transmission properties of vegetation canopies p 15 N85-27320 [E85-10099]

Ĺ

#### LABRADOR

Drifting budys on the Labrador shelf

p 42 N85-24415

#### LAGEOS (SATELLITE)

JAPANESE SPACECRAFT

Preliminary processing of laser ranging data from LAGEOS artificial Earth satellite during short ment program p 21 N85-25355 observation period LAKE ICE

Machine classification of freshwater ice types from Landsat-1 digital data using ice albedos as training sets p 51 A85-38392

#### LAKES

Optimization of the reference calibration method for remote sensing data on natural waters

p 51 A85-38714

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes -- Lake Chicot, Arkansas p 52 N85-23204

#### LAND

A classification of MSS data for land-cover mapping p 60 A85-34438 The NASA land processes program - Status and future p 78 A85-38802 directions

A method for determining Antarctic land ice parameters from satellite multichannel microwave measurements

p 35 A85-37511 Synthetic aperture radar capabilities for snow and glacier p 50 A85-37976

LAND MANAGEMENT Timber inventory using Landsat p 6 A85-32142

Ecological studies in the Ukai command area

p 1 A85-30727 p 16 A85-30737 Land-use survey of Idukki Distnot Land-use and land-cover mapping and change detection in Tripura using satellite Landsat data

p 16 A85-30738 Urban change detection and land-use mapping of Delhi p 16 A85-30739

Land use and forestry studies of Himachal Pradesh p 1 A85-30740

Mapping of land/soil degradation using multispectral ata p 16 A85-32127 Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zones

p 5 A85-32128 Landsat study of changes in surface cover

p 59 A85-32140 An evaluation of simulated Thematic Mapper data and Landsat MSS data for discriminating suburban and regional land use and land cover p 17 A85-33557

Texture analysis and classification of airborne radar data with synthetic aperture p 60 A85-34865 Experimental land mapping based on photographic data A85-37117

Landsat Thematic Mapper studies of land cover spatial variability related to hydrology p 50 A85-37972 The utility of Thematic Mapper sensor characteristics for surface mine monitoring p 27 A85-38810 Identifying vegetative land use classes during each of

the four seasons on aerial photographs and Landsat imagery in coastal South Carolina p 10 A85-38815 Analysis methods for Thematic Mapper data of urban regions p 18 A85-38816 Characterization of LANDSAT-4 TM and MSS image

quality for the interpretation of California's agricultural esources --- Central Valley p 12 N85-23190 An initial analysis of LANDSAT-4 Thematic Mapper data resources --- Central Valley for the discrimination of agricultural, forested wetlands, and urban land cover --- Poinsett County, Arkansas, and Reelfoot Lake and Union City, Tennessee

p 12 N85-23193 Ouick look analysis of TM data of the Washington, istrict of Columbia, area p 64 N85-23197 District of Columbia, area Thematic Mapper data quality and performance assessment in renewable resources/agriculture/remote

sensing p 12 N85-23201 Preliminary comparisons of the information content and utility of TM versus MSS data p 64 N85-23202

The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207 programme Preliminary study of information extraction of LANDSAT

TM data for a suburban/regional test site

p 65 N85-23208 Comparative techniques used to evaluate Thematic

Mapper data for land cover classification in Logan County, West Virginia p 65 N85-23209 Companson of MSS and TM data for landcover

classification in the Chesapeake Bay area A preliminary report --- Taylor's Island, Maryland p 65 N85-23210 Atlas of archived vegetation, land-use and seasonal

Albedo data sets [NASA-TM-86199] p 14 N85-24508

Identifying land use structures of multizonal aerospace photographs using digital data processing

p 66 N85-25348 Expenence of the Institute of Space Research with the use of remote sensing in urban planning studies

[INPE-3159-PRE/533] p 19 N85-27770 **LANDFORMS** 

Airphoto interpretation of vegetation and landforms for soil mapping p 15 N85-28436

### LANDSAT SATELLITES

Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil exploration in Gujarat, India p 22 A85-30736 Monitoring changes in ecology in the Kudremukh mining

Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the Kerala coast p 23 A85-30742

Image processing applications for geologic mapping p 23 A85-31736

The analysis of Landsat MSS data for characterizing sediment dispersal in the Beaufort Sea

p 48 A85-32122

Application of remote sensing by means of a satellite in surveying the water resources of the Sahel

p 48 A85-32123 Landsat information as basis for a permanent monitoring

of ecology and agricultural situations in tropical zones p 5 A85-32128

Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates p 5 A85-32129

Overcoming technical problems to make Landsat useful for timely crop area estimates p 5 A85-32130

A method for enhancing Landsat images for classifying p 5 A85-32134 plant cover A practical method for monitoring and mapping cutovers

based on the digital analysis of Landsat data and automated map production p 5 A85-32135 Classification of mires using multitemporal Landsat MSS p 5 A85-32136 and topographic map data

The use of Landsat images in the selection of hydroelectric-transmission comdors on the North Shore Preliminary study of the principal surface-material types

p 48 A85-32138 Seasonal and interannual evolution of the spectral

signature in forest environments using Landsat data p 6 A85-32139

Landsat study of changes in surface cover

p 59 A85-32140 Estimation of bidirectional reflectances Landsat-image analysis - Problems and possible p 59 A85-32141

Timber inventory using Landsat p 6 A85-32142 Cobalt-abitibi project - Landsat image analysis in the Canadian Shield application of the geological analysis aid p 23 A85-32144 package

Basic outline of a guide for the use of Landsat images p 23 A85-32147 in geology Mapping surficial geology by Landsat - An investigation into variations in spectral response patterns

p 23 A85-32148 Applications of Landsat data and the data base p 59 A85-32210 Mapping native vegetation using Landsat data

p 6 A85-33352 Simulation of errors in a Landsat based crop estimation p 6 A85-33556

An evaluation of simulated Thematic Mapper data and Landsat MSS data for discriminating suburban and regional land use and land cover p 17 A85-33557 Use of Landsat imagery to detect hydrologic indicators

of the Niger river regime p 49 A85-33874 Geological interpretation of Landsat imagery of the angladesh Ganges delta p 24 A85-33875 Bangladesh Ganges delta Edge- and shape-based geometric registration

p 59 A85-34351

Reducing Landsat MSS scene variability

p 59 A85-34429 Landsat data for operational mineral exploration - The Canadian experience p 24 A85-35106 Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin, p 25 A85-35111

Landsat data for population estimates - Approaches to inter-censal counts in the rural Sudan

p 17 A85-37955 Landsat 4 and 5 status and results from Thematic p 61 A85-38803 Mapper data analyses Reflectance measurements from Landsat Thematic p 62 A85-38824 Mapper over rugged terrain

Expenence with the use of supercomputers to process p 73 A85-38830 Landsat data-Scene segmentation through region growing p 62 A85-38832

Thematic Mapper data quality and performance assessment in renewable resources/agniculture/remote p 12 N85-23201

Study of the urban evolution of Brasilia with the use of LANDSAT data

[E85-10101] p 19 N85-27321

LANDSAT 1 Machine classification of freshwater ice types from

Landsat-1 digital data using ice albedos as training sets p 51 A85-38392 Developments in remote sensing

[B8580069] p 67 N85-28441 LANDSAT 4

Influence of the viewing geometry on vegetation p 4 A85-32102 **LANDSAT 5** SUBJECT INDEX Microwave model prediction and verifications for

MARINE BIOLOGY

p 46 N85-29505

p 60 A85-37121

[AD-A153582]

METEOROLOGICAL CHARTS

Digital processing of meteorological satellite imagery

The use of Landsat-4 MSS digital data in temporal data

vegetated terrain sets and the evaluation of scene-to-scene registration accuracy p 59 A85-33449 Estimating ocean production from satellite-derived [E85-10102] p 15 N85-27322 chlorophyll - Insights from the EASTROPAC data set Spectral characterization of the Landsat Thematic p 32 A85-35047 LIGHT AIRCRAFT Mapper sensors p 72 A85-37983 Towards a study of synoptic-scale variability of the The possibility of using small unmanned aircraft for Selecting band combinations from multispectral data California current system [NASA-CR-175871] studies of terrestnal natural resources p 60 A85-38272 Wetlands classification using Landsat Thematic Mapper p 46 N85-28529 p 73 A85-38702 MARINE CHEMISTRY LIMNOLOGY data unsupervised classification approach Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical Optimization of the reference calibration method for p 51 A85-38817 remote sensing data on natural waters LANDSAT-4 Science Characterization Early Results dynamics in ocean frontal areas p 51 A85-38714 Volume 4 Applications --- agriculture, soils land use, [AD-A153765] p 47 N85-29507 Automatic hydrological data collection facility using geology, hydrology, wetlands, water quality, biomass MARINE ENVIRONMENTS ARGOS p 54 N85-24363 identification, and snow mapping Marine aerosol optical depth from satellite-detected LINE SPECTRA p 63 N85-23186 [E85-100701 radiance p 35 A85-37729 Expenence in automation of data processing in Overview of TM applications research reports Monitoring of manne environment p 44 N85-27341 interpretation and defining of linear elements from space p 63 N85-23187 MARINE METEOROLOGY p 66 N85-25349 photographs Impact of Thematic Mapper sensor characteristics on Measurement of the condition of the sea by ionospheric LINEARITY classification accuracy --- suburban Washington, D.C. p 34 A85-36427 backscatter radar On geoid heights and flexure of the lithosphere at Maryland, and the Chesapeake Bay p 63 N85-23188 Satellite derived atmosphere water vapor as a tracer seamounts Analysis and evaluation of the LANDSAT-4 MSS and of large scale interactions between the atmosphere and [AD-A151220] p 21 N85-26050 TM sensors and ground data processing systems Early p 35 A85-37754 LITHOLOGY p 63 N85-23189 results Science opportunities using the NASA scatterometer on Recent developments in lithologic mapping using remote Characterization of LANDSAT-4 TM and MSS image N-ROSS sensing data p 25 A85-35112 quality for the interpretation of California's agricultural resources --- Central Valley p 12 N85-23190 [NASA-CR-175639] p 74 N85-23222 Lithologic mapping in deeply weathered terrain using Automatic weather stations in Antarctica visible-NIR, SWIR and mid-infrared remote sensing techniques p 26 A85-35115 Evaluation of Thematic Mapper performance as applied p 75 N85-24360 to hydrocarbon exploration --- Ontano, Canada, Cement, The development of an automated marine The significance of scale in geobotanical applications Oklahoma, and Death Valley, California meteorological data system MARINE RESOURCES p 39 N85-24362 for lithologic discrimination and mineral exploration p 27 N85-23191 p 26 A85-35119 An initial analysis of LANDSAT-4 Thematic Mapper data Joint expenments programme in remote sensing of Geologic utility of LANSDAT-4 TM data --- Death Valley, for the discrimination of agricultural, forested wetlands, p 30 A85-30744 marine fish resources California and the Silver Bell area of southern Anzona and urban land cover --- Poinsett County, Arkansas, and Monitoring environmental resources through NOAA's p 28 N85-23192 polar orbiting satellites p 17 A85-36282 Contribution of the NOAA-7 and 8 and ARGOS Reelfoot Lake and Union City, Tennessee LITHOSPHERE p 12 N85-23193 On goold heights and flexure of the lithosphere at A preliminary comparison of the information content of partnership to white tuna fishing in the northeast Atlantic eamounts data from the LANDSAT 4 Thematic Mapper and Multispectral Scanner --- Arkansas p 64 N85-23199 p 46 N85-27355 [AD-A151220] p 21 N85-26050 MARKET RESEARCH LONG TERM EFFECTS Early results of investigations of LANDSAT 4 Thematic Remote sensing - A tortuous trip to marketplace The World Ocean Circulation Experiment Mapper and Multispectral Scanner applications p 78 A85-34218 p 31 A85-32166 Washington, DC MARSHLANDS LOW COST Preliminary comparisons of the information content and Classification of mires using multitemporal Landsat MSS Main results and perspectives of some Chilean utility of TM versus MSS data p 64 N85-23202 and topographic map data p 5 A85-32136 experiences developed with low cost and accurate spatial Remote sensing of coastal wetlands biomass using Snow reflectance from Thematic Mapper remote sensing technology p 72 A85-37957 Practical considerations when using water quality and p 52 N85-23205 Thematic Mapper wavebands --- Lewes, Delaware The use of Thematic Mapper data for land cover p 12 N85-23198 structure monitoring sensors as applied to portable discrimination Preliminary results from the UK SATMaP MATHEMATICAL LOGIC ARGOS satellite transmitter equipment p 64 N85-23207 Issues in designing geographic information systems p 41 N85-24405 Relative accuracy assessment of LANDSAT-4 MSS and under conditions of inexactness p 18 A85-38822 Development of a low cost drifting buoy TM data for level 1 land cover inventory --- Washington, MATHEMATICAL MODELS p 41 N85-24408 p 65 N85-23212 DC The microwave propagation and backscattering CNPq/INPE LANDSAT system Report of activities from characteristics of vegetation --- wheat, sorghum, soybeans October 1, 1983 to September 30, 1984 --- Brazil and corn fields in Kansas [E85-10097] p 66 N85-27318 [E85-10088] p 13 N85-23213 LANDSAT 5 Remanent magnetization model for the broken ndge atellite magnetic anomaly p 20 N85-23219 **MAGNETIC ANOMALIES** An investigation of several aspects of LANDSAT-5 data satellite magnetic anomaly Vertical component Magsat anomalies and Indian Estimation of regional evapotranspiration using remotely quality --- Palmer County, Shelby, mt, White sands, NM, tectonic boundaries p 26 A85-37150 Great Sait Lake, UT, San Matted Bridge and Sacramento, sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research MAGSAT anomaly field data of the crustal properties of Australia [E85-10100] [E85-10096] p 65 N85-23214 Center and determination of Priestley-Taylor parameter p 20 N85-23215 LARGE SPACE STRUCTURES p 13 N85-23233 An investigation of the crustal properties of Australia Orbiting multi-beam microwave radiometer for soil Estimation of regional evapotranspiration using remotely and surrounding regions derived from interpretation of MAGSAT anomaly field data p 20 N85-23216 moisture remote sensing p 14 N85-23818 Large space antenna technology applied to sensed land surface temperature Part 2 Application of Remanent magnetization model for the broken ridge equilibrium evaporation model to estimate evapotranspiration by remote sensing technique radar-imaging, rain-rate measurements, and ocean wind satellite magnetic anomaly p 20 N85-23219 p 13 N85-23234 p 37 N85-23820 sensing **MAGNETIC SURVEYS** LASER APPLICATIONS On goold heights and flexure of the lithosphere at GADB A database facility for modelling naturally courring geophysical fields p 28 N85-23217 Optical noncontact methods for the study of the world seamounts occurring geophysical fields p 30 A85-31890 p 21 N85-26050 ocean --- Russian book [AD-A151220] Data selection techniques in the interpretation of CO2 laser reflectance of rocks for geological remote p 28 N85-23218 MAGSAT data over Australia Companson of a diffusion model with dye dispersion p 26 A85-35116 MAGNETIZATION measurements to study turbulence in coastal waters Airborne measurements of the sea state from mirror Remanent magnetization model for the broken ridge [INPE-3492-PRE/729] p 46 N85-27504 reflections of the beam of a continuous-wave lase p 20 N85-23219 satellite magnetic anomaly
MAN ENVIRONMENT INTERACTIONS p 34 A85-35879 Alaska meander lines determined by vegetation LASER RANGE FINDERS Ecological studies in the Ukai command area appearance on color infrared photographs p 1 A85-30727
MANAGEMENT INFORMATION SYSTEMS Preliminary processing of laser ranging data from LAGEOS artificial Earth satellite during short ment program p 2 A85-30834 The RMS TM resource measurement system, description and applications --- Resource Management System p 56 A85-30842 p 21 N85-25355 observation period An observation of snow melting process from remotely LASER SPECTROMETERS p 50 A85-37974 sensed data Probing of the earth's surface and the atmosphere with MESH an airborne laser spectrometer p 68 A85-31397 MAPPING Determination of electromagnetic properties of mesh p 6 A85-32142 LEAVES Timber inventory using Landsat p 6 A85-32142 Comparative study of the digital analysis of areas of material using advanced radiometer techniques Pubescence of Texas lantana affects leaf spectra and p 74 N85-23855 the Earth's surface prepared for planting using different p 3 A85-30836 imagery MESOSCALE PHENOMENA classification algorithms Changes in vegetation spectra with leaf deterioration Mesoscale analysis and modeling group [INPE-3359-PRE/637] n 15 N85-27545 p 6 A85-33558 under two methods of preservation p 76 N85-26001 German contributions to the cartography of Antarctica Diurnal movements of cotton leaves expressed as Convective storm downdraft outflows detected by by means of photogrammetry and remote sensing p 22 N85-29342 thermodynamic work and entropy changes NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar p8 A85-38273 System Reports on cartography and geodesy Senes 1 Onginal Changes in spectral properties of detached birch [NASA-CR-3898] p 77 N85-28511 reports, number 93 p 9 A85-38394 leaves Arctic mixed layer dynamics [ISSN-0469-4236] p 22 N85-29343

An investigation of the crustal properties of Australia

p 20 N85-23216

and surrounding regions derived from interpretation of

MAGSAT anomaly field data

spectral data

coniferous forests

Techniques for the estimation of leaf area index using

Remote sensing of the leaf area index of temperate

MAPS

p 10 A85-38835

p 11 A85-38839

#### METEOROLOGICAL PARAMETERS

Remote sensing and climate parameters

p 70 A85-32853 Retneval of cloud cover parameters from multispectral p 70 A85-35124 satellite images

Development and application of the Interactive Planetary Image Processing System (IPIPS) in support of remote sensing studies at Imperial College p 72 A85-37956 Methods for the meteorological interpretation of satellite spectral measurements p 36 A85-38681

Meteorological buoys developed at the EERM boratory p 40 N85-24374 laboratory The Tropical Ocean and Global Atmosphere program

p 42 N85-24411 (TOGA) An overview of NDBC drifting buoy development programs --- NOAA Data Buoy Center (DBC)

p 43 N85-24422 p 76 N85-26013 East coast snowstorm survey

Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance p 45 N85-27344 Hurncane Research Division, fiscal year 1984 programs

fiscal year 1985 projections p 77 N85-27491 METEOROLOGICAL RADAR

Inference of rain rate profile and path-integrated rain rate by an airborne microwave rain scatterometer p 49 A85-36565

Airborne Doppler radar velocity measurements of precipitation seen in ocean surface reflection p 36 A85-38866

Hurncane structure and dynamics from stereoscopic and infrared satellite observations and radar data p 76 N85-25988

#### **METEOROLOGICAL SATELLITES**

Digital processing of meteorological satellite imagery

p 60 A85-37121
Conference on Satellite/Remote Sensing and pplications Clearurge De-Applications, Clearwater Beach, FL, June 25-29, 1984, p 71 A85-37726 Preprints

Meteorological satellite data useful for agroclimate p 7 A85-37730

Monitoring global vegetation dynamics using the NOAA/AVHRR p.11 A85-38840 p 11 A85-38840 Remote sensing used for study of forest resources p 12 N85-22440

#### **METEOROLOGICAL SERVICES**

Project PAPA The integration of drifting buoy data into an operational meteorological service

p 37 N85-23874 The ARGOS communications performance trials p 40 N85-24376

Collecting meteorological reports with the ARGOS p 40 N85-24398 system

### METEOROLOGY

Environmental satellites o 19 N85-24392 Hurncane Research Division, fiscal year 1984 programs, fiscal year 1985 projections p 77 N85-27491

#### METEOSAT SATELLITE

Companson of Meteosat-2 and NOAA-7 data used for understanding the environment of albacore in the east Atlantic p 31 A85-32118

Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar [NASA-CR-175711] p 29 N85-25927

MICROCOMPUTERS

The RMS TM resource measurement system, description and applications --- Resource Management System p 56 A85-30842

#### **MICRODENSITOMETERS**

Estimating phytomass of sagebrush habitat types from p 6 A85-33450 microdensitometer data

MICROPROCESSORS

Automatic hydrological data collection facility using ARGOS p.54 N85-24363 p 54 N85-24363

#### **MICROSEISMS**

A\_seismic\_ARGOS\_data\_collection platform

#### p 29 N85-27350 **MICROWAVE ANTENNAS**

Orbiting multi-beam microwave radiometer for soil p 14 N85-23818 moisture remote sensing MICROWAVE ATTENUATION

The microwave propagation and backscattering characteristics of vegetation --- wheat, sorghum, soybeans and corn fields in Kansas

#### p 13 N85-23213 [E85-10088] MICROWAVE EMISSION

Calculation of the emissivity of ice and snow covers in the microwave region p 51 A85-38587 Remote Sensing of Snow and Evapotranspiration

INASA-CP-23631 p 53 N85-23223 Microwave radiometer observations of snowpack properties and companson of U.S. Japanese results ---Hokkaido, Japan and Vermont and North Dakota test p 53 N85-23230 Microwave remote sensing of soil moisture

p 13 N85-23235 MICROWAVE IMAGERY

Summer Arctic sea ice character from satellite microwave data p 33 A85-35170 Active microwave measurements of Arctic sea ice under p 33 A85-35171 summer conditions

Temporal vanations of the microwave signatures of sea ice during the late spring and early summer near Mould Bay, NWT p 34 A85-35173 Digital processing of single-band (33 6 GHz) microwave

imagery for sea ice classification p 36 A85-38819 Digital processing of passive Ka-band microwave images for sea-ice classification

[AD-A150686] p 43 N85-24511

#### MICROWAVE RADIOMETERS

On a verification plane for MOS-1 (Manne Observation Satellite-1) p 31 A85-32149 A concept for an advanced earth observation spacecraft p 70 A85-32228

Arctic atmosphere - Ice interaction studies using Numbus-7 SMMR p 35 A85-37752 Capability of Bhaskara-II satellite microwave radiometer

brightness temperature data to discriminate soil moisture conditions of Indian landmass p 7 A85-37958 p 7 A85-37958 Assessment of some methods for increasing the

information content of an active-passive microwave remote p 36 A85-38578 sensing system Studies on physical properties of snow based on multi

channel microwave radiometer p 54 N85-23231 Orbiting multi-beam microwave radiometer for soil p 14 N85-23818 moisture remote sensing p 14 N85-23818

Determination of electromagnetic properties of mesh

material using advanced radiometer techniques p 74 N85-23855

#### MICROWAVE SCATTERING

On the microwave reflectivity of small-scale breaking p 34 A85-36570 and backscattering water waves The microwave propagation

characteristics of vegetation --- wheat, sorghum, soybeans and corn fields in Kansas [E85-10088] p 13 N85-23213

Modeling the backscattering and transmission properties of vegetation canopies [E85-10099] p 15 N85-27320

Microwave model prediction and verifications for vegetated terrain [E85-10102] p 15 N85-27322

#### MICROWAVE SENSORS

Inference of rain rate profile and path-integrated rain rate by an airborne microwave rain scatterometer

p 49 A85-36565 Dielectric properties and microwave remote sensing p 72 A85-37959

#### MICROWAVE SOUNDING

A method for determining Antarctic land ice parameters from satellite multichannel microwave measurements p 35 A85-37511

### **MICROWAVE SPECTROMETERS**

Effects of wind speed and rain on precipitable water and cloud liquid water based on SCAMS data --- SCAnning p 70 A85-32863 Microwave Spectrometer

### MIDLATITUDE ATMOSPHERE

Rain estimation in extratropical cyclones using GMS p 49 A85-37855

### MINERAL DEPOSITS

Geologic utility of LANSDAT-4 TM data --- Death Valley, California and the Silver Bell area of southern Arizona p 28 N85-23192

#### MINERAL EXPLORATION

Application of digitally processed and enhanced Landsat imagery for geological mapping and mineral targeting in the Singhbhum Precambrian mineralized belt, Bihar-Orissa p 22 A85-30733 Targeting areas for mineral exploration - A case study

from Örissa, India p 22 A85-30734 Correlations between spatial remote sensing,

geochemical and geophysical data in Western France -An integrative and orientation technique for geological mapping and ore exploration p 24 A85-35105 Landsat data for operational mineral exploration - The Canadian expenence p 24 A85-35106

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory

p 26 A85-35117 Geobotany in geological mapping and mineral p 26 A85-35118

The significance of scale in geobotanical applications for lithologic discrimination and mineral exploration

p 26 A85-35119 Mapping of wolframite region in the Sirohi district (Rajasthan) in India from different digitally enhanced data products of Landsat p 26 A85-38808

Complex aenal and space remote-sensing studies of Sibena --- Russian book p 27 A85-38896

Evaluation of Thematic Mapper performance as applied to hydrocarbon exploration -- Ontano, Canada, Cement, Oklahoma, and Death Valley, California

o 27 N85-23191

#### MINERALOGY

Lithologic mapping in deeply weathered terrain using visible-NIR, SWIR and mid-infrared remote sensing p 26 A85-35115 techniques

#### MINERALS

Temperature anomalies above ore bodies

p 28 N85-24500

#### MINES (EXCAVATIONS)

Comparative techniques used to evaluate Thematic Mapper data for land cover classification in Logan County, p 65 N85-23209 West Virginia

#### MISSION PLANNING

Aenal photo coverage planning - Programs to help determine mission specifications p 55 A85-30828 p 55 A85-30828

#### **MODULATION TRANSFER FUNCTION**

An investigation of several aspects of LANDSAT-5 data quality --- Palmer County, Shelby, mt, White sands, NM, Great Salt Lake, UT, San Matted Bridge and Sacramento, California

[E85-10096] p 65 N85-23214

#### MOISTURE CONTENT

Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day p 53 N85-23229 method

Microwave radiometer observations of snowpack properties and companson of U.S. Japanese results ---Hokkaido, Japan and Vermont and North Dakota test sites p 53 N85-23230

Studies on physical properties of snow based on multichannel microwave radiometer p 54 N85-23231 Determination of electromagnetic properties of mesh material using advanced radiometer techniques

p 74 N85-23855 Measurement of water equivalent of mountain snow cover --- ARGOS system p 54 N85-24386

A georeferenced Landsat digital database for forest p 8 A85-37980 insect-damage assessment MOUNTAINS

Drainage network analysis of Landsat images of the Olympus-Pieria mountain area, northern Greece

p 51 A85-37982 Hydrological data collection from Swedish mountain p 54 N85-24388

#### **MULTIBEAM ANTENNAS**

Orbiting multi-beam microwave radiometer for soil noisture remote sensing p 14 N85-23818

#### MULTISENSOR APPLICATIONS

The use of multisensor images for Earth Science applications p 69 A85-32211 A concept for an advanced earth observation p 70 A85-32228 spacecraft

#### MULTISPECTRAL BAND SCANNERS

7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes omputer compatible tapes p 57 A85-30962 Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada

p 4 A85-32126 SPOT and Landsat-4 simulations Generalization of MRC biophysical-inventory data on the upper St Lawrence Preliminary analysis p 48 A85-32131 Classification of mires using multitemporal Landsat MSS

and topographic map data nd topographic map data p 5 A85-32136
The use of multisensor images for Earth Science p 69 A85-32211 Short summary of multispectral imaging systems

p 69 A85-32212 Multispectral identification of clouds and earth surfaces using AVHRR radiometric data p 70 A85-32936

The use of Landsat-4 MSS digital data in temporal data ets\_and the\_evaluation\_of scene-to-scene\_registration accuracy p 59 A85-33449 Geological interpretation of Landsat imagery of the

p 24 A85-33875 Bangladesh Ganges delta Reducing Landsat MSS scene vanability

p 59 A85-34429 A classification of MSS data for land-cover mapping p 60 A85-34438

Spectral characterization of the Landsat Thematic p 72 A85-37983 Mapper sensors Landsat 4 and 5 status and results from Thematic

Mapper data analyses p 61 A85-38803 Information content companson of Thematic Mapper, multispectral scanner and airborne Thematic Mapper

ata p 61 A85-38807 Companson of classification schemes for MSS and TM data p 62 A85-38821 data Preliminary compansons of the information content and

utility of TM versus MSS data

p 64 N85-23202

p 44 N85-27340

p 45 N85-27345

p 46 N85-28529

p 31 A85-32118

p 34 A85-36427

n 37 N85-23874

p 37 N85-23879

p 38 N85-23891

p 75 N85-24348

p 75 N85-24353

p 75 N85-24355

p 39 N85-24358

p 39 N85-24359

p 39 N85-24366

p 39 N85-24367

at the EERM p 40 N85-24374

p 40 N85-24381

p 40 N85-24391

p 40 N85-24398

p 40 N85-24399

p 40 N85-24400

p 41 N85-24401

p 41 N85-24402

p 41 N85-24405

p 41 N85-24406

p 41 N85-24409

p 41 N85-24410

p 42 N85-24415

p 42 N85-24417

p 43 N85-24418

p 43 N85-24422

p 44 N85-27333

p 44 N85-27338

p 44 N85-27339

p 44 N85-27341

p 45

N85-27344

Long term drifting float for measuring mean oceanic

Routine wave and meteorological measurements in

circulation using ARGOS system

Monitoring of marine environment

offshore areas using ARGOS data surveillance

Equatorial Atlantic

A85-32166

p 31

The use of Thematic Mapper data for land cover The ARGOS system status report p 74 N85-23884 ARGOS-tracked drifters in the Rockall Trough discrimination Preliminary results from the UK SATMaP Automatic weather stations in Antarctica programme n 64 N85-23207 p 75 N85-24360 Results of an initial trial of a satellite telemetering buoy Thermal Infrared Multispectral Scanner (TIMS) An measuring near surface current The ARGOS system after 3 years operation investigator's guide to TIMS data Towards a study of synoptic-scale variability of the p 39 N85-24368 n 77 N85-28286 [NASA-CR-175875] California current system NOAA 6 SATELLITE An assessment of the potential role of multispectral INASA-CR-1758711 The ARGOS system main characteristics -OCEAN DATA ACQUISITIONS SYSTEMS imagery in bathymetric charting based localization p 39 N85-24367 [AD-A1524601 p 46 N85-28438 Comparison of Meteosat-2 and NOAA-7 data used for The ARGOS program --- satellite based localization Dynamic rectification of airborne scanner digital image understanding the environment of albacore in the east p 75 N85-24775 p 67 N85-29344 recordings
MULTISPECTRAL PHOTOGRAPHY Location and data collection satellite system ARGOS The World Ocean Circulation Experiment User's guide --- satellite based localization Computer-assisted synthesis of information from p 66 N85-27371 p 68 A85-30960 Measurement of the condition of the sea by ionospheric multispectral imagery First results of oceanography utilization of infrared high Mapping of land/soil degradation using multispectral backscatter radar resolution picture transmission images [KNMI-TR-59] p 16 A85-32127 Project PAPA The integration of drifting buoy data into data n 47 N85-29511 An evaluation of simulated Thematic Mapper data and an operational meteorological service NOAA 7 SATELLITE Landsat MSS data for discriminating suburban and regional Comparison of Meteosat-2 and NOAA-7 data used for p 17 A85-33557 Automatic buoys to assist the tuna fishery off the land use and land cover understanding the environment of albacore in the east Selecting band combinations from multispectral data p 31 A85-32118 p 60 A85-38272 Operational experiences with the ARGOS system in The ARGOS system main characteristics --- satellite Problems related to the collection, systematization and oceanography and oil spill emergency planning Future p 39 N85-24367 based localization plans for the use of the ARGOS system as a component in offshore data collection system p 38 N85-23887 use of a priori data during the digital processing of The ARGOS program --- satellite based localization multispectral data obtained from space p 75 N85-24775 p 73 A85-38701 Some experience from ARGOS stations in the open Availability of the ARGOS system based on the orbital The use of artificial objects in calibrating remote sensing characteristics of the TIROS-N satellites --oceanographic/meteorological data p 45 N85-27352
Contribution of the NOAA-7 and 8 and ARGOS Proceedings of the ARGOS Users Conference on Data data on the quality of natural waters p 51 A85-38713 Relative geological information yield from small-scale Collection and Location by Satellite multizonal space images (example of Fergama depression The development of Platform Transmitter Terminal (PTT) partnership to white tuna fishing in the northeast Atlantic p 29 N85-25343 and its application for drifting buoys and its mountainous margins) p 46 N85-27355 Identifying land use structures of multizonal aerospace US programs using the ARGOS data collection and Location and data collection satellite system ARGOS photographs using digital data processing platform location system User's guide --- satellite based localization p 66 N85-25348 Inferences of future operations drawn from past and p 66 N85-27371 present applications of drifting buoys p 38 N85-24356 Information relative to cartography and geodesy Series US program in anchored data buoy and the other fixed Translations, number 42, volume 1 observation platforms [ISSN-0469-4244] p 21 N85-29338 One thousand days in the brine --- platform transmitter Digital image mapping of Antarctica using NOAA-7 NASA PROGRAMS terminals AVHRR imagery p 67 N85-29340
First results of oceanography utilization of infrared high Pilot land data system --- for satellite imagery Data Collection and Platform Location by Satellite A85-38274 ARGOS Users' Conference resolution picture transmission images The NASA land processes program - Status and future The ARGOS system main characteristics --- satellite p 47 N85-29511 (KNMI-TR-591 p 78 A85-38802 based localization **NOAA 8 SATELLITE** NASA's land remote sensing plans for the 1980's Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites ---Meteorological buoys developed p 78 N85-23224 laboratory NATIONAL PARKS The ARGOS contribution to the successful dredging of oceanographic/meteorological data p 45 N85-27352 A history of the Everglades and future implications of a deep moored current meter Contribution of the NOAA-7 and 8 and ARGOS p 2 A85-30827 aerial photography Data Collection and Platform Location by Satellite partnership to white tuna fishing in the northeast Atlantic NATURAL GAS EXPLORATION ARGOS users' Conference p 46 N85-27355 Evaluation of Thematic Mapper performance as applied Collecting meteorological reports with the ARGOS First results of oceanography utilization of infrared high to hydrocarbon exploration --- Ontario, Canada, Cement, system resolution picture transmission images Oklahoma, and Death Valley, California The French Ocean Climate p 47 N85-29511 p 27 N85-23191 (FOCAL) Drifter Program, 1983-1984 p 40 N85-24 The Deep Drifter Program --- deep ocean sensors NOISE REDUCTION NAVIGATION INSTRUMENTS Navigation and sensor orientation systems in aerial Adaptive filtering and image segmentation for SAR analysis p 62 A85-38833 A85-36284 US programs using the ARGOS data collection and Reports on cartography and geodesy Series 1 Original NEAR INFRARED RADIATION platform location system reports, number 93 Space methods in oceanology Telemetered meteorological and engineering data from [ISSN-0469-4236] p 22 N85-29343 [NASA-TM-77652] p 44 N85-26047 a deep sea moored body in the Long Term Upper Ocean NUMERICAL WEATHER FORECASTING NEARSHORE WATER Study (LOTUS) On the use of satellite estimates of precipitation in initial A cool anomaly off northern California - An investigation Practical considerations when using water quality and analyses for numerical weather prediction using IR imagery and in situ data p 33 A85-35167 structure monitoring sensors as applied to portable ARGOS satellite transmitter equipment p 74 A85-39829 NEPHANALYSIS Multispectral identification of clouds and earth surfaces using AVHRR radiometric data
NEUTRINO BEAMS p 70 A85-32936 O Drifting buoy development and future programs -Japanese ARGOS program panese Angus program

Development of a low cost drifting buoy

p 41 N85-24408 Investigation of the earth by means of neutrinos OCEAN BOTTOM Neutrino geology NEW ENGLAND (US) p 27 A85-39825 Assessing LANDSAT TM and MSS data for detecting Data Collection and Platform Location by Satellite p 37 N85-23203 submerged plant communities East coast snowstorm survey p 76 N85-26013 Remanent magnetization model for the broken ridge ARGOS Users' Conference NIGER US program using the ARGOS data collection and p 20 N85-23219 satellite magnetic anomaly Use of Landsat imagery to detect hydrologic indicators platform location system The Deep Drifter Program --- deep ocean sensors A85-33874 of the Niger river regime p 49 A report on the DRIFTERS program --- buoys p 40 N85-24400 p 42 N85-24413 Drifting buoys on the Labrador shelf NIMBUS 6 SATELLITE **OCEAN COLOR SCANNER** Effects of wind speed and rain on precipitable water An evaluation of 685 nm fluorescence imagery of coastal and cloud liquid water based on SCAMS data --- SCAnning p 35 A85-37269 Microwave Spectrometer NIMBUS 7 SATELLITE p 70 A85-32863 A new versatile ARGOS PTT for oceanographic Characteristic vector analysis of inflection ratio spectra applications --- Platform Transmit Terminal (PTT) New technique for analysis of ocean color data Joint experiments programme in remote sensing of [NASA-TP-2428] N85-23237 p 37 p 30 A85-30744 manne fish resources OCEAN CURRENTS Overview of data processing at AES local user terminals Arctic atmosphere - Ice interaction studies using -- Canadian Atmospheric Environment Service (AES) The World Ocean Circulation Experiment p 35 A85-37752 Nimbus-7 SMMR p 31 A85-32166 Evaluation of sensitivity decay of Coastal Zone Colour An overview of NDBC drifting buoy development Earth and space science - Oceans p 32 A85-32215 Scanner (CZCS) detectors by comparison with in situ programs --- NOAA Data Buoy Center (DBC) Observing large-scale temporal variability of ocean near-surface radiance measurements currents by satellite altimetry - With application to the p 35 A85-37986 Data Collection and Platform Location by Satellite Antarctic circumpolar current p 33 A85-35166 NOAA SATELLITES Circulation pattern of the North Atlantic, part of the ARGOS Users' Conference Automated computer monitoring sea-ice temperature by DB2 and DB3 The next generation --- buoys p 44 N85-27337 warmwater sphere research effort at Kiel University use of NOAA satellite data p 31 A85-32112 p 38 N85-23888 Applications of GOES VAS data to NOAA's interactive Development of a Lagrangian drifting buoy

Surface currents in the tropical Pacific during 1979-1980

Long term drifting float for measuring mean oceanic

The Deep Drifter Program --- deep ocean sensors

Development of a Lagrangian drifting buoy

circulation using ARGOS system

p 38 N85-24354

p 40 N85-24400

p 44 N85-27338

p 44 N85-27339

using drifting buoys

p 49 A85-35985

p 17 A85-36282

p 74 N85-23870

p 74 N85-23871

Monitoring environmental resources through NOAA's

The ARGOS system status report after 2 years

System performance, data distribution and technical files

A-14

flash flood analyzer

--- ÁRGOS project

polar orbiting satellites

SUBJECT INDEX

Results of an initial trial of a satellite telemetering buoy measuring near surface current p 45 N85-27345 An operational buoy network collecting meteorological p 45 N85-27351 Availability of the ARGOS system based on the orbital characteristics of the satellites TIROS-N oceanographic/meteorological data p 45 N85-27352 Contribution of the NOAA 7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic p 46 N85-27355 First results of oceanography utilization of infrared high resolution picture transmission images [KNMI-TR-59] p 47 N85-29511 ERS economic impace study p 47 N85-29847 (ESA-CR(P)-1979) OCEAN DYNAMICS The World Ocean Circulation Experiment p 31 A85-32166 Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047 Characteristic vector analysis of inflection ratio spectra. New technique for analysis of ocean color data p 37 N85-23237 [NASA-TP-2428] A large-scale air sea interaction project over the Pacific p 39 N85-24373 First results of oceanography utilization of infrared high resolution picture transmission images p 47 N85-29511 OCEAN MODELS Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal (INPE-3492-PRF/7291 p 46 N85-27504 Research Review, 1983 p 46 N85-29433 [NASA-TM-86219] OCEAN SURFACE Satellite-derived sea surface temperature - Workshop comparisons A85-30599 Theory of radar imaging of internal waves p 30 A85-30980 Optical noncontact methods for the study of the world ocean --- Russian book p 30 A85-31890 Transient sea surface height variation and the p 31 A85-32121 Seasat-altimeter data application TOPEX ground data system p 32 A85-32192 Investigation of the atmospheric aerosols and water vapor by the AVHRR radiometer (visible and IR) on board NOAA-7 p 32 A85-32872 Theory of synthetic aperture radar ocean imaging - A IARSEN view p 32 A85-35164 MARSEN VIEW A review of satellite altimeter measurement of sea surface wind speed - With a proposed new algorithm p 32 A85-35165 Investigations of the ocean surface by radiophysical p 34 A85-35832 means from aerospace platforms Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser p 34 A85-35879 On the microwave reflectivity of small-scale breaking n 34 A85-36570 Versatile airborne laser system for remote probing of ocean, atmosphere, and farmland p 73 A85-38336 Airborne Doppler radar velocity measurements of precipitation seen in ocean surface reflection p 36 A85-38866 Surface currents in the tropical Pacific during 1979-1980 p 38 N85-24354 using drifting buoys p 38 N85-24354
Results of an initial trial of a satellite telemetering buoy neasuring near surface current p 45 N85-27345 OCEAN TEMPERATURE Satellite-derived sea surface temperature - Workshop compansons p 30 A85-30599 Surface radiation in the tropical Pacific p 30 A85-31200 Investigation of the atmospheric aerosols and water vapor by the AVHRR radiometer (visible and IR) on board

p 32 A85-32872 A cool anomaly off northern California - An investigation

using IR imagery and in situ data p 33 A85-35167 OCEANOGRAPHIC PARAMETERS

Optical noncontact methods for the study of the world p 30 ocean --- Russian book A85-31890 The World Ocean Circulation Experiment

A85-32166 p 31 Theory of synthetic aperture radar ocean imaging - A p 32 A85-35164 A cool anomaly off northern California - An investigation using IR imagery and in situ data p 33 A85-35167 Investigations of the ocean surface by radiophysical neans from aerospace platforms p 34 A85-35832
Development and application of the Interactive Planetary means from aerospace platforms Image Processing System (IPIPS) in support of remote sensing studies at Impenal College p 72 A85-37956 Distinguishing homogeneous regions of water surfaces on the basis of space imagery p 36 A85-38712

The Tropical Ocean and Global Atmosphere program p 42 N85-24411 (TOGA) Space methods in oceanology p 44 N85-26047 INASA-TM-776521 Function of remote sensing in Brazil (INPF-3314-PRF/6211 p 77 N85-27329 Diffusion coefficients for coastal water determined from aenal photographs p 44 N85-27331 [INPE-3413-PRE/679] Towards a study of synoptic-scale variability of the California current system [NASA-CR-175871] p 46 N85-28529 **OCEANOGRAPHY** p 32 A85-32192 TOPEX ground data system Earth and space science · Oceans p 32 A85-32215 Science opportunities using the NASA scatterometer on INASA-CR-1756391 p 74 N85-23222 Remote sensing of directional wave spectra using the surface contour radar p 43 N85-24510 [NASA-TM-84440] Arctic mixed layer dynamics p 46 N85-29505 (AD-A153582) OCEANS Assessing LANDSAT TM and MSS data for detecting p 37 N85-23203 submerged plant communities Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical dynamics in ocean frontal areas [AD-A153765] p 47 N85-29507 OIL EXPLORATION exploration in Guiarat, India

Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil p 22 A85-30736

Evaluation of Thematic Mapper performance as applied to hydrocarbon exploration --- Ontano, Canada, Cement, Oklahoma, and Death Valley, California

p 27 N85-23191 Use of space information in petroleum- and gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341

Operational experiences with the ARGOS system in oceanography and oil spill emergency planning. Future plans for the use of the ARGOS system as a component in offshore data collection system p 38 N85-23887 Arabian gulf circulation --- pollution monitoring

p 42 N85-24412

#### OPTICAL DATA PROCESSING

Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, Purdue University, West Lafayette, IN, June 12-14, 1984

p 73 A85-38801 Impacts of high resolution data on an operational remote p 62 A85-38814 sensing program

#### OPTICAL PROPERTIES

Assessing LANDSAT TM and MSS data for detecting p 37 N85-23203 submerged plant communities OPTICAL BADAR

Analysis of the NASA/MSFC airborne Doppler lidar sults from San Gorgonio Pass, California p 77 N85-27463 [NASA-CR-3901]

Convective storm downdraft outflows detected by NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar p 77 N85-28511 [NASA-CR-3898]

#### OPTICAL THICKNESS

Investigation of the atmospheric aerosols and water apor by the AVHRR radiometer (visible and IR) on board p 32 A85-32872 NOAA-7

Manne aerosol optical depth from satellite-detected p 35 A85-37729 radiance

#### ORBITAL SPACE STATIONS Space methods in oceanology

\_[NASA-TM-776521\_\_\_\_ \_\_\_ p 44 N85-26047 **ORCHARDS** 

Inventorying Florida's citrus groves p 3 A85-30841 OROGRAPHY An observation of snow melting process from remotely

p 50 A85-37974 sensed data Drainage network analysis of Landsat images of the

Olympus-Piena mountain area, northern Greece p 51 A85-37982

#### ORTHOPHOTOGRAPHY

The significance of orthophoto maps for developing countries p 21 N85-29341

Angle dependence of radiances in the ozone-sensing channel of the HIRS --- High Resolution Infrared Radiation

P

#### PACIFIC OCEAN

Surface radiation in the tropical Pacific

p 30 A85-31200 A cool anomaly off northern California - An investigation p 33 A85-35167 using IR imagery and in situ data Surface currents in the tropical Pacific during 1979-1980 p 38 N85-24354 using drifting buoys A large-scale air sea interaction project over the Pacific basın p 39 N85-24373

Applications of ARGOS measurements in equatorial Pacific Ocean-atmosphere interaction studies

p 42 N85-24414

The ARGOS system used for tracking gray whales n 45 N85-27347

#### PARTICLE DENSITY (CONCENTRATION)

Evaluation of atmospheric particulate concentrations derived from analysis of ratio Thematic Mapper data p 19 A85-38825

#### PATTERN RECOGNITION

Importance of pattern recognition for geological remote sensing applications and new look at geological maps p 24 A85-35103

Scene segmentation through region growing

p 62 A85-38832 Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 Comparative techniques used to evaluate Thematic Mapper data for land cover classification in Logan County.

p 65 West Virginia Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory --- Washington.

p 65 N85-23212 Identifying land use structures of multizonal aerospace photographs using digital data processing

p 66 N85-25348 Interpretation of space photolineaments

p 29 N85-25353 Air photo analysis, photo interpretation logic, and feature extraction

p 67 N85-29347 (AD-A153926)

#### PATTERN REGISTRATION

The use of Landsat-4 MSS digital data in temporal data sets and the evaluation of scene-to-scene registration p 59 A85-33449 Edge- and shape-based geometric registration

p 59 A85-34351 Study of the urban evolution of Brasilia with the use of I ANDSAT data

[E85-10101] p 19 N85-27321

#### PERIODIC VARIATIONS

Results of a study of nontidal gravity variations p 20 A85-37310

PERMITTIVITY

#### Microwave remote sensing of soil moisture

p 13 N85-23235

#### PETROGRAPHY

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern D Valley, California PETROLOGY p 28 N85-23195

CO2 laser reflectance of rocks for geological remote p 26 A85-35116

### PHOTOGEOLOGY

#### Application of digitally processed and enhanced Landsat imagery for geological mapping and mineral targeting in Singhbhum Precambnan mineralized Bihar-Orissa p 22 A85-30733 Targeting areas for mineral exploration - A case study

p 22 A85-30734 from Onssa, India Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil exploration in Gujarat, India p 22 A85-30736

Computer-assisted synthesis of information from p 68 A85-30960 multispectral imagery Probing of the earth's surface and the atmosphere with an airborne laser spectrometer p 68 Å85-31397 The use of Langsat images in the selection of hydroelectric-transmission corndors on the North Shore Preliminary study of the principal surface-material types

p 48 A85-32138 Cobalt-abitibi project - Landsat image analysis in the Canadian Shield application of the geological analysis aid p 23 A85-32144 package

Basic outline of a guide for the use of Landsat images p 23 A85-32147 in geology Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984

p 24 A85-35101 Applications of space images for neotectonic studies

p 24 A85-35104

Medium to small scale geological maps based on Landsat MSS and RBV data - Case histories of projects p 25 A85-35110

SUBJECT INDEX **PHOTOGRAMMETRY** 

Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin Venezuela p 25 A85-35111

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory

p 26 A85-35117 Geobotany in geological mapping and mineral p 26 A85-35118 exploration Mapping of wolframite region in the Sirohi district

(Rajasthan) in India from different digitally enhanced data products of Landsat p 26 A85-38808 Registering Thematic Mapper imagery to digital elevation

p 27 A85-38846 Methods of structural geology and geological mapping p 27 A85-39341 --- Russian book

Evaluation of Thematic Mapper performance as applied to hydrocarbon exploration --- Ontano, Canada, Cement, Oklahoma, and Death Valley, California

p 27 N85-23191 Geologic utility of LANSDAT-4 TM data --- Death Valley, California and the Silver Bell area of southern Anzona p 28 N85-23192

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death p 28 N85-23195 Valley, California

Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of North Zeravshan seismogenic faults p 29 N85-25342 Relative geological information yield from small-scale

multizonal space images (example of Fergama depression p 29 N85-25343 and its mountainous margins) Function of remote sensing in Brazil

[INPE-3314-PRE/621] p 77 N85-27329

PHOTOGRAMMETRY Alaska meander lines determined by vegetation

appearance on color infrared photographs p.2 A85-30834

Surveying and mapping with space data p 71 A85-36286

Expectations for aerial photography as seen from the p 71 A85-36287 side of the user A combined photogrammetric and Doppler adjustment p 60 A85-38271

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and p 21 N85-26829 photomaps

Standards and specifications for geodetic control

p 21 N85-27374 [PB85-166478] German contributions to the cartography of Antarctica by means of photogrammetry and remote sensing

p 22 N85-29342

PHOTOGRAPHIC PROCESSING EQUIPMENT

Features of exposure conditions and photolab processing of materials obtained from aerial photography using the MKF-6M camera
PHOTOINTERPRETATION p 73 A85-38703

Evaluation of Landsat and airborne multispectral data and aerial photographs for mapping forest features and phenomena in a part of the Godavari basin

A85-30729 p 1 Acquisition, processing and photo interpretation of an aerial color infrared photograph D 2 A85-30829 Training and testing interpreters of small-scale CIR photography - A digitizer-aided approach

p 2 A85-30830 Analysis of photo interpretation test results for seven aerospace image types on the Mendocino National Forest, p 2 A85-30832 California

The interpretability of small and medium scale aerospace imagery for wildland environments of California and p 2 A85-30833 Colorado

The contribution of the heat capacity mapping mission to the interpretation of thermal infrared data

p 56 A85-30955 Multi-band image classification with a distributed architecture p 57 A85-30963 Geologic interpretation of Seasat SAR imagery near the p 25 A85-35109 Rio Lacantum, Mexico

The use of Meteor satellite images for geographic egionalization of the Soviet Union p 18 A85-38706 regionalization of the Soviet Union A preliminary method for complex aerovisual and ground-based subsatellite observations

agrophytocenosis status (through the example of winter p 9 A85-38708 wheat) Assessment of the study and mapping of pastures in semiand zones using remote sensing methods

p 9 A85-38719 Use of the TM tasseled cap transform for interpretation

of spectral contrasts in an urban scene p 18 A85-38811 Space-borne imagery interpretation - Earthquake studies p 27 A85-39095

Experience in combined special mapping using space p 62 N85-22449 information

Overview of TM applications research reports

p 63 N85-23187 Preliminary study of information extraction of LANDSAT TM data for a suburban/regional test site

p 65 N85-23208 Identifying land use structures of multizonal aerospace photographs using digital data processing

p 66 N85-25348 Interpretation of space photolineaments

p 29 N85-25353 Airphoto interpretation of vegetation and landforms for

p 15 N85-28436 Air photo analysis, photo interpretation logic, and feature extraction

(AD-A153926) p 67 N85-29347

#### **PHOTOMAPPING**

Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh using Landsat MSS data p 1 A85-30728

Evaluation of Landsat and airborne multispectral data and aerial photographs for mapping forest features and phenomena in a part of the Godavan basin

p 1 A85-30729 Inundation mapping of the Sahibi river flood of 1977

p 47 A85-30731 Application of digitally processed and enhanced Landsat imagery for geological mapping and mineral targeting in Singhbhum Precambrian mineralized Rihar-Onssa

p 22 A85-30733 p 16 A85-30737 Land-use survey of Idukki District Land-use and land-cover mapping and change detection in Tripura using satellite Landsat data

p 16 A85-30738 Monitoring changes in ecology in the Kudremukh mining region p 22 Abb-30/4Description of techniques for automation of regional natural resource inventories p 57 A85-30964

Theory of single space photographs --- Russian book A85-31893 p 57 First steps towards integration of remote sensing and

p 58 A85-32115 digital mapping A method for enhancing Landsat images for classifying p 5 A85-32134 plant cover

A practical method for monitoring and mapping cutovers based on the digital analysis of Landsat data and automated map production utomated map production p 5 A85-32135
An evaluation of simulated Thematic Mapper data and

Landsat MSS data for discriminating suburban and regional p 17 A85-33557 land use and land cover

The use of space photographs for landscape mapping p 59 A85-33598 A classification of MSS data for land-cover mapping

p 60 A85-34438 Importance of pattern recognition for geological remote sensing applications and new look at geological maps

p 24 A85-35103 Correlations between spatial remote sensing, geochemical and geophysical data in Western France -An integrative and orientation technique for geological mapping and ore exploration p 24 A85-35105

Recent developments in lithologic mapping using remote ensing data p 25 A85-35112 sensing data Lithologic mapping in deeply weathered terrain using visible-NIR, SWIR and mid-infrared remote sensing

p 26 A85-35115 techniques Experimental land mapping based on photographic data from space p 7 A85-37117 Landsat model for groundwater exploration in Nuba

p 49 A85-37961 Mountains, Sudan Mapping of coastal-water turbidity using LANDSAT pagery p 35 A85-37979 ımagery

Application of digital image enhancement processing of Landsat data for terrain mapping of southern Huairou County of Beijing (Peking), China p 61 A85-38813 Methods of structural geology and geological mapping p 27 A85-39341 Russian book

Study of Volga river delta using space photosurvey p 55 N85-25340 materials Use of space photographic information to map plant

p 14 N85-25359 Minimizing influence of Earth's curvature in projective

rectification of space photographs into photoplans and photomaps p 21 N85-26829 Information relative to cartography and geodesy Senes

Translations, number 42, volume 1 (ISSN-0469-4244) p 21 N85-29338

Two satellite image maps of Central Europe p 21 N85-29339

Digital image mapping of Antarctica using NOAA-7 AVHRR imagery p 67 N85-29340 The significance of orthophoto maps for developing countries p 21 N85-29341

#### **PHOTOMETRY**

Photometry and polarization in remote sensing p 71 A85-36993

#### **PHOTOSYNTHESIS**

Spectral estimators of absorbed photosynthetically p 8 A85-38390 active radiation in corn canopies PILOTS (PERSONNEL)

Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical dynamics in ocean frontal areas

p 47 N85-29507 (AD-A153765)

#### PLANETARY EVOLUTION

The development and current state of earth expansion and fluctuation problems PLANETARY MAPPING p 20 A85-37302

Mapping surficial geology by Landsat - An investigation into variations in spectral response patterns

p 23 A85-32148

#### **PLANETOLOGY**

Development and application of the Interactive Planetary Image Processing System (IPIPS) in support of remote sensing studies at Imperial College p 72 A85-37956 PLANT STRESS

Assessment of water-stress effects on crops

A85-30745 p 1 Detection of forest stress with 35mm color p 2 A85-30831 photographs Using aenal photography to detect vegetation damage in a large-scale air quality monitoring program

p 3 A85-30835 Spectral densitometer application to stress detection in p 3 A85-30837

#### PLANTS (BOTANY)

Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and University of Florida, Lake Alfred, FL November 15-17, 1983 p 1 A85-30826 Pubescence of Texas lantana affects leaf spectra and p 3 A85-30836 ımaqerv Assessing LANDSAT TM and MSS data for detecting

p 37 N85-23203 submerged plant communities POLAR METEOROLOGY

Arctic atmosphere - Ice interaction studies using Nimbus-7 SMMR p 35 A85-37752

POLAR ORBITS

Utilization of the polar platform of NASA's Space Station Program for operational Earth observations p 75 N85-23895 [PB85-152502]

Availability of the ARGOS system based on the orbital TIROS-N of the satellites characteristics oceanographic/meteorological data p 45 N85-27352 POLAR REGIONS

New directions in ARGOS instrumentation at Polar Research Lab (PRL) p 38 N85-24350 POLARIMETRY

Photometry and polarization in remote sensing --Book p 71 A85-36993

### POLARIZATION CHARACTERISTICS

Study of spectral-polarization characteristics of natural surfaces from various heights A85-31478 p 69 POLLUTION CONTROL

Environmental management needs

p 78 N85-29405 DE85-0078591

### POLLUTION MONITORING

Using aerial photography to detect vegetation damage in a large-scale air quality monitoring program p 3 A85-30835

Bright spot analysis of ocean-dump plumes using p 36 A85-37987 Landsat MSS Evaluation of atmospheric particulate concentrations

derived from analysis of ratio Thematic Mapper data p 19 A85-38825 Use of Thematic Mapper for water quality assessment

p 52 A85-38826 Arabian gulf circulation --- pollution monitoring p 42 N85-24412

#### POLLUTION TRANSPORT

based localization

**POPULATIONS** 

Arabian gulf circulation --- pollution monitoring p 42 N85-24412

Landsat data for population estimates - Approaches to inter-censal counts in the rural Sudan

p 17 A85-37955

POSITION (LOCATION) Data Collection and Platform Location by Satellite p 74 N85-23869 ARGOS Users' Conference System performance, data distribution and technical files ARGOS project p 74 N85-23871 p 74 N85-23884 The ARGOS system status report Proceedings of the ARGOS Users Conference on Data Collection and Location by Satellite p 75 N85-24348 Data Collection and Platform Location by Satellite ARGOS Users' Conference p 39 N85-24366 The ARGOS system main characteristics -- satellite

p 39 N85-24367 The ARGOS system after 3 years operation p 39 N85-24368

Data Collection and Platform Location by Satellite p 40 N85-24391 ARGOS users' Conference

Comparative study of the digital analysis of areas of

Data Collection and Platform Location by Satellite Processes and imagery of first-year fast sea ice during ARGOS Users' Conference p 41 N85-24409 the Earth's surface prepared for planting using different p 33 A85-35172 The ARGOS program --- satellite based localization Synthetic aperture radar capabilities for snow and glacier classification algorithms [INPE-3359-PRE/637] p 15 N85-27545 monstonna p 50 A85-37976 p 75 N85-24775 Spaceborne and airborne radar, infrared and thermal RADIOMETRIC CORRECTION Data Collection and Platform Location by Satellite RGOS Users' Conference p 44 N85-27333 studies of coastal processes at the Mississippi Delta, Louisiana p 52 A85-38827 A comparison of techniques for radiometric calibration ARGOS Users' Conference Location and data collection satellite system ARGOS of aenal infrared thermal images p 56 A85-30956 Adaptive filtering and image segmentation for SAR User's guide --- satellite based localization Analog simulation for radiometric correction for solar analysis p 62 A85-38833 p 68 A85-30957 p 66 N85-27371 angle The imaging of internal waves by the SEASAT-A Testing the radiometric stability of HCMM thermal PRECIPITATION (METEOROLOGY) inthetic aperture radar infrared data p 58 A85-32109 Authorne Doppler radar velocity measurements of [ARE(PORTLAND)TN-720/84] p 36 N85-22860 The sensitivity of the computational scheme for taking precipitation seen in ocean surface reflection Remote sensing of directional wave spectra using the p 36 A85-38866 into account the contribution of atmospheric haze to variations in initial data --- image brightness correction surface contour radar On the use of satellite estimates of precipitation in initial [NASA-TM-84440] p 43 N85-24510 p 61 A85-38716 analyses for numerical weather prediction Analysis of the Gran Desierto, Pinacte Region, Sonora, p 74 A85-39829 Analysis and evaluation of the LANDSAT-4 MSS and Mexico, via shuttle imaging radar PRECIPITATION PARTICLE MEASUREMENT [NASA-CR-175711] TM sensors and ground data processing systems Early p 29 N85-25927 p 63 N85-23189 results Inference of rain rate profile and path-integrated rain RADAR MEASUREMENT RADIOMETRIC RESOLUTION rate by an airborne microwave rain scatterometer Investigations of the ocean surface by radiophysical A simple model for satellite discrimination estimation p 49 A85-36565 SAR radiometric means from aerospace platforms p 34 A85-35832 Measurement of the condition of the sea by ionospheric PREDICTION ANALYSIS TECHNIQUES p 31 A85-32104 Impact of Thematic Mapper sensor characteristics on Snowmelt runoff model in Japan p 53 N85-23227 backscatter radar p 34 A85-36427 Airborne Doppler radar velocity measurements of classification accuracy - suburban Washington, D.C., PREPROCESSING p 63 N85-23188 precipitation seen in ocean surface reflection Maryland, and the Chesapeake Bay Scientific experiments Preprocessing of scientific data p 36 A85-38866 p 66 N85-24779 Assessing LANDSAT TM and MSS data for detecting spaceborne experiments RADAR SCATTERING PRIMITIVE EQUATIONS submerged plant communities p 37 N85-23203 Modeling the backscattering and transmission properties The use of Thematic Mapper data for land cover On the use of satellite estimates of precipitation in initial of vegetation canonies analyses for numerical weather prediction discrimination Preliminary results from the UK SATMaP [E85-10099] p 15 N85-27320 p 74 A85-39829 p 64 N85-23207 programme RADARSAT PRODUCT DEVELOPMENT RAIN Stereo viewability of proposed Radarsat imagery Effects of wind speed and rain on precipitable water New directions in ARGOS instrumentation at Polar p 58 A85-32111 and cloud liquid water based on SCAMS data --- SCAnning Research Lab (PRL) p 38 N85-24350 Preliminary results of an examination of C-band synthetic p 70 A85-32863 Development of a low cost drifting buoy Microwave Spectrometer aperture radar for forestry applications p 4 A85-32113 p 41 N85-24408 Inference of rain rate profile and path-integrated rain RADIANCE A report on the DRIFTERS program --- buoys rate by an airborne microwave rain scatterometer reflectances Estimation of bidirectional hv p 49 A85-36565 p 42 N85-24413 Landsat-image analysis - Problems and possible Development of a Lagrangian drifting buoy Rain estimation in extratropical cyclones using GMS p 59 A85-32141 N85-27338 D 44 p 49 A85-37855 ımagery Remote sensing and climate parameters PROJECT PLANNING p 70 A85-32853 Hurricane structure and dynamics from stereoscopic and Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates An evaluation of the use of atmospheric radiances for infrared satellite observations and radar data p 76 N85-25988 water vapor retneval in a global retneval system p 5 A85-32129 p 59 A85-32868 RANGELANDS PYRENEES MOUNTAINS (EUROPE) Angle dependence of radiances in the ozone-sensing Pubescence of Texas lantana affects leaf spectra and Measurement of water equivalent of mountain snow channel of the HIRS --- High Resolution Infrared Radiation p 3 A85-30836 ımagery cover --- ARGOS system p 54 N85-24386 Sounder p 70 A85-32871 REAL TIME OPERATION Manne aerosol optical depth from satellite-detected The ARGOS communications performance trials p 35 A85-37729 p 40 N85-24376 radiance Evaluation of sensitivity decay of Coastal Zone Colour REFLECTANCE Scanner (CZCS) detectors by comparison with in situ of bidirectional RADAR reflectances near-surface radiance measurements Landsat-mage analysis - Problems and possible solutions p 59 A85-32141 Remote sensing of directional wave spectra using the p 35 A85-37986 surface contour radar [NASA-TM-84440] p 43 N85-24510 Remote sensing of coastal wetlands biomass using A TM Tasseled Cap equivalent transformation for Thematic Mapper wavebands --- Lewes, Delaware RADAR DATA reflectance factor data p 9 A85-38395 p 12 N85-23198 REGIONAL PLANNING Texture analysis and classification of airborne radar data **RADIATION ABSORPTION** p 60 A85-34865 with synthetic aperture Remote sensing in civil engineering --- Book Merging Landsat and spaceborne radar data over Spectral estimators of absorbed photosynthetically p 17 A85-36990 active radiation in corn canopies RADIATIVE TRANSFER p 8 A85-38390 p 72 A85-37962 Geographic regionalization and the problems related to Tunisia p 18 A85-38705 space-based monitoring p 18 A85-38705
The use of Meteor satellite images for geographic RADAR DETECTION Convective storm downdraft outflows detected by Microwave model prediction and venfications for NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar venetated terrain regionalization of the Soviet Union p 18 A85-38706 [E85-10102] p 15 N85-27322 REGIONS System RADIO ALTIMETERS [NASA-CR-3898] p 77 N85-28511 Region-based modeling algorithms for remotely-sensed RADAR GEOLOGY A review of satellite altimeter measurement of sea p 18 A85-38823 surface wind speed - With a proposed new algorithm **REGRESSION ANALYSIS** Recent advances in geologic mapping by radar p 25 A85-35114 p 32 A85-35165 A classification of MSS data for land-cover mapping Shuttle imaging radar-A (SIR-A) data analysis --- geology On good heights and flexure of the lithosphere at p 60 A85-34438 of the Ozark Plateau of southern Missoun, land use in seamounts Multiple regression analysis of photographic image of AD-A1512201 p 21 N85-26050 p 14 N85-26825 western Illinois, and vegetation types at Koonamore soil properties RADIO TELEMETRY Station, Australia RELIABILITY Tracking pelagic dolphins by satellite [NASA-CR-175785] p 15 N85-27324 Supplement to evaluation of satellite derived estimates p 39 N85-24364 RADAR IMAGERY of solar radiation p 14 N85-24506 Stereo models from synthetic aperture radar The ARGOS communications performance trials [E85-10086] p 40 N85-24376 Evaluation of satellite derived estimates of solar p 68 A85-30961 Theory of radar imaging of internal waves radiation Telemetered meteorological and engineering data from p 30 A85-30980 [E85-10087] p 14 N85-24507 a deep sea moored body in the Long Term Upper Ocean p 41 N85-24402 Theory of single space photographs --- Russian book Test and evaluation plan for the Centralized Storm Study (LOTUS) RADIO TRACKING p 77 N85-28508 p 57-A85-31893 Information System<sup>-</sup> Preliminary results from satellite SAR image simulation Data Collection and Platform Location by Satellite RELIEF MAPS A85-32103 D 30 The use of space photographs for landscape mapping experiments ARGOS Users' Conference p 39 N85-24366 SAR p 59 A85-33598 simple model for satellite radiometric RADIO TRANSMITTERS p 31 discrimination estimation A85-32104 REMOTE REGIONS The development of Platform Transmitter Terminal (PTT) Stereo viewability of proposed Radarsat imagery Landsat model for groundwater exploration in Nuba and its application for drifting buoys p 75 N85-24353 A new versatile ARGOS PTT for oceanographic p 58 A85-32111 Mountains, Sudan p 49 A85-37961 Automated cartography and aeomorphological REMOTE SENSING applications -- Platform Transmit Terminal (PTT) boundary-unit detection in the Mopti-Bandiagara (Mali) Remote sensing of surface and near surface p 42 N85-24417 region using multisatellite data from Landsat, SIR-A radai temperature from remotely piloted aircraft RADIOGRAPHY p 58 A85-32116 p 68 A85-30543 The evolution of satellite-based remote-sensing and SPOT simulation Investigation of the earth by means of neutrinos Geological cartography of Gabon using side-looking p 27 A85-39825 Neutrino geology radar imagery - An example of an integrated mapping capabilities in India p 68 A85-30726 RADIOMETERS p 25 A85-35108 Ecological studies in the Ukai command area Radiometric characterization of thematic mappe p 1 A85-30727 Geologic interpretation of Seasat SAR imagery near the p 57 A85-30958 Rio Lacantum, Mexico p 25 A85-35109 full-frame imagery The evaluation of hydrogeological conditions in the Multispectral identification of clouds and earth surfaces Theory of synthetic aperture radar ocean imaging - A southern part of Tamil Nadu using remote-sensing techniques p 48 A85-30732 MARSEN VIEW p 32 A85-35164

using AVHRR radiometric data

p 70 A85-32936

REMOTE SENSING

Assessment of the role of remote sensing techniques A classification of MSS data for land-cover mapping p 60 A85-34438 in monitoring shoreline changes - A case study of the Kerala coast p 23 A85-30742 p 17 A85-34534 Geography in the space age Coastal morphology - A case study of the Gulf of Texture analysis and classification of airborne radar data Knambhat (Cambay) p 48 A85-30743 with synthetic aperture p 60 A85-34865 Joint experiments programme in remote sensing of Remote sensing for geological mapping, Proceedings marine fish resources p 30 A85-30744 ground-based subsatellite of the Seminar, Orleans, France, February 2-4, 1984 Indian remote-sensing satellite - Utilization plan p 24 A85-35101 p 77 A85-30746 wheat) Remote sensing in geology - A decade of progress Analysis of photo interpretation test results for seven p 24 A85-35102 aerospace image types on the Mendocino National Forest, sensing data --- in hydrology p 2 A85-30832 Importance of pattern recognition for geological remote California sensing applications and new look at geological maps The RMS TM resource using remote sensing data measurement system p 24 A85-35103 description and applications --- Resource Management p 56 A85-30842 Landsat data for operational mineral exploration - The System p 24 A85-35106 Canadian experience Utility guide for aerial photography p 3 A85-30845 Recent developments in lithologic mapping using remote Extraction of information from remotely sensed images sensing data p 25 A85-35112 on the basis of space imagery Proceedings of the Conference on Techniques for Extraction of Information from Remotely Sensed Images Lithologic mapping in deeply weathered terrain using Rochester Institute of Technology, Rochester, NY, August visible-NIR, SWIR and mid-infrared remote sensing 16-19, 1983 p 56 A85-30951 techniques p 26 A85-35115 Resource inventory through instructionally-based digital CO2 laser reflectance of rocks for geological remote processing system p 56 A85-30953 p 26 A85-35116 Analog simulation for radiometric correction for solar Geobotany geological mapping and mineral p 68 A85-30957 p 26 A85-35118 Description of techniques for automation of regional Remote detection of geobotanical anomalies associated A85-30964 natural resource inventories p 57 with hydrocarbon microseepage using thematic mapper Probing of the earth's surface and the atmosphere with simulator (TMS) and airborne imaging spectrometer (AIS) A85-31397 p 7 A85-35120 an airborne laser spectrometer p 68 Remote sensing of the atmospheric aerosol from space Investigations of the ocean surface by radiophysical -- Russian book p 16 A85-31882 p 34 A85-35832 means from aerospace platforms Optical noncontact methods for the study of the world Imaging spectrometry for earth remote sensing p 71 A85-36248 A85-31890 ocean --- Russian book p 30 Canadian Symposium on Remote Sensing, 8th, and On the microwave reflectivity of small-scale breaking Association Quebecoise de Teledetection, Congress, 4th, p 34 A85-36570 sensing program water waves Montreal, Canada, May 3-6, 1983, Proceedings Remote sensing in civil engineering --- Book p 69 A85-32101 p 17 A85-36990 data Influence of the viewing geometry on vegetation Photometry and polarization in remote sensing -measures p 4 A85-32102 p 57 A85-32107 p 71 A85-36993 Book Video image analysis An evaluation of 685 nm fluorescence imagery of coastal Louisiana Global crop condition assessment using remotely p 35 A85-37269 on Satellite/Remote Sensing and waters p 4 A85-32114 sensed satellite data analysis First steps towards integration of remote sensing and Applications, Clearwater Beach, FL, June 25-29, 1984, digital mapping p 58 A85-32115 Preprints p 71 A85-37726 geomorphological Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, region using multisatellite data from Landsat, SIR-A rada June 25-July 7, 1984 p 49 A85-37951 p 58 A85-32116 and SPOT simulation p 58 A85-32116
Clouds - A fundamental limitation to satellite remote A decade of remote sensing in India - Some salient p 72 A85-37952 crops results sensing in the visible spectral region p 69 A85-32119 Responses to satellite remote sensing opportunities in Application of remote sensing by means of a satellite p 72 spectral measurements east and southern Africa A85-37953 in surveying the water resources of the Sahel The private sector - A global pool of technical talent p 48 A85-32123 NOAA/AVHRR for remote sensing training and program support p 78 A85-37954

Main results and perspectives of some Chilean expenences developed with low cost and accurate spatial Operational crop forecasting using remotely sensed ımagery Overcoming project planning and timeliness problems remote sensing technology to make Landsat useful for timely crop area estimates p 72 A85-37957 p 5 A85-32129 Dielectric properties and microwave remote sensing Siberia --- Russian book Overcoming technical problems to make Landsat useful p 72 A85-37959 p 5 A85-32130 for timely crop area estimates Review of remote sensing applications in hydrology and New remote sensing techniques for monitoring the water resources management in India fescue grasslands of Alberta p 5 A85-32133 p 49 A85-37970 Monitoring earth resource and environmental change Remote sensing based continuous hydrologic Some limitations and potentials of satellite data modelina p 50 A85-37971 p 17 A85-32137 Modelling the atmospheric boundary layer for remotely [NASA-CP-2363] Landsat study of changes in surface cover sensed estimates of daily evaporation p 59 A85-32140 p 50 A85-37973 Cobalt-abitibi project - Landsat image analysis in the An observation of snow melting process from remotely Canadian Shield application of the geological analysis aid p 50 A85-37974 sensed data p 23 A85-32144 Diurnal movements of cotton leaves expressed as Correlations between satellite data and radar. thermodynamic work and entropy changes and multispectral surveys for the p 8 A85-38273 thermographic. geomorphological characterization of a region of southern Pilot land data system --- for satellite imagery Quebec p 48 A85-32146 A85-38274 p 17 Mapping surficial geology by Landsat - An investigation Estimation of total above-ground phytomass production sing remotely sensed data p 8 A85-38389 into variations in spectral response patterns using remotely sensed data A85-32148 p 23 Satellite remote sensing of total herb aceous biomass sites The use of multisensor images for Earth Science production in the Senegalese Sahel - 1980-1984 applications p 69 A85-32211 p 9 A85-38391 detached birch Short summary of multispectral imaging systems Changes in spectral properties of p 69 A85-32212 p 9 A85-38394 A TM Tasseled Cap equivalent transformation for A Shuttle Imaging Spectrometer Experiment for the late reflectance factor data 1980's p 69 A85-32214 p 9 A85-38395 Calculation of the emissivity of ice and snow covers in A concept for an advanced earth observation the microwave region p 51 A85-38587 spacecraft p 70 A85-32228 equilibrium Methods for the meteorological interpretation of satellite Remote sensing and climate parameters pectral measurements p 36 A85-38681 Problems related to the collection, systematization and spectral measurements p 70 A85-32853 Simulation of errors in a Landsat based crop estimation Characteristic vector analysis of inflection ratio spectra use of a priori data during the digital processing of p 6 A85-33556 New technique for analysis of ocean color data multispectral data obtained from space Use of Landsat imagery to detect hydrologic indicators [NASA-TP-2428] p 73 A85-38701 A85-33874 of the Niger river regime p 49

The possibility of using small unmanned aircraft for

Operational planning for a remote-sensing space

p 73 A85-38702

p 9 A85-38704

studies of terrestrial natural resources

SUBJECT INDEX Geographic regionalization and the problems related to p 18 A85-38705 space-based monitoring p 18 A85-38705 A concept for establishing a database for a support databank (through an example of an agricultural block) p 60 A85-38707 A preliminary method for complex aerovisual and observations agrophytocenosis status (through the example of winter p 9 A85-38708 Modeling of spatially distributed objects using remote p 51 A85-38709 A graphic approach to the modeling of river discharge p 51 A85-38710 An algorithm for reconstructing correlating series of ground-based and remote observations p 61 A85-38711 Distinguishing homogeneous regions of water surfaces p 36 A85-38712 The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713 Optimization of the reference calibration method for remote sensing data on natural waters p 51 A85-38714 Assessment of the study and mapping of pastures in semiand zones using remote sensing methods A85-38719 р9 Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, Purdue University, West Lafayette, IN, June 12-14, 1984 p 73 A85-38801 Remote sensing of the agrochemical properties of p 9 A85-38809 Impacts of high resolution data on an operational remote p 62 A85-38814 Region-based modeling algorithms for remotely-sensed p 18 A85-38823 Spaceborne and airborne radar, infrared and thermal studies of coastal processes at the Mississippi Delta. p 52 A85-38827 Adaptive filtering and image segmentation for SAR p 62 A85-38833 Role of vegetation in the biosphere p 10 A85-38834 Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model p 11 A85-38836 Spectral estimates of agronomic characteristics of p 11 A85-38837 Assessing biophysical characteristics of grassland from p 11 A85-38838 Monitoring global vegetation dynamics using the p 11 A85-38840 Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study p 11 A85-38841 Complex aenal and space remote-sensing studies of p 27 A85-38896 Utilization of aerial and space remote-sensing data studies of land water --- Russian book p 52 A85-39347 Remote sensing used for study of forest resources p 12 N85-22440 Remote Sensing of Snow and Evapotranspiration p 53 N85-23223 NASA's land remote sensing plans for the 1980's p 78 N85-23224 General report of the researches of snowpack properties, snowmelt runoff and evapotranspiration in p 53 N85-23225 Snowmelt-runoff model utilizing remotely-sensed data p 53 N85-23226 Microwave radiometer observations of snowpack properties and comparison of U.S. Japanese results ---Hokkaido, Japan and Vermont and North Dakota test p 53 N85-23230 Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233 Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of evaporation model to estimate evapotranspiration by remote sensing technique --p 13 N85-23234

p 37 N85-23237

p 14 N85-23818

p 37 N85-23820

technology applied to

Orbiting multi-beam microwave radiometer for soil

radar-imaging, rain-rate measurements, and ocean wind

moisture remote sensing

sensina

Large space antenna

Remote sensing - A tortuous trip to marketplace

Edge- and shape-based geometric registration

p 78 A85-34218

p 59 A85-34351

RETRIEVAL

RIVER BASINS

a deep moored current meter

using remote sensing data

--- Clinton River Basin, Michigan

The ARGOS contribution to the successful dredging of

A graphic approach to the modeling of river discharge

Companson of land cover information from LANDSAT

Multispectral Scanner (MSS) and airborne Thematic Mapper simulator (TMS) data for hydrologic applications

p 40 N85-24381

p 51 A85-38710

p 52 N85-23211

p 66 N85-27371

p 68 A85-30726

p 1 A85-30728

p 47 A85-30731

p 48 A85-30732

p 22 A85-30733

p 22 A85-30735

p 22 A85-30736

p 16 A85-30738

p 1 A85-30740

p 56 A85-30951

p 57 A85-30958

p 23 A85-31736

p 69 A85-32101

p 30 A85-32103

o 1

A85-30729

Checking on the position of navigation marker buoys the ARGOS system p 46 N85-27354

Location and data collection satellite system ARGOS

The evolution of satellite-based remote-sensing

Forest-type stratification and delineation of shifting

Evaluation of Landsat and authorne multispectral data

and aerial photographs for mapping forest features and

Inundation mapping of the Sahibi river flood of 1977

The evaluation of hydrogeological conditions in the

Application of digitally processed and enhanced Landsat

Precambnan mineralized

imagery for geological mapping and mineral targeting in

southern part of Tamil Nadu using remote-sensing

cultivation areas in the eastern part of Arunachal Pradesh

User's guide --- satellite based localization

phenomena in a part of the Godavan basin

by the ARGOS system

SATELLITE IMAGERY

capabilities in India

techniques

Bihar-Orissa

using Landsat MSS data

Singhbhum

Geometric error analysis for shuttle imaging General report of the researches of snowpack spectrometer experiment properties, snowmelt runoff and evapotranspiration in [NASA-CR-175665] p 75 N85-24269 Japan p 53 N85-23225 Snowmelt-runoff model utilizing remotely-sensed data Remote sensing of directional wave spectra using the p 53 N85-23226 surface contour radar p 53 N85-23227 p 43 N85-24510 Snowmelt runoff model in Japan INASA-TM-844401 Scientific experiments Preprocessing of scientific data Application of Martinec-Rango model to river basin in spaceborne experiments p 53 N85-23228 p 66 N85-24779 Japan Distribution of snow and maximum snow water Use of space information petroleumand equivalent obtained by LANDSAT data and degree day gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341 method p 53 N85-23229 Automatic hydrological data collection facility using Multiple regression analysis of photographic image of p 14 N85-26825 p 54 N85-24363 ARGOS soil properties Study of the urban evolution of Brasilia with the use of The ARGOS system and hydrology. The use of Platform Terminal Transmitter (PTT) with built-in memory and direct LANDSAT data p 19 N85-27321 reception by the Seine basin hydrology service p 55 N85-24389 Simultaneous Earth observations from 2 satellites p 76 N85-27325 Study of Volga river delta using space photosurvey [NASA-TM-86204] p 55 N85-25340 Function of remote sensing in Brazil materials [INPE-3314-PRE/621] p 77 N85-27329 Experience of the Institute of Space Research with the Hydrologic appraisal of rivers plan-form at confluence use of remote sensing in urban planning studies [INPE-3159-PRE/533] p 19 N8 zone A case study using Landsat MSS data p 50 p 19 N85-27770 The ARGOS system and hydrology by ORSTROM and benefits of Developments in remote sensing Results obtained p 67 N85-28441 of [B8580069] а degree N85-23881 Convective storm downdraft outflows detected by p 54 **ROCK INTRUSIONS** NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar System [NASA-CR-3898] andsat imagery p 77 N85-28511 Experimental philosophy leading to a small scale digital ROCKS data base of the conterminous United States for designing experiments with remotely sensed data assessment of green biomass p 67 N85-28877 [NASA-TM-85009] German contributions to the cartography of Antarctica by means of photogrammetry and remote sensing Valley, California p 22 N85-29342 Looking down looking forward Earth observation, sciences and applications, a perspective p 78 N85-29497 [ESA-SP-1073] Arctic mixed layer dynamics [AD-A153582] p 46 N85-29505 ERS economic impace study SAHARA DESERT (AFRICA) p 47 N85-29847 [ESA-CR(P)-1979] REMOTE SENSORS production in the Senegalese Sahel - 1980-1984 Study of spectral-polarization characteristics of natural urfaces from various heights p 69 A85-31478
Evaluation of the TM, MSS, and HRV sensors in surfaces from various heights estimating the surface area of corn within Canada Landsat data - A semioperational program p 4 A85-32126 р5 Remote sensing systems compansons for geological SALYUT SPACE STATION p 24 A85-35107 mapping in Brazil Versatile airborne laser system for remote probing of p 73 A85-38336 ocean, atmosphere, and farmland SATELLITE ANTENNAS Assessment of some methods for increasing the information content of an active-passive microwave remote moisture remote sensing SATELLITE DOPPLER POSITIONING p 36 A85-38578 sensing system
REMOTELY PILOTED VEHICLES Remote sensing of surface and near surface ARGOS Users' Conference temperature from remotely piloted aircraft p 68 A85-30543 Remotely Piloted Aircraft for small format aerial p 16 A85-32110 ARGOS Users' Conference The possibility of using small unmanned aircraft for The ARGOS system status report studies of terrestrial natural resources p 73 A85-38702 RESOURCES MANAGEMENT Project Indravati I - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and p 22 A85-30735 Maharashtra, India Research Lab (PRL) Land-use survey of Idukki District p 16 A85-30737 Color and color-IR photography for assessing forest pest nanagement tactics p 3 A85-30840 management tactics The RMS TM resource measurement system, description and applications --- Resource Management platform location system p 56 A85-30842 System ARGOS Users' Conference Video color infrared imagery - A future natural resource management tool p 56 A85-30844 based localization Applications of Landsat data and the data base \_р 59— A85-32210 Remote sensing in civil engineering --- Book p 17 A85-36990 a deep moored current meter Geometric error analysis for shuttle imaging spectrometer experiment ARGOS users' Conference p 40 [NASA-CR-175665] p 75 N85-24269 RETICI ES platform location system p 22 N85-29449 Derivation of model topography

Project Indravati 1 - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Fracture mapping of part of northern Ontario using Maharashtra, India p 23 A85-32145 Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil Influence of rock-soil spectral variation on the exploration in Guiarat, India p 9 A85-38393 Land-use and land-cover mapping and change detection in Tripura using satellite Landsat data Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death p 28 N85-23195 Land use and forestry studies of Himachal Pradesh Analysis of mesofissuring on space photographs. New technique for study of petroleum and gas deposits Extraction of information from remotely sensed images, Proceedings of the Conference on Techniques for p 29 N85-26828 Extraction of Information from Remotely Sensed Images, Rochester Institute of Technology, Rochester, NY, August Radiometric characterization of thematic mapper full-frame imagery Satellite remote sensing of total herbaceous biomass Multi-band image classification with a distributed rchitecture p 57 A85-30963 architecture p 9 A85-38391 Image processing applications for geologic mapping Dryland salinity mapping in southern Alberta from Remote sensing of the atmospheric aerosol from space Russian book p 16 A85-31882 Canadian Symposium on Remote Sensing, 8th, and --- Russian book A85-32132 Association Quebecoise de Teledetection, Congress, 4th, Remote sensing used for study of forest resources Montreal, Canada, May 3-6, 1983, Proceedings p 12 N85-22440 Preliminary results from satellite SAR image simulation Orbiting multi-beam microwave radiometer for soil experiments p 14 N85-23818 Data Collection and Platform Location by Satellite p 74 N85-23869 The ARGOS system status report after 2 years p 74 N85-23870 infrared data Data Collection and Platform Location by Satellite p 38 N85-23883 p 74 N85-23884 Some experience from ARGOS stations in the open p 38 N85-23891 Proceedings of the ARGOS Users Conference on Data Collection and Location by Satellite p 75 N85-24348 p 75 N85-24348 New directions in ARGOS instrumentation at Polar p 38 N85-24350 The development of Platform Transmitter Terminal (PTT) and its application for drifting buoys p 75 N85-24353
US programs using the ARGOS data collection and p 75 N85-24355 Data Collection and Platform Location by Satellite p 39 N85-24366 The ARGOS system main characteristics --- satellite p 39 N85-24367 The ARGOS system after 3 years operation p 39 N85-24368 The ARGOS contribution to the successful dredging of p 40 N85-24381 Data Collection and Platform Location by Satellite N85-24391 US programs using the ARGOS data collection and p 41 N85-24401 Data Collection and Platform Location by Satellite ARGOS Users' Conference RGOS Users' Conference p 41 N85-24409
US program using the ARGOS data collection and platform location system p 41 N85-24410 Moored buoy stationkeeping and location system p 42 N85-24416 The ARGOS program -- satellite based localization ımagery p 75 N85-24775 Data Collection and Platform Location by Satellite ARGOS Users' Conference p 44 N85-27333

A simple model for satellite SAR radiometric discrimination estimation p 31 A85-32104 The stereoscopic accentuation of SPOT images p 58 A85-32108
Testing the radiometric stability of HCMM thermal p 58 A85-32109 Stereo viewability of proposed Radarsat imagery p 58 A85-32111 Automated computer monitoring sea-ice temperature by se of NOAA satellite data p 31 A85-32112
Preliminary results of an examination of C-band synthetic use of NOAA satellite data aperture radar for forestry applications p 4 A85-32113 Global crop condition assessment using remotely sensed satellite data p 4 A85-32114 First steps towards integration of remote sensing and digital mapping p 58 A85-32115 Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116 Companson of Meteosat-2 and NOAA-7 data used for understanding the environment of albacore in the east p 31 A85-32118 -Clouds - A-fundamental-limitation to satellite remote sensing in the visible spectral region p 69 A85-32119
Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120
The analysis of Landsat MSS data for characterizing sediment dispersal in the Beaufort Sea p 48 A85-32122 Application of remote sensing by means of a satellite in surveying the water resources of the Sahel p 48 A85-32123 A thermal study of the waters of the St. Lawrence estuary by means of the HCMM satellite - Preliminary results p 48 A85-32124 Operational crop forecasting using remotely sensed nagery p 4 A85-32125 Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada p 4 A85-32126 A-19 SATELLITE IMAGERY SUBJECT INDEX

ımagery

in satellite imagery

June 25-July 7, 1984

east and southern Africa

remote sensing technology

Mountains, Sudan

Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zones p 5 A85-32128 Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates p 5 A85-32129 Overcoming technical problems to make Landsat useful p 5 A85-32130 for timely crop area estimates p 5 A85-32130
Dryland salinity mapping in southern Alberta from Landsat data - A semioperational program p 5 A85-32132 New remote sensing techniques for monitoring the p 5 A85-32133 fescue grasslands of Alberta A method for enhancing Landsat images for classifying p 5 A85-32134 plant cover A practical method for monitoring and mapping cutovers based on the digital analysis of Landsat data and automated map production p 5 A85-32135 Classification of mires using multitemporal Landsat MSS and topographic map data p 5 A85-32136
The use of Landsat images in the selection of p 5 A85-32136 hydroelectric-transmission corridors on the North Shore Preliminary study of the principal surface-material types p 48 A85-32138 Landsat study of changes in surface cover p 59 A85-32140 of bidirectional reflectances Estimation Landsat-image analysis - Problems and possible p 59 A85-32141 solutions Fracture mapping of part of northern Ontario using n 23 A85-32145 Landsat imagery Basic outline of a guide for the use of Landsat images p 23 A85-32147 in geology A Shuttle Imaging Spectrometer Experiment for the late p 69 A85-32214 1980's Mapping native vegetation using Landsat data n.6 A85-33352 Use of Landsat imagery to detect hydrologic indicators p 49 A85-33874 of the Niger river regime Geological interpretation of Landsat imagery of the Bangladesh Ganges delta p 24 A85-33875 Remote sensing - A tortuous trip to marketplace p 78 A85-34218 Edge- and shape-based geometric registration n 59 A85-34351 Reducing Landsat MSS scene variability p 59 A85-34429 Geography in the space age p 17 A85-34534 Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 p 24 A85-35101 Applications of space images for neotectonic studies p 24 A85-35104 Landsat data for operational mineral exploration - The p 24 A85-35106 Canadian experience Medium to small scale geological maps based on Landsat MSS and RBV data - Case histories of projects in North Africa 'p 25 A85-35110 Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin, p 25 A85-35111 Venezuela Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory p 26 A85-35117 Remote detection of geobotanical anomalies associated with hydrocarbon microseepage using thematic mapper simulator (TMS) and airborne imaging spectrometer (AIS) p 7 A85-35120 data Retneval of cloud cover parameters from multispectral satellite images p 70 A85-35124 A cool anomaly off northern California - An investigation using IR imagery and in situ data p 33 A85-35167 Summer Arctic sea ice character from satellite p 33 A85-35170 microwave data Applications of GOES VAS data to NOAA's interactive p 49 A85-35985 flash flood analyzer Monitoring environmental resources through NOAA's polar orbiting satellites p 17 A85-36282 Determination of sea-ice concentration according to p 34 A85-37114 satellite imagery Geological information content of space images different spectral bands during the experiment (Mushugai test range -p 26 A85-37118 Gobi-Khangai Gurvan-Bogd) Digital processing of meteorological satellite imagery p 60 A85-37121

on Satellite/Remote Sensing and

1984

A85-37730

p 71 A85-37726

p 7 A85-37742

рŽ

Applications, Clearwater Beach, FL, June 25-29,

satellite infrared data to estimate soil moisture

Meteorological satellite data useful for agroclimate

A case study on the application of geosynchronous

Merging Landsat and spaceborne radar data over Tunisia p 72 A85-37962 Estimating canopy cover in drylands with Landsat MSS p 8 A85-37966 data Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan p 8 A85-37967 models Application of space sciences to hydrology and water resources - The potential and practical use as reflected p 49 A85-37969 by WMO experience Review of remote sensing applications in hydrology and water resources management in India A85-37970 Landsat Thematic Mapper studies of land cover spatial variability related to hydrology p 50 A85-37972 Use of satellite images to obtain accurate snowmelting runoff forecasts and to survey geothermal activity along Los Andes range, Chile p 50 A85-37975 Hydrologic appraisal of rivers plan-form at confluence zone A case study using Landsat MSS data p 50 A85-37977 Mapping of coastal-water turbidity using LANDSAT p 35 A85-37979 imagery A georeferenced Landsat digital database for forest insect-damage assessment p 8 A85-37980 Drainage network analysis of Landsat images of the Olympus-Pieria mountain area, northern Greece p 51 A85-37982 Bright spot analysis of ocean-dump plumes using andsat MSS p 36 A85-37987 Landsat MSS quality Selecting band combinations from multispectral data p 60 A85-38272 Pilot land data system --- for satellite imagery p 17 A85-38274 Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984 p 9 A85-38391 Machine classification of freshwater ice types from Landsat-1 digital data using ice albedos as training sets sensing p 51 A85-38392 A TM Tasseled Cap equivalent transformation for p 9 A85-38395 reflectance factor data Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space p 73 A85-38701 The use of Meteor satellite images for geographic p 18 A85-38706 regionalization of the Soviet Union California Distinguishing homogeneous regions of water surfaces p 36 A85-38712 on the basis of space imagery Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems. Proceedings of the Tenth International Symposium, Purdue method University, West Lafayette, IN, June 12-14, 1984 p 73 A85-38801 Landsat 4 and 5 status and results from Thematic p 61 A85-38803 Mapper data analyses Algorithms for the estimation of failed detector data --for replacement of Landsat-4 thematic mapping missing lata p 61 A85-38806 Information content companson of Thematic Mapper, data cover multispectral scanner and airborne Thematic Ma p 61 A85-38807 data Mapping of wolframite region in the Sirohi district (Rajasthan) in India from different digitally enhanced data p 26 A85-38808 products of Landsat Remote sensing of the agrochemical properties of p 9 A85-38809 algorithm [E85-10098] impacts of high resolution data on an operational remote sensing program p 62 A85-38814 Expenence of the Institute of Space Research with the identifying vegetative land use classes during each of use of remote sensing in urban planning studies [INPE-3159-PRE/533] the four seasons on aerial photographs and Landsat imagery in coastal South Carolina Information relative to cartography and geodesy Senes p 10 A85-38815 Analysis methods for Thematic Mapper data of urban Translations, number 42, volume 1 p 18 A85-38816 [ISSN-0469-4244] regions

Rain estimation in extratropical cyclones using GMS Wetlands classification using Landsat Thematic Mapper p 49 A85-37855 data unsupervised classification approach p.51 A85-38817 Santa Ana airflow observed from wildfire smoke patterns Spectral response curve models applied to forest p 7 A85-37868 p 10 A85-38820 Remote sensing from satellites, Proceedings of the First cover-type discrimination Comparison of classification schemes for MSS and TM and Ninth Workshops and Topical Meeting, Graz, Austria, p 62 A85-38821 p 49 A85-37951 Evaluation of atmospheric particulate concentrations Responses to satellite remote sensing opportunities in derived from analysis of ratio Thematic Mapper data p 72 A85-37953 p 19 A85-38825 Landsat data for population estimates - Approaches to Spaceborne and airborne radar, infrared and thermal inter-censal counts in the rural Sudan studies of coastal processes at the Mississippi Delta, p 17 A85-37955 p 52 A85-38827 Main results and perspectives of some Chilean expenences developed with low cost and accurate spatial An analysis of the utility of Landsat Thematic Mapper data and digital elevation model data for predicting soil p 72 A85-37957 A85-38828 Capability of Bhaskara-II satellite microwave radiometer Utility of some image enhancement techniques for brightness temperature data to discriminate soil moisture reconnaissance soil mapping - A case study from southern p 7 A85-37958 conditions of Indian landmass p 10 A85-38829 Landsat model for groundwater exploration in Nuba Techniques for the estimation of leaf area index using spectral data p 10 A85-38835 p 49 A85-37961 Discrimination of tropical forest cover types using p 12 A85-38843 Landsat MSS data Evaluation of local and global deformation models for the registration of simulated SPOT images D 62 A85-38845 Registering Thematic Mapper imagery to digital elevation p 27 A85-38846 Space-borne imagery interpretation - Farthquake studies p 27 Utilization of aenal and space remote-sensing data studies of land water --- Russian book p 52 A85-39347 delineation and An objective technique for the extrapolation of thunderstorms from GOES satellite data p 19 On the use of satellite estimates of precipitation in initial analyses for numerical weather prediction p 74 A85-39829 LANDSAT-4 Science Characterization Early Results Volume 4 Applications --- agriculture, soils land use, geology, hydrology, wetlands, water quality, biomass identification, and snow mapping [E85-10070] p 63 N85-23186 Overview of TM applications research reports p 63 N85-23187 Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural resources --- Central Valley p 12 N85-23190 Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 A concept for the processing and display of Thematic Mapper data p 63 N85-23196 Quick look analysis of TM data of the Washington, istrict of Columbia, area p 64 N85-23197 District of Columbia, area A preliminary comparison of the information content of data from the LANDSAT 4 Thematic Mapper and Multispectral Scanner --- Arkansas p 64 N85-23199 Multispectral Scanner --- Arkansas Thematic Mapper data quality and performance assessment in renewable resources/agriculture/remote p 12 N85-23201 Preliminary evaluation of TM for soils information p 13 N85-23206 Companson of MSS and TM data for landcover classification in the Chesapeake Bay area A preliminary report --- Taylor's Island, Maryland eport --- Taylor's Island, Maryland p 65 N85-23210 An investigation of several aspects of LANDSAT-5 data quality --- Palmer County, Shelby, mt, White sands, NM, Great Salt Lake, UT, San Matted Bridge and Sacramento, p 65 N85-23214 [E85-10096] Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day p 53 N85-23229 Analysis of NIMBUS-7 SMMR data --- Hokkaido, Japan p 54 N85-23232 snow cover Analysis of the inflow laver and air-sea interactions in Hurncane Frederic (1979) p 37 N85-23271 INASA-CR-1756161 Use of space photographic information to map plant p 14 N85-25359 Identification of structure of soil-vegetation cover using p 15 N85-26826 aenal and space photographs CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 --- Brazil [E85-10097] p 66 N85-27318 Noise correction on LANDSAT images using a spline-like

p 66 N85-27319

p 19 N85-27770

p 21 N85-29338

Conference

Preonnts

Two satellite image maps of Central	Europe
	p 21 N85-29339
Digital image mapping of Antarctic	
AVHRR imagery ATELLITE INSTRUMENTS	p 67 N85-29340
On a ventication plane for MOS-1 (M	lanne Observation
Satellite-1)	p 31 A85-32149
ATELLITE NETWORKS	
The ARGOS system status repo	
operation	p 74 N85-23870
System performance, data distribution ARGOS project	p 74 N85-23871
Applications of ARGOS data collection	•
regions	p 37 N85-23875
The ARGOS system and hydrology	Results obtained
by ORSTROM and benefits of	a degree of
standardization	p 54 N85-23881 p 74 N85-23884
The ARGOS system status report Operational experiences with the A	
oceanography and oil spill emergency	
plans for the use of the ARGOS system	n as a component
in offshore data collection system	p 38 N85-23887
Applications of ARGOS data colle	
automatic meteorological observatories	p 38 N85-23893
Automatic weather stations in Antarc	•
,	p 75 N85-24360
Automatic hydrological data colle	ction facility using
ARGOS	p 54 N85-24363
The ARGOS system after 3 years or	
The ADCOS communications and	p 39 N85-24368
The ARGOS communications perfori	nance trais p 40 N85-24376
Measurement of water equivalent of	•
cover ARGOS system	p 54 N85-24386
The ARGOS system and hydrology	The use of Platform
Terminal Transmitter (PTT) with built-in	
reception by the Seine basin hydrology	service p 55 N85-24389
Collecting meteorological reports	
system	p 40 N85-24398
Telemetered meteorological and eng	
a deep sea moored body in the Long 1	
Study (LOTUS)  Drifting buoy development and fur	p 41 N85-24402
Japanese ARGOS program	p 41 N85-24406
Applications of ARGOS measurem	
Pacific Ocean-atmosphere interaction	
Overview of data processing at AES I	p 42 N85-24414
Canadian Atmospheric Environment	
	p 43 N85-24418
Routine wave and meteorological i	
offshore areas using ARGOS data sur	
Present stage of utilization of the A	
the ORSTOM hydrological service for	
collection	p 55 N85-27348
The ARGOS system in Brazil hyd	
A seismic ARGOS data collection pl	p 55 N85-27349 atform
7. 50.51116 71.1400 44.14 50.15016.1 p.	p 29 N85-27350
An operational buoy network collect	ing meteorological
data	p 45 N85-27351
Operational expenences with the a Greenland	p 45 N85-27353
SATELLITE OBSERVATION	p 10 7.00 2.000
Satellite-derived sea surface temper	
compansons	
	p 30 A85-30599
Coastal morphology - A case stu-	dy of the Gulf of
Khambhat (Cambay)	dy of the Gulf of p 48 A85-30743
	dy of the Gulf of p 48 A85-30743
Khambhat (Cambay) Surface radiation in the tropical Pace Mapping of land/soil degradation	dy of the Gulf of p 48 A85-30743 ffic p 30 A85-31200 using multispectral
Khambhat (Cambay) Surface radiation in the tropical Pace Mapping of land/soil degradation data	dy of the Gulf of p 48 A85-30743 ffic p 30 A85-31200 using multispectral p 16 A85-32127
Khambhat (Cambay) Surface radiation in the tropical Pace Mapping of land/soil degradation	dy of the Gulf of p 48 A85-30743 flic p 30 A85-31200 using multispectral p 16 A85-32127 onmental change -
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation data Monitoring earth resource and envir- Some limitations and potentials of sate	dy of the Gulf of p 48 A85-30743 fic p 30 A85-31200 using multispectral p 16 A85-32127 onmental change abilite data p 17 A85-32137
Khambhat (Cambay) Surface radiation in the tropical Pace Mapping of land/soil degradation data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system	dy of the Gulf of p 48 A85-30743 fife p 30 A85-31200 using multispectral p 16 A85-32127 onmental change - pilite data_ p 17 A85-32137 p 32 A85-32192
Khambhat (Cambay) Surface radiation in the tropical Paci Mapping of land/soil degradation data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans	dy of the Gulf of p 48 A85-30743 (fic p 30 A85-31200 using multispectral p 16 A85-32127 ommental change -ellite data p 17 A85-32137 p 32 A85-32192 p 32 A85-32195
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation data Monitoring earth resource and envir- Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp	dy of the Gulf of p 48 A85-30743 fic p 30 A85-31200 using multispectral p 16 A85-32127 onmental change - allite data p 17 A85-32137 p 32 A85-32192 p 32 A85-32215 henc radiances for
Khambhat (Cambay) Surface radiation in the tropical Paci Mapping of land/soil degradation data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retneval in a global retney	dy of the Gulf of p 48 A85-30743 (c) p 30 A85-31200 (using multispectral p 16 A85-32127 (c) p 30 A85-32137 p 32 A85-32192 p 32 A85-32215 henc radiances for radisystem p 59 A85-32868
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in	dy of the Gulf of p 48 A85-30743 (ic p 30 A85-31200 using multispectral p 16 A85-3210 ommental change ellite data p 17 A85-32192 p 32 A85-32195 henc radiances for all system p 59 A85-32868 the ozone-sensing
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation data Monitoning earth resource and envir- Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution	dy of the Gulf of p 48 A85-30743 ffic p 30 A85-31200 using multispecture p 16 A85-32127 onmental change - slitte data p 17 A85-32192 p 32 B85-322868 then c radiances for rad system p 59 A85-32868 the ozone-sensing in Infrared Radiation
Khambhat (Cambay) Surface radiation in the tropical Paci Mapping of land/soil degradation data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution Sounder	dy of the Gulf of p 48 A85-30743 (c) p 30 A85-31200 (susing multispectral p 16 A85-32127 (c) p 30 A85-32137 p 32 A85-32192 p 32 A85-32215 (c) henc radiances for all system p 59 A85-32868 (d) the ozone-sensing p 170 A85-32871
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation data Monitoning earth resource and envir- Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution	dy of the Gulf of p 48 A85-30743 (c) p 30 A85-31200 (susing multispectral p 16 A85-32127 (c) p 30 A85-32137 p 32 A85-32192 p 32 A85-32215 (c) henc radiances for all system p 59 A85-32868 (d) the ozone-sensing p 170 A85-32871
Khambhat (Cambay) Surface radiation in the tropical Paci Mapping of land/soil degradation of data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution Sounder Multispectral identification of clouds using AVHRR radiometric data A review of satellite altimeter mea	dy of the Gulf of p 48 A85-30743 ffic p 30 A85-31200 using multispectral p 16 A85-32127 onmental change - ellite data
Khambhat (Cambay) Surface radiation in the tropical Paci- Mapping of land/soil degradation of data Monitoring earth resource and envir- Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution Sounder Multispectral identification of clouds using AVHRR radiometric data	dy of the Gulf of p 48 A85-30743 (c) p 30 A85-31200 (using multispectral p 16 A85-32127 (o) p 30 A85-32137 p 32 A85-32192 p 32 A85-32195 (e) p 32 A85-32195 (e) p 35 A85-32868 (e) p 59 A85-32868 (e) p 70 A85-32871 (e) p 70
Khambhat (Cambay) Surface radiation in the tropical Paci Mapping of land/soil degradation of data Monitoring earth resource and envir Some limitations and potentials of sate TOPEX ground data system Earth and space science - Oceans An evaluation of the use of atmosp water vapor retrieval in a global retriev Angle dependence of radiances in channel of the HIRS High Resolution Sounder Multispectral identification of clouds using AVHRR radiometric data A review of satellite altimeter mea	dy of the Gulf of p 48 A85-30743 ffic p 30 A85-3120 ousning multispectral p 16 A85-32127 onmental change - slitte data

currents by satellite altimetry - With application to the

n 33 A85-35168

Antarctic circumpolar current

Comment on 'Seasonal variation in wind speed and sea Surveying and mapping with space data p 71 A85-36286 state from global satellite measurements' by D Sandwell A85-35169 p 33 Satellite derived atmosphere water vapor as a tracer Remote sensing in civil engineering -- Book of large scale interactions between the atmosphere and p 17 A85-36990 p 35 A85-37754 Vertical component Magsat anomalies and Indian Mesoscate analysis and modeling group tectonic boundaries p 26 A85-37150 p 76 N85-26001 p 71 A85-37199 Orbits for earth observation SATELLITE-BORNE PHOTOGRAPHY Satellite derived atmosphere water vapor as a tracer Ground water exploration in the Saurashtra peninsula of large scale interactions between the atmosphere and p 47 A85-30730 p 35 A85-37754 Targeting areas for mineral exploration - A case study from Onssa, India p 22 A85-30734 Methods for the meteorological interpretation of satellite p 22 A85-30734 spectral measurements p 36 A85-38681 Monitoring global vegetation dynamics using the NOAA/AVHRR p 11 A85-38840 Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741 The interpretability of small and medium scale aerospace MAGSAT anomaly field data of the crustal properties imagery for wildland environments of California and p 2 A85-30833 [E85-10100] Colorado p 20 N85-23215 A method for estimating soil moisture availability The use of space photographs for landscape mapping [NASA-CR-175606] p 14 N85-23238 p 59 A85-33598 Supplement to evaluation of satellite derived estimates The application of computerized space image of solar radiation processing techniques to data from large scale aerial surveys of forests p 7 A85-37119 [E85-10086] p 14 N85-24506 Evaluation of satellite derived estimates of solar A test of the Suits vegetative-canopy reflectance model with LARS soybean-canopy reflectance data [E85-10087] p 14 N85-24507 p 8 A85-37981 Scientific experiments Preprocessing of scientific data A combined photogrammetric and Doppler adjustment spaceborne experiments p 66 N85-24779 p 60 A85-38271 Preliminary processing of laser ranging data from LAGEOS artificial Earth satellite during short ment program Geographic regionalization and the problems related to p 18 A85-38705 space-based monitoring observation period p 21 N85-25355 A concept for establishing a database for a support Humcane structure and dynamics from stereoscopic and databank (through an example of an agnicultural block) infrared satellite observations and radar data p 60 A85-38707 p 76 N85-25988 The sensitivity of the computational scheme for taking Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data into account the contribution of atmospheric haze to p 76 N85-25989 vanations in initial data --- image brightness correction p 61 A85-38716 Research Review, 1983 [NASA-TM-86219] p 46 N85-29433 The NASA land processes program - Status and future p 78 A85-38802 SATELLITE ORBITS directions Orbits for earth observation p 71 A85-37199 Complex aenal and space remote-sensing studies of ibena --- Russian book p 27 A85-38896 SATELLITE SOUNDING Sibena --- Russian book A method for determining Antarctic land ice parameters Minimizing influence of Earth's curvature in projective from satellite multichannel microwave measurements rectification of space photographs into photoplans and p 35 A85-37511 photomaps p 21 N85-26829 First results of oceanography utilization of infrared high Marine aerosol optical depth from satellite-detected p 35 A85-37729 radiance resolution picture transmission images p 19 N85-24392 Environmental satellites [KNMI-TR-59] p 47 N85-29511 SATELLITE TRACKING SATELLITE-BORNE RADAR Proceedings of the ARGOS Users Conference on Data Preliminary results from satellite SAR image simulation p 75 N85-24348 p 30 A85-32103 SAR radiometric Collection and Location by Satellite experiments A simple model for satellite One thousand days in the brine --- platform transmitter p 39 N85-24359 discrimination estimation p 31 A85-32104 Tracking pelagic dolphins by satellite SCALE (RATIO) p 39 N85-24364 The significance of scale in geobotanical applications Data Collection and Platform Location by Satellite for lithologic discrimination and mineral exploration p 40 N85-24391 ARGOS users' Conference p 26 A85-35119 US programs using the ARGOS data collection and **SCATTEROMETERS** platform location system p 41 N85-24401 Inference of rain rate profile and path-integrated rain Tracking whale migrations with the ARGOS satellite rate by an airborne microwave rain scatterometer p 41 N85-24403 p 49 A85-36565 Data Collection and Platform Location by Satellite Science opportunities using the NASA scatterometer on ARGOS Users' Conference p 41 N85-24409 N-ROSS US program using the ARGOS data collection and [NASA-CR-175639] p 74 N85-23222 platform location system p 41 N85-24410 SCENE ANALYSIS Arabian gulf circulation -- pollution monitoring Machine classification of freshwater ice types from p 42 N85-24412 Landsat-1 digital data using ice albedos as training sets Drifting buoys on the Labrador shelf p 51 A85-38392 p 42 N85-24415 growing Scene segmentation through region The ARGOS system used for tracking gray whales p 62 A85-38832 p 43 N85-24421 Preliminary study of information extraction of LANDSAT Data Collection and Platform Location by Satellite TM data for a suburban/regional test site ARGOS Users' Conference p 44 N85-27333 p 65 N85-23208 Long term drifting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339 A simple model for satellite SAR radiometric p 31 A85-32104 Results of an initial that of a satellite telemetering buoy discrimination estimation measuring near surface current p 45 N85-27345 Automated computer monitoring seaice temperature by The ARGOS system used for tracking gray whales use of NOAA satellite data p 31 A85-32112 -Summer - Arctic -- sea -- ice - character -- from -- satellite -p 45-N85-27347 p 33 A85-35170 microwave data SATELLITE-BORNE INSTRUMENTS Active microwave measurements of Arctic sea ice under Satellite-derived sea surface temperature - Workshop summer conditions p 33 A85-35171 p 30 A85-30599 compansons Processes and imagery of first-year fast sea ice during Joint experiments programme in remote sensing of p 30 A85-30744 the melt season p 33 A85-35172 manne fish resources Temporal variations of the microwave signatures of sea SPOT and Landsat-4 simulations. Generalization of MRC ice during the late spring and early summer near Mould biophysical-inventory data on the upper St Lawrence Bav. NWT p 34 A85-35173 Preliminary analysis p 48 A85-32131 Determination of sea-ice concentration according to Correlations between satellite data and radar, p 34 A85-37114 satellite imagery thermographic, and multispectral surveys for the Digital processing of single-band (33 6 GHz) microwave geomorphological characterization of a region of southern magery for sea ice classification p 36 A85-38819 Quebec p 48 A85-32146 Digital processing of passive Ka-band microwave images TOPEX ground data system p 32 A85-32192 for sea-ice classification Investigation of the atmospheric aerosols and water [AD-A150686] p 43 N85-24511 vapor by the AVHRR radiometer (visible and IR) on board Arctic mixed layer dynamics p 32 A85-32872 [AD-A153582] p 46 N85-29505 **SEA ROUGHNESS** SUBJECT INDEX

SEA ROUGHNESS

On a verification plane for MOS-1 (Marine Observation p 31 A85-32149 Satellite-1) Airborne measurements of the sea state from mirror

reflections of the beam of a continuous-wave laser p 34 A85-35879

Comment on 'Seasonal variation in wind speed and sea state from global satellite measurements' by D Sandwell and R Agreen p 33 A85-35169 Measurement of the condition of the sea by ionospheric n 34 A85-36427 backscatter radar

SEA SURFACE TEMPERATURE

Applications of ARGOS measurements in equatorial Pacific Ocean-atmosphere interaction studies

p 42 N85-24414

SEA TRUTH

An assessment of the potential role of multispectral nagery in bathymetric charting

[AD-A152460] p 46 N85-28438

SEA WATER

Bright spot analysis of ocean-dump plumes using Landsat MSS p 36 A85-37987 SEALS (ANIMALS)

Motivation for satellite tracking of southern elephant p 45 N85-27346 seals Mirounga leonina at sea SEAMOUNTS

On geoid heights and flexure of the lithosphere at seamounts

SEARCHING

[AD-A151220] p 21 N85-26050

The ARGOS contribution to the successful dredging of

a deep moored current meter p 40 N85-24381 SEASAT SATELLITES Transient sea surface height variation and the

easat-altimeter data application p 31 A85-32121
Geologic interpretation of Seasat SAR imagery near the Seasat-altimeter data application p 25 A85-35109 Rio Lacantum, Mexico

The imaging of internal waves by the SEASAT-A synthetic aperture radar

p 36 N85-22860 ARE(PORTLAND)TN-720/84] SEDIMENT TRANSPORT

Coastal morphology - A case study of the Gulf of p 48 A85-30743 Khambhat (Cambay)

SEDIMENTS

The analysis of Landsat MSS data for characterizing sediment dispersal in the Beaufort Sea p 48 A85-32122

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes --- Lake Chicot, Arkansas p 52 N85-23204

SEISMOGRAPHS

A seismic ARGOS data collection platform

p 29 N85-27350

SEISMOLOGY

A seismic ARGOS data collection platform p 29 N85-27350

SEMANTICS

Precedency control and other semantic integrity issues a workbench database p 65 N85-23220 in a workbench database

Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984

p 9 A85-38391

SHIPS

Operation guiding light-scientific program and field plan The pilot field experiment for NORDA project chemical amics in ocean frontal areas

p 47 N85-29507 [AD-A153765]

SHORELINES

Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the p 23 A85-30742 Kerala coast

SHUTTLE IMAGING RADAR

Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar [NASA-CR-175711]

p 29 N85-25927 Shuttle imaging radar-A (SIR-A) data analysis --- geology of the Ozark Plateau of southern Missouri, land use in western Illinois, and vegetation types at Koonamore Station, Australia

[NASA-CR-175785] p 15 N85-27324

Complex aerial and space remote-sensing studies of Sibena --- Russian book p 27 A85-38896

SIDE-LOOKING RADAR

Stereo models from synthetic aperture radar

p 68 A85-30961

Geological cartography of Gabon using side-looking radar imagery - An example of an integrated mapping p 25 A85-35108

Assessment of some methods for increasing the information content of an active-passive microwave remote p 36 A85-38578 sensing system

Developments in remote sensing

IB85800691 o 67 N85-28441

SIMULATION

Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845 SIZE DISTRIBUTION

The development and current state of earth expansion p 20 A85-37302 and fluctuation problems SKY WAVES

Measurement of the condition of the sea by ionospheric p 34 A85-36427 backscatter radar

Santa Ana airflow observed from wildfire smoke patterns in satellite imagery p 7 A85-37868

Snow reflectance from Thematic Mapper

p 52 N85-23205 Remote Sensing of Snow and Evapotranspiration N85-23223 [NASA-CP-2363] p 53 General report of the researches of snowpack

properties, snowmelt runoff and evapotranspiration in p 53 N85-23225 Snowmelt-runoff model utilizing remotely-sensed data

p 53 N85-23226

Snowmelt runoff model in Japan p 53 N85-23227 Studies on physical properties of snow based on multichannel microwave radiometer p 54 N85-23231 SNOW COVER

An observation of snow melting process from remotely p 50 A85-37974

Use of satellite images to obtain accurate snowmelting runoff forecasts and to survey geothermal activity along Los Andes range, Chile

Synthetic aperture radar capabilities for snow and glacier p 50 A85-37976 monitoring Calculation of the emissivity of ice and snow covers in

p 51 A85-38587 the microwave region p 51 A85-38587 Application of Martinec-Rango model to river basin in p 53 N85-23228

Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day p 53 N85-23229

Microwave radiometer observations of snowpack properties and comparison of U.S. Japanese results --Hokkaido, Japan and Vermont and North Dakota test p 53 N85-23230

Analysis of NIMBUS-7 SMMR data --- Hokkaido, Japan p 54 N85-23232 snow cover Estimation of regional evapotranspiration using remotely

sensed land surface temperature Part 2 Application of equilibrium evaporation model to evapotranspiration by remote sensing technique --p 13 N85-23234

Measurement of water equivalent of mountain snow cover --- ARGOS system p 54 N85-24386

SNOWSTORMS

p 76 N85-26013 East coast snowstorm survey SOIL EROSION

Land use and forestry studies of Himachal Pradesh

p 1 A85-30740 An analysis of the utility of Landsat Thematic Mapper data and digital elevation model data for predicting soil p 10 A85-38828 erosion SOIL MAPPING

Mapping of land/soil degradation using multispectral p 16 A85-32127 Dryland salinity mapping in southern Alberta from

Landsat data - A semioperational program p 5 A85-32132 Geobotany in geological mapping and mineral

p 26 A85-35118 exploration Remote detection of geobotanical anomalies associated with hydrocarbon microseepage using thematic mapper simulator (TMS) and airborne imaging spectrometer (AIS)

p 7 A85-35120 data Experimental land mapping based on photographic data p 7 A85-37117 from space

Remote sensing of the agrochemical properties of Utility of some image enhancement techniques for

reconnaissance soil mapping - A case study from southern p 10 A85-38829

Preliminary evaluation of TM for soils information p 13 N85-23206 Identification of structure of soil-vegetation cover using

aenal and space photographs p 15 N85-26826 Airphoto interpretation of vegetation and landforms for soil mapping p 15 N85-28436

SOIL MOISTURE

A case study on the application of geosynchronous satellite infrared data to estimate soil moisture

p 7 A85-37742 Capability of Bhaskara-II satellite microwave radiometer brightness temperature data to discriminate soil moisture p 7 A85-37958 conditions of Indian landmass

Remote sensing based continuous hydrologic p 50 A85-37971 modeling Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation

p 50 A85-37973 Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter

Microwave remote sensing of soil moisture

p 13 N85-23235 A method for estimating soil moisture availability

p 13 N85-23233

p 68 A85-30957

p 14 N85-23238 [NASA-CR-175606] Orbiting multi-beam microwave radiometer for soil p 14 N85-23818 moisture remote sensing

SOLLS

Influence of rock-soil spectral variation on the p 9 A85-38393 ssessment of green biomass Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural resources --- Central Valley p 12 N85-23190 Preliminary comparisons of the information content and

utility of TM versus MSS data p 64 N85-23202 Determination of electromagnetic properties of mesh

material using advanced radiometer techniques p 74 N85-23855

Multiple regression analysis of photographic image of p 14 N85-26825 soil properties

SOLAR POSITION Analog simulation for radiometric correction for solar

Simultaneous Earth observations from 2 satellites p 76 N85-27325 [NASA-TM-862041

SOLAR RADIATION

angle

Surface radiation in the tropical Pacific

p 30 A85-31200 Supplement to evaluation of satellite derived estimates of solar radiation

[F85-10086] n 14 NR5-24506 Evaluation of satellite derived estimates of solar radiation n 14 NR5-24507

[F85-10087] SOUTHERN HEMISPHERE

Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea p 45 N85-27346

A test of the Suits vegetative-canopy reflectance model with LARS soybean-canopy reflectance data

p 8 A85-37981 Modeling the backscattering and transmission properties of vegetation canopies p 15 N85-27320

SPACE COMMERCIALIZATION

Remote sensing - A tortuous trip to marketplace

p 78 A85-34218 The private sector - A global pool of technical talent for remote sensing training and program support p 78 A85-37954

SPACE EXPLORATION

Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar [NASA-CR-175711] n 29 N85-25927

SPACE PLATFORMS

Utilization of the polar platform of NASA's Space Station Program for operational Earth observations

[PB85-152502] p 75 N85-23895

SPACE SHUTTLE PAYLOADS A Shuttle Imaging Spectrometer Experiment for the late

p 69 A85-32214 Geometric error analysis for shuttle imaging spectrometer experiment

[NASA-CR-175665] p 75 N85-24269

SPACE SHUTTLES Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind

sensing

p 37 N85-23820 SPACE STATIONS Determination of electromagnetic properties of mesh material using advanced radiometer techniques

p 74 N85-23855 Utilization of the polar platform of NASA's Space Station

Program for operational Earth observations [PB85-152502] p 75 p 75 N85-23895

SPACEBORNE EXPERIMENTS

Scientific experiments Preprocessing of scientific data spaceborne experiments p 66 N85-24779 p 66 N85-24779

SPACEBORNE PHOTOGRAPHY

Optical noncontact methods for the study of the world ocean --- Russian book p 30 A85-31890 p 30 A85-31890 Theory of single space photographs -- Russian book

Surveying and mapping with space data

p 57 A85-31893 p 71 A85-36286

Experimental land mapping based on photographic data p 7 A85-37117 from space

SUBJECT INDEX Geological information content of space images obtained in different spectral bands during the Gobi-Khangai experiment (Mushugai test range Gurvan-Bogd) p 26 A85-37118 An evaluation of 685 nm fluorescence imagery of coastal waters p 35 A85-37269 The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713 Experience in combined special mapping using space p 62 N85-22449 information Study of Volga river delta using space photosurvey p 55 matenals petroleum- and Use of space information in gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341 Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of forth Zeravshan seismogenic faults p 29 N85-25342 Relative geological information yield from small-scale North Zeravshan seismogenic faults multizonal space images (example of Fergama depression and its mountainous margins) p 29 N85-25343 Identifying land use structures of multizonal aerospace photographs using digital data processing p 66 N85-25348 Expenence in automation of data processing in interpretation and defining of linear elements from space p 66 N85-25349 Multiple regression analysis of photographic image of p 14 N85-26825 soil properties Analysis of mesofissuring on space photographs New technique for study of petroleum and gas deposits N85-26828 SPACECRAFT DESIGN A concept for an advanced earth observation p 70 A85-32228 SPATIAL DISTRIBUTION Modeling of spatially distributed objects using remote sensing data --- in hydrology p 51 A85-38709 SPATIAL RESOLUTION Automated cartography geomorphological and boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar and SPOT simulation p 58 A85-32116

for lithologic discrimination and mineral exploration p 26 A85-35119 Impact of Thematic Mapper sensor characteristics on classification accuracy --- suburban Washington, D.C., Maryland, and the Chesapeake Bay p 63 N85-23188 p 63 N85-23188 Quick look analysis of TM data of the Washington, District of Columbia, area p 64 N85-23197 Preliminary comparisons of the information content and p 64 N85-23202 utility of TM versus MSS data Assessing LANDSAT TM and MSS data for detecting submerged plant communities p 37 N85-23203 The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207 Preliminary study of information extraction of LANDSAT TM data for a suburban/regional test site

The significance of scale in geobotanical applications

p 65 N85-23208 Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper simulator (TMS) data for hydrologic applications
--- Clinton River Basin, Michigan p 52 N85-23211

**SPECIFICATIONS** 

Standards and specifications for geodetic control networks

[PB85-166478]

p 21 N85-27374 **SPECTRA** 

Wave directional spectra via ARGOS p 45 N85-27343

SPECTRAL BANDS

Geological information content of space images obtained in different spectral bands during the Gobi-Khangai experiment (Mushugai test range Gurvan-Bogd) p 26 A85-37118

Selecting band combinations from multispectral data p 60 A85-38272

Snow reflectance from Thematic Mapper p 52 N85-23205 Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory --- Washington, p 65 N85-23212 DC

SPECTRAL METHODS

Use of the TM tasseled cap transform for interpretation of spectral contrasts in an urban scene

p 18 A85-38811

SPECTRAL REFLECTANCE

Changes in vegetation spectra with leaf deterioration under two methods of preservation p 6 A85-33558 Reducing Landsat MSS scene variability

p 59 A85-34429 A test of the Suits vegetative-canopy reflectance model with LARS soybean-canopy reflectance data

p 8 A85-37981

Spectral estimators of absorbed photosynthetically p 8 A85-38390 active radiation in corn canopies Influence of rock-soil spectral variation on assessment of green biomass p 9 A85-38393 Changes in spectral properties of detached birch p 9 A85-38394

Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminary p 10 A85-38812

Reflectance measurements from Landsat Thematic Mapper over rugged terrain p 62 A85-38824 Evaluation of atmospheric particulate concentrations derived from analysis of ratio Thematic Mapper data

p 19 A85-38825 Techniques for the estimation of leaf area index using p 10 A85-38835 spectral data Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model

p 11 A85-38836 Assessing biophysical characteristics of grassland from spectral measurements p 11 A85-38838 Remote sensing of the leaf area index of temperate consterous forests p 11 A85-38839 Snow reflectance from Thematic Mapper

p 52 N85-23205

SPECTRAL RESOLUTION

The significance of scale in geobotanical applications for lithologic discrimination and mineral exploration

p 26 A85-35119 Spectral characterization of the Landsat Thematic p 72 A85-37983 Impact of Thematic Mapper sensor characteristics on

classification accuracy --- suburban Washington, DC, p 63 N85-23188 Maryland, and the Chesapeake Bay Quick look analysis of TM data of the Washington, District of Columbia, area p 64 N85-23197 Preliminary compansons of the information content and ulity of TM versus MSS data p 64 N85-23202 Assessing LANDSAT TM and MSS data for detecting utility of TM versus MSS data

submerged plant communities p 37 N85-23203 The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207

Preliminary study of information extraction of LANDSAT TM data for a suburban/regional test site

p 65 N85-23208 Companson of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper simulator (TMS) data for hydrologic applications --- Clinton River Basin, Michigan p 52 N85-23211 SPECTRAL SENSITIVITY

LANDSAT-4 Science Characterization Early Results Volume 4 Applications --- agriculture, soils land use, geology, hydrology, wetlands, water quality, biomass identification, and snow mapping [E85-10070] p 63 N85-23186

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes --- Lake Chicot, Arkansas p 52 N85-23204 Preliminary evaluation of TM for soils information

p 13 N85-23206 Comparison of MSS and TM data for landcover classification in the Chesapeake Bay area A preliminary

report --- Taylor's Island, Maryland p 65 N85-23210 SPECTRAL SIGNATURES SPOT and Landsat-4 simulations. Generalization of MRC

biophysical-inventory data on the upper St Lawrence Preliminary analysis p 48 A85-32131 Seasonal and interannual evolution of the spectral

signature in forest environments using Landsat data p 6 A85-32139

Landsat study of changes in surface cover p 59 A85-32140

Correlations between satellite data and radar. thermographic, and multispectral surveys for the geomorphological characterization of a region of southern Quebec p 48 A85-32146

Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space

p 73 A85-38701 Spectral response curve models applied to forest cover-type discrimination p 10 A85-38820

Spectral estimates of agronomic characteristics of p 11 A85-38837

Overview of TM applications research reports

p 63 N85-23187 A concept for the processing and display of Thematic Mapper data p 63 N85-23196

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications Washington, DC p 64 N85-23200

SPECTROMETERS

A Shuttle Imaging Spectrometer Experiment for the late p 69 A85-32214 Imaging spectrometry for earth remote sensing

p 71 A85-36248 Geometric error analysis for shuttle imaging

spectrometer experiment [NASA-CR-175665] p 75 N85-24269 SPECTRORADIOMETERS.

Retrieval of cloud cover parameters from multispectral satellite images p 70 A85-35124

SPECTRUM ANALYSIS

Study of spectral-polarization characteristics of natural p 69 A85-31478 surfaces from various heights Mapping surficial geology by Landsat - An investigation into variations in spectral response patterns p 23 A85-32148

Methods for the meteorological interpretation of satellite p 36 A85-38681 spectral measurements Remote sensing of directional wave spectra using the

surface contour radar p 43 N85-24510 [NASA-TM-84440] Multiple regression analysis of photographic image of

soil properties SPECULAR REFLECTION

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser

p 14 N85-26825

SPLINE FUNCTIONS

Noise correction on LANDSAT images using a spline-like algorithm

p 66 N85-27319 (F85-10098) SPOT (FRENCH SATELLITE)

The stereoscopic accentuation of SPOT images

p 58 A85-32108 Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

STANDARD DEVIATION p 22 N85-29449 Derivation of model topography

STANDARDIZATION The ARGOS system and hydrology Results obtained

ORSTROM and benefits f a degree of p 54 N85-23881 standardization

Standards and specifications for geodetic control networks p 21 N85-27374

[PB85-166478] STATIONKEEPING

Moored buoy stationkeeping and location system

p 42 N85-24416 STEPPES

Estimating phytomass of sagebrush habitat types from icrodensitometer data p 6 A85-33450

STEREOSCOPY Stereo models from synthetic aperture radar

p 68 A85-30961 The stereoscopic accentuation of SPOT images

p 58 A85-32108 Stereo viewability of proposed Radarsat imagery p 58 A85-32111

Hurncane structure and dynamics from stereoscopic and infrared satellite observations and radar data

p 76 N85-25988

Mesoscale analysis and modeling group

p 76 N85-26001
Test and evaluation plan for the Centralized Storm Information System p 77 N85-28508 Convective storm downdraft outflows detected by NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar System

[NASA-CR-3898] p 77 N85-28511

STRATIFICATION

Arctic mixed layer dynamics

[AD-A153582] p 46 N85-29505

STRATIGRAPHY

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death p 28 N85-23195 Valley, California

STRIP MINING

The utility of Thematic Mapper sensor characteristics p 27 A85-38810 for surface mine monitoring p
STRUCTURAL PROPERTIES (GEOLOGY)

Cobalt-abitibi project - Landsat image analysis in the Canadian Shield application of the geological analysis aid package p 23 A85-32144 Fracture mapping of part of northern Ontano using

p 23 A85-32145 Landsat imagery Basic outline of a guide for the use of Landsat images p 23 A85-32147 in geology

Geological interpretation of Landsat imagery of the Bangladesh Ganges delta p 24 A85-33875 lethods of structural geology and geological mapping

--- Russian book - Russian book p 27 A85-39341 Use of space information in petroleum- and gas-prospecting work (example of Southern Mangyshlak)

p 28 N85-25341

SUBJECT INDEX SUPERCOMPUTERS

SYSTEMS ANALYSIS Interpretation of space photolineaments Mapping of land/soil degradation using multispectral p 29 N85-25353 Experimental philosophy leading to a small scale digital p 16 A85-32127 data data base of the conterminous United States for designing Analysis of the Gran Desierto, Pinacte Region, Sonora, New remote sensing techniques for monitoring the tescue grasslands of Alberta p 5 A85-32133 Mexico, via shuttle imaging radar experiments with remotely sensed data andsat data [NASA-CR-175711] p 29 N85-25927 (NASA-TM-850091 n 67 N85-28877 Mapping native vegetation using L SUPERCOMPUTERS p.6 A85-33352 An evaluation of simulated Thematic Mapper data and Expenence with the use of supercomputers to process p 73 A85-38830 Landsat MSS data for discriminating suburban and regional Landsat data SURFACE NAVIGATION D 17 AB5-33557 land use and land cover Checking on the position of navigation marker buoys Remote sensing systems comparisons for geological TECHNOLOGICAL FORECASTING p 46 N85-27354 mapping in Brazil by the ARGOS system p 24 A85-35107 inferences of future operations drawn from past and Geological cartography of Gabon using side-looking present applications of drifting buoys p 38 N85-24356 SURFACE PROPERTIES radar imagery - An example of an integrated mapping Study of spectral-polanzation characteristics of natural surfaces from various heights p 69 A85-31478 TECHNOLOGY ASSESSMENT p 69 A85-31478 p 25 A85-35108 Remote sensing in geology - A decade of progress Medium to small scale geological maps based on SURFACE ROUGHNESS p 24 A85-35102 Landsat MSS and RBV data - Case histories of projects Expectations for aenal photography as seen from the Microwave remote sensing of soil moisture in North Africa p 25 A85-35110 p 13 N85-23235 p 71 A85-36287 side of the user Applications of Landsat images to geological mapping A decade of remote sensing in India - Some salient SURFACE TEMPERATURE in tropical jungle environment - Caroni River basin, p 72 A85-37952 Remote sensing of surface and near surface results Responses to satellite remote sensing opportunities in Venezuela p 25 A85-35111 temperature from remotely piloted aircraft Surveying and mapping with space data east and southern Africa p 72 A85-37953 p 68 A85-30543 The private sector - A global pool of technical talent p 71 A85-36286 Surface radiation in the tropical Pacific for remote sensing training and program support Expectations for aenal photography as seen from the p 30 A85-31200 p 78 A85-37954 side of the user p 71 A85-36287 Estimation of regional evapotranspiration using remotely Landsat Thematic Mapper studies of land cover spatial Main results and perspectives of some Chilean sensed land surface temperature Part 1 Measuremen vanability related to hydrology p 50 A85-37972 expenences developed with low cost and accurate spatial A TM Tasseled Cap equivalent transformation for of evapotranspiration at the Environmental Research remote sensing technology mote sensing technology p 72 A85-37957 The NASA land processes program - Status and future Center and determination of Priestley-Taylor parameter reflectance factor data p 9 A85-38395 p 13 N85-23233 p 78 A85-38802 Geographic regionalization and the problems related to Estimation of regional evapotranspiration using remotely space-based monitoring p 18 A85-38705 Drifting buoy studies for weather applications The use of Meteor satellite images for geographic sensed land surface temperature Part 2 Application of p 40 N85-24396 eauilibrium model to evaporation estimate **TECHNOLOGY UTILIZATION** regionalization of the Soviet Union gionalization of the Soviet Union p 18 A85-38706 A concept for establishing a database for a support evapotranspiration by remote sensing technique ---Short summary of multispectral imaging systems p 13 N85-23234 p 69 A85-32212 databank (through an example of an agricultural block) p 60 A85-38707 Application of space sciences to hydrology and water A method for estimating soil moisture availability [NASA-CR-175606] p 14 N85-23238 Modeling of spatially distributed objects using remote resources - The potential and practical use as reflected sensing data --- in hydrology SURFACE WATER p 49 A85-37969 p 51 A85-38709 by WMO experience Assessment of the study and mapping of pastures in semiarid zones using remote sensing methods Inferences of future operations drawn from past and Distinguishing homogeneous regions of water surfaces on the basis of space imagery p 36 A85-38712 present applications of drifting buoys p 38 N85-24356 Function of remote sensing in Brazil p 9 A85-38719 Optimization of the reference calibration method for p 77 N85-27329 Machine processing of remotely sensed data. Thematic [INPE-3314-PRE/621] remote sensing data on natural waters Mapper data and geographic information systems, p 51 A85-38714 **TECTONICS** Proceedings of the Tenth International Symposium, Purdue Applications of space images for neotectonic studies Operation guiding light-scientific program and field plan University, West Lafayette, IN, June 12-14, 1984 p 24 A85-35104 The pilot field experiment for NORDA project chemical p 73 A85-38801 Vertical component Magsat anomalies and Indian dynamics in ocean frontal areas tectonic boundaries p 26 A85-37150 Landsat 4 and 5 status and results from Thematic [AD-A153765] p 47 N85-29507 Results of a study of nontidal gravity variations Mapper data analyses p 61 A85-38803 SURFACE WAVES Algorithms for the estimation of failed detector data -n 20 A85-37310 Results of an initial trial of a satellite telemetering buoy for replacement of Landsat-4 thematic mapping missing Example of joint use of data from surface studies and p 45 N85-27345 measuring near surface current p 61 A85-38806 space photographs in investigating dynamics of zone of North Zeravshan seismogenic faults p 29 N85-25342 SURVEYS Information content comparison of Thematic Mapper, The application of computerized space image multispectral scanner and airborne Thematic Mapper Analysis of mesofissuring on space photographs. New processing techniques to data from large scale aerial data p 61 A85-38807 technique for study of petroleum and gas deposits A85-37119 surveys of forests The utility of Thematic Mapper sensor characteristics p 29 N85-26828 SWEDEN for surface mine monitoring TELEMETRY p 27 A85-38810 Hydrological data collection from Swedish mountain Use of the TM tasseled cap transform for interpretation Hydrometric telemetry in Canada p 54 N85-23882 Present stage of utilization of the ARGOS system by areas p 54 N85-24388 of spectral contrasts in an urban scene SYNOPTIC METEOROLOGY the ORSTOM hydrological service for hydrometric data p 18 A85-38811 An objective technique for the delineation and Analysis methods for Thematic Mapper data of urban p 55 N85-27348 collection p 18 A85-38816 extrapolation of thunderstorms from GOES satellite data TEMPERATURE DISTRIBUTION p 19 A85-39537 Analysis of NIMBUS-7 SMMR data Wetlands classification using Landsat Thematic Mapper Hokkaido, Japan data unsupervised classification approach Towards a study of synoptic-scale variability of the snow cover p 54 N85-23232 p 51 A85-38817 California current system **TEMPERATURE GRADIENTS** Comparison of classification schemes for MSS and TM [NASA-CR-175871] p 46 N85-28529 Arctic mixed layer dynamics p 62 A85-38821 [AD-A153582] data SYNTHETIC APERTURE RADAR p 46 N85-29505 Reflectance measurements from Landsat Thematic TEMPERATURE SENSORS Stereo models from synthetic aperture radai Remote sensing of surface and temperature from remotely piloted aircraft Mapper over rugged terrain p 62 A85-38824 p 68 A85-30961 and near surface Evaluation of atmospheric particulate concentrations Preliminary results from satellite SAR image simulation p 68 A85-30543 derived from analysis of ratio Thematic Mapper data p 30 A85-32103 p 19 A85-38825 **TEMPORAL RESOLUTION** A simple model for satellite SAR radiometric Use of Thematic Mapper for water quality assessment The use of Landsat-4 MSS digital data in temporal data discrimination estimation p 31 A85-32104 p 52 A85-38826 An analysis of the utility of Landsat Thematic Mapper sets and the evaluation of scene-to-scene registration Preliminary results of an examination of C-band synthetic p 59 A85-33449 aperture radar for forestry applications p 4 A85-32113 TERRAIN ANALYSIS data and digital elevation model data for predicting soil The use of multisensor images for Earth Science p 10 A85-38828 Structures for geo-information and their application in erosion p 69 A85-32211 Scene segmentation through region growing p 62 A85-38832 selective sampling of digital terrain models A concept for an advanced earth observation p 60 A85-36283 spacecraft p 70 A85-32228 Application of digital image enhancement processing of Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model Texture analysis and classification of airborne radar data Landsat data for terrain mapping of southern Huairou County of Beijing (Peking), China p 11 A85-38836 p 60 A85-34865 p 61 A85-38813 with synthetic aperture Modelling forest biomass accessibility in South Carolina Remote sensing of the leaf area index of temperate Geologic interpretation of Seasat SAR imagery near the p 11 A85-38839 p 11 A85-38842 conferous forests Rio Lacantum, Mexico p 25 A85-35109 with digital terrain data TEXTURES Registering Thematic Mapper imagery to digital elevation Recent advances in geologic mapping by radar p 27 A85-38846 models Microwave remote sensing of soil moisture p 25 A85-35114 p 13 N85-23235 Experience in combined special mapping using space Theory of synthetic aperture radar ocean imaging - A MARSEN view p 32 A85-35164

p 32 A85-35164

p 72 A85-37962

p 50 A85-37976

p 62 A85-38833

p 36 N85-22860

Merging Landsat and spaceborne radar data over

Synthetic aperture radar capabilities for snow and glacier

Adaptive filtering and image segmentation for SAR

The imaging of internal waves by the SEASAT-A

THEMATIC MAPPING

Urban change detection and land-use mapping of Delhi p 16 A85-30739 Radiometric characterization of thematic mapper p 57 A85-30958 full-frame imagery 7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes p 57 A85-30962 p 57 A85-30962 First steps towards integration of remote sensing and

p 58 A85-32115

Impact of Thematic Mapper sensor characteristics on classification accuracy -- suburban Washington, D.C., Maryland, and the Chesapeake Bay p 63 N85-23188

Overview of TM applications research reports

LANDSAT-4 Science Characterization Early Results

Volume 4 Applications --- agriculture, soils land use,

geology, hydrology, wetlands, water quality, biomass

identification, and snow mapping

[F85-10070]

p 62 N85-22449

p 63 N85-23186

p 63 N85-23187

monitoring

synthetic aperture radar

[ARE(PORTLAND)TN-720/84]

SUBJECT INDEX **VEGETATION** 

Discrimination of tropical forest cover types using Analysis and evaluation of the LANDSAT-4 MSS and THERMOGRAPHY p 12 A85-38843 Landsat MSS data limitations on quantitative autoorne TM sensors and ground data processing systems Early Current thermography p 57 A85-32105 results p 63 N85-23189 Surface currents in the tropical Pacific during 1979-1980 Characterization of LANDSAT-4 TM and MSS image Automated computer monitoring sea ice temperature by using drifting buoys p 38 N85-24354 quality for the interpretation of California's agricultural use of NOAA satellite data A85-32112 p 31 The Tropical Ocean and Global Atmosphere program THUNDERSTORMS resources --- Central Valley p 12 N85-23190 (TOGA) p 42 N85-24411 Evaluation of Thematic Mapper performance as applied An objective technique for the delineation and TROPICAL STORMS extrapolation of thunderstorms from GOES satellite data to hydrocarbon exploration --- Ontano, Canada, Cement, Effects of wind speed and rain on precipitable water p 19 A85-39537 Oklahoma, and Death Valley, California and cloud liquid water based on SCAMS data -- SCAnning TIMBER IDENTIFICATION p 27 N85-23191 Microwave Spectrometer p 70 A85-32863 Analysis of photo interpretation test results for seven Geologic utility of LANSDAT-4 TM data - Death Valley, Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data erospace image types on the Mendocino National Forest, California and the Silver Bell area of southern Arizona p 28 N85-23192 California alifornia p 2 A85-30832 Digital processing to improve forest classification results p 76 N85-25989 An initial analysis of LANDSAT-4 Thematic Mapper data Technique that uses satellite, radar, and conventional at resolutions of 5 to 50 metres for the discrimination of agricultural, forested wetlands, p 4 A85-30965 data for analyzing and short-range forecasting of precipitation from extratropical cyclones Remote detection of geobotanical anomalies associated and urban land cover --- Poinsett County, Arkansas, and with hydrocarbon microseepage using thematic mapper Reelfoot Lake and Union City, Tennessee p 55 N85-27499 [PB85-164994] p 12 N85-23193 simulator (TMS) and airborne imaging spectrometer (AIS) Preliminary evaluation of Thematic Mapper image data uality p 63 N85-23194 TURBIDITY p 7 A85-35120 data Mapping of coastal-water turbidity using LANDSAT p 35 A85-37979 An initial analysis of LANDSAT-4 Thematic Mapper data quality for the discrimination of agricultural, forested wetlands, and urban land cover --- Poinsett County, Arkansas, and ımagery Assessment of computer based geologic mapping of TYPHOONS rock units in the LANDSAT-4 scene of northern Death Valley, California p 28 N85-23195 Hurncane Research Division, fiscal year 1984 programs, Reelfoot Lake and Union City, Tennessee p 12 N85-23193 p 77 N85-27491 A concept for the processing and display of Thematic fiscal year 1985 projections p 63 N85-23196 TIMBER INVENTORY Mapper data p 6 A85-32142 Quick look analysis of TM data of the Washington, Timber inventory using Landsat District of Columbia, area p 64 N85-23197 TIMBER VIGOR Training and testing interpreters of small-scale CIR Remote sensing of coastal wetlands biomass using photography - A digitizer-aided approach Thematic Mapper wavebands --- Lewes, Delaware p 12 N85-23198 p 2 A85-30830 Study of Volga river delta using space photosurvey 35mm Detection of forest stress with p 55 N85-25340 A preliminary companson of the information content of materials p 2 A85-30831 data from the LANDSAT 4 Thematic Mapper and photographs
TIME SERIES ANALYSIS Use of space information in petroleum- and p 64 N85-23199 Multispectral Scanner --- Arkansas gas-prospecting work (example of Southern Mangyshlak) Early results of investigations of LANDSAT 4 Thematic Towards a study of synoptic-scale variability of the p 28 N85-25341 Mapper and Multispectral Scanner applications California current system **ULTRAHIGH FREQUENCIES** [NASA-CR-175871] p 46 N85-28529 Washington, DC p 64 N85-23200 The ARGOS Platform Transmitter Terminals (PTTs) TIROS N SERIES SATELLITES Thematic Mapper data quality and performance p 74 N85-23872 The ARGOS Platform Transmitter Terminals (PTTs) assessment in renewable resources/agriculture/remote **UNDERWATER TESTS** p 12 N85-23201 p 74 N85-23872 The Deep Drifter Program --- deep ocean sensors Hydrometric telemetry in Canada p 54 N85-23882 Preliminary comparisons of the information content and p 40 N85-24400 utility of TM versus MSS data p 64 N85-23202 Data Collection and Platform Location by Satellite RGOS Users' Conference p 38 N85-23883 UNITED NATIONS ARGOS Users' Conference A first evaluation of LANDSAT TM data to monitor The world's topographic and cadastral mapping Some experience from ARGOS stations in the oper suspended sediments in lakes --- Lake Chicot, Arkansas p 20 A85-33448 p 38 N85-23891 p 52 N85-23204 UNITED STATES New directions in ARGOS instrumentation at Polar Snow reflectance from Thematic Mapper Experimental philosophy leading to a small scale digital p 52 N85-23205 Research Lab (PRL) p 38 N85-24350 data base of the conterminous United States for designing Automatic weather stations in Antarctica Preliminary evaluation of TM for soils information experiments with remotely sensed data p 75 N85-24360 p 13 N85-23206 INASA-TM-850091 p 67 N85-28877 Preliminary study of information extraction of LANDSAT Long term drifting float for measuring mean oceanic URBAN DEVELOPMENT TM data for a suburban/regional test site circulation using ARGOS system p 44 N85-27339 Use of the TM tasseled cap transform for interpretation Availability of the ARGOS system based on the orbital p 65 N85-23208 of spectral contrasts in an urban scene characteristics of the TIROS oceanographic/meteorological data TIROS-N satellites Comparative techniques used to evaluate Thematic p 18 A85-38811 p 45 N85-27352 Mapper data for land cover classification in Logan County, Analysis methods for Thematic Mapper data of urban Location and data collection satellite system ARGOS p 18 A85-38816 West Virginia p 65 N85-23209 regions Comparison of MSS and TM data for landcover User's guide --- satellite based localization Study of the urban evolution of Brasilia with the use of classification in the Chesapeake Bay area A preliminary report --- Taylor's Island, Maryland p 65 N85-23210 p 66 N85-27371 LANDSAT data [E85-10101] p 19 N85-27321 report --- laylor's island, Maryland p 65 N85-23210
Companson of land cover information from LANDSAT
Multispectral Scanner (MSS) and airborne Thematic
Mapper simulator (TMS) data for hydrologic applications
--- Clinton River Basin, Michigan p 52 N85-23211
Relative accuracy assessment of LANDSAT-4 MSS and
TM data for level 1 land cover inventory --- Washington, Data Collection and Platform Location by Satellite **URBAN PLANNING** p 74 N85-23869 ARGOS Users' Conference Experience of the Institute of Space Research with the The ARGOS system status report after 2 years use of remote sensing in urban planning studies operation p 74 N85-23870 p 19 N85-27770 [INPE-3159-PRE/533] System performance, data distribution and technical files URBAN RESEARCH p 74 N85-23871 ARGOS project An initial analysis of LANDSAT-4 Thematic Mapper data p 74 N85-23884 DC p 65 N85-23212 The ARGOS system status report for the discrimination of agricultural, forested wetlands, and urban land cover --- Poinsett County, Arkansas, and The ARGOS system after 3 years operation An investigation of several aspects of LANDSAT-5 data p 39 N85-24368 quality --- Palmer County, Shelby, mt, White sands, NM, Reelfoot Lake and Union City, Tennessee Great Salt Lake, UT, San Matted Bndge and Sacramento, The ARGOS program --- satellite based localization p 12 N85-23193 p 75 N85-24775 California UTILIZATION p 65 N85-23214 **TOPEX** Indian remote-sensing satellite - Utilization plan TOPEX ground data system p 32 A85-32192 Studies on physical properties of snow based on multi p 77 A85-30746 TOPOGRAPHY channel microwave radiometer p 54 N85-23231 p 32 A85-32192 Analysis of NIMBUS-7 SMMR data --- Hokkaido, Japan TOPEX ground data system p 54 N85-23232 The world's topographic and cadastral mapping p 20 A85-33448 CNPg/INPE LANDSAT system Report of activities from operation October 1, 1983 to September 30, 1984 --- Brazil Surveying and mapping with space data VECTOR ANALYSIS p 71 A85-36286 [E85-10097] p 66 N85-27318 Characteristic vector analysis of inflection ratio spectra Shuttle imaging radar-A (SIR-A) data analysis --- geology of the Ozark Plateau of southern Missoun, land use in p 22 N85-29449 New technique for analysis of ocean color data Derivation of model topography [NASA-TP-2428] p 37 N85-23237 **TORNADOES** western Illinois, and vegetation types at Koonamore VEGETATION Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections p 77 N85-27491 Station, Australia Forest-type stratification and delineation of shifting p 77 cultivation areas in the eastern part of Arunachal Pradesh [NASA-CR-175785] p 15 N85-27324 TRANSFORMATIONS (MATHEMATICS) p 1 A85-30728 THERMAL MAPPING using Landsat MSS data A TM Tasseled Cap equivalent transformation for Color aerial photography in the plant sciences and The contribution of the heat capacity mapping mission reflectance factor data p 9 A85-38395 to the interpretation of thermal infrared data related fields, Proceedings of the Ninth Biennial Workshop, TRIANGULATION p 56 AR5\_30955 Orlando and University of Florida, Lake Alfred, FL, Standards and specifications for geodetic control ovember 15-17, 1983 p.1 A85-30826 Alaska meander lines determined by vegetation A comparison of techniques for radiometric calibration November 15-17, 1983 of aenal infrared thermal images p 56 A85-30956 [PB85-166478] p 21 N85-27374 Current limitations on quantitative aurborne appearance on color infrared photographs TROPICAL REGIONS thermography A85-32105 p 2 A85-30834 p 57 Surface radiation in the tropical Pacific Identifying vegetative land use classes during each of Testing the radiometric stability of HCMM thermal

p 30 A85-31200

p 24 A85-35107

p 25 A85-35111

Remote sensing systems compansons for geological

Applications of Landsat images to geological mapping

in tropical jungte environment - Caroni River basin

mapping in Brazil

infrared data

ifrared data p 58 A85-32109 A thermal study of the waters of the St. Lawrence estuary

p 48 A85-32124

p 28 N85-24500

by means of the HCMM satellite - Preliminary results

Temperature anomalies above ore bodies

A-25

p 10 A85-38815

p 10 A85-38834

p 64 N85-23202

the four seasons on aenal photographs and Landsat

Preliminary compansons of the information content and

imagery in coastal South Carolina

utility of TM versus MSS data

Role of vegetation in the biosphere

**VEGETATION GROWTH** SUBJECT INDEX

Optimization of the reference calibration method for The microwave propagation and backscattering data unsupervised classification approach characteristics of vegetation --- wheat, sorghum, soybeans remote sensing data on natural waters p 51 A85-38817 and corn fields in Kansas o 51 A85-38714 [E85-10088] p 13 N85-23213 Use of Thematic Mapper for water quality assessment Microwave remote sensing of soil moisture p 52 A85-38826 p 13 N85-23235 A first evaluation of LANDSAT TM data to monitor Reelfoot Lake and Union City, Tennessee Atlas of archived vegetation, land-use and seasonal suspended sediments in lakes --- Lake Chicot, Arkansas p 12 N85-23193 p 52 N85-23204 p 14 N85-24508 [NASA-TM-86199] WATER RESOURCES Microwave model prediction and ventications for Thematic Mapper wavebands --- Lewes, Delaware Ground water exploration in the Saurashtra peninsula vegetated terrain p 12 N85-23198 p 47 A85-30730 p 15 N85-27322 [E85-10102] Optical noncontact methods for the study of the world Function of remote sensing in Brazil p 30 A85-31890 ocean --- Russian book [INPE-3314-PRE/621] p 77 N85-27329 report --- Taylor's Island, Maryland Application of remote sensing by means of a satellite Airphoto interpretation of vegetation and landforms for WHALES in surveying the water resources of the Sahel Tracking whale migrations with the ARGOS satellite p 15 N85-28436 soil mapping p 48 A85-32123 **VEGETATION GROWTH** The ARGOS system used for tracking gray whales p 43 N85-24421 Landsat model for groundwater exploration in Nuba Mapping native vegetation using Landsat data Mountains, Sudan p 49 A85-37961 p 6 A85-33352 The ARGOS system used for tracking gray whales p 45 N85-27347 Changes in vegetation spectra with leaf detenoration Application of space sciences to hydrology and water under two methods of preservation p 6 A85-33558 Assessment of the study and mapping of pastures in resources - The potential and practical use as reflected by WMO expenence p 49 A85-37969 semiand zones using remote sensing methods Distinguishing homogeneous regions of water surfaces p 9 A85-38719 p 36 A85-38712 on the basis of space imagery Monitoring global vegetation dynamics using the NOAA/AVHRR p 11 A85-38840 Utilization of aerial and space remote-sensing data p 11 A85-38840 of vegetation canopies studies of land water --- Russian book (E85-100991 p 15 N85-27320 **VEGETATIVE INDEX** p 52 A85-39347 WILDERNESS Influence of the viewing geometry on vegetation WATER RUNOFF p 4 A85-32102 Analysis of photo interpretation test results for seven Use of satellite images to obtain accurate snowmelting Influence of rock-soil spectral variation on the runoff forecasts and to survey geothermal activity along p 9 A85-38393 assessment of green biomass Los Andes range, Chile p 50 A85-37975 Techniques for the estimation of leaf area index using Remote Sensing of Snow and Evapotranspiration spectral data p 10 A85-38835 [NASA-CP-2363] p 53 N85-23223 Estimation of leaf area index from bidirectional spectral p 2 A85-30833 General report of the researches of snowpack reflectance data by inverting a canopy reflectance model WILDLIFE RADIOLOCATION properties, snowmelt runoff and evapotranspiration in p 11 A85-38836 Tracking pelagic dolphins by satellite p 53 N85-23225 Remote sensing of the leaf area index of temperate Japan p 39 N85-24364 p 11 A85-38839 Snowmelt-runoff model utilizing remotely-sensed data coniferous forests Remote sensing of coastal wetlands biomass using p 53 N85-23226 system p 53 N85-23227 Thematic Mapper wavebands --- Lewes, Delaware Snowmelt runoff model in Japan Drifting buoy development and future programs p 12 N85-23198 Japanese ARGOS program Distribution of snow and maximum snow water **VELOCITY MEASUREMENT** The ARGOS system used for tracking gray whales equivalent obtained by LANDSAT data and degree day p 43 N85-24421 Large space antenna technology applied to p 53 N85-23229 method radar-imaging, rain-rate measurements, and ocean wind WATER TEMPERATURE p 37 N85-23820 sensing A thermal study of the waters of the St Lawrence estuary by means of the HCMM satellite - Preliminary results seals Mirounga leonina at sea The ARGOS system used for tracking gray whales VERTICAL DISTRIBUTION p 45 N85-27347

Vertical component Magsat anomalies and Indian p 26 A85-37150 tectonic boundaries VIDEO DATA

Video color infrared imagery - A future natural resource p 56 A85-30844 p 57 A85-32107 management tool

Video image analysis Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space

p 73 A85-38701

p 35 A85-37986

VIEWING Influence of the viewing geometry on vegetation p 4 A85-32102

The devastation of a vineyard by phylloxera

p 3 A85-30838

VISIBLE SPECTRUM Clouds - A fundamental limitation to satellite remote sensing in the visible spectral region p 69 A85-32119 Changes in spectral properties of detached birch p 9 A85-38394

VOLCANOES

Results of a study of nontidal gravity variations p 20 A85-37310

# W

**WASTE DISPOSAL** 

Bright spot analysis of ocean-dump plumes using p 36 A85-37987 Landsat MSS WATER COLOR

Evaluation of sensitivity decay of Coastal Zone Colour Scanner (CZCS) detectors by companson with in situ near-surface radiance measurements

WATER MANAGEMENT

Review of remote sensing applications in hydrology and water resources management in India

p 49 A85-37970 The ARGOS system and hydrology Results obtained ORSTROM and benefits of degree а p 54 N85-23881 standardization Hydrometric telemetry in Canada N85-23882 p 54

WATER POLLUTION

Bright spot analysis of ocean-dump plumes using Landsat MSS p 36 A85-37987

WATER QUALITY

The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713

Investigation of the atmospheric aerosols and water apor by the AVHRR radiometer (visible and IR) on board p 32 A85-32872 NOAA-7 Satellite derived atmosphere water vapor as a tracer of large scale interactions between the atmosphere and

A first evaluation of LANDSAT TM data to monitor

An evaluation of the use of atmospheric radiances for

p 52 N85-23204

p 59 A85-32868

suspended sediments in lakes --- Lake Chicot, Arkansas

p 35 A85-37754 WATER WAVES

water vapor retrieval in a global retrieval system

Theory of radar imaging of internal waves

WATER VAPOR

p 30 A85-30980 Theory of synthetic aperture radar ocean imaging -MARSEN view A85-35164 p 32 Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser

p 34 A85-35879 On the microwave reflectivity of small-scale breaking p 34 A85-36570

Fourier transform of wave data on ARGOS buoys p 38 N85-24351

Remote sensing of directional wave spectra using the surface contour radar [NASA-TM-84440] o 43 N85-24510

Wave directional spectra via ARGOS

p 45 N85-27343 Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance p 45 N85-27344

# **WEATHER FORECASTING**

Mesoscale analysis and modeling group

p 76 N85-26001 Hurricane Research Division, fiscal year 1984 programs, fiscal year 1985 projections p 77 N85-27491

Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones p 55 N85-27499 [PB85-164994]

Test and evaluation plan for the Centralized Storm Information System p 77 N85-28508 Research Review, 1983

[NASA-TM-86219] p 46 N85-29433 WETLANDS

Coastal morphology - A case study of the Gulf of Khambhat (Cambay) p 48 A85-30743 Wetlands classification using Landsat Thematic Mapper

An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetlands, and urban land cover --- Poinsett County, Arkansas, and

Remote sensing of coastal wetlands biomass using

Comparison of MSS and TM data for landcover classification in the Chesapeake Bay area A preliminary p 65 N85-23210

p 41 N85-24403

Operational crop forecasting using remotely sensed imagery P 4 A85-32 123 Modeling the backscattering and transmission properties

aerospace image types on the Mendocino National Forest, p 2 A85-30832 The interpretability of small and medium scale aerospace

imagery for wildland environments of California and

Tracking whale migrations with the ARGOS satellite p 41 N85-24403

p 41 N85-24406

Motivation for satellite tracking of southern elephant p 45 N85-27346

### WIND DIRECTION Analysis of the inflow and air-sea interactions in

humçane Fredenc p 76 N85-25990 WIND EFFECTS

Effects of wind speed and rain on precipitable water and cloud liquid water based on SCAMS data --- SCAnning Microwave Spectrometer p 70 A85-32863 p 70 A85-32863

WIND MEASUREMENT An overview of NDBC drifting buoy development programs --- NOAA Data Buoy Center (DBC)

p 43 N85-24422 Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California p 77 N85-27463 [NASA-CR-3901]

WIND VELOCITY Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind sensino p 37 N85-23820

# WIND VELOCITY MEASUREMENT

A review of satellite altimeter measurement of sea surface wind speed - With a proposed new algorithm

p 32 A85-35165

Comment on 'Seasonal variation in wind speed and sea state from global satellite measurements' by D Sandwell and R Agreen p 33 A85-35169

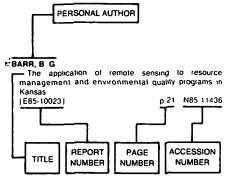
Science opportunities using the NASA scatterometer on N-ROSS [NASA-CR-175639] p 74 N85-23222

Z

Simultaneous Earth observations from 2 satellites [NASA-TM-86204] p 76 N85-27325

# Typical Personal Author Index Listing

EARTH RESOURCES / A Continuing Bibliography (Issue 47)



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report) The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first

# ABBOTT, M R

Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047

# ABDEL HADY, M A

Space-borne imagery interpretation - Earthquake studies p 27 A85-39095 ın Aswan

# ABRAMENOK, G A

Analysis of mesofissuring on space photographs. New technique for study of petroleum and gas deposits p 29 N85-26828

# ABRAMS, M

Image processing applications for geologic mapping p 23 A85-31736

Recent developments in lithologic mapping using remote p 25 A85-35112 sensing data

Geologic utility of LANSDAT-4 TM data p 28 N85-23192

# ACEVEDO, W

Information content companson of Thematic Mapper. multispectral scanner and airborne Thematic Mapper p 61 A85-38807

Remote sensing of the leaf area index of temperate p 11 A85-38839 conferous forests

# ACKLESON, S G

Assessing LANDSAT TM and MSS data for detecting —p 37 - N85-23203 -submerged plant communities ---

# AFANASOV. M. M.

Features of exposure conditions and photolab processing of materials obtained from aerial photography p 73 A85-38703 using the MKF-6M camera

# AGRAWAL, P.K.

Vertical component Magsat anomalies and Indian p 26 A85-37150 tectonic boundaries

# AHERN, F J

Digital processing to improve forest classification results at resolutions of 5 to 50 metres p 4 A85-30965

New remote sensing techniques for monitoring the fescue grasslands of Alberta p 5 A85-32133

# AHMED, F

Landsat model for groundwater exploration in Nuba p 49 A85-37961 Mountains, Sudan

Assessment of water-stress effects on crops

p 1 A85-30745

# ALEKSANDROV, V IU

Determination of sea-ice concentration according to satellite imagery p 34 A85-37114

### ALEXANDER, D. A.

Information content companion of Thematic Mapper. multispectral scanner and airborne Thematic Mapper p 61 A85-38807 data

#### ALLEN, C T

Modeling the backscattering and transmission properties of vegetation canopies

F85-100991 p 15 N85-27320

#### ALPERS, W

Theory of radar imaging of internal waves

p 30 A85-30980 Theory of synthetic aperture radar ocean imaging - A p 32 A85-35164 MARSEN view

# AMANN. V

An evaluation of 685 nm fluorescence imagery of coastal p 35 A85-37269

# AMARAL, G.

Remote sensing systems comparisons for geological mapping in Brazil p 24 A85-35107 AMURSKIY, G I.

Analysis of mesofissuring on space photographs New technique for study of petroleum and gas deposits

#### p 29 N85-26828 ANDERSON, J.

New directions in ARGOS instrumentation at Polar Research Lab (PRL) p 38 N85-24350

An overview of NDBC drifting buoy development p 43 N85-24422

# ANDERSON, J E

The use of Landsat-4 MSS digital data in temporal data sets and the evaluation of scene-to-scene registration p 59 A85-33449 accuracy

# ANDERSÓN, J M

A combined photogrammetric and Doppler adjustment p 60 A85-38271

# ANDERSON, M R

Arctic atmosphere Ice interaction studies using Nimbus-7 SMMR p 35 A85-37752 p 35 A85-37752

# ANDERSON, W H

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications p 64 N85-23200

# ANDRAWIS, A S

Landsat model for groundwater exploration in Nuba Mountains, Sudan p 49 A85-37961

ANDREEV. A A An algorithm for reconstructing correlating series of

ground-based and remote observations p 61 A85-38711

# ANUTA, P E

Comparison of classification schemes for MSS and TM p 62 A85-38821 data

# APARINOVA, N A

ARKING, A.

The application of computenzed space image processing techniques to data from large scale aerial surveys of forests p 7 A85-37119 surveys of forests

# ARAI, K.

On a venfication plane for MOS-1 (Marine Observation p 31 A85-32149

# ARAYA, M. F Main results and perspectives of some Chilean

expenences developed with low cost and accurate spatial remote sensing technology p 72 A85-37957 Use of satellite images to obtain accurate snowmelting runoff forecasts and to survey geothermal activity along p 50 A85-37975 Los Andes range, Chile

Retneval of cloud cover parameters from multispectral satellite images p 70 A85-35124

### ARNONE, R. A. p 42 N85-24412

#### Arabian gulf circulation ARRINGTON, R F

Determination of electromagnetic properties of mesh material using advanced radiometer techniques

p 74 N85-23855

# ARSENAULT, L. D

Preliminary results from satellite SAR image simulation experiments p 30 A85-32103

# ARVANITIS, L. G

Estimation of woody biomass in slash pine plantations using color aerial photography - A feasibility study

#### ARVIDSON, R E

Shuttle imaging radar-A (SIR-A) data analysis [NASA-CR-175785] p 15 N85-27324

ASH. D Resource inventory through instructionally-based digital

processing system p 56 A85-30953 ASKARIAN, G A.

Investigation of the earth by means of neutrinos -Neutrino geology p 27 A85-39825

ASMEROM. Y Analysis of the Gran Desierto, Pinacte Region, Sonora,

Mexico, via shuttle imaging radar [NASA-CR-175711] p 29 N85-25927

Estimation of total above-ground phytomass production using remotely sensed data p 8 A85-38389 Spectral estimates of agronomic characteristics of p 11 A85-38837 Assessing biophysical characteristics of grassland from

# spectral measurements ASTAKHOVA, V A

Experience in combined special mapping using space p 62 N85-22449

### ASTARAS, T

AUDET H

Drainage network analysis of Landsat images of the Olympus-Pieria mountain area, northern Greed

p 51 A85-37982

# ATKINSON, I A E

Mapping native vegetation using Landsat data p 6 A85-33352

# A case study on the application of geosynchronous

p 11 A85-38838

satellite infrared data to estimate soil moisture p 7 A85-37742

Airborne Doppler radar velocity measurements of precipitation seen in ocean surface reflection

# p 36 A85-38866

First steps towards integration of remote sensing and p 58 A85-32115 gital mapping AUDUNSON, T

# Operational experiences with the ARGOS system in

oceanography and oil spill emergency planning Future plans for the use of the ARGOS system as a component p 38 N85-23887 in offshore data collection system Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance p 45 N85-27344

# AUSTIN, G. L.

An objective technique for the delineation and extrapolation of thunderstorms from GOES satellite data p 19 A85-39537

# AVIGNON. M

Scientific experiments Preprocessing of scientific ata p 66 N85-24779 data

# AZIMOV, B G

Relative geological information yield from small-scale multizonal space images (example of Fergama depression p 29 N85-25343 and its mountainous margins)

# В

# BADHWAR, G. D.

Techniques for the estimation of leaf area index using spectral data p 10 A85-38835

# BAGG, M T

The imaging of internal waves by the SEASAT-A synthetic aperture radar [ARE(PORTLAND)TN-720/84] p 36 N85-22860

# BAKER, J R

The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207

BALGOVIND, R C

p 22 N85-29449 Derivation of model topography

BALICK, L. K

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications

p 64 N85-23200

BANNER, M L. On the microwave reflectivity of small-scale breaking

p 34 A85-36570

BARDINET, C

Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116

BARKER, J. L.

Spectral characterization of the Landsat Thematic p 72 A85-37983 LANDSAT-4 Science Characterization Early Results Volume 4 Applications

[E85-10070] p 63 N85-23186

BARRELL, S L.

Rain estimation in extratropical cyclones using GMS p 49 A85-37855 ımagery

BARROS, V R P

Automatic buoys to assist the tuna fishery off the p 37 N85-23879

BARSTOW, S F

Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance

p 45 N85-27344

BARTOLUCCI, L. A

Comparison of classification schemes for MSS and TM p 62 A85-38821 data

BARVYN, G I

A concept for establishing a database for a support databank (through an example of an agricultural block)

BASSOT, J-P

Geological cartography of Gabon using side-looking radar imagery - An example of an integrated mapping p 25 A85-35108 project

Looking down looking forward Earth observation, sciences and applications, a perspective

[ESA-SP-1073] p 78 N85-29497

BAUER, M E

Spectral estimators of absorbed photosynthetically active radiation in corn canopies p.8 A85-38390

BEATY, D

The ARGOS system used for tracking gray whales p 45 N85-27347

BEAUBIEN, J

A method for enhancing Landsat images for classifying p 5 A85-32134 plant cover BÉCO. D

Wave directional spectra via ARGOS

p 45 N85-27343

BEDFORD, P A.

DB2 and DB3 The next generation

p 44 N85-27337 BELIAEVA, N V

Assessment of the study and mapping of pastures in semiand zones using remote sensing methods

p 9 A85-38719 BELICH, R B

Calculation of the emissivity of ice and snow covers in p 51 A85-38587 the microwave region

BELLON, A

An objective technique for the delineation and extrapolation of thunderstorms from GOES satellite data p 19 A85-39537

Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing experiments with remotely sensed data

[NASA-TM-850091 n 67 N85-28877

BENARD, M

Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116 BENCI, J F

Operational crop forecasting using remotely sensed p 4 A85-32125

BENETT, W J

Digital processing to improve forest classification results p 4 A85-30965 at resolutions of 5 to 50 metres

BENSON, A. S.

Analysis of photo interpretation test results for seven aerospace image types on the Mendocino National Forest, p 2 A85-30832 California

The interpretability of small and medium scale aerospace imagery for wildland environments of California and p 2 A85-30833 Colorado

BERCHA, F G

Cobalt-abitibli project - Landsat image analysis in the Canadian Shield application of the geological analysis aid p 23 A85-32144 package BERNIER. M

Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada

p 4 A85-32126 BERNSTEIN, R

Analysis and evaluation of the LANDSAT-4 MSS and TM sensors and ground data processing systems Early p 63 N85-23189

BESSIS, J L

The ARGOS system status report after 2 years p 74 N85-23870
The ARGOS system status report p 74 N85-23884 The ARGOS system main characteristics

p 39 N85-24367 BESTER, M N

Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea p 45 N85-27346 BHAN, S K

Targeting areas for mineral exploration - A case study p 22 A85-30734 from Onssa, India BHAVSAR, P D

Indian remote-sensing satellite - Utilization plan

p 77 A85-30746 Review of remote sensing applications in hydrology and water resources management in India p 49 A85-37970

BIEGEL, J D

A companson of techniques for radiometric calibration of aerial infrared thermal images p 56 A85-30956 BIEHL, L. L.

Changes in spectral properties of detached birch p 9 A85-38394 Spectral estimates of agronomic characteristics of p 11 A85-38837 RIRCH J. R.

Drifting buoys on the Labrador shelf

p 42 N85-24415 RIZZELI R M

Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 Thematic Mapper data quality and performance assessment in renewable resources/agriculture/remote p 12 N85-23201

BLAD, B L. Spectral estimates of agronomic characteristics of p 11 A85-38837

BLANCK, J. P.

Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116

BLASCO, S

The analysis of Landsat MSS data for characterizing sediment dispersal in the Beaufort Sea

BLAZQUEZ, C H

Spectral densitometer application to stress detection in p 3 A85-30837

BLODGET, H W

Comparative techniques used to evaluate Thematic Mapper data for land cover classification in Logan County, West Virginia p 65 N85-23209

BLUME, H J C

Determination of electromagnetic properties of mesh material using advanced radiometer techniques p 74 N85-23855

BLUSSON, A

Image processing applications for geologic mapping p 23 A85-31736

BLYTH, K.

Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation p 50 A85-37973

BOATWRIGHT, G O

A first evaluation of LANDSAT TM data to monitor p 52 N85-23204 suspended sediments in lakes

BOLSHAKOV, A. A. Space methods in oceanology

[NASA-TM-77652] p 44 N85-26047

BONDARENKO, L. V

Features of exposure conditions and photolab processing of materials obtained from aerial photography using the MKF-6M camera p 73 A85-38703 p 73 A85-38703 BONN, F

Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings

p 69 A85-32101

p 48 A85-32122

A thermal study of the waters of the St. Lawrence estuary by means of the HCMM satellite - Preliminary results p 48 A85-32124

SPOT and Landsat-4 simulations. Generalization of MRC biophysical-inventory data on the upper St Lawrence Preliminary analysis p 48 A85-32131 Correlations between satellite data and radar,

thermographic, and multispectral surveys for the geomorphological characterization of a region of southern p 48 A85-32146

BOOTH, D ARGOS-tracked drifters in the Rockall Trough

p 44 N85-27340

Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

BORESJO, L.

BOQUET, E.

Classification of mires using multitemporal Landsat MSS and topographic map data p 5 A85-32136

BOSTON, N E J

Inferences of future operations drawn from past and present applications of drifting buoys p 38 N85-24356 BOTKIN, D B

Role of vegetation in the biosphere

p 10 A85-38834

BOUCHET, P

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory

p 26 A85-35117

Fracture mapping of part of northern Ontario using

Landsat imagery p 23 A85-32145

BOURQUE, D. A.

Project PAPA The integration of drifting buoy data into an operational meteorological service

p 37 N85-23874

BOWEN, R L.

Video color infrared imagery - A future natural resource management tool p 56 A85-30844

BOWKER D F

Bright spot analysis of ocean-dump plumes using Landsat MSS p 36 A85-37987

BRANDENBERGER, A. J

The world's topographic and cadastral mapping p 20 A85-33448 operation

BRICENO, H O

Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin, Venezuela p 25 A85-35111

BRIVIO, P. A.

Use of Landsat imagery to detect hydrologic indicators of the Niger river regime p 49 A85-33874

BRODERICK, P W

Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing experiments with remotely sensed data

[NASA-TM-85009] p 67 N85-28877

Influence of the viewing geometry on vegetation measures p 4 A85-32102 Operational crop forecasting using remotely sensed p 4 A85-32125 New remote sensing techniques for monitoring the

fescue grasslands of Alberta p 5 A85-32133 BROWN, W P New directions in ARGOS instrumentation at Polar p 38 N85-24350

Research Lab (PRL) BRUCE, B

Cobalt-abitibi project - Landsat image analysis in the Canadian Shield application of the geological analysis aid p 23 A85-32144 package Landsat data for operational mineral exploration - The p 24 A85-35106

Canadian experience BRUMFIELD, J. O.

Comparative techniques used to evaluate Thematic Mapper data for land cover classification in Logan County, p 65 N85-23209 West Virginia

BRYAN, T E.

US programs using the ARGOS data collection and p 75 N85-24355 platform location system US programs using the ARGOS data collection and platform location system p 41 N85-24401

BUCKLEY, J R Drifting buoys on the Labrador shelf

p 42 N85-24415 BUECHER, U

Two satellite image maps of Central Europe

p 21 N85-29339 BUGAEVSKII, L. M

Theory of single space photographs p 57 A85-31893

Information content comparison of Thematic Mapper, multispectral scanner and airborne Thematic Mappe p 61 A85-38807 BULANZHE, IU D.

Results of a study of nontidal gravity variations p 20 A85-37310

RIINKIN A F

Versatile airborne laser system for remote probing of p 73 A85-38336 ocean, atmosphere, and farmland **BUNKIN, F. V** 

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser p 34 A85-35879

BURTSEV. A. I

Methods for the meteorological interpretation of satellite p 36 A85-38681 spectral measurements BUSHUEV. A. V.

Determination of sea-ice concentration according to p 34 A85-37114 satellite imagery

NASA's land remote sensing plans for the 1980's p 78 N85-23224

BUZRUKOV, D D.

Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of p 29 N85-25342 North Zeravshan seismogenic faults BYRAN, T E

US program using the ARGOS data collection and p 41 N85-24410 platform location system

# C

CALLEDE, J

The ARGOS system and hydrology Results obtained y ORSTROM and benefits of a degree of andardization p 54 N85-23881 standardization The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service

p 55 N85-24389

CAMILLO, P. J.

Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation

n 50 A85-37973

CANNON, S E. Multi-band image classification with a distributed p 57 A85-30963 architecture CARD, D H

Remote sensing of the leaf area index of temperate p 11 A85-38839 coniferous forests

CARLSON, T N

A method for estimating soil moisture availability [NASA-CR-175606] p 14 N85-23238

CARNAHAN, W H Evaluation of atmospheric particulate concentrations

derived from analysis of ratio Thematic Mapper data p 19 A85-38825

CARNES, J

Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 quality

CARPENTER, L. H

Estimating phytomass of sagebrush habitat types from p 6 A85-33450 microdensitometer data

CARRERE, V

Image processing applications for geologic mapping p 23 A85-31736

CARSEY, F D

Summer Arctic sea ice character from satellite microwave data p 33 A85-35170

CARTER, W D

Remote sensing in geology - A decade of progress

p 24 A85-35102 Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, p 49 A85-37951 June 25-July 7, 1984 The private sector - A global pool of technical talent

for remote sensing training and program support p 78 A85-37954

CAVAYAS, F

Estimation of bidirectional reflectances by Landsat-image analysis - Problems and possible p 59 A85-32141 solutions

CAYLOR, J. A.

Aerial photo coverage planning - Programs to help determine mission specifications p 55 A85-30828

CERVELLE R

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory

p 26 A85-35117

CHAHINE, M T

Remote sensing and climate parameters p 70 A85-32853

CHANCE, J. E.

A test of the Suits vegetative-canopy reflectance model with LARS soybean-canopy reflectance data

p 8 A85-37981

CHANG, A. T C.

Microwave radiometer observations of snowpack properties and comparison of U.S. Japanese results p 53 N85-23230

CHATURVEDI, G. S

Assessment of water-stress effects on crops

p 1 A85-30745

Seasonal and interannual evolution of the spectral signature in forest environments using Landsat data p 6 A85-32139

CHELTON, D B.

A review of satellite altimeter measurement of sea surface wind speed - With a proposed new algorithm

p 32 A85-35165 Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the Antarctic circumpolar current p 33 A85-35166 Comment on 'Seasonal variation in wind speed and sea state from global satellite measurements' by D Sandwell and R Agreen p 33 A85-35169 CHENG. T.

7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes p 57 A85-30962 CHENNAIAH, G. CH

Land-use and land-cover mapping and change detection in Tripura using satellite Landsat data p 16 A85-30738

An objective technique for the delineation and

extrapolation of thunderstorms from GOES satellite data p 19 A85-39537 CHEUNG, E.

Video image analysis p 57 A85-32107 CHILDS, J D

Retneval of cloud cover parameters from multispectral satellite images p 70 A85-35124 CHONG, Y J

Landsat study of changes in surface cover

p 59 A85-32140

CHOROWICZ, J.

Importance of pattern recognition for geological remote sensing applications and new look at geological maps p 24 A85-35103

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory p 26 A85-35117

CHOU. M -D

Surface radiation in the tropical Pacific

p 30 A85-31200

CHRISTENSEN, P R Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar p 29 N85-25927

[NASA-CR-175711]

CIESLA, W. M. Color and color-IR photography for assessing forest pest p 3 A85-30840

CIHLAR, J Digital processing to improve forest classification results

at resolutions of 5 to 50 metres p 4 A85-30965 CITEAU, J

Comparison of Meteosat-2 and NOAA-7 data used for understanding the environment of albacore in the east Atlantic p 31 A85-32118 CLAESSON, TH.

Mapping of coastal-water turbidity using LANDSAT imagen p 35 A85-37979

Hydrometric telemetry in Canada CLARKSON, B D p 54 N85-23882

Mapping native vegetation using Landsat data

p 6 A85-33352 CLIFF, W C

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

[NASA-CR-3901] p 77 N85-27463 CLOUGH, M A.

Monitoring earth resource and environmental change -Some limitations and potentials of satellite data

p 17 A85-32137

COGAN, J. L.

Remote sensing of surface and near surface temperature from remotely piloted aircraft

p 68 A85-30543 COLE, M -M.

Geobotany in geological mapping and mineral exploration p 26 A85-35118

The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 COLLAR, P G.

Results of an initial that of a satellite telemetering buoy p 45 N85-27345 measuring near surface current

COLWELL R N

Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural resources p 12 N85-23190

Seasonal and interannual evolution of the spectral signature in forest environments using Landsat data p 6 A85-32139

CONDAL, A. R

Automated computer monitoring sea-ice temperature by use of NOAA satellite data p 31 A85-32112 CONFL .L

Geologic utility of LANSDAT-4 TM data p 28 N85-23192

CORL P A Air photo analysis, photo interpretation logic, and feature

(AD-A1539261 p 67 N85-29347 CORTEN, F L. J H

Navigation and sensor orientation systems in aerial photography p 71 A85-36284

CRACKNELL A. P.

Evaluation of sensitivity decay of Coastal Zone Colour Scanner (CZCS) detectors by comparison with in situ near-surface radiance measurements

p 35 A85-37986

CRANE, R G Arctic atmosphere - Ice interaction studies using Nimbus-7 SMMR p 35 A85-37752 p 35 A85-37752

CRESSY, P J Pilot land data system p 17 A85-38274

CRIST, E P

A TM Tasseled Cap equivalent transformation for reflectance factor data p 9 A85-38395 CROSBY, D S

Angle dependence of radiances in the ozone-sensing channel of the HIRS p 70 A85-32871

CURINGTON, I J Multi-band image classification with a distributed rehitecture p.57 A85-30963 architecture

# D

DADDIO, E

Region-based modeling algorithms for remotely-sensed p 18 A85-38823

DAMPNEY, C N G

An investigation of the caustal properties of Australia and surrounding regions derived from interpretation of

MAGSAT anomaly field data p 20 N85-23216 GADB A database facility for modelling naturally occurring geophysical fields p 28 N85-23217

Data selection techniques in the interpretation of MAGSAT data over Australia p 28 N85-23218 Precedency control and other semantic integrity issues p 65 N85-23220 ın a workbench database

DANA, R W

Estimating phytomass of sagebrush habitat types from microdensitometer data p 6 A85-33450

DANARD. M

On the use of satellite estimates of precipitation in initial analyses for numerical weather prediction

p 74 A85-39829

DANGERMOND, J Description of techniques for automation of regional p 57 A85-30964 natural resource inventories

DANILIUK, V G The possibility of using small unmanned aircraft for studies of terrestnal natural resources

p 73 A85-38702 DAUGHTRY, C S. T

Spectral estimators of absorbed photosynthetically active radiation in corn canopies p 8 A85-38390 Changes in spectral properties of detached birch -p 9-A85-38394leaves.

Spectral estimates of agronomic characteristics of p 11 A85-38837 crops

DAVIES, K F Hydrometric telemetry in Canada p 54 N85-23882

An evaluation of the use of atmospheric radiances for

water vapor retneval in a global retneval system p 59 A85-32868

DEASSUNCAO, G. V

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms p 15 N85-27545

IINPE-3359-PRE/6371 DEBARROSAGUIRRE J I

CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 p 66 N85-27318 [E85-10097]

DEGLORIA, S. D.

Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural p 12 N85-23190

A classification of MSS data for land-cover mapping p 60 A85-34438

DELBEATO, R

Rain estimation in extratropical cyclones using GMS p 49 A85-37855

DEMARS, C. J. JR.

Training and testing interpreters of small-scale CIR photography - A digitizer-aided approach

p 2 A85-30830

DEMORAIS, T. K.

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms (INPE-3359-PRE/637) p 15 N85-27545

DEOLIVEIRA, M D L. N

Study of the urban evolution of Brasilia with the use of LANDSAT data n 19 N85-27321 [F85-10101]

DERENYI, E

Stereo viewability of proposed Radarsat imagery p 58 A85-32111

DEROSE, J C

Angle dependence of radiances in the ozone-sensing channel of the HIRS p 70 A85-32871

Telemetered meteorological and engineering data from a deep sea moored body in the Long Term Upper Ocean N85-24402 Study (LOTUS)

DEVIRIAN, M

Pilot land data system p 17 A85-38274

DIAS, L. A V

Noise correction on LANDSAT images using a spline-like algorithm

p 66 N85-27319 [F85-10098]

DICENZO, C

Collecting meteorological reports with the ARGOS p 40 N85-24398 system

DIGBY, S A

Processes and imagery of first-year fast sea ice during p 33 A85-35172 the melt season

DIOULY-OSSO

Geological cartography of Gabon using side-looking radar imagery - An example of an integrated mapping p 25 A85-35108 project

DIXON T

Geologic interpretation of Seasat SAR imagery near the p 25 A85-35109 Rio Lacantum, Mexico

DOBBINS, R

Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates

p.5 A85-32129 Overcoming technical problems to make Landsat useful p 5 A85-32130 for timely crop area estimates

DOFRFFFR. R

An evaluation of 685 nm fluorescence imagery of coastal p 35 A85-37269 DORSON D

The Deep Drifter Program p 40 N85-24400

DOTTAVIO, C L.

A georeferenced Landsat digital database for forest p 8 A85-37980 insect-damage assessment

Surveying and mapping with space data p 71 A85-36286

DOZIER. J

Reflectance measurements from Landsat Thematic Mapper over rugged terrain p 62 A85-38824 Snow reflectance from Thematic Mapper

p 52 N85-23205

DRABKIN, M O

Assessment of some methods for increasing the information content of an active-passive microwave remote sensing system p 36 A85-38578 DUBF. C

Correlations between satellite data and radar, thermographic, and multispectral surveys for the geomorphological characterization of a region of southern Quebec p 48 A85-32146 p 48 A85-32146

DUBOIS, M

A thermal study of the waters of the St Lawrence estuary by means of the HCMM satellite - Preliminary results p 48 A85-32124

DUMMER, K J

Analysis of photo interpretation test results for seven aerospace image types on the Mendocino National Forest, p 2 A85-30832 California

The interpretability of small and medium scale aerospace imagery for wildland environments of California and Colorado p 2 A85-30833 **DUPENHOAT, Y** 

The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 DURKEE, P. A.

Marine aerosol optical depth from satellite-detected p 35 A85-37729 radiance

DUTARTRE, PH

Correlations between spatial remote sensing, geochemical and geophysical data in Western France -An integrative and orientation technique for geological p 24 A85-35105 mapping and ore exploration

Project Indravati I - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Maharashtra, India p 22 A85-30735

Project Indravati 1 - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and p 22 A85-30735 Maharashtra, India DWIVEDI, R M

Joint experiments programme in remote sensing of marine fish resources p 30 A85-30744

DWIVEDI. R S Utility of some image enhancement techniques for reconnaissance soil mapping - A case study from southern p 10 A85-38829 India

DYKSTRA, J

Evaluation of Thematic Mapper performance as applied p 27 N85-23191 to hydrocarbon exploration

EBERHARDT, J-E

CO2 laser reflectance of rocks for geological remote p 26 A85-35116

EDWARĎS, G J

Color aerial photography in the plant sciences and related fields, Proceedings of the Ninth Biennial Workshop, Orlando and University of Florida, Lake Alfred, FL November 15-17, 1983 p 1 A85-30826 Spectral densitometer application to stress detection in citriis p 3 A85-30837

EFIMOV. V B

Investigations of the ocean surface by radiophysical p 34 A85-35832 means from aerospace platforms

Photometry and polarization in remote sensing p 71 A85-36993

EL SHAZLY, E M

Space-borne imagery interpretation - Earthquake studies p 27 A85-39095 in Aswan

A thermal study of the waters of the St Lawrence estuary by means of the HCMM satellite - Preliminary results p 48 A85-32124

ELVIDGE, C D

Influence of rock-soil spectral variation on the sessment of green biomass p 9 A85-38393

EMBLETON, B J J

An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of p 20 N85-23216 MAGSAT anomaly field data EMMITT, G D

Convective storm downdraft outflows detected by NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar

System NASA-CR-38981

ENDO. S

An observation of snow melting process from remotely sensed data p 50 A85-37974 ENGMAN, E T

Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, June 25-July 7, 1984 p 49 A85-37951 Remote sensing based continuous hydrologic

modeling EPPLER, D T

Digital processing of single-band (33 6 GHz) microwave imagery for sea ice classification p 36 A85-38819 Digital processing of passive Ka-band microwave images for sea-ice classification

[AD-A150686]

p 43 N85-24511 EPPLEY, R W

Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047

ESCOBAR, D E

Video color infrared imagery - A future natural resource management tool p 56 A85-30844 ESTES. J E

Pilot land data system

EVANS, B M Using aerial photography to detect vegetation damage

in a large-scale air quality monitoring program p.3 A85-30835

n 17 A85-38274

p 50 A85-37971

EVANS, D

The use of multisensor images for Earth Science applications p 69 A85-32211

EVERETT, J R

Evaluation of Thematic Mapper performance as applied p 27 N85-23191 to hydrocarbon exploration

EVERITT, J H

Pubescence of Texas lantana affects leaf spectra and p 3 A85-30836 ımagerv

EVLANOVA, N A.

The use of Meteor satellite images for geographic regionalization of the Soviet Union p 18 A85-38706

F

FALCONER, A

Responses to satellite remote sensing opportunities in east and southern Africa p 72 A85-37953

FARMER, L. D.

Digital processing of single-band (33 6 GHz) microway imagery for sea ice classification p 36 A85-38819 Digital processing of passive Ka-band microwave images for sea-ice classification [AD-A150686] p 43 N85-24511

FARR. T G

Recent advances in geologic mapping by radar

p 25 A85-35114

FEDCHENKO, P P

Remote sensing of the agrochemical properties of p 9 A85-38809 soils

FEDOSEJEVS, G

New remote sensing techniques for monitoring the fescue grasslands of Alberta

FELDMANN, S G

Changes in vegetation spectra with leaf detenoration under two methods of preservation p 6 A85-33558

FERRALL, C Spaceborne and airborne radar, infrared and thermal studies of coastal processes at the Mississippi Delta, p 52 A85-38827 Louisiana

FETISOV, A B

Investigations of the ocean surface by radiophysical p 34 A85 35832 means from aerospace platforms

FEUQUAY, J W Early results of investigations of LANDSAT 4 Thematic

Mapper and Multispectral Scanner applications

p 64 N85-23200 FIALHO G L.

Automatic buoys to assist the tuna fishery off the p 37 N85-23879

FIAMMI, M A

The RMS TM resource measurement system, description and applications p 56 A85-30842

The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 FISSEL, D B

Drifting buoys on the Labrador shelf

p 42 N85-24415

FLEMING, E A

Expectations for aenal photography as seen from the side of the user p 71 A85-36287

FLEMING, R J

A large-scale air sea interaction project over the Pacific basın p 39 N85-24373

FOOKS, E H

On the microwave reflectivity of small-scale breaking ater waves p 34 A85-36570 FORESTI, C

Study of the urban evolution of Brasilia with the use of LANDSAT data p 19 N85-27321 [E85-10101]

FORMAGGIO, A R

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms

[INPE-3359-PRE/637] FORTIN. M

Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

p 15 N85-27545

Operational experiences with the ARGOS system in oceanography and oil spill emergency planning Future plans for the use of the ARGOS system as a component p 38 N85-23887 in offshore data collection system

Analysis of the inflow and air-sea interactions in humcane Frederic p 76 N85-25990

FRANK, W M

FRANK, W

Analysis of the inflow layer and air-sea interactions in Humcane Frederic (1979)

[NASA-CR-175616] p 37 N85-23271

FRANKLIN, S	E.			
Current	limitations	on	quantitative	airborne
thermograph	Ty		p 57	A85-32105
FREILICH, M.	H			
Science o	pportunities u	ising th	e NASA scatte	erometer on
N-ROSS	• •			
(NASA-CR-	1756391		р 74	N85-23222
FREITAG, H			•	

Applications of ARGOS measurements in equatonal Pacific Ocean-atmosphere interaction studies p 42 N85-24414

FRENCH, V

Supplement to evaluation of satellite derived estimates of solar radiation

[E85-10086] p 14 N85-24506 Evaluation of satellite derived estimates of solar radiation p 14 N85-24507

[E85-10087] FŘEW. J.

Registering Thematic Mapper imagery to digital elevation p 27 A85-38846 models FROMANTIN, B

Automatic hydrological data collection facility using ARGOS p 54 N85-24363 FRYE, D. E

A new versatile ARGOS PTT for oceanographic p 42 N85-24417 applications

Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the p 33 A85-35166 Antarctic circumpolar current FUJITA. M

Inference of rain rate profile and path-integrated rain rate by an airborne microwave rain scatterometer

p 49 A85-36565 FUNG, A K

Microwave model prediction and verifications for vegetated terrain [E85-10102] p 15 N85-27322

G

### GABELL, A.-R

Lithologic mapping in deeply weathered terrain using visible-NIR, SWIR and mid-infrared remote sensing techniques p 26 A85-35115 GADDIS, L.

Spaceborne and airborne radar, infrared and thermal studies of coastal processes at the Mississippi Delta. p 52 A85-38827 Louisiana GALLO, K P

Spectral estimators of absorbed photosynthetically active radiation in corn canopies p 8 A85-38390 Spectral estimates of agronomic characteristics of

p 11 A85-38837 crops GALT, J A. Arabian gulf circulation GALUMIAN, A S p 42 N85-24412

Versatile airborne laser system for remote probing of ocean, atmosphere, and farmland p 73 A85-38336

SPOT and Landsat-4 simulations Generalization of MRC biophysical-inventory data on the upper St. Lawrence Preliminary analysis p 48 A85-32131

GARBYAL, S. S. Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh p 1 A85-30728 using Landsat MSS data GARCÍA, PRM

The ARGOS system in Brazil p 55 N85-27349 GARDNER, B R

Spectral estimates of agronomic characteristics of

GARMAN, T.R. Experimental philosophy leading to a small scale digital

data base of the conterminous United States for designing experiments with remotely sensed data p 67 N85-28877 [NASA-TM-85009] GARRAND-R-F-

Moored buoy stationkeeping and location system p 42 N85-24416

GASCARD, J C Long term drifting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339

GAUSMAN, H W Pubescence of Texas lantana affects leaf spectra and p 3 A85-30836 imagery

GAUTAM, N. C Land-use and land-cover mapping and change detection

in Tripura using satellite Landsat data p 16 A85-30738

GAYLER, J. F. The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP programme p 64 N85-23207 GERVIN, J. C.

Comparison of MSS and TM data for landcover classification in the Chesapeake Bay area. A preliminan p 65 N85-23210 Companson of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper simulator (TMS) data for hydrologic applications p 52 N85-23211

GESCH. D B

An analysis of the utility of Landsat Thematic Mapper data and digital elevation model data for predicting soil erosion p 10 A85-38828

GHOSH, S. K. The world's topographic and cadastral mapping p 20 A85-33448 operation

GILLESPIE. A. Geologic utility of LANSDAT-4 TM data

p 28 N85-23192

Operational crop forecasting using remotely sensed nagery p 4 A85-32125 imagery GLOT, J. P

A seismic ARGOS data collection platform

p 29 N85-27350 GOASGUEN, A. System performance, data distribution and technical

files GOEL, N S

Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model p 11 A85-38836

GOEPFERT, W. Two satellite image maps of Central Europe

p 21 N85-29339 Digital image mapping of Antarctica using NOAA-7 AVHŘR imagery

GOETZ, A. F H A Shuttle Imaging Spectrometer Experiment for the late p 69 A85-32214

Imaging spectrometry for earth remote sensing D 71 A85-36248

GOGINENI, S P

Active microwave measurements of Arctic sea ice under summer conditions p 33 A85-35171 Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind sensing p 37 N85-23820

GOLDBERG, M Region-based modeling algorithms for remotely-sensed data p 18 A85-38823

GOLOSOV. V V

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and p 43 N85-25354 satellite observations GOLTVEGER, V Y

Experience in automation of data processing in interpretation and defining of linear elements from space p 66 N85-25349 photographs GONELLA, J

The ARGOS contribution to the successful dredging of p 40 N85-24381 a deep moored current meter The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 GOODENOUGH, D. G

Adaptive filtering and image segmentation for SAR analysis p 62 A85-38833

Clouds - A fundamental limitation to satellite remote sensing in the visible spectral region p 69 A85-32119

Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741 Assessment of water-stress effects on crops

A85-30745 GORIN, G S

The possibility of using small unmanned aircraft for studies of terrestrial natural resources \_p\_73\_\_A85-38702\_\_\_

GORNYY, V I

Temperature anomalies above ore bodies p 28 N85-24500

GOROZHANKINA, S M

Identification of structure of soil-vegetation cover using aenal and space photographs p 15 N85-26826 GOSSELIN, C.

Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada p 4 A85-32126

GOWARD, S. N

Use of the TM tasseled cap transform for interpretation of spectral contrasts in an urban scene p 18 A85-38811

Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminary results p 10 A85-38812 GRAY, A. L.

Preliminary results from satellite SAR image simulation p 30 A85-32103 experiments A simple model for satellite SAR radiometric discrimination estimation p 31 GREEGOR, D. H., JR.

Monitoring global vegetation dynamics using the NOAA/AVHRR p 11 A85-38840 GREELEY, R

Analysis of the Gran Desierto, Pinacte Region, Sonora, lexico, via shuttle imaging radar

p 29 N85-25927 INASA-CR-1757111 GREEN. A.-A.

Lithologic mapping in deeply weathered terrain using visible-NIR, SWIR and mid-infrared remote sensing p 26 A85-35115 techniques CO2 laser reflectance of rocks for geological remote p 26 A85-35116 GREGOIRE, J-M

Use of Landsat imagery to detect hydrologic indicators p 49 A85-33874 of the Niger river regime

GRENFELL, T C Temporal variations of the microwave signatures of sea ice during the late spring and early summer near Mould

GRENON, A.

First steps towards integration of remote sensing and digital mapping p 58 A85-32115 GREW, G W

Characteristic vector analysis of inflection ratio spectra New technique for analysis of ocean color data p 37 N85-23237 (NASA-TP-24281

GŘIGOREV. A. A.

Remote sensing of the atmospheric aerosol from space p 16 A85-31882

Effects of wind speed and rain on precipitable water and cloud liquid water based on SCAMS data

p 70 A85-32863 GROOTERS, F.

Availability of the ARGOS system based on the orbital

characteristics of the TIROS-N satellites p 45 N85-27352

Effects of wind speed and rain on precipitable water

and cloud liquid water based on SCAMS data p 70 A85-32863 Multispectral identification of clouds and earth surfaces using AVHRR radiometric data p 70 A85-32936

GUILLOT. P Measurement of water equivalent of mountain snow

cover p 54 N85-24386 GUINDON, B Algorithms for the estimation of failed detector data

p 61 A85-38806 Adaptive filtering and image segmentation for SAR p 62 A85-38833

GUNCHENKO, E V

Features of exposure conditions and photolab processing of materials obtained from aerial photography using the MKF-6M camera p 73 A85-38703

Mapping of wolframite region in the Sirohi district (Rajasthan) in India from different digitally enhanced data products of Landsat p 26 A85-38808 GUPTA, D M

Urban change detection and land-use mapping of p 16 A85-30739 Delhi

Land use and forestry studies of Himachal Pradesh p 1 A85-30740

GUPTILL, F Development of a low cost drifting buoy

p 41 N85-24408

**GURNEY, R. J.** Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation

p 50 A85-37973

-H- ---

HAGAN, D. E

A cool anomaly off northern California - An investigation using IR imagery and in situ data p 33 A85-35167

Landsat model for groundwater exploration in Nuba p 49 A85-37961 Mountains, Sudan

HALL F G

Preliminary evaluation of Thematic Mapper image data quality p 63 N85-23194

HALL, J M The Tropical Ocean and Global Atmosphere program

(TOGA) p 42 N85-24411 HALLOCK, H. B

Analog simulation for radiometric correction for solar p 68 A85-30957 angle

HALPERN, D. HOCK, J C HALPERN, D INOUE, M Applications of ARGOS measurements in equatorial Monitoring environmental resources through NOAA's Application of Martinec-Rango model to river basin in Pacific Ocean-atmosphere interaction studies polar orbiting satellites p 17 A85-36282 Japan p 53 N85-23228 p 42 N85-24414 HOISINGTON, C IRONS, J R The ARGOS system used for tracking gray whales The utility of Thematic Mapper sensor characteristics p 27 A85-38810 for surface mine monitoring Remote sensing of directional wave spectra using the p 45 N85-27347 HOLT. B surface contour radar Impact of Thematic Mapper sensor characteristics on [NASA-TM-84440] p 43 N85-24510 Processes and imagery of first-year fast sea ice during classification accuracy p 63 N85-23188 the melt season p 33 A85-35172 HARDISKY, M A. Quick look analysis of TM data of the Washington, HOOKER, L. K Remote sensing of coastal wetlands biomass using District of Columbia, area p 64 N85-23197 Experimental philosophy leading to a small scale digital p 12 N85-23198 Thematic Mapper wavebands ISHIDA, C data base of the conterminous United States for designing HARDY, J R On a ventication plane for MOS-1 (Marine Observation Satellite-1) p 31 A85-32149 experiments with remotely sensed data The use of Thematic Mapper data for land cover [NASA-TM-85009] p 67 N85-28877 discrimination Preliminary results from the UK SATMaP ISHIHARA, K p 64 N85-23207 programme Snowmelt runoff model in Japan p 53 N85-23227 Digital processing of passive Ka-band microwave images HARPER, J IVANCHIK, M. V. for sea-ice classification The analysis of Landsat MSS data for characterizing [AD-A150686] p 43 N85-24511 Digital processing of meteorological satellite imager sediment dispersal in the Beaufort Sea HOPKINS, P F p 60 A85-37121 p 48 A85-32122 Extraction of information from remotely sensed images, IVANOVA. V. V. HARRIS, J Proceedings of the Conference on Techniques for The sensitivity of the computational scheme for taking Cobalt-abitibi project - Landsat image analysis in the into account the contribution of atmospheric haze to Extraction of Information from Remotely Sensed Images, Canadian Shield application of the geological analysis aid p 61 A85-38716 Rochester Institute of Technology, Rochester, NY, August variations in initial data package p 23 A85-32144 p 56 A85-30951 HARVEY, J T HORLER, D Tracking whale migrations with the ARGOS satellite Evaluation of the TM, MSS, and HRV sensors in p 41 N85-24403 system estimating the surface area of corn within Canada HASKINS. R p 4 A85-32126 JACKSON, M J HORLER, D N H Remote sensing and climate parameters The use of Thematic Mapper data for land cover p 70 A85-32853 Digital processing to improve forest classification results discrimination Preliminary results from the UK SATMaP at resolutions of 5 to 50 metres p 64 N85-23207 HASLER, A. p 4 A85-30965 programme HORN, E M Hurricane structure and dynamics from stereoscopic and JACKSON, R D Use of Thematic Mapper for water quality assessment Estimation of total above-ground phytomass production infrared satellite observations and radar data p 52 A85-38826 p 8 A85-38389 p 76 N85-25988 using remotely sensed data HORNSBY, J K JADAV, K L HASSELMANN, K Mapping surficial geology by Landsat - An investigation Theory of synthetic aperture radar ocean imaging -Ecological studies in the Ukai command area MARSEN view p 32 A85-35164 into variations in spectral response patterns p 1 A85-30727 p 23 A85-32148 HAUR J.G JADHAV, R N HOUSTON, A G CO2 laser reflectance of rocks for geological remote Joint experiments programme in remote sensing of Preliminary evaluation of TM for soils information p 26 A85-35116 marine fish resources p 30 A85-30744 p 13 N85-23206 HAWKINS R K JANO, A HOYLES, S Preliminary results from satellite SAR image simulation A practical method for monitoring and mapping cutovers A85-32103 New remote sensing techniques for monitoring the experiments p 30 based on the digital analysis of Landsat data and A simple model for satellite SAR radiometric fescue grasslands of Alberta p 5 A85-32133 automated map production p 5 A85-32135 HUDSON, W D discrimination estimation A85-32104 JAYARAMAN, M p 31 Spectral response curve models applied to forest HAYDN, R The evaluation of hydrogeological conditions in the p 10 A85-38820 cover-type discrimination A concept for the processing and display of Thematic southern part of Tamil Nadu using remote-sensing HUME, W Mapper data p 63 N85-23196 p 48 A85-30732 techniques HEGDE, V S Overview of data processing at AES local user JEANNIN, P F terminals p 43 N85-24418 Long term dnfting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339 Targeting areas for mineral exploration - A case study from Onssa, India p 22 A85-30734 p 22 A85-30734 HUNT, G. E HEINMILLER, R Development and application of the Interactive Planetary JENNINGS, J G A report on the DRIFTERS program Image Processing System (IPIPS) in support of remote Tracking pelagic dolphins by satellite sensing studies at Imperial College p 72 A85-37956 p 42 N85-24413 p 39 N85-24364 HUNTER, C A HELLDEN, U JENSEN, C K Results of an initial trial of a satellite telemetering buoy Remote sensing for drought impact assessment - A study Some experience from ARGOS stations in the open measuring near surface current p 45 N85-27345 p 38 N85-23891 of land transformation in Kordofan, Sudan p 8 A85-37967 **HUNTINGTON, J-F** An operational buoy network collecting meteorological HENDERSON, K E Lithologic mapping in deeply weathered terrain using p 45 N85-27351 data visible-NIR, SWIR and mid-infrared remote sensing JENSEN, D R Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model techniques p 26 A85-35115 Marine aerosol optical depth from satellite-detected p 11 A85-38836 radiance p 35 A85-37729 Preliminary evaluation of TM for soils information JENSEN, F ı p 13 N85-23206 Applications of ARGOS data collection systems in Arctic HENDERSON, T C p 37 N85-23875 regions Edge- and shape-based geometric registration IANOVSKAIA, E A Applications of ARGOS data collection system for Study of spectral-polarization characteristics of natural p 59 A85-34351 automatic meteorological observatories in Arctic regions p 69 A85-31478 surfaces from various heights HERNER, R-R p 38 N85-23893 Operational experiences with the ARGOS system in Geological cartography of Gabon using side-looking IANOVSKII, A F p 45 N85-27353 radar imagery - An example of an integrated mapping Study of spectral-polarization characteristics of natural Greenland surfaces from various heights p 25 A85-35108 JOHNSON, B D project p 69 A85-31478 HERRING. M IANSHIN, A L. An investigation of the crustal properties of Australia A Shuttle Imaging Spectrometer Experiment for the late and surrounding regions derived from interpretation of Complex aerial and space remote-sensing studies of p 69 A85-32214 MAGSAT anomaly field data p 20 N85-23216 Siberia A85-38896 HEYMAN, P J Data selection techniques in the interpretation of IH, C H C p 28 N85-23218 Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing MAGSAT data over Australia Geometric error analysis for shuttle imaging Remanent magnetization model for the broken ridge spectrometer experiment experiments with remotely sensed data p 20 N85-23219 satellite magnetic anomaly p 75 N85-24269 [NASA-CR-175665] [NASA-TM-85009] p 67 N85-28877 JOHNSON, K. I. ILIN. V A. The imaging of internal waves by the SEASAT-A Expenence in automation of data processing in Global crop condition assessment using remotely synthetic aperture radar [ARE(PORTLAND)TN-720/84] interpretation and defining of linear elements from space sensed satellite data p 4 A85-32114 p 36 N85-22860 photographs p 66 N85-25349 JONSSON, M IMHOFF, M. L. NASA's land remote sensing plans for the 1980's Mapping of coastal-water turbidity using LANDSAT Region-based modeling algorithms for remotely-sensed p 78 N85-23224 p 35 A85-37979 p 18 A85-38823 JOSEPH, K M The analysis of Landsat MSS data for characterizing Joint experiments programme in remote sensing of

Pubescence of Texas lantana affects leaf spectra and

Diffusion coefficients for coastal water determined from

Comparison of a diffusion model with dye dispersion

measurements to study turbulence in coastal waters

p 3 A85-30836

p 44 N85-27331

p 46 N85-27504

p 30 A85-30744

p 22 A85-30735

p 46 N85-28438

manne fish resources

Maharashtra, India

[AD-A152460]

imagery in bathymetric charting

Project Indravati 1 - An appraisal of the natural resources

An assessment of the potential role of multispectral

of the Indravati basin, Orissa, Madhya Pradesh and

JOSHI, V B

HINDMAN, E.F.

surface contour radar

[NASA-TM-R4440]

radiance

HINES, D.E.

sediment dispersal in the Beaufort Sea

Marine aerosol optical depth from satellite-detected

Remote sensing of directional wave spectra using the

p 48 A85-32122

p 35 A85-37729

p 43 N85-24510

ımagery

INOSTROZAV. H M

aenal photographs
[INPE-3413-PRE/679]

[INPE-3492-PRE/729]

K

v	A	c	w	A	н	

Overview of data processing at AES local user p 43 N85-24418 terminals KAHLE, A.

Recent developments in lithologic mapping using remote sensing data KAHLE, A. B p 25 A85-35112

Geologic utility of LANSDAT-4 TM data

p 28 N85-23192

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of eauilibrium evaporation model to estimate evapotranspiration by remote sensing technique

p 13 N85-23234 KALININA, I N

Interpretation of space photolineaments p 29 N85-25353

KALMYKOV, A. I

Investigations of the ocean surface by radiophysical p 34 A85-35832 means from aerospace platforms KALUBARME, M H

Ecological studies in the Ukai command area

KAMAT, D S

Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil exploration in Gujarat, India p 22 A85-30736 Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741 reason Assessment of water-stress effects on crops

p 1 A85-30745

KAMISSARCHUK, A. A.

Modeling of spatially distributed objects using remote p 51 A85-38709 sensing data KANDYA, A. K

Capability of Bhaskara-II satellite microwave radiometer brightness temperature data to discriminate soil moisture conditions of Indian landmass p 7 A85-37958

KANEMASU, E T Estimation of total above-ground phytomass production sing remotely sensed data p 8 A85-38389 using remotely sensed data Spectral estimates of agronomic characteristics of crops p 11 A85-38837 Assessing biophysical characteristics of grassland from p 11 A85-38838 spectral measurements

KAPTSOV, A N Multiple regression analysis of photographic image of p 14 N85-26825 soil properties

KARIAGIN, P. M.

A preliminary method for complex aerovisual and ground-based subsatellite observations agrophytocenosis status (through the example of winter A85-38708 KARTAVTSEFF. A

The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 KASTURIRANGAN, K

The evolution of satellite-based remote-sensing capabilities in India KAUL, R N p 68 A85-30726

Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh using Landsat MSS data p 1 A85-30728 p 1 A85-30728

Identifying vegetative land use classes during each of the four seasons on aerial photographs and Landsat

imagery in coastal South Carolina p 10 A85-38815 Modelling forest biomass accessibility in South Carolina with digital terrain data p 11 A85-38842 KENNARD, R L

The utility of Thematic Mapper sensor characteristics for surface mine monitoring p 27\_A85-38810 KENNEY, J E.

Remote sensing of directional wave spectra using the surface contour radar

[NASA-TM-84440] p 43 N85-24510

KENNIE, T J M

Remote sensing in civil engineering p 17 A85-36990

KERUT, E. G.

Drifting buoy studies for weather applications p 40 N85-24396

Development of a Lagrangian drifting buoy

p 44 N85-27338

KESELMAN, V O.

An algorithm for reconstructing correlating series of ground-based and remote observations p 61 A85-38711

Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zones A85-32128

KILAMBI, A

An objective technique for the delineation and extrapolation of thunderstorms from GOES satellite data

An evaluation of 685 nm fluorescence imagery of coastal aters p 35 A85-37269 waters

KIM, M G.

7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS p 57 A85-30962 computer compatible tapes

Diurnal movements of cotton feaves expressed as thermodynamic work and entropy changes

p 8 A85-38273

Correlations between spatial remote sensing, geochemical and geophysical data in Western France An integrative and orientation technique for geological p 24 A85-35105 mapping and ore exploration

KIRCHOF, W

Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zones p.5 A85-32128

KLAUS, V

p 1 A85-30727

Meteorological buoys developed at the EERM p 40 N85-24374 laboratory

KLEMAS, V

Remote sensing of coastal wetlands biomass using Thematic Mapper wavebands p 12 N85-23198 Assessing LANDSAT TM and MSS data for detecting p 37 N85-23203 submerged plant communities

KLEPFER. M M

Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, Purdue University, West Lafayette, IN, June 12-14, 1984

KLIUSHNIKOV. S 1

Digital processing of meteorological satellite imagery p 60 A85-37121

KOCIN, P East coast snowstorm survey p 76 N85-26013 KOFFLER, R

Environmental satellites p 19 N85-24392

KOMIAK, V A

Investigations of the ocean surface by radiophysical p 34 A85-35832 means from aerospace platforms

KOMISSARCHUK, A. A.

A graphic approach to the modeling of river discharge using remote sensing data p 51 A85-38710 KONDRATEV, K IA.

Remote sensing of the atmospheric aerosol from p 16 A85-31882 Remote sensing of the agrochemical properties of p 9 A85-38809

KONSTANTINOV, V D Identification of structure of soil-vegetation cover using p 15 N85-26826 aenal and space photographs

KOTADA, K. Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233

KOTLOVSKII, P. T.

An algorithm for reconstructing correlating senes of ground-based and remote observations

p 61 A85-38711

KOTODA, K

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of equilibrium evaporation --- model --- - toestimate evapotranspiration by remote sensing technique p 13 N85-23234

KOZAL K

Analysis of NIMBUS-7 SMMR data p 54 N85-23232 KOZAK, R

An overview of NDBC drifting buoy development p 43 N85-24422 programs KÖZLÖV, V. V

Expenence in combined special mapping using space ınformation p 62 N85-22449 KOZODEROV, V V

The sensitivity of the computational scheme for taking

into account the contribution of atmospheric haze to vanations in initial data p 61 A85-38716

Remote sensing of the agrochemical properties of p 9 A85-38809 KRASNOPEVTSEVA, B V

The use of space photographs for landscape mapping p 59 A85-33598 Use of space photographic information to map plant p 14 N85-25359

KRASNOZHON, G. F

Study of Volga river delta using space photosurvey materials o 55 N85-25340 KRAUSS, W

Circulation pattern of the North Atlantic, part of the warmwater sphere research effort at Kiel University

p 38 N85-23888 KRAVCHENKO, A. E.

Study of spectral-polarization characteristics of natural urfaces from various heights p 69 A85-31478 KRECKEL, K. H

The RMS TM resource measurement system, escription and applications p 56 A85-30842 p 56 A85-30842 KRISHNAPPA, H. P.

Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741

KRIŬLKOV, V A.

The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713 Optimization of the reference calibration method for remote sensing data on natural waters p 51 A85-38714

KROVOTYNTSEV, V A.

Digital processing of meteorological satellite imagery p 60 A85-37121

KULESHOV, L. N

Experimental land mapping based on photographic data A85-37117 p 7 KUMAR, S S

The evaluation of hydrogeological conditions in the southern part of Tamil Nadu using remote-sensing techniques p 48 A85-30732

KUNINA, N M Expenence in automation of data processing in

interpretation and defining of linear elements from space KUREKIN, A. S.

Investigations of the ocean surface by radiophysical means from aerospace platforms p 34 A85-35832

KUSHNAREV, L.P. Methods of structural geology and geological mapping p 27 A85-39341

KUSHNAREV, P. I.

Methods of structural geology and geological mapping p 27 A85-39341

KUTZ, R

The ARGOS system used for tracking gray whales p 45 N85-27347 KUZENKOV, L. A.

The application of computerized space image processing techniques to data from large scale aerial surveys of forests p 7 A85-37119

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and p 21 N85-26829

L

LABAZIN, A. V

Optimization of the reference calibration method for remote sensing data on natural waters

p 51 A85-38714 LABOVITZ, M L

Changes in vegetation spectra with leaf deterioration under two methods of preservation p 6 A85-33558 Experimental philosophy leading to a small scale digital data base of the conterminous United States for designing experiments with remotely sensed data

[NASA-TM-85009] p 67 N85-28877 LACHOWSKI, H M

Utility guide for aerial photography p 3 A85-30845 LAFRAMBOISE, P

The use of Landsat images in the selection of hydroelectric-transmission comdors on the North Shore Preliminary study of the principal surface-material types p 48 A85-32138

LANG. H.

Geologic utility of LANSDAT-4 TM data

p 28 N85-23192

LANGFORD, G.

Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120 LANGLEY, K. S.

Monitoring earth resource and environmental change - Some limitations and potentials of satellite data

p 17 A85-32137

LATTY, R S.

Scene segmentation through region growing p 62 A85-38832

PERSONAL AUTHOR INDEX

LAUER, D. T. Impact of Thematic Mapper sensor characteristics on LOOYEN, J MALILA, W A p 63 N85-23188 The ARGOS communications performance thals Radiometric characterization of thematic mapper classification accuracy full-frame imagery p 40 N85-24376 o 57 A85-30958 Quick look analysis of TM data of the Washington, LOSHCHILOV, V S p 64 N85-23197 MALTSEV. D V District of Columbia, area Determination of sea-ice concentration according to Versatile airborne laser system for remote probing of Applications of Landsat data and the data base satellite imagery p 34 A85-37114 ocean, atmosphere, and farmland p 73 A85-38336 LOTSPIECH, J B n 59 A85-32210 annroach MANN. P Analysis and evaluation of the LANDSAT-4 MSS and Early results of investigations of LANDSAT 4 Thematic Remote sensing - A tortuous trip to marketplace TM sensors and ground data processing systems Early Mapper and Multispectral Scanner applications p 78 A85-34218 p 63 N85-23189 p 64 N85-23200 MANORE, M J LOUGEAY R Remotely Piloted Aircraft for small format aenal Resource inventory through instructionally-based digital A thermal study of the waters of the St Lawrence estuary photography p 16 A85-32110 by means of the HCMM satellite - Preliminary results
p 48 A85-32124 p 56 A85-30953 MARATHE, G. T. LOVELACE, U M Hydrologic appraisal of rivers plan-form at confluence A concept for an advanced earth observation LAVRUSEVICH, A I zone A case study using Landsat MSS data p 70 A85-32228 Example of joint use of data from surface studies and p 50 A85-37977 LOWRY R space photographs in investigating dynamics of zone of Preliminary results from satellite SAR image simulation MARCELL, R. F. North Zeravshan seismogenic faults p 29 N85-25342 Comparative techniques used to evaluate Thematic expenments p 30 A85-32103 LAWRENCE, R W Mapper data for land cover classification in Logan County, LOZANO-GARCIA, D. F. Orbiting multi-beam microwave radiometer for soil West Virginia p 65 N85-23209 p 14 N85-23818 Comparison of classification schemes for MSS and TM moisture remote sensing Comparison of land cover information from LANDSAT p 62 A85-38821 LE GALL J Y Multispectral Scanner (MSS) and airborne Thematic Companson of Meteosat-2 and NOAA-7 data used for LU.Y.C Mapper simulator (TMS) data for hydrologic applications Comparison of MSS and TM data for landcover understanding the environment of albacore in the east p 52 N85-23211 classification in the Chesapeake Bay area Atlantic p 31 A85-32118 p 65 N85-23210 report MARKHAM R I Companson of land cover information from LANDSAT Spectral characterization of the Landsat Thematic Automated computer monitoring sea-ice temperature by use of NOAA satellite data p 31 A85-32112 Multispectral Scanner (MSS) and airborne Thematic p 31 A85-32112 p 72 A85-37983 Mapper simulator (TMS) data for hydrologic applications p 52 N85-23211 LEBLANC-COOKE, J Impact of Thematic Mapper sensor characteristics on Overcoming project planning and timeliness problems classification accuracy p 63 N85-23188 Relative accuracy assessment of LANDSAT-4 MSS and Quick look analysis of TM data of the Washington, pistrict of Columbia, area p 64 N85-23197 to make Landsat useful for timely crop area estimates TM data for level 1 land cover inventory p 5 A85-32129 District of Columbia, area n 65 N85-23212 LECKIE, D. G. Preliminary comparisons of the information content and LUDWIG, D Preliminary results of an examination of C-band synthetic utility of TM versus MSS data p 64 N85-23202 The ARGOS program p 75 N85-24775 perture radar for forestry applications p 4 A85-32113 MARTYNOV, M V LUDWIG, R W LECONTE II Digital processing of meteorological satellite imagery The use of Landsat images in the selection of Experimental philosophy leading to a small scale digital p 60 A85-37121 data base of the conterminous United States for designing hydroelectric-transmission corndors on the North Shore MASLANIK, J. A. experiments with remotely sensed data Preliminary study of the principal surface-material types Impacts of high resolution data on an operational remote p 67 N85-28877 p 48 A85-32138 (NASA-TM-850091 sensing program p 62 A85-38814 LUSCH, D P LECROY, S. R. Spectral response curve models applied to forest I. PZAM Bright spot analysis of ocean-dump plumes using p 10 A85-38820 Orbits for earth observation p 71 A85-37199 p 36 A85-37987 cover-type discrimination Landsat MSS LYGRE. A MASTERSON, J LEDUC. S K Routine wave and meteorological measurements in A report on the DRIFTERS program Supplement to evaluation of satellite derived estimates p 42 N85-24413 of solar radiation offshore areas using ARGOS data surveillance p 14 N85-24506 p 45 N85-27344 [E85-10086] MASUOKA, E J Evaluation of satellite derived estimates of solar Changes in vegetation spectra with leaf deterioration Influence of rock-soil spectral variation on the under two methods of preservation р6 p 9 A85-38393 p 14 N85-24507 assessment of green biomass [E85-10087] Experimental philosophy leading to a small scale digital LYON, R -J -P data base of the conterminous United States for designing LEE. K CO2 laser reflectance of rocks for geological remote Applications of Landsat images to geological mapping experiments with remotely sensed data p 67 N85-28877 p 26 A85-35116 in tropical jungle environment - Caroni River basin INASA-TM-850091 p 25 A85-35111 LYZENGA, D R MATE. B R Venezuela LEGALL, J Y Theory of synthetic aperture radar ocean imaging -Tracking whale migrations with the ARGOS satellite MARSEN view p 32 A85-35164 Contribution of the NOAA-7 and 8 and ARGOS p 41 N85-24403 system partnership to white tuna fishing in the northeast Atlantic The ARGOS system used for tracking gray whales p 46 N85-27355 p 43 N85-24421 LEHMANN, F The ARGOS system used for tracking gray whales Probing of the earth's surface and the atmosphere with p 45 N85-27347 MACAULAY, E an airborne laser spectrometer p 68 A85-31397 MATE, M L Digital processing to improve forest classification results The ARGOS system used for tracking gray whales LEMASTER, E W at resolutions of 5 to 50 metres p 4 A85-30965 p 45 N85-27347 A test of the Suits vegetative-canopy reflectance model MACDONALD, R. B. with LARS soybean-canopy reflectance data MATEJKA, T J Preliminary evaluation of Thematic Mapper image data p 8 A85-37981 Airborne Doppler radar velocity measurements of p 63 N85-23194 LEONARDO, E. S. precipitation seen in ocean surface reflection MADHAVAN LINNI, N. V. p 36 A85-38866 Stereo models from synthetic aperture radar Evaluation of Landsat and airborne multispectral data p 68 A85-30961 MATHUR, V. K. and aerial photographs for mapping forest features and LEROUX, P. A Project Indravati 1 - An appraisal of the natural resources phenomena in a part of the Godavan basin p 39 N85-24359 One thousand days in the brine of the Indravati basin, Orissa, Madhya Pradesh and p 1 A85-30729 LESHKEVICH, G. A. p 22 A85-30735 Maharashtra, India MAJUMDAR, T J Machine classification of freshwater ice types from MATSUO, K Correlation of Landsat data with surface and subsurface Landsat-1 digital data using ice albedos as training sets A classification of MSS data for land-cover mapping information - A synergistic, quantitative approach to oil p 51 A85-38392 p 60 A85-34438 exploration in Gujarat, India p 22 A85-30736 Capability of Bhaskara-II satellite microwave radiometer LEVINA, E. B MATTHEWS, E The use of Meteor satellite images for geographic Atlas of archived vegetation, land-use and seasonal brightness temperature data to discriminate soil moisture regionalization of the Soviet Union p 18 A85-38706 Albedo data sets conditions of Indian landmass p 7 A85-37958 LINDELL, L. T. [NASA-TM-86199] p 14 N85-24508 MAJUMDER, K. L. Mapping of coastal-water turbidity using LANDSAT MATTHEWS, M C Monitoring changes in ecology in the Kudremukh mining p 35 A85-37979 Remote sensing in civil engineering ımagery p 22 A85-30741 LIST, F. K p 17 A85-36990 Joint experiments programme in remote sensing of Medium to small scale geological maps based on MAUSEL, P W p 30 A85-30744 manne fish resources Landsat MSS and RBV data - Case histories of projects Evaluation of atmospheric particulate concentrations MAKAROV, V I in North Africa p 25 A85-35110 derived from analysis of ratio Thematic Mapper data LIVINGSTONE, C E. Geological information content of space images p 19 A85-38825 obtained in different spectral bands during the Preliminary results from satellite SAR image simulation MCCABE, P J Gobi-Khangai experiment (Mushugai test range xperiments p 30 A85-32103 A simple model for satellite SAR radiometric experiments A review of satellite altimeter measurement of sea Gurvan-Bood) p 26 A85-37118 surface wind speed - With a proposed new algorithm p 31 A85-32104 MAKAROVIC, B discrimination estimation p 32 A85-35165 MCCAFFREY, C. A. LOHANICK, A. W Structures for geo-information and their application in Temporal variations of the microwave signatures of sea selective sampling of digital terrain models Alaska meander lines determined by vegetation p 60 A85-36283 ice during the late spring and early summer near Mould appearance on color infrared photographs p 34 A85-35173 Bay, NWT MALIAROVSKII, A. I p 2 A85-30834

Airborne measurements of the sea state from mirror

p 34 A85-35879

reflections of the beam of a continuous-wave laser

MCCALL J C

observation platforms

US program in anchored data buoy and the other fixed

p 39 N85-24358

for sea-ice classification

[AD-A1506861

Digital processing of passive Ka-band microwave images

p 43 N85-24511

MCCLEOD, I

A comparison of techniques for radiometric calibration p 56 A85-30956 of aerial infrared thermal images

MCELROY, J H

Utilization of the polar platform of NASA's Space Station Program for operational Earth observations [PB85-152502] p 75 N85-23895

MCHAIL, R. R

The RMS TM resource measurement system, description and applications p 56 A85-30842

MCHONE, J. F

Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar p 29 N85-25927

[NASA-CR-175711]

MCMILLIN, L. M

An evaluation of the use of atmospheric radiances for water vapor retneval in a global retneval system

p 59 A85-32868

MCNALLY, G. J

Surface currents in the tropical Pacific during 1979-1980 p 38 N85-24354 using drifting buoys

MCQUILLAN, A. K

Monitoring earth resource and environmental change -Some limitations and potentials of satellite data

p 17 A85-32137

MCWILLIAMS, J.

A report on the DRIFTERS program p 42 N85-24413

MEEKS, G R

Thermal Infrared Multispectral Scanner (TIMS) An nvestigator's guide to TIMS data p 77 N85-28286

[NASA-CR-175875]

MEINCKE, J.

Circulation pattern of the North Atlantic, part of the warmwater sphere research effort at Kiel University p 38 N85-23888

MEISSNER B

Medium to small scale geological maps based on Landsat MSS and RBV data - Case histories of projects in North Africa p 25 A85-35110

MELDRUM, D. J.

ARGOS-tracked drifters in the Rockall Trough

p 44 N85-27340

MELNIKOVA, K M Methods of structural geology and geological mapping p 27 A85-39341

METALNIKOV. A Remote sensing used for study of forest resources

p 12 N85-22440 METZLER, M D Radiometric characterization of thematic mapper

full-frame imagery

p 57 A85-30958 MEUNIER, J.-F Adaptive filtering and image segmentation for SAR

analysis

p 62 A85-38833 MIDDLETON, E M

Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory

p 65 N85-23212

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser p 34 A85-35879

MILANOVSKII, E E

The development and current state of earth expansion p 20 A85-37302 and fluctuation problems

MILLER G P

Assessing biophysical characteristics of grassland from spectral measurements p 11 A85-38838

MILLER, L. D.

7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes p 57 A85-30962

MILTON, N-M

The significance of scale in geobotanical applications for lithologic discrimination and mineral exploration

p 26 A85-35119

MINOR, T B

Testing the radiometric stability of HCMM thermal infrared data p 58 A85-32109

MIRKAMILOV, D M

Versatile airborne laser system for remote probing of p 73 A85-38336 ocean, atmosphere, and farmland

Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil exploration in Gujarat, India

MOKMA, D. L.

Applied Geographic Information System techniques for assessing agricultural production potential in developing countries - A Honduran case study n 11 A85-38841 MONGET, J. M.

Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation

Geological cartography of Gabon using side-looking radar imagery - An example of an integrated mapping project

MONTGOMERY, H. E.

Simultaneous Earth observations from 2 satellites [NASA-TM-86204] p 76 N85-27325

MOOERS, C. N. K.

A cool anomaly off northern California - An investigation p 33 A85-35167 using IR imagery and in situ data MOON, W

Transient sea surface height variation and the Seasat-altimeter data application p 31 A85-32121 MOORE, R K.

Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind p 37 N85-23820

Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120 MOREIRA, M A.

Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms

[INPE-3359-PRE/637] p 15 N85-27545

MORISON, J

Arctic mixed layer dynamics [AD-A153582] p 46 N85-29505

MOROZ. P

Remote sensing used for study of forest resources

MORRIS, R Humcane structure and dynamics from stereoscopic and

infrared satellite observations and radar data p 76 N85-25988

p 12 N85-22440

p 52 A85-38826

p 7 A85-37730

p 1 A85-30740

MORRISON, D. B.

Machine processing of remotely sensed data. Thematic Mapper data and geographic information systems, Proceedings of the Tenth International Symposium, Purdue University, West Lafayette, IN, June 12-14, 1984

p 73 A85-38801 MORRISSEY, L. A Use of Thematic Mapper for water quality assessment

Meteorological satellite data useful for agroclimate

Remote sensing of the leaf area index of temperate p 11 A85-38839 conferous forests MOUAT, D -A

The significance of scale in geobotanical applications for lithologic discrimination and mineral exploration p 26 A85-35119

MOUGINIS-MARK, P.

Spaceborne and airborne radar, infrared and thermal studies of coastal processes at the Mississippi Delta, Louisiana p 52 A85-38827

MUEKSCH, W

Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zone p 5 A85-32128

MULEY, M. V. Land-use survey of Idukki District p 16 A85-30737

MULLIGAN, P Landsat Thematic Mapper studies of land cover spatial variability related to hydrology p 50 A85-37972

MULLIGAN, P J Comparison of MSS and TM data for landcover

classification in the Chesapeake Bay area A preliminary report p 65 N85-23210

Urban change detection and land-use mapping of Delhi p 16 A85-30739 Land use and forestry studies of Himachai Pradesh

MURASHKINTSEVA, G V

The use of Meteor satellite images for geographic regionalization of the Soviet Union p 18 A85-38706 p 18 A85-38706 MURPHY, R. E.

The NASA land processes program - Status and future directions p 78 A85-38802

NAGA BHUSANA, S. R.

Monitoring changes in ecology in the Kudremukh mining region p 22 A85-30741 NAIR. M. M.

Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the p 23 A85-30742 Kerala coast

Joint experiments programme in remote sensing of manne fish resources p 30 A85-30744

Estimation of regional evapotranspiration using remotely sensed land surface temperature. Part 1. Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of equilibrium evaporation model to estimate model evapotranspiration by remote sensing technique p 13 N85-23234

NAKAMURA, K.

Inference of rain rate profile and path-integrated rain rate by an airborne microwave rain scatterometer

NARAIN. A.

Joint experiments programme in remote sensing of marine fish resources

An analysis of the utility of Landsat Thematic Mapper data and digital elevation model data for predicting soil p 10 A85-38828

NAYAK, S R.

Land-use survey of Idukki District p 16 A85-30737 Coastal morphology - A case study of the Gulf of Khambhat (Cambay) p 48 A85-30743

Vertical component Magsat anomalies and Indian p 26 A85-37150 tectonic boundaries

NELSON, R

Reducing Landsat MSS scene variability

p 59 A85-34429 NELSON, R F

A georeferenced Landsat digital database for forest p 8 A85-37980 insect-damage assessment Impact of Thematic Mapper sensor characteristics on p 63 N85-23188 classification accuracy Quick look analysis of TM data of the Washington,

District of Columbia, area NEMEC. J

Application of space sciences to hydrology and water resources - The potential and practical use as reflected p 49 A85-37969 by WMO experience

NERGAARD, N S

Monitoring of marine environment p 44 N85-27341 NESTEROV, V. V

Preliminary processing of laser ranging data from LAGEOS artificial Earth satellite during short merit program p 21 N85-25355 observation period

NEVIAZHSKII, I. I Geographic regionalization and the problems related to

p 18 A85-38705 space-based monitoring NEWCOMB, W W Diurnal movements of cotton leaves expressed as

thermodynamic work and entropy changes p 8 A85-38273

p 64 N85-23197

NGUYEN P T Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

NGUYEN, T

Image processing applications for geologic mapping p 23 A85-31736

Application of digital image enhancement processing of Landsat data for terrain mapping of southern Huairou p 61 A85-38813 County of Beijing (Peking), China NIBLACK, W

Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

NIEMANN, O.

sensed data

Avalanche hazard mapping integrating Landsat digital data and digital topographic data p 58 A85-32120 p 58 A85-32120 NIERO, M

Study of the urban evolution of Brasilia with the use of LANDSAT data p 19 N85-27321

[E85-10101] NISHIKAWA, H

An observation of snow melting process from remoteh p 50 A85-37974

NISHIMURA, Y Snowmelt runoff model in Japan o 53 N85-23227 NITTINGER, J

The significance of orthophoto maps for developing p 21 N85-29341

PARKER, A. R. PRABHAKARA, C NIX. L. E. Satellite derived atmosphere water vapor as a tracer Identifying vegetative land use classes during each of Practical considerations when using water quality and the four seasons on aerial photographs and Landsat structure monitoring sensors as applied to portable of large scale interactions between the atmosphere and ARGOS satellite transmitter equipment imagery in coastal South Carolina p 10 A85-38815 ocean p 35 A85-37754 p 41 N85-24405 Modelling forest biomass accessibility in South Carolina PRANGSMA. G. J. PARREIRAS. E M D M F with digital terrain data p 11 A85-38842 First results of oceanography utilization of infrared high Study of the urban evolution of Brasilia with the use of NIXON, P. R resolution picture transmission images LANDSAT data [KNMI-TR-59] p 47 N85-29511 Video color infrared imagery - A future natural resource [E85-10101] p 19 N85-27321 PRASAD, J S p 56 A85-30844 management tool PARTHASARATHY, V An evaluation of the use of atmospheric radiances for NJOKU, E G Evaluation of Landsat and airborne multispectral data Satellite-derived sea surface temperature - Workshop water vapor retrieval in a global retrieval system and aerial photographs for mapping forest features and p 59 A85-32868 p 30 A85-30599 comparisons phenomena in a part of the Godavan basin PREVOST, C NORMAN, J. M p 1 A85-30729 Application of remote sensing by means of a satellite Spectral estimates of agronomic characteristics of PARTRIDGE, R M in surveying the water resources of the Sahel p 11 A85-38837 crops Arabian gulf circulation p 42 N85-24412 p 48 A85-32123 NORWINE, J R. PASCAUD, P N Monitoring global vegetation dynamics using the NOAA/AVHRR p.11 A85-38840 PRICE, J C Merging Landsat and spaceborne radar data over p 11 A85-38840 The contribution of the heat capacity mapping mission Tunisia p 72 A85-37962 to the interpretation of thermal infrared data NOVAES, R A. PASCUCCI, R F Function of remote sensing in Brazil p 56 A85-30955 Computer-assisted synthesis of information from [INPE-3314-PRE/621] p 77 N85-27329 A preliminary comparison of the information content of multispectral imagery p 68 A85-30960 data from the LANDSAT 4 Thematic Mapper and PATOUREAUX, Y NUMATA, M p 64 N85-23199 Multispectral Scanner Geological cartography of Gabon using side-looking A classification of MSS data for land-cover mapping p 60 A85-34438 radar imagery - An example of an integrated mapping PRIOR, H L. Thematic Mapper data quality and performance p 25 A85-35108 assessment in renewable resources/agriculture/remote PATZERT, W 0 p 12 N85-23201 Surface currents in the tropical Pacific during 1979-1980 sensing using drifting buoys D 38 N85-24354 PROUT N A PEARČE, C Dryland salinity mapping in southern Alberta from OCHIAI, H New remote sensing techniques for monitoring the Landsat data - A semioperational program Distribution of snow and maximum snow water fescue grasslands of Alberta
PEBERAY. M equivalent obtained by LANDSAT data and degree day p 5 A85-32133 p.5 A85-32132 p 53 N85-23229 PRYOR, A -W CO2 laser reflectance of rocks for geological remote ensing p 26 A85-35116 The ARGOS Platform Transmitter Terminals (PTTs) ODENYO, V A O Responses to satellite remote sensing opportunities in p 74 N85-23872 PERROTT, T east and southern Africa p 72 A85-37953 The analysis of Landsat MSS data for characterizing OKAMOTO, K Q sediment dispersal in the Beaufort Sea Inference of rain rate profile and path-integrated rain p 48 A85-32122 rate by an airborne microwave rain scatterometer PETEHERYCH, S p 49 A85-36565 QUATTROCHI, D. A. Clouds - A fundamental limitation to satellite remote An initial analysis of LANDSAT-4 Thematic Mapper data OLLIVIER, B sensing in the visible spectral region p 69 A85-32119 for the discrimination of agricultural, forested wetlands The ARGOS contribution to the successful dredging of PETERSON, D L p 12 N85-23193 deep moored current meter p 40 N85-24381 and urban land cover Remote sensing of the leaf area index of temperate OLSON, C E, JR oniterous forests p 11 A85-38839 Detection of forest stress with 35mm color PFEIFFER, B photographs p 2 A85-30831 Texture analysis and classification of airborne radar data OLSSON. K with synthetic aperture p 60 A85-34865 RABBIA, G Estimating canopy cover in drylands with Landsat MSS PICHUGIN, A P Present stage of utilization of the ARGOS system by p 8 A85-37966 Investigations of the ocean surface by radiophysical the ORSTOM hydrological service for hydrometric data ONSTOTT, R G p 34 A85-35832 means from aerospace platforms collection p 55 N85-27348 Active microwave measurements of Arctic sea ice unde PICKETT, R L. p 33 A85-35171 ummer conditions Arabian gulf circulation p 42 N85-24412 Image processing applications for geologic mapping ORMSBY, J PINTER, P J., JR p 23 A85-31736 Landsat Thematic Mapper studies of land cover spatial Estimation of total above-ground phytomass production RACAPE, J F variability related to hydrology p 50 A85-37972 using remotely sensed data p 8 A85-38389 Checking on the position of navigation marker buoys by the ARGOS system p 46 N85-27354 ORSENIGO, J. R. A history of the Everglades and future implications Estimation of leaf area index from bidirectional spectral p 2 A85-30827 RADHAKRISHNAMOORTHY, P aerial photography reflectance data by inverting a canopy reflectance model The evaluation of hydrogeological conditions in the ORUDZHEVA, D S p 11 A85-38836 southern part of Tamil Nadu using remote-sensing petroleumspace information Preliminary evaluation of Thematic Mapper image data p 48 A85-30732 technique gas-prospecting work (example of Southern Mangyshlak) p 63 N85-23194 quality RAJAN, Y S p 28 N85-25341 Preliminary evaluation of TM for soils information A decade of remote sensing in India - Some salient OVARLEZ, H p 13 N85-23206 results p 72 A85-37952 Long term drifting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339 PLANT, W J RAJU. D. V. Theory of synthetic aperture radar ocean imaging -Assessment of the role of remote sensing techniques OWEN, R. W MARSEN view p 32 A85-35164 in monitoring shoreline changes - A case study of the Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 23 A85-30742 Kerala coast Study of spectral-polarization characteristics of natural RAKSHIT, A. M p 32 A85-35047 surfaces from various heights p 69 A85-31478 Application of digitally processed and enhanced Landsat OZERKINA. V V imagery for geological mapping and mineral targeting in POEHLMANN, G A method for determining Antarctic land ice parameters Medium to small scale geological maps based on Singhbhum Precambnan mineralized from satellite multichannel microwave measurements Landsat MSS and RBV data - Case histories of projects Rihar-Onssa p 22 A85-30733 p 35 A85-37511 n North Africa p 25 A85-35110 RAMAKRISHNAN, R OZGA, M POKROVSKII, O M Monitoring changes in ecology in the Kudremukh mining Expenence with the use of supercomputers to process Remote sensing of the atmospheric aerosol from region RAMAMOORTHI, A S p 22 A85-30741 p 73 A85-38830 Landsat data p 16 A85-31882 POLOVINKO, V V Inundation mapping of the Sahibi river flood of 1977 Optical noncontact methods for the study of the world p 47 A85-30731 p 30 A85-31890 RAMEY, D B POMARES, J. P. PALA, S Simulation of errors in a Landsat based crop estimation The use of Landsat images in the selection of A practical method for monitoring and mapping cutovers p 6 A85-33556 svstem based on the digital analysis of Landsat data and hydroelectric-transmission corridors on the North Shore RAMM. N. S. p 5 A85-32135 Preliminary study of the principal surface-material types automated map production Minimizing influence of Earth's curvature in projective PALLUCONI, F D p 48 A85-32138 rectification of space photographs into photoplans and PORTNOV, A. M. p 21 N85-26829 Thermal Infrared Multispectral Scanner (TIMS) An photomaps Theory of single space photographs investigator's guide to TIMS data [NASA-CR-175875] RANEY, R K p 57 A85-31893 p 77 N85-28286 Theory of synthetic aperture radar ocean imaging - A MARSEN view p 32 A85-35164 PARADA, N D J POSPELOVA, E B p 32 A85-35164

A preliminary method for complex aerovisual and

agrophytocenosis status (through the example of winter

observations

p 9 A85-38708

p 29 N85-27350

subsatellite

A seismic ARGOS data collection platform

ground-based

wheati

POUPINET, G.

RANGO, A.

RAO, K S.

Snowmelt-runoff model utilizing remotely-sensed data

Capability of Bhaskara-II satellite microwave radiometer

brightness temperature data to discriminate soil moisture

conditions of Indian landmass

p 53 N85-23226

p 7 A85-37958

Function of remote sensing in Brazil

Land-use survey of Idukki District

Measurement of the condition of the sea by ionospheric

p 77 N85-27329

p 34 A85-36427

p 16 A85-30737

[INPE-3314-PRE/621]

PARENT DU CHATELET, J.

backscatter radar

PARIHAR, J S.

RAO, P.K. Meteorological satellite data useful for agroclimate p 7 A85-37730

RAO, P. P Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the p 23 A85-30742 RAO. V. R.

Monitoring changes in ecology in the Kudremukh mining egion p 22 A85-30741
A decade of remote sensing in India - Some salient p 72 A85-37952 results Mapping of wolframite region in the Sirohi district

(Rajasthan) in India from different digitally enhanced data products of Landsat p 26 A85-38808 REBENKOVA, O A.

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and p 43 N85-25354 satellite observations REBILLARD, PH

Geologic interpretation of Seasat SAR imagery near the p 25 A85-35109 Rio Lacantum, Mexico Merging Landsat and spaceborne radar data over p 72 A85-37962 REID, I A.

p 54 N85-23882 Hydrometric telemetry in Canada RENNE, D S

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

p 77 N85-27463 [NASA-CR-3901] RENTIERE, J

The ARGOS system and hydrology. The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service

p 55 N85-24389

REUTER, D Remote sensing and climate parameters

p 70 A85-32853 REVERDIN, G.

The French Ocean Climate in Equatorial Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 REYNA. E

Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 RIBE, N. M.

On geoid heights and flexure of the lithosphere at

seamounts [AD-A1512201 p 21 N85-26050

RICHARDSON, A J

Video color infrared imagery - A future natural resource p 56 A85-30844 management tool

Wetlands classification using Landsat Thematic Mapper data unsupervised classification approach

p 51 A85-38817 RIEDEL, C

Multiple regression analysis of photographic image of p 14 N85-26825 soil properties

RIENECKER, M. M. A cool anomaly off northern California - An investigation p 33 A85-35167

using IR imagery and in situ data RINKER, J N Air photo analysis, photo interpretation logic, and feature

[AD-A153926] p 67 N85-29347

Medium to small scale geological maps based on Landsat MSS and RBV data - Case histories of projects p 25 A85-35110 in North Africa RITCHIE D

ARGOS-tracked drifters in the Rockall Trough

p 44 N85-27340 RITCHIE J. C.

A first evaluation of LANDSAT TM data to monitor p 52 N85-23204 suspended sediments in lakes ROARK, R C

A new versatile ARGOS PTT for oceanograph p 42 N85-24417 applications ROBINSON, A. R

A cool anomaly off northern California - An investigation p 33 A85-35167 using IR imagery and in situ data ROBINSON, V B

Issues in designing geographic information systems p 18 A85-38822 under conditions of inexactness ROCHON, G.

Application of remote sensing by means of a satellite in surveying the water resources of the Sahel

p 48 A85-32123 reflectances by of bidirectional Landsat-image analysis - Problems and possible p 59 A85-32141 solutions

Remote detection of geobotanical anomalies associated with hydrocarbon microseepage using thematic mapper simulator (TMS) and airborne imaging spectrometer (AIS) p 7 A85-35120 Imaging spectrometry for earth remote sensing p 71 A85-36248

RODGERS, E.

Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data

p 76 N85-25989 ROMANOVA, T M

The sensitivity of the computational scheme for taking into account the contribution of atmospheric haze to p 61 A85-38716 vanations in initial data ROSELL, S. N.

TOPEX ground data system p 32 A85-32192 ROSENFELD, A.

Application of hierarchical data structures to geographical information systems

[AD-A152169] p 67 N85-27753 ROSS, D I

Current limitations on quantitative p 57 A85-32105 thermography ROSSBY, T

The Deep Drifter Program p 40 N85-24400 ROST, A. A.

Estimation of woody biomass in slash pine plantations using color aenal photography - A feasibility study p 3 A85-30839

Synthetic aperture radar capabilities for snow and glacie p 50 A85-37976 monstoring

ROUQUEROL Y

The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service p 55 N85-24389

Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh using Landsat MSS data p 1 A85-30728 Evaluation of Landsat and airborne multispectral data

and aerial photographs for mapping forest features and phenomena in a part of the Godavari basin

p 1 A85-30729

Correlations between satellite data and radar, thermographic, and multispectral surveys for the geomorphological characterization of a region of southern

Ougher p 48 A85-32146 ROZANOV, L. N.

Interpretation of space photolineaments

p 29 N85-25353 ROZHDESTVENSKAIA, N A

Operational planning for a remote-sensing space p 9 A85-38704 Geographic regionalization and the problems related to ace-based monitoring p 18 A85-38705 RUFENACH, C. L.

Theory of synthetic aperture radar ocean imaging -MARSEN view p 32 A85-35164 RUFF, I

Multispectral identification of clouds and earth surfaces using AVHRR radiometric data p 70 A85-32936 RULE, W S

Acquisition, processing and photo interpretation of an aenal color infrared photograph RUNNING, S W p 2 A85-30829

Role of vegetation in the biosphere

p 10 A85-38834 Remote sensing of the leaf area index of temperate coniferous forests p 11 A85-38839 RYABCHIKOVA, V. I.

Experience in combined special mapping using space p 62 N85-22449 RYERSON, R

Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates p 5 A85-32129

RYERSON, R. A.

Overcoming technical problems to make Landsat useful p 5 A85-32130 for timely crop area estimates

S

SADASHIVAIAH, A. S.

Monitoring changes in ecology in the Kudremukh mining p 22 A85-30741

SADOWSKI, F G

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications

p 64 N85-23200 SAHAL B

Ecological studies in the Ukai command area

p 1 A85-30727 Ground water exploration in the Saurashtra peninsula p 47 A85-30730 Land-use survey of Idukki District p 16 A85-30737

Coastal morphology - A case study of the Gulf of Khambhat (Cambay) o 48 A85-30743 SAKAL T

An observation of snow melting process from remotely sensed data p.50 A85-37974 SALOMONSON, V.

Landsat Thematic Mapper studies of land cover spatial vanability related to hydrology SALOMONSON, V V p 50 A85-37972

Landsat 4 and 5 status and results from Thematic Mapper data analyses p 61 A85-38803

Application of hierarchical data structures to geographical information systems [AD-A152169] p 67 N85-27753

SAMUEL T V Land-use survey of Idukki District p 16 A85-30737

SANDUSKY, W. F. Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

p 77 N85-27463 [NASA-CR-3901] SANYAL A.

An evaluation of the use of atmospheric radiances for water vapor retrieval in a global retrieval system

p 59 A85-32868

SARKAR, S. C. Project Indravati I - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Maharashtra, India SARRAT, D

Merging Landsat and spaceborne radar data over p 72 A85-37962

SARTIEL, J Orbits for earth observation p 71 A85-37199

SAULESLEJA, A Clouds - A fundamental limitation to satellite remote

sensing in the visible spectral region p 69 A85-32119 SAVAGE, M L. Automatic weather stations in Antarctica

p 75 N85-24360

SAZHIN. S M Distinguishing homogeneous regions of water surfaces p 36 A85-38712 on the basis of space imagery The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713

Correlations between spatial remote geochemical and geophysical data in Western France -An integrative and orientation technique for geological p 24 A85-35105 mapping and ore exploration SCHIEBE, F R

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes p 52 N85-23204 SCHMIDT-FALKENBERG, H

German contributions to the cartography of Antarctica

by means of photogrammetry and remote sensing p 22 N85-29342 SCHMIDT, I

Identifying land use structures of multizonal aerospace photographs using digital data processing

p 66 N85-25348 SCHMUGGE, T

Remote Sensing of Snow and Evapotranspiration p 53 N85-23223 [NASA-CP-2363]

SCHMUGGE, T J Microwave remote sensing of soil moisture

p 13 N85-23235

SCHNEIDER, S R Utilization of the polar platform of NASA's Space Station

Program for operational Earth observations [PB85-152502] p 75 p 75 N85-23895 SCHOTT, J R

A comparison of techniques for radiometric calibration of aerial infrared thermal images p 56 A85-30956 SCHULTINK, G

Applied Geographic Information System techniques for assessing agricultural production potential in developing - A Honduran case study p 11 A85-38841 countries SCHUTT, J B

Diurnal movements of cotton leaves expressed as thermodynamic work and entropy changes p 8 A85-38273

SCOFIELD, R A.

Meteorological satellite data useful for agroclimate

p 7 A85-37730 Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones

[PB85-164994] p 55 N85-27499

SEBAUGH, J L Supplement to evaluation of satellite derived estimates

of solar radiation p 14 N85-24506 [E85-10086] Evaluation of satellite derived estimates of solar

radiation [E85-10087] p 14 N85-24507 SEEGEL, K. J. PERSONAL AUTHOR INDEX

SEEGEL K J

Dynamic rectification of airborne scanner digital image recordings p 67 N85-29344

SEEVERS, P M

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications

p 64 N85-23200

SEKHON, R S

Testing the radiometric stability of HCMM thermal p 58 A85-32109 Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory

p 65 N85-23212

SFKI, K

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of equilibrium evaporation model to estimate evapotranspiration by remote sensing technique p 13 N85-23234

SEMENOV. N. A.

Assessment of the study and mapping of pastures in semiarid zones using remote sensing methods p 9 A85-38719

SEREBRENNIKOV, A. N

Digital processing of meteorological satellite imagery p 60 A85-37121

SERGUNIN, S M

Assessment of some methods for increasing the information content of an active-passive microwave rer sensing system SESOREN, A.

Geological interpretation of Landsat imagery of the Bangladesh Ganges delta p 24 A85-33875

Project Indravati 1 - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Maharashtra, India

SETTLE, M

NASA's land remote sensing plans for the 1980's p 78 N85-23224

SEUTHE, C

Basic outline of a guide for the use of Landsat images p 23 A85-32147 n geology SHAIN, W A.

Identifying vegetative land use classes during each of the four seasons on aerial photographs and Landsat imagery in coastal South Carolina p 10 A85-38815 Modelling forest biomass accessibility in South Carolina ith digital terrain data p 11 A85-38842

SHALINA, E. V

Remote sensing of the atmospheric aerosol from p 16 A85-31882

SHARMA ROY, M. R.

Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh p 1 A85-30728 using Landsat MSS data

SHARMA, G. P

Joint experiments programme in remote sensing of marine fish resources p 30 A85-30744

SHARMA, S C

Ground water exploration in the Saurashtra peninsula p 47 A85-30730

SHARMAN, M J

Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984 p 9 A85-38391

SHASHIKUMAR, M N

Assessment of water-stress effects on crops

p 1 A85-30745

Monitoring earth resource and environmental change -Some limitations and potentials of satellite data p 17 A85-32137

SHAW, W B.

Mapping native vegetation using Landsat data

SHEFFIELD, C

p 6 A85-33352

Selecting band combinations from multispectral data p 60 A85-38272 Evaluation of Thematic Mapper performance as applied

to hydrocarbon exploration p 27 N85-23191 SHEN, S S. Techniques for the estimation of leaf area index using

coectral data p 10 A85-38835

SHEN. W C Effects of wind speed and rain on precipitable water and cloud liquid water based on SCAMS data

SHENDE, D M

Land-use survey of Idukki District p 16 A85-30737

Applications of ARGOS measurements in equatorial Pacific Ocean-atmosphere interaction studies

p 42 N85-24414

p 34 A85-35879

p 35 A85-37986

SHESTOPALOV, V P.
Investigations of the ocean surface by radiophysical means from aerospace platforms p 34 A85-35832 SHEVCHENKO, T B

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser p 34 A85-35879

SHILO S A

Investigations of the ocean surface by radiophysical means from aerospace platforms p 34 A85-35832 SHIUE. J C

Orbiting multi-beam microwave radiometer for soil moisture remote sensing p 14 N85-23818 SHORT, D.A.

Satellite derived atmosphere water vapor as a tracer of large scale interactions between the atmosphere and ocean p 35 A85-37754

Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death p 28 N85-23195 Valley, California

SHUCHMAN, R A.

Theory of synthetic aperture radar ocean imaging - A MARSEN view p 32 A85-35164 SHUGAN, I V

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave laser

Joint experiments programme in remote sensing of p 30 A85-30744 marine fish resources SIMARD, R

The stereoscopic accentuation of SPOT images p 58 A85-32108

SIMONOV. IU G

Operational planning for a remote-sensing space p 9 A85-38704 A concept for establishing a database for a support databank (through an example of an agnicultural block) p 60 A85-38707

Discrimination of tropical forest cover types using Landsat MSS data p 12 A85-38843

SINGH, A K

Assessment of water-stress effects on crops p 1 A85-30745

SINGH, R P Dielectric properties and microwave remote sensing

p 72 A85-37959 Evaluation of sensitivity decay of Coastal Zone Colour

Scanner (CZCS) detectors by comparison with in situ near-surface radiance measurements

SINGH, T P

Land-use survey of Idukki District p 16 A85-30737 SINGHROY, V

Landsat data for operational mineral exploration - The Canadian experience p 24 A85-35106

SINHA, S K

Assessment of water-stress effects on crops p 1 A85-30745

SKARDA, J R

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California

[NASA-CR-3901] SKORODUMOV, A P

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and p 21 N85-26829

Short summary of multispectral imaging systems

p 69 A85-32212 SLOBODIANIN, V P

Versatile airborne laser system for remote probing of ocean, atmosphere, and farmland p 73 A85-38336 SMITH, A. F

Computer-assisted synthesis of information from multispectral imagery p 68 A85-30960

SMITH, C R

Impacts of high resolution data on an operational remote p 62 A85-38814 sensing program SMITH, J H.

Simulation of errors in a Landsat based crop estimation system p 6 A85-33556 SMITH, P F

p 70 A85-32863

A new versatile ARGOS PTT for oceanographic applications p 42 N85-24417

Geography in the space age p 17 A85-34534 SOKOLOV, Y S

Study of Volga river delta using space photosurvey materials p 55 N85-25340

SOLNTSEV. M V

Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave lase

SOLOMON, J E

Imaging spectrometry for earth remote sensing p 71 A85-36248

Analysis of mesofissuring on space photographs New technique for study of petroleum and gas deposits p 29 N85-26828

SOMMERFELDT, T G

Dryland salinity mapping in southern Alberta from Landsat data - A semioperational program

p 5 A85-32132

n 34 A85-35879

SOMVANSHI, V S

Joint experiments programme in remote sensing of manne fish resources p 30 A85-30744

SOOD, R K

Ground water exploration in the Saurashtra peninsula p 47 A85-30730

SORENSEN, C

Preliminary evaluation of Thematic Mapper image data uality p 63 N85-23194

SOWMYA, A.

Capability of Bhaskara-II satellite microwave radiometer brightness temperature data to discriminate soil moisture p 7 A85-37958 conditions of Indian landmass

SPANNER, M. A. Remote sensing of the leaf area index of temperate p 11 A85-38839 coniferous forests

SPAYD, L. E. JR

Applications of GOES VAS data to NOAA's interactive flash flood analyzer p 49 A85-35985

Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones p 55 N85-27499

[PB85-164994] SPIRIDONOV, IU G

A method for determining Antarctic land ice parameters from satellite multichannel microwave measurements

p 35 A85-37511

p 63 N85-23188

p 75 N85-24360

p 76 N85-25989

p 17 A85-37955

SPITSYN, I G

Study of spectral-polarization characteristics of natural surfaces from various heights

Evaluation of sensitivity decay of Coastal Zone Colour Scanner (CZCS) detectors by comparison with in situ near-surface radiance measurements

p 35 A85-37986

SRINIVAS, M G Hydrologic appraisal of rivers plan-form at confluence

zone A case study using Landsat MSS data

p 50 A85-37977

STAENZ, K Influence of the viewing geometry on vegetation measures p 4 A85-32102

STAR, J L Pilot land data system p 17 A85-38274

STARCHENKO, A V The application of computerized space image

processing techniques to data from large scale aerial surveys of forests p 7 A85-37119 STAUFFER, M L. Impact of Thematic Mapper sensor characteristics on

classification accuracy Quick look analysis of TM data of the Washington,

District of Columbia, area STAVROPOULOS, C C p 64 N85-23197 p 39 N85-24359 One thousand days in the brine

STEARNS, C R Automatic weather stations in Antarctica

STEINVALL O

Mapping of coastal-water turbidity using LANDSAT p 35 A85-37979

STERANKA, J

Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data

Landsat data for population estimates - Approaches to inter-censal counts in the rural Sudan

STEVENSON, M R

Diffusion coefficients for coastal water determined from aenal photographs

[INPE-3413-PRE/679] p 44 N85-27331 Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters [INPE-3492-PRE/729] p 46 N85-27504

**B-12** 

STEWART, E.

Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047

STEWART, R H

Earth and space science - Oceans p 32 A85-32215 STIVES, R K.

Tracking pelagic dolphins by satellite

p 39 N85-24364

STOUT, J Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data

p 76 N85-25989

Identifying land use structures of multizonal aerospace photographs using digital data processing

p 66 N85-25348

STRAHLER, A. H

p 6 A85-32142 Timber inventory using Landsat Issues in designing geographic information systems under conditions of inexactness p 18 A85-38822 STROMBERG, B.

The use of multisensor images for Earth Science applications p 69 A85-32211 STRONG, L. L.

Estimating phytomass of sagebrush habitat types from p 6 A85-33450 microdensitometer data STUART, A.

Stereo viewability of proposed Radarsat imagery p 58 A85-32111

STURDEVANT, J A.

Early results of investigations of LANDSAT 4 Thematic Mapper and Multispectral Scanner applications p 64 N85-23200

SUBBA RAO, P

Inundation mapping of the Sahibi river flood of 1977 p 47 A85-30731

SUBBARAJU, G

Joint experiments programme in remote sensing of marine fish resources p 30 A85-30744 SUGIMURA, T

An observation of snow melting process from remotely p 50 A85-37974

SULLIVAN, G H Supplement to evaluation of satellite derived estimates

of solar radiation p 14 N85-24506 (E85-10086)

Evaluation of satellite derived estimates of solar

[F85-10087] p 14 N85-24507

SUSSKIND, J

Remote sensing and climate parameters

p 70 A85-32853 SVANEMSELLEM, K

Operational experiences with the ARGOS system in Greenland

p 45 N85-27353 SVEJKOVSKY, J

Santa Ana airflow observed from wildfire smoke patterns in satellite imagery p 7 A85-37868

Clouds - A fundamental limitation to satellite remote sensing in the visible spectral region p 69 A85-32119 SWAMINATHAN, V L.

Application of digitally processed and enhanced Landsat imagery for geological mapping and mineral targeting in Singhbhum Precambrian mineralized Bihar-Onssa p 22 A85-30733 SWANBERG, N A.

Adaptive filtering and image segmentation for SAR analysis p 62 A85-38833

# T

TAAGHOLT, J.

Operational expenences with the ARGOS system in Greenland p 45 N85-27353 TAILLADE, M.

The ARGOS system after 3 years operation

p 39 N85-24368 p 75 N85-24775 The ARGOS program

TAKASHIMA, T. Investigation of the atmospheric aerosols and water

vapor by the AVHRR radiometer (visible and IR) on board NOAA-7 p 32 A85-32872 TAKAYAMA, Y

investigation of the atmospheric aerosols and water vapor by the AVHRR radiometer (visible and IR) on board NOAA-7 p 32 A85-32872

TAKEDA, K

Japan

General report of the researches of snowpack properties, snowmelt runoff and evapotranspiration in p 53 N85-23225 Snowmelt runoff model in Japan p 53 N85-23227 Application of Martinec-Rango model to nver basin in p 53 N85-23228

Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day method p 53 N85-23229 Studies on physical properties of snow based on multi-

p 54 N85-23231 channel microwave radiometer Analysis of NIMBUS-7 SMMR data p 54 N85-23232

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Pnestley-Taylor parameter

p 13 N85-23233 Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of evaporation model to

evapotranspiration by remote sensing technique p 13 N85-23234

Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day method p 53 N85-23229

TAMILARASAN, V Land-use survey of Idukki District p 16 A85-30737 TAMITSKII, E. D.

Features of exposure conditions and photolab processing of materials obtained from aerial photography p 73 A85-38703 using the MKF-6M camera TANAKA, S

An observation of snow melting process from remotely p 50 A85-37974 sensed data

TANGUAY, M. G.

Basic outline of a guide for the use of Landsat images p 23 A85-32147 ın geology TARPLEY. J D

Meteorological satellite data useful for agroclimate p 7 A85-37730

TEAGUE, C

Automatic weather stations in Antarctica p 75 N85-24360

TEILLET, P

Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada

p 4 A85-32126 reflectances by of bidirectional Landsat-image analysis - Problems and possible solutions p 59 A85-32141

TEILLET, P M. Influence of the viewing geometry on vegetation leasures p 4 A85-32102

measures

Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984 p 24 A85-35101

TEUBER, K. W

Remote sensing of the leaf area index of temperate coniferous forests p 11 A85-38839

THAKUR, N K

Vertical component Magsat anomalies and Indian tectonic boundaries p 26 A85-37150 THAMPI. C. J.

Project Indravati 1 - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Maharashtra, India p 22 A85-30735

THAYALAN, S. Monitoring changes in ecology in the Kudremukh mining

region p 22 A85-30741 THIBAULT. C

Overcoming technical problems to make Landsat useful p 5 A85-32130 for timely crop area estimates THILLAIGOVINDARAJAN, S.

The evaluation of hydrogeological conditions in the southern part of Tamil Nadu using remote-sensing p 48 A85-30732 THOMAS, C. V.

Land-use survey of Idukki District p 16 A85-30737 THOMPSON, B

Development of a low cost drifting buoy

p 41 N85-24408 THOMPSON, D R

Preliminary evaluation of TM for soils information

p 13 N85-23206 THOMPSON, M. D.

Dryland salinity mapping in southern Alberta from Landsat data - A semioperational program

THOMPSON, W. C

Drifting buoys on the Labrador shelf

p 42 N85-24415

p 5 A85-32132

THOMSON, K. P B

Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings

p 69 A85-32101 Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada

p 4 A85-32126

New remote sensing techniques for monitoring the fescue grasslands of Alberta p 5 A85-32133 TIMMINS, S. M.

Mapping native vegetation using Landsat data

p 6 A85-33352

TISHCHENKO, A. P

Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space

p 73 A85-38701

Land-use survey of Idukki District p 16 A85-30737 TODD, J W

Inventorying Florida's citrus groves p 3 A85-30841 An evaluation of simulated Thematic Mapper data and

Landsat MSS data for discriminating suburban and regional p 17 A85-33557 land use and land cover Impact of Thematic Mapper sensor characteristics on classification accuracy p 63 N85-23188 Quick look analysis of TM data of the Washington,

estrict of Columbia, area p 64 N85-23197
Preliminary study of information extraction of LANDSAT District of Columbia, area

TM data for a suburban/regional test site p 65 N85-23208

TOMLINS, G F

Remotely Piloted Aircraft for small format aenal photography p 16 A85-32110 TOWNSHEND, J R G

The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207

TRICART. J Automated geomorphological cartography and boundary-unit detection in the Mopti-Bandiagara (Mali) region using multisatellite data from Landsat, SIR-A radar,

and SPOT simulation p 58 A85-32116 TRIENDL, E E

Edge- and shape-based geometric registration p 59 A85-34351

TRIFONOV, V G Applications of space images for neotectonic studies p 24 A85-35104

TROFIMOV, I A.

Assessment of the study and mapping of pastures in semiand zones using remote sensing methods

p 9 A85-38719 TSHIHARA, K Application of Martinec-Rango model to river basin in

Japan p 53 N85-23228 TSUCHIYA, K

Studies on physical properties of snow based on multi p 54 N85-23231 channel microwave radiometer Analysis of NIMBUS-7 SMMR data p 54 N85-23232

TSUTSUMI, M The development of Platform Transmitter Terminal (PTT) and its application for drifting buoys p 75 N85-24353

Drifting buoy development and future programs p 41 N85-24406 TSYMBAL, V. N

Investigations of the ocean surface by radiophysical means from aerospace platforms p 34 A85-35832 TUCKER, C. J

Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984

p 9 A85-38391

TUCKER, M J Theory of synthetic aperture radar ocean imaging - A MARSEN view p 32 A85-35164

# U

UCCELLINI, L

Mesoscale analysis and modeling group

p 76 N85-26001 p 76 N85-26013 East coast snowstorm survey

ULABY, F T

The microwave propagation and backscattering

characteristics of vegetation p 13 N85-23213 [E85-10088] Modeling the backscattering and transmission properties

of vegetation canopies p 15 N85-27320 (E85-100991

UNVERFERTH, M J

7 1/2' map-image extraction from precision processed Landsat multispectral scanner (MSS) and Thematic Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes p 57 A85-30962

USACHEV, V. F. Utilization of aerial and space remote-sensing data studies of land water p 52 A85-39347

USOVA. V V

The use of space photographs for landscape mapping p 59 A85-33598

Use of space photographic information to map plant VONG, V K Collection of in situ forest canopy spectra using a p 14 N85-25359 Landsat study of changes in surface cover helicopter - A discussion of methodology and preliminary p 59 A85-32140 p 10 A85-38812 HISDENSKII A R results VOROBEVA, T. A. Overview of TM applications research reports Methods for the meteorological interpretation of satellite p 36 A85-38681 Operational planning for a remote-sensing space spectral measurements p 63 N85-23187 p 9 A85-38704 Impact of Thematic Mapper sensor characteristics on Geographic regionalization and the problems related to classification accuracy p 63 N85-23188 space-based monitoring p 18 A85-38705 Quick look analysis of TM data of the Washington, VOROBYEV, V T p 64 N85-23197 District of Columbia, area Use of space information in petroleum-VALDES, J A WILSKI, I gas-prospecting work (example of Southern Mangyshlak) Comparison of classification schemes for MSS and TM Two satellite image maps of Central Europe p 28 N85-25341 p 62 A85-38821 p 21 N85-29339 VALENZUELA, C. R WILSON, E A. Comparison of classification schemes for MSS and TM p 62 A85-38821 W The microwave propagation and backscattering data charactenstics of vegetation VAN DER PIEPEN. H [E85-10088] p 13 N85-23213 WALLBRINK, H An evaluation of 685 nm fluorescence imagery of coastal First results of oceanography utilization of infrared high resolution picture transmission images WILSON W B p 35 A85-37269 waters Development of a Lagrangian drifting buoy p 47 N85-29511 VAN ITTÉRSUM, G [KNMI-TR-59] p 44 N85-27338 WALSH, E J Satellite remote sensing of total herbaceous biomass WILSON, W W production in the Senegalese Sahel - 1980-1984 Remote sensing of directional wave spectra using the Supplement to evaluation of satellite derived estimates p 9 A85-38391 surface contour radar [NASA-TM-84440] of solar radiation p 43 N85-24510 VANE, G [E85-10086] p 14 N85-24506 WALTHALL C L. A Shuttle Imaging Spectrometer Experiment for the late Evaluation of satellite derived estimates of solar Collection of in situ forest canopy spectra using a p 69 A85-32214 helicopter - A discussion of methodology and preliminary Imaging spectrometry for earth remote sensing (F85-10087) p 14 N85-24507 p 10 A85-38812 p 71 A85-36248 WINTER, R WALTZ, F. A. VANPRAET, C L. Edge- and shape-based geometric registration Early results of investigations of LANDSAT 4 Thematic Satellite remote sensing of total herbaceous biomass p 59 A85-34351 Mapper and Multispectral Scanner applications production in the Senegalese Sahel - 1980-1984 p 64 N85-23200 p 9 A85-38391 Testing the radiometric stability of HCMM thermal WANG, S C VARADARAJAN, K p 58 A85-32109 Analysis methods for Thematic Mapper data of urban infrared data Correlation of Landsat data with surface and subsurface Comparative techniques used to evaluate Thematic p 18 A85-38816 regions information - A synergistic, quantitative approach to oil Mapper data for land cover classification in Logan County, West Virginia p 65 N85-23209 exploration in Gujarat, India WANG S J p 22 A85-30736 Geometric error analysis for shuttle imaging Relative accuracy assessment of LANDSAT-4 MSS and spectrometer expenment A preliminary method for complex aerovisual and TM data for level 1 land cover inventory [NASA-CR-175665] p 75 N85-24269 subsatellite ground-based observations of p 65 N85-23212 WATTS, A. B agrophytocenosis status (through the example of winter WITTER, S G On goold heights and flexure of the lithosphere at p 9 A85-38708 Applied Geographic Information System techniques for seamounts VELICHKO, S A assessing agricultural production potential in developing (AD-A1512201 p 21 N85-26050 Investigations of the ocean surface by radiophysic p 11 A85-38841 countries - A Honduran case study WEBER, C means from aerospace platforms p 34 A85-35832 WOOD, J Remote sensing for geological mapping, Proceedings VENKATACHALAM, P Fracture mapping of part of northern Ontano using of the Seminar, Orleans, France, February 2-4, 1984 Capability of Bhaskara-II satellite microwave radiometer p 23 A85-32145 Landsat imagery p 24 A85-35101 brightness temperature data to discriminate soil moisture WOODS, J D conditions of Indian landmass p 7 A85-37958 The World Ocean Circulation Experiment Two satellite image maps of Central Europe VENKATARATNAM, L p 31 A85-32166 p 21 N85-29339 Mapping of land/soil degradation using multispectral WOODWARD, R H data p 16 A85-32127 A case study on the application of geosynchronous Angle dependence of radiances in the ozone-sensin VERESHCHAKA, T V satellite infrared data to estimate soil moisture p 70 A85-32871 channel of the HIRS The use of space photographs for landscape mapping p 7 A85-37742 p 59 A85-33598 Assessing biophysical characteristics of grassland from Use of space photographic information to map plant p 11 A85-38838 Information content companion of Thematic Mapper, spectral measurements p 14 N85-25359 cover multispectral scanner and airborne Thematic Mapper WELLMAN, J B p 61 A85-38807 A Shuttle Imaging Spectrometer Experiment for the late First steps towards integration of remote sensing and An investigation of several aspects of LANDSAT-5 data 1980's p 69 A85-32214 digital mapping VIJAYKUMAR, N L. p 58 A85-32115 WENNERBERG, G quality [E85-10096] p 65 N85-23214 Hydrological data collection from Swedish mountain Noise correction on LANDSAT images using a spline-like p 54 N85-24388 algorithm WERNER, CH [E85-10098] p 66 N85-27319 Probing of the earth's surface and the atmosphere with VINCENT, P p 68 A85-31397 an airborne laser spectrometer SPOT and Landsat-4 simulations Generalization of MRC YAMARONE, C. A., JR. WESSELS, G biophysical-inventory data on the upper St Lawrence TOPEX ground data system p 32 A85-32192 p 48 A85-32131 Preliminary results from satellite SAR image simulation Preliminary analysis
Correlations 4-between satellite YANG, Y K
7 1/2' map-image extraction from precision processed p 30 A85-32103 experiments data and radar. WETZEL, P J thermographic, and multispectral surveys for the andsat multispectral scanner (MSS) and Thematic A case study on the application of geosynchronous Mapper (TM) imagery using a microcomputer and EROS computer compatible tapes p 57 A85-30962 geomorphological characterization of a region of southern satellite infrared data to estimate soil moisture p 48 A85-32146 Quebec p 7 A85-37742 VINOGRADOV, B V WHARTON, S. Preliminary evaluation of Thematic Mapper image data uality p 63 N85-23194 Multiple regression analysis of photographic image of Landsat Thematic Mapper studies of land cover spatial p 14 N85-26825 soil properties quality variability related to hydrology p 50 A85-37972 YEO, A. C WHARTON, S. W. Versatile airborne laser system for remote probing of Landsat study of changes in surface cover Use of the TM tasseled cap transform for interpretation p 73 A85-38336 p 59 A85-32140 ocean, atmosphere, and farmland of spectral contrasts in an urban scene YERMOLAYEV-MASLOV, V B p 18 A85-38811 Video image analysis p 57 A85-32107 Temperature anomalies above ore bodies WHITEHEAD, W R VOCKEROTH. R p 28 N85-24500 Fourier transform of wave data on ARGOS buoys of an automated p 38 N85-24351 p 39 N85-24362 meteorological data system Remote sensing used for study of forest resources WIESEMANN, W Collecting meteorological reports with the ARGOS p 12 N85-22440 Probing of the earth's surface and the atmosphere with p 40 N85-24398 p 68 A85-31397 an airborne laser spectrometer VOLCHKOVA, G. I. A classification of MSS data for land-cover mapping p 60 A85-34438 WIESENBURG, D. A. Geological information content of space images Operation guiding light-scientific program and field plan obtained in different spectral bands during the The pilot field experiment for NORDA project chemical Gob-Khangai experiment (Mushugai test range Interence of rain rate profile and path-integrated rain p 26 A85-37118 dynamics in ocean frontal areas Gurvan-Bogd) rate by an airborne microwave rain scatterometer

[AD-A153765]

WILDMAN, W E.

WILLIAMS, D. L.

insect-damage assessment

The devastation of a vineyard by phylloxera

A georeferenced Landsat digital database for forest

p 47 N85-29507

ρ3 A85-30838

p8 A85-37980

YOSHINO, M M

p 49 A85-36565

p 13 N85-23233

Estimation of regional evapotranspiration using remotely

sensed land surface temperature Part 1 Measurement

of evapotranspiration at the Environmental Research

Center and determination of Pnestley-Taylor parameter

**B-14** 

VONDER HAAR, T. H.

Airborne measurements of the sea state from mirror

Marine aerosol optical depth from satellite-detected

p 34 A85-35879

p 35 A85-37729

reflections of the beam of a continuous-wave laser

ZISK, S. PERSONAL AUTHOR INDEX

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of equilibrium evaporation model to estimate evapotranspiration by remote sensing technique

p 13 N85-23234

# Z

# ZAITSEVA, V A.

Study of spectral-polarization characteristics of natural surfaces from various heights p 69 A85-31478 ZAVOLOKIN, IU V p 69 A85-31478

The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713 Optimization of the reference calibration method for remote sensing data on natural waters

p 51 A85-38714

# ZHOU, G P

Evaluation of atmospheric particulate concentrations derived from analysis of ratio Thematic Mapper data

p 19 A85-38825

ZHUK, P A.

Modeling of spatially distributed objects using remote sensing data p 51 A85-38709

A graphic approach to the modeling of river discharge p 51 A85-38710 using remote sensing data

ZIATKOVA, L. K

Complex aerial and space remote-sensing studies of bibena p 27 A85-38896 Sibena

# ZILIOLI, E

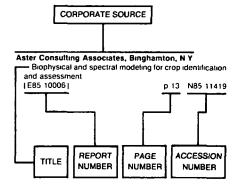
Use of Landsat imagery to detect hydrologic indicators of the Niger river regime p 49 A85-33874

ZIMBELMAN, J R Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar

[NASA-CR-175711] p 29 N85-25927

ZISK, S Spaceborne and airborne radar, infrared and thermal studies of coastal processes at the Mississippi Delta, p 52 A85-38827 Louisiana

# **Typical Corporate Source Index Listing**



The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document

# Admiralty Underwater Weapons Establishment,

Portland (England)

The imaging of internal waves by the SEASAT-A synthetic aperture radar

[ARE(PORTLAND)TN-720/84] p.36 N85-22860

Agricultural Research Service, Beltsville, Md

A preliminary comparison of the information content of data from the LANDSAT 4 Thematic Mapper and Multispectral Scanner p 64 N85-23199 A first evaluation of LANDSAT TM data to monitor suspended sediments in takes p 52 N85-23204

Snowmelt-runoff model utilizing remotely-sensed data

p 53 N85-23226

Agricultural Research Service, Durant, Okla A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes p 52 N85-23204

Agricultural Research Service, Houston, Tex

A first evaluation of LANDSAT TM data to monitor suspended sediments in takes p 52 N85-23204

Arizona State Univ. Tempe

Analysis of the Gran Desierto, Pinacte Region, Sonora, Mexico, via shuttle imaging radar

[NASA-CR-175711] p 29 N85-25927

Arizona Univ., Tucson

Short summary of multispectral imaging systems p 69 A85-32212 An investigation of several aspects of LANDSAT-5 data

quality [E85-10096] p 65 N85-23214 Army Engineer Topographic Labs., Fort Belvoir, Va.

Air photo analysis, photo interpretation logic, and feature extraction [AD-A153926] p 67 N85-29347

Atmospheric Environment Service, Downsview

Project PAPA. The integration of drifting buoy data into an operational meteorological service

p 37 N85-23874

Overview of data processing at AES local user priminals p 43 N85-24418 terminals

Atmospheric Environment Service, Toronto (Ontario) Collecting meteorological reports with the ARGOS system p 40 N85-24398

# В

Beak Consultants Ltd., Richmond (British Columbia) Inferences of future operations drawn from past and present applications of drifting buoys p 38 N85-24356 Bristol Aerospace, Ltd , Winnipeg (Manitoba)

Fourier transform of wave data on ARGOS buoys p 38 N85-24351

# California Univ , Berkeley

Characterization of LANDSAT-4 TM and MSS image quality for the interpretation of California's agricultural resources p 12 N85-23190

# California Univ , La Jolia

Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047

### California Univ , Santa Barbara

Pilot land data system p 17 A85-38274 Reflectance measurements from Landsat Thematic p 62 A85-38824 Mapper over rugged terrain Registering Thematic Mapper imagery to digital elevation p 27 models A85-38846 Snow reflectance from Thematic Mapper

p 52 N85-23205 Canada Centre for Remote Sensing, Ottawa (Ontario) Processes and imagery of first-year fast sea ice during

the melt season p 33 A85-35172 Centre National d'Etudes Spatiales, Toulouse (France) Data Collection and Platform Location by Satellite p 74 N85-23869 ARGOS Users' Conference The ARGOS system status report after 2 years peration p 74 N85-23870 System performance, data distribution and technical files p 74 N85-23871 Data Collection and Platform Location by Satellite p 38 N85-23883 ARGOS Users' Conterence The ARGOS system status report p 74 N85-23884

Proceedings of the ARGOS Users Conference on Data Collection and Location by Satellite p 75 N85-24348 Data Collection and Platform Location by Satellite p 39 N85-24366 ARGOS Users' Conference The ARGOS system main characteristics

p 39 N85-24367 The ARGOS system after 3 years operation

p 39 N85-24368 Data Collection and Platform Location by Satellite p 40 N85-24391 ARGOS users' Conference Data Collection and Platform Location by Satellite ARGOS Users' Conference p 41 N85-24409 p 75 N85-24775 The ARGOS program Scientific experiments Preprocessing of scientific p 66 N85-24779 Data Collection and Platform Location by Satellite RGOS Users' Conference p 44 N85-27333 ARGOS Users' Conference Location and data collection satellite system ARGOS User's guide p 66 N85-27371 Centre National pour l'Exploitation des Oceans, Brest

(France). Contribution of the NOAA-7 and 8 and ARGOS

### partnership to white tuna fishing in the northeast Atlantic p 46 N85-27355 Centre National pour l'Exploitation des Oceans, Paris

The French Ocean Climate in Equational Atlantic (FOCAL) Drifter Program, 1983-1984 p 40 N85-24399 Wave directional spectra via ARGOS

#### p 45 N85-27343 Chiba Univ. (Japan).

Studies on physical properties of snow based on multi p 54 N85-23231 channel microwave radiometer Analysis of NIMBUS-7 SMMR data p 54 N85-23232

### Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway)

Monitoring of marine environment p 44 N85-27341 Compagnie pour l'Electronique, l'Informatique et les Systemes-Espace, Toulouse (France)

Automatic hydrological data collection facility using ARGOS p 54 N85-24363 Computer Sciences Corp., Bay St. Louis, Miss.

Moored buoy stationkeeping and location system p 42 N85-24416

Computer Sciences Corp , Silver Spring, Md

Testing the radiometric stability of HCMM thermal infrared data p 58 A85-32109 Continental Shelf Inst., Trondheim (Norway)

Operational experiences with the ARGOS system in oceanography and oil spill emergency planning. Future plans for the use of the ARGOS system as a component offshore data collection system p 38 N85-23887 Routine wave and meteorological measurements in in offshore data collection system offshore areas using ARGOS data surveillance

p 45 N85-27344

Cornell Univ , Ithaca, N Y Spectral estimators of absorbed photosynthetically p 8 A85-38390 active radiation in corn canopies

### Danish Meteorological Inst., Copenhagen

Applications of ARGOS data collection systems in Arctic p 37 N85-23875 regions Applications of ARGOS data collection system for automatic meteorological observatories in Arctic regions p 38 N85-23893

Operational experiences with the ARGOS system in Greenland p 45 N85-27353

# Delaware Univ, Newark

Remote sensing of coastal wetlands biomass using Thematic Mapper wavebands nematic Mapper wavebands p 12 N85-23198 Assessing LANDSAT TM and MSS data for detecting submerged plant communities p 37 N85-23203 Department of Agriculture, Columbia, Mo

Supplement to evaluation of satellite derived estimates of solar radiation

[E85-10086] p 14 N85-24506 Evaluation of satellite derived estimates of solar radiation p 14 N85-24507 [E85-10087]

Department of Agriculture, Phoenix, Ariz

Estimation of total above-ground phytomass production using remotely sensed data р8 A85-38389 Department of Environment, Ottawa (Ontario)

The development of an automated meteorological data system p 39 N85-24362 Deutsche Forschungs- und Versuchsanstalt fuer Luft-und Raumfahrt, Oberpfaffenhofen (West Germany)

An evaluation of 685 nm fluorescence imagery of coastal waters p 35 A85-37269 Direction de la Meteorologie Nationale, Magny les

# Hameaux (France)

Meteorological buoys developed at the EERM p 40 N85-24374 laboratory

# E

# Earth Satellite Corp , Chevy Chase, Md.

Evaluation of Thematic Mapper performance as applied to hydrocarbon exploration p 27 N85-23191

# Electricite de France, Grenoble

Measurement of water equivalent of mountain snow p 54 N85-24386

#### Electronique Marcel Dassault, St. Cloud (France). The ARGOS Platform Transmitter Terminals (PTTs)

p 74 N85-23872 Environmental Research Inst. of Michigan, Ann Arbor

A TM Tasseled Cap equivalent transformation for reflectance factor data p 9 A85-38395

# European Space Agency, Paris (France).

Looking down looking forward Earth observation, sciences and applications, a perspective [ESA-SP-1073] p 78 N85-29497

Eurosat S.A., Geneva (Switze	rland	i).
Eurosat S A , Geneva (Switzerland) ERS economic impace study [ESA-CR(P)-1979]	p 47	N85-29847
F		
Federal Geodetic Control Committee, Standards and specifications fo networks		
[PB85-166478]	p 21	N85-27374
G		
General Software Corp , Landover, M. A case study on the application o satellite infrared data to estimate soil	f geos	
•		A85-37742
Gesellschaft fuer Kernenergieverwert und Schiffahrt m b H, Geesthacht An evaluation of 685 nm fluorescence	(Wes	t Germany)
waters		A85-37269
Grenoble Univ (France)	•	
A seismic ARGOS data collection p		N85-27350
	þ 29	1465-27350
H		
Harvard Univ , Cambridge, Mass A cool anomaly off northern Californ		

iia - An investigation p 33 A85-35167 Hermes Electronics Ltd , Dartmouth (Nova Scotia) Development of a low cost drifting buoy

p 41

**Hunter Coll**, New York p 6 A85-32142 Timber inventory using Landsat

IBM France S A, Paris Recent developments in lithologic mapping using remote p 25 A85-35112 sensing data

Indiana State Univ, Terre Haute Evaluation of atmospheric particulate concentrations

derived from analysis of ratio Thematic Mapper data p 19 A85-38825

Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany)

Information relative to cartography and geodesy Series Translations, number 42, volume 1 [ISSN-0469-4244] p 21 N85-29338

Two satellite image maps of Central Europe

p 21 N85-29339 Digital image mapping of Antarctica using NOAA-7 p 67 N85-29340 AVHRR imagery

The significance of orthophoto maps for developing p 21 N85-29341 German contributions to the cartography of Antarctica

by means of photogrammetry and remote sensing p 22 N85-29342

Reports on cartography and geodesy Series 1 Original reports, number 93 (ISSN-0469-42361 p 22 N85-29343

Dynamic rectification of airborne scanner digital image acordings p 67 N85-29344 recordings Institute for Atmospheric Optics and Remote Sensing, Hampton, Va

Remote sensing and climate parameters

p 70 A85-32853 Institute of Hydrology, Wallingford (England)

Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation p 50 A85-37973

Institute of Oceanographic Sciences, Wormley

Results of an initial trial of a satellite telemetering buoy measuring near surface current p 45 N85-27345 Instituto de Pesquisas Espaciais, Sao Jose dos

Campos (Brazil) CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 [E85-10097] p

p 66 N85-27318 Noise correction on LANDSAT images using a spline-like algorithm

[E85-10098] p 66 N85-27319 Study of the urban evolution of Brasilia with the use of LANDSAT data p 19 N85-27321 [E85-10101]

Function of remote sensing in Brazil [INPE-3314-PRE/621]

ρ77 N85-27329 Diffusion coefficients for coastal water determined from aerial photographs [INPE-3413-PRE/679]

p 44 N85-27331

Comparison of a diffusion model with dye dispersion measurements to study turbulence in coastal waters NPE-3492-PRE/729] p 46 N85-27504 Experience of the Institute of Space Research with the [INPE-3492-PRE/7291 use of remote sensing in urban planning studies [INPE-3159-PRE/533] p 19 N8 p 19 N85-27770

Instituto de Pesquisas Espaciais, Sao Paulo (Brazil) Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different classification algorithms [INPE-3359-PRE/637] p 15 N85-27545

International Business Machines Corp , Palo Alto, Calif Analysis and evaluation of the LANDSAT-4 MSS and TM sensors and ground data processing systems Early p 63 N85-23189 results

#### Jet Propulsion Lab., California Inst. of Tech. Pasadena

Satellite-derived sea surface temperature - Workshop p 30 A85-30599 p 32 A85-32192 comparisons TOPEX ground data system The use of multisensor images for Earth Science applications p 69 A85-32211 A Shuttle Imaging Spectrometer Experiment for the late p 69 A85-32214 Earth and space science - Oceans p 32 A85-32215 Remote sensing and climate parameters

p 70 A85-32853 Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set

p 32 A85-35047 Geologic interpretation of Seasat SAR imagery near the to Lacantum, Mexico p 25 A85-35109 Rio Lacantum, Mexico Recent developments in lithologic mapping using remote

p 25 A85-35112 sensing data Recent advances in geologic mapping by radar p 25 A85-35114

Remote detection of geobotanical anomalies associated with hydrocarbon microseepage using thematic mapper simulator (TMS) and airborne imaging spectrometer (AIS) p 7 A85-35120

Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the Antarctic circumpolar current p 33 A85-35166

A cool anomaly off northern California - An investigation p 33 A85-35167 using IR imagery and in situ data Summer Arctic sea ice character from satellite p 33 A85-35170 Imaging spectrometry for earth remote sensing

p 71 A85-36248 Geologic utility of LANSDAT-4 TM data

p 28 N85-23192 Science opportunities using the NASA scatterometer on N-ROSS p 74 N85-23222 [NASA-CR-175639]

Geometric error shuttle imaging analysis for p 75 N85-24269 [NASA-CR-1756651

Shuttle imaging radar-A (SIR-A) data analysis [NASA-CR-175785] p 15 N85-27324

Thermal Infrared Multispectral Scanner (TIMS) An investigator's guide to TIMS data p 77 N85-28286 [NASA-CR-175875]

Towards a study of synoptic-scale variability of the California current system p 46 N85-28529 [NASA-CR-175871]

# Joint Publications Research Service, Arlington, Va

Remote sensing used for study of forest resources p 12 N85-22440

Experience in combined special mapping using space p 62 N85-22449 Temperature anomalies above ore bodies p 28 N85-24500

Study of Volga river delta using space photosurvey p 55 N85-25340 materials

in petroleum- and Use of space information gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341

Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of North Zeravshan seismogenic faults p 29 N85-25342

Relative geological information yield from small-scale multizonal space images (example of Fergama depression and its mountainous margins) p 29 N85-25343 Identifying land use structures of multizonal aerospace

photographs using digital data processing p 66 N85-25348

Experience in automation of data processing in interpretation and defining of linear elements from space photographs p 66 N85-25349

Interpretation of space photolineaments p 29 N85-25353

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and p 43 N85-25354 satellite observations Preliminary processing of laser ranging data from

LAGEOS artificial Earth satellite during short ment program p 21 N85-25355 observation period Use of space photographic information to map plant

p 14 N85-25359 cover Multiple regression analysis of photographic image of p 14 N85-26825 soil properties

Identification of structure of soil-vegetation cover using p 15 N85-26826 aerial and space photographs Analysis of mesofissuring on space photographs New

technique for study of petroleum and gas deposits p 29 N85-26828

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and p 21 N85-26829 photomaps

#### Kansas State Univ , Manhattan

Estimation of total above-ground phytomass production using remotely sensed data p 8 A85-38389 Kansas Univ Center for Research, Inc., Lawrence

Active microwave measurements of Arctic sea ice under

Immer conditions p 33 A85-35171
The microwave propagation and backscattering summer conditions characteristics of vegetation

[E85-10088] p 13 N85-23213 Large space antenna technology applied to radar-imaging, rain-rate measurements, and ocean wind sensing p 37 N85-23820

Modeling the backscattering and transmission properties of vegetation canopies

p 15 N85-27320 (E85-100991 Microwave model prediction and verifications for regetated terrain p 15 N85-27322 [E85-10102]

Kentron International, Inc., Hampton, Va.

Bright spot analysis of ocean-dump plumes using p 36 A85-37987 Landsat MSS

Kiel Univ (West Germany)

Circulation pattern of the North Atlantic, part of the warmwater sphere research effort at Kiel University p 38 N85-23888

Ĺ

### Laboratoire de Meteorologie Dynamique du CNRS, Palaiseau (France)

Long term drifting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339 Lamont-Doherty Geological Inst., Palisades, N Y

On goold heights and flexure of the lithosphere at seamounts [AD-A151220]

Lockheed Engineering and Management Services Co, Inc. Houston, Tex

Techniques for the estimation of leaf area index using spectral data p 10 A85-38835 Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 quality

М

# MacQuarie Univ , North Ryde (Australia)

MAGSAT anomaly field data of the crustal properties of Australia [E85-101001 p 20 N85-23215

An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of MAGSAT anomaly field data D 20 N85-23216 GADB A database facility for modelling naturally occurring geophysical fields p 28 N85-23217 Data selection techniques in the interpretation of MAGSAT data over Australia p 28 N85-23218 Precedency control and other semantic integrity issues p 65 N85-23220 in a workbench database

Maryland Univ , College Park

Changes in vegetation spectra with leaf deterioration under two methods of preservation p 6 A85-33558 Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation

p 50 A85-37973 Use of the TM tasseled cap transform for interpretation of spectral contrasts in an urban scene

p 18 A85-38811 Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminary p 10 A85-38812 results

Scene segmentation through region growing

Authorne Doppler radar velocity measurements of precipitation seen in ocean surface reflection p 36 A85-38866 Application of hierarchical data structures to geographical information systems p 67 N85-27753 [AD-A152169] Michigan State Univ., East Lansing. Spectral response curve models applied to forest cover-type discrimination p 10 A85-38820 Airphoto interpretation of vegetation and landforms for p 15 N85-28436 soil mapping Minnesota Univ., St. Paul. Spectral estimators of absorbed photosynthetically active radiation in corn canopies p 8 A85-38390 Missouri Univ., Columbia. Supplement to evaluation of satellite derived estimates of solar radiation (E85-10086) p 14 N85-24506 Evaluation of satellite derived estimates of solar radiation [E85-10087] p 14 N85-24507 Montana State Univ., Missoula. Remote sensing of the leaf area index of temperate conferous forests p 11 A85-38839 N National Aeronautics and Space Administration, Washington, D C. p 17 A85-38274 Pilot land data system The NASA land processes program - Status and future p 78 A85-38802 NASA's land remote sensing plans for the 1980's p 78 N85-23224 Space methods in oceanology [NASA-TM-77652] p 44 N85-26047 National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif Information content comparison of Thematic Mapper, multispectral scanner and airborne Thematic Mapper p 61 A85-38807 data Remote sensing of the leaf area index of temperate A85-38839 coniferous forests p 11 National Aeronautics and Space Administration. Earth Resources Labs , Bay St. Louis, Miss. An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetlands, p 12 N85-23193 and urban land cover National Aeronautics and Space Administration Goddard Inst. for Space Studies, New York Atlas of archived vegetation, land-use and seasonal Albedo data sets [NASA-TM-86199] p 14 N85-24508 National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md Surface radiation in the tropical Pacific p 30 A85-31200 Testing the radiometric stability of HCMM thermal p 58 A85-32109 Remote sensing and climate parameters p 70 A85-32853 An evaluation of simulated Thematic Mapper data and Landsat MSS data for discriminating suburban and regional land use and land cover p 17 A85-33557 Changes in vegetation spectra with leaf deterioration under two methods of preservation p 6 A85-33558 Reducing Landsat MSS scene variability p 59 A85-34429 Retneval of cloud cover parameters from multispectral satellite images p 70 A85-35124 A review of satellite altimeter measurement of sea surface wind speed - With a proposed new algorithm p 32 A85-35165 Processes and imagery of first-year fast sea ice during p 33 A85-35172 the melt season An evaluation of 685 nm fluorescence imagery of coastal waters p 35 A85-37269 A case study on the application of geosynchronous satellite infrared data to estimate soil moisture p 7 A85-37742 Satellite derived atmosphere water vapor as a tracer of large scale interactions between the atmosphere and p 35 A85-37754 ocean Landsat Thematic Mapper studies of land cover spatial vanability related to hydrology p 50 A85-37972 A georeferenced Landsat digital database for forest insect-damage assessment p 8 A85-37980 Spectral characterization of the Landsat Thematic p 72 A85-37983 Mapper sensors Diurnal movements of cotton leaves expressed as

thermodynamic work and entropy changes

Pdot land data system

p 8 A85-38273

p 17 A85-38274

Landsat MSS

quality

Satellite remote sensing of total herbaceous biomass production in the Senegalese Sahel - 1980-1984 p 9 A85-38391 [NASA-TP-2428] Landsat 4 and 5 status and results from Thematic Landsai e and Samuel e and Samuel Landsai e and Sam Use of the TM tasseled cap transform for interpretation of spectral contrasts in an urban scene p 18 A85-38811 Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminary p 10 A85-38812 Region-based modeling algorithms for remotely-sensed p 18 A85-38823 Airborne Doppler radar velocity measurements of precipitation seen in ocean surface reflection p 36 A85-38866 surface contour radar (NASA-TM-84440) LANDSAT-4 Science Characterization Early Results Volume 4 Applications [E85-10070] p 63 N85-23186 Overview of TM applications research reports (B85800691 p 63 N85-23187 Impact of Thematic Mapper sensor characteristics on p 63 N85-23188 classification accuracy Assessment of computer based geologic mapping of rock units in the LANDSAT-4 scene of northern Death p 28 N85-23195 Valley, California Quick look analysis of TM data of the Washington, District of Columbia, area p 64 N85-23197 Preliminary compansons of the information content and utility of TM versus MSS data p 64 N85-23202 p 64 N85-23202 Preliminary study of information extraction of LANDSAT Arabian gulf circulation TM data for a suburban/regional test site p 65 N85-23208 Comparative techniques used to evaluate Thematic (Brazil) Mapper data for land cover classification in Logan County, West Virginia p 65 N85-23209 Companson of MSS and TM data for landcover classification in the Chesapeake Bay area. A preliminary p 65 N85-23210 Environmental satellites Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper simulator (TMS) data for hydrologic applications [PB85-164994] p 52 N85-23211 Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory p 65 N85-23212 Remanent magnetization model for the broken ridge satellite magnetic anomaly p 20 N85-2 Remote Sensing of Snow and Evapotranspiration p 20 N85-23219 [NASA-CP-2363] p 53 N85-23223 Microwave radiometer observations of snowpack properties and comparison of U.S. Japanese results a deep moored current meter o 53 N85-23230 Microwave remote sensing of soil moisture St Louis, Miss p 13 N85-23235 Humcane structure and dynamics from stereoscopic and observation platforms infrared satellite observations and radar data p 76 N85-25988 Monitoring tropical cyclone growth using GOES VISSR/VAS and Nimbus-7 TOMS data Columbia, Mo p 76 N85-25989 Mesoscale analysis and modeling group p 76 N85-26001 of solar radiation [E85-10086] East coast snowstorm survey p 76 N85-26013 Simultaneous Earth observations from 2 satellites INASA-TM-862041 p 76 N85-27325 (E85-10087) The ARGOS system used for tracking gray whales p 45 N85-27347 Experimental philosophy leading to a small scale digital Miaml, Fla data base of the conterminous United States for designing experiments with remotely sensed data fiscal year 1985 projections [NASA-TM-85009] p 67 N85-28877 Research Review, 1983 Rockville, Md. [NASA-TM-86219] p 46 N88 National Aeronautics and Space Administration. p 46 N85-29433 platform location system Johnson (Lyndon B) Space Center, Techniques for the estimation of leaf area index using platform location system p 10 A85-38835 Estimation of leaf area index from bidirectional spectral platform location system reflectance data by inverting a canopy reflectance model p 11 A85-38836 (TOGA) Preliminary evaluation of Thematic Mapper image data p 63 N85-23194 Seattle, Wash. Thematic Mapper data quality and performance assessment in renewable resources/agriculture/remote sensina o 12 N85-23201 Preliminary evaluation of TM for soils information p 13 N85-23206 Washington, D C National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. observation A concept for an advanced earth [PB85-152502] A85-32228 p 70 spacecraft Bright spot analysis of ocean-dump plumes using p 36 A85-37987

Characteristic vector analysis of inflection ratio spectra. New technique for analysis of ocean color data p 37 N85-23237 Orbiting multi-beam microwave radiometer for soil p 14 N85-23818 moisture remote sensing p 14 N85-23818
Determination of electromagnetic properties of mesh material using advanced radiometer techniques p 74 N85-23855 National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, The use of Landsat-4 MSS digital data in temporal data sets and the evaluation of scene-to-scene registration accuracy p 59 A85-33449 National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
Remote sensing of directional wave spectra using the p 43 N85-24510 National Aerospace Lab., Amsterdam (Netherlands) Developments in remote sensing p 67 N85-28441 National Center for Atmospheric Research, Boulder, Airborne Doppler radar velocity measurements of precipitation seen in ocean surface reflection p 36 A85-38866 A report on the DRIFTERS program p 42 N85-24413 National Data Buoy Center, Bay Saint Louis, Miss. Drifting buoy studies for weather applications p 40 N85-24396 p 42 N85-24412 An overview of NDBC drifting buoy development p 43 N85-24422 National Dept. of Water and Electrical Energy, Brasilia The ARGOS system in Brazil p 55 N85-27349 National Environmental Satellite Service, Washington, p 19 N85-24392 Technique that uses satellite, radar, and conventional data for analyzing and short-range forecasting of precipitation from extratropical cyclones p 55 N85-27499 National Marine Fisheries Service, La Jolla, Calif Estimating ocean production from satellite-derived chlorophyll - Insights from the EASTROPAC data set p 32 A85-35047 Tracking pelagic dolphins by satellite p 39 N85-24364 National Museum of Natural History, Paris (France) The ARGOS contribution to the successful dredging of p 40 N85-24381 National Oceanic and Atmospheric Administration, Bay US program in anchored data buoy and the other fixed p 39 N85-24358 Development of a Lagrangian drifting buoy p 44 N85-27338 National Oceanic and Atmospheric Administration, Supplement to evaluation of satellite derived estimates p 14 N85-24506 Evaluation of satellite derived estimates of solar p 14 N85-24507 National Oceanic and Atmospheric Administration, Hurncane Research Division, fiscal year 1984 programs, p 77 N85-27491 National Oceanic and Atmospheric Administration, US programs using the ARGOS data collection and p 75 N85-24355 US programs using the ARGOS data collection and p 41 N85-24401 US program using the ARGOS data collection and p 41 N85-24410 The Tropical Ocean and Global Atmosphere program p 42 N85-24411 National Oceanic and Atmospheric Administration, Applications of ARGOS measurements in equational Pacific Ocean-atmosphere interaction studies p 42 N85-24414 National Oceanic and Atmospheric Administration. Utilization of the polar platform of NASA's Space Station Program for operational Earth observations p 75 N85-23895 A large-scale air sea interaction project over the Pacific p 39 N85-24373

National	Researc	h Inst.	for	Ocean	iology,	Stel	lenbo	osch
(South	Africa)							

One thousand days in the brine p 39 N85-24359 National Research Inst. of Fisheries, Lisbon (Portugal) Automatic buoys to assist the tuna fishery off the p 37 N85-23879 Azores

# Natural Environment Research Council, London

The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP p 64 N85-23207 programme

### Naval Ocean Research and Development Activity, Bay St Louis, Miss

Temporal vanations of the microwave signatures of sea ce during the late spring and early summer near Mould p 34 A85-35173 Bay, NWT

Digital processing of passive Ka-band microwave images for sea-ice classification

p 43 N85-24511 [AD-A150686] Operation guiding light-scientific program and field plan
The pilot field experiment for NORDA project chemical

dynamics in ocean frontal areas p 47 N85-29507 [ÁD-A153765]

Naval Postgraduate School, Monterey, Calif A cool anomaly off northern California - An investigation using IR imagery and in situ data p 33 A85-35167 An assessment of the potential role of multispectral magery in bathymetric charting

p 46 N85-28438 [AD-A152460]

# Nebraska Univ , Lincoln

Collection of in situ forest canopy spectra using a helicopter - A discussion of methodology and preliminar results p 10 A85-38812

### New Orleans Univ. La

Analysis methods for Thematic Mapper data of urban p 18 A85-38816

# New York State Univ , Binghamton

Estimation of leaf area index from bidirectional spectral reflectance data by inverting a canopy reflectance model p 11 A85-38836

# Norwegian Meteorological Inst, Blindern

Some experience from ARGOS stations in the open p 38 N85-23891 An operational buoy network collecting meteorological p 45 N85-27351

# Office de la Recherche Scientifique et Technique,

Present stage of utilization of the ARGOS system by the ORSTOM hydrological service for hydrometric data p 55 N85-27348

# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France)

The ARGOS system and hydrology Results obtained by ORSTROM and benefits of a degree of standardization p 54 N85-23881 The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct

reception by the Seine basin hydrology service p 55 N85-24389

# Oregon State Univ, Corvallis

A review of satellite altimeter measurement of sea surface wind speed - With a proposed new algorithm

p 32 A85-35165 Observing large-scale temporal variability of ocean currents by satellite altimetry - With application to the

p 33 A85-35166 Antarctic circumpolar current Comment on 'Seasonal vanation in wind speed and sea state from global satellite measurements' by D Sandwell p 33 A85-35169 and R Agreen

# Oregon State Univ , Newport.

Tracking whale migrations with the ARGOS satellite p 41 N85-24403 The ARGOS system used for tracking gray whales p 43 N85-24421

# Pacific Northwest Lab , Richland, Wash

Analysis of the NASA/MSFC airborne Doppler lidar results from San Gorgonio Pass, California p 77 N85-27463 [NASA-CR-3901]

Pan American Univ , Edinburg, Tex

A test of the Suits vegetative-canopy reflectance model with LARS soybean-canopy reflectance data p 8 A85-37981

# Partech Electronics Ltd , St. Austell (England)

Practical considerations when using water quality and structure monitoring sensors as applied to portable ARGOS satellite transmitter equipment

p 41 N85-24405

# Pennsylvania State Univ , University Park

A method for estimating soil moisture availability [NASA-CR-175606] p 14 N85-23238 Analysis of the inflow layer and air-sea interactions in Hurricane Frederic (1979) [NASA-CR-175616] p 37 N85-23271 Analysis of the inflow and air-sea interactions in

hurricane Frederic p 76 N85-25990

# Petro-Canada Ltd , Calgary (Alberta)

Drifting buoys on the Labrador shelf

# p 42 N85-24415 Polar Research Lab , Inc , Santa Barbara, Calif New directions in ARGOS instrumentation at Polar

Research Lab (PRL) p 38 N85-24350

Pretoria Univ (South Africa)

Motivation for satellite tracking of southern elephant seals Mirounga leonina at sea p 45 N85-27346

Purdue Univ , Lafayette, ind Spectral estimators of absorbed photosynthetically p 8 A85-38390 active radiation in corn canopies Changes in spectral properties of detached birch p 9 A85-38394 leaves Comparison of classification schemes for MSS and TM data p 62 A85-38821

# Rhode Island Univ, Kingston

The Deep Drifter Program p 4/ Rijkswaterstaat, The Hague (Netherlands) p 40 N85-24400

The ARGOS communications performance trials p 40 N85-24376

# Royal Netherlands Meteorological Inst , De Bilt

Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites

p 45 N85-27352 First results of oceanography utilization of infrared high resolution picture transmission images p 47 N85-29511 [KNMI-TR-59]

# S

# SAR. Inc , Riverdale, Md

Modelling the atmospheric boundary layer for remotely sensed estimates of daily evaporation

p 50 A85-37973

Science and Technology Agency, Tokyo (Japan)
General report of the researches of snowpack
properties, snowmelt runoff and evapotranspiration in p 53 N85-23225 p 53 N85-23227 Snowmelt runoff model in Japan

Application of Martinec-Rango model to river basin in p 53 N85-23228 Distribution of snow and maximum snow water equivalent obtained by LANDSAT data and degree day p 53 N85-23229

Science Applications, Inc , Rockville, Md

The utility of Thematic Mapper sensor characteristics for surface mine monitoring p 27 A85-38810 Region-based modeling algorithms for remotely-sensed p 18 A85-38823

# Scottish Marine Biological Association, Edinburgh (Scotland)

ARGOS-tracked drifters in the Rockall Trough p 44 N85-27340

Scripps Institution of Oceanography, La Jolla, Calif

Earth and space science - Oceans p 32 A85-32215 Surface currents in the tropical Pacific during 1979-1980 sing drifting buoys p 38 N85-24354 using drifting buoys

# Services Technique des Phares et Balises,

Bonneuil-sur-Marne (France)

Checking on the position of navigation marker buoys by the ARGOS system p 46 N85-27354 p 46 N85-27354

Sigma Data Services Corp , Greenbelt, Md Derivation of model topography p 22 N85-29449

# Simpson Weather Associates, Charlottesville, Va

Convective storm downdraft outflows detected by NASA/MSFC's Airborne 10 6 micron pulsed Doppler Lidar System [NASA-CR-3898] p 77 N85-28511

Societe Europeenne de Propulsion, Puteaux (France) Geologic interpretation of Seasat SAR imagery near the Rio Lacantum, Mexico p 25 A85-35109

Stanford Univ, Calif Influence of rock-soil spectral assessment of green biomass vanation on the

p 9 A85-38393 Stanford Univ , Palo Alto. Calif

Remote sensing of the leaf area index of temperate coniferous forests p 11 A85-38839

#### Swedish Meteorological and Hydrological Inst., Stockholm

Hydrological data collection from Swedish mountain p 54 N85-24388 Synergetics International, Inc., Boulder, Colo

new versatile ARGOS PTT for oceanographic applications p 42 N85-24417 Systems and Applied Sciences Corp , Vienna, Va

Retrieval of cloud cover parameters from multispectral satellite images p 70 A85-35124

# T

# Technicolor Government Services, Inc , Moffett Field,

Information content comparison of Thematic Mapper. multispectral scanner and airborne Thematic Mapper p 61 A85-38807 Use of Thematic Mapper for water quality assessment p 52 A85-38826

Remote sensing of the leaf area index of temperate p 11 A85-38839 conferous forests Technicolor Government Services, Inc., Sioux Falls, S

Early results of investigations of LANDSAT 4 Thematic

Mapper and Multispectral Scanner applications p 64 N85-23200

# Technische Univ , Munich (West Germany)

A concept for the processing and display of Thematic p 63 N85-23196 Mapper data

Thorn EMI, Hayes (England)

DB2 and DB3 The next generation

# n 44 N85-27337 Toyo Communication Equipment Co Ltd, Kanagawa

The development of Platform Transmitter Terminal (PTT) and its application for drifting buoys p 75 N85-24353 Toyo Communication Equipment Co Ltd., Kawasaki

Drifting buoy development and future programs p 41 N85-24406

# Tsukuba Univ (Japan)

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Priestley-Taylor parameter p 13 N85-23233

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of evaporation model to estimate evapotranspiration by remote sensing technique

# Universities Space Research Association, Columbia,

Remote sensing and climate parameters

p 70 A85-32853

p 41 N85-24402

# Washington Univ , Seattle

# Temporal variations of the microwave signatures of sea

ice during the late spring and early summer near Mould Bay, NWT p 34 A85-35173 Arctic mixed layer dynamics p 46 N85-29505

[AD-A153582] Washington Univ , St Louis, Mo

Shuttle imaging radar-A (SIR-A) data analysis [NASA-CR-175785] p 15 N p 15 N85-27324 Water Survey of Canada, Ottawa (Ontario)

p 54 N85-23882 Hydrometric telemetry in Canada Wisconsin Univ , Madison

Automatic weather stations in Antarctica

p 75 N85-24360 Test and evaluation plan for the Centralized Storm p 77 N85-28508 Information System p 77 N85-28
Woodrow Wilson International Center for Scholars,

Washington, D C

Environmental management needs [DE85-007859] p 78 N85-29405

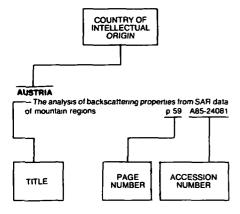
Woods Hole Oceanographic Institution, Mass Telemetered meteorological and engineering data from a deep sea moored body in the Long Term Upper Ocean

Study (LOTUS) Wyoming Univ., Laramie

Cloud physics studies in the SCPP (Sierra Cooperative

[PB85-1630951 p 55 N85-27501

# Typical Foreign Technology Index Listing



Listings in this index are arranged alphabetically by country of intellectual origin. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the citation in the abstract section.

# Δ

# AUSTRALIA Lithologic mapping in deeply weathered terrain using

visible-NIR, SWIR and mid-infrared remote sensing techniques p 26 A85-35115 CO2 laser reflectance of rocks for geological remote p 26 A85-35116 sensing On the microwave reflectivity of small-scale breaking p 34 A85-36570 Rain estimation in extratropical cyclones using GMS p 49 A85-37855 ımagery MAGSAT anomaly field data of the crustal properties of Australia [E85-10100] p 20 N85-23215 An investigation of the crustal properties of Australia and surrounding regions derived from interpretation of MAGSAT anomaly field data p 20 N85-23216 GADB A database facility for modelling naturally occurring geophysical fields p 28 N85-23217 Data selection techniques in the interpretation of p 28 N85-23218 MAGSAT data over Australia

Synthetic aperture radar capabilities for snow and glacier monitoring p 50 A85-37976

Precedency control and other semantic integrity issues

p 65

# В

# BRAZIL

**AUSTRIA** 

a workbench database

Remote sensing systems compansons for geological mapping in Brazil p 24 A85-35107 CNPq/INPE LANDSAT system Report of activities from October 1, 1983 to September 30, 1984 [E85-10097] p 66 N85-27318

Noise correction on LANDSAT images using a spline-like algorithm

[E85-10098] p 66 N85-27319

Study of the urban evolution of Brasilia with the use of LANDSAT data

[E85-10101] p 19 N85-27321 Function of remote sensing in Brazil

[INPE-3314-PRE/621] p 77 N85-27329 Diffusion coefficients for coastal water determined from aenal photographs [INPE-3413-PRE/679] p 44 N85-27331

[INPE-3413-PRE/679] p 44 N85-27331 The ARGOS system in Brazil p 55 N85-27349 Companson of a diffusion model with dye dispersion

measurements to study turbulence in coastal waters [INPE-3492-PRE/729] p 46 N85-27504 Comparative study of the digital analysis of areas of the Earth's surface prepared for planting using different

classification algorithms
[INPE-3359-PRE/637] p 15 N85-27545
Expenence of the Institute of Space Research with the use of remote sensing in urban planning studies
[INPE-3159-PRE/533] p 19 N85-27770

# C

### CANADA

Digital processing to improve forest classification results at resolutions of 5 to 50 metres p 4 A85-30965 Canadian Symposium on Remote Sensing, 8th, and Association Quebecoise de Teledetection, Congress, 4th, Montreal, Canada, May 3-6, 1983, Proceedings

p 69 A85-32101 vegetation A85-32102 Influence of the viewing geometry on р4 measures Preliminary results from satellite SAR image simulation A85-32103 experiments p 30 . A simple model for satellite radiometric p 31 discrimination estimation A85-32104 Current limitations on quantitative airborne p 57 A85-32105 thermography Video image analysis p 57 A85-32107 The stereoscopic accentuation of SPOT images

Remotely Piloted Aircraft for small format aenal photography p 16 A85-32110 Stereo viewability of proposed Radarsat imagery

p 58 Å85-32111

Automated computer monitoring sea-ice temperature by use of NOAA satellite data p 31 A85-32121

Preliminary results of an examination of C-band synthetic aperture radar for forestry applications p 4 A85-32113

First steps towards integration of remote sensing and digital mapping p 58 A85-32115

Clouds A fundamental limitation to satellite remote sensing in the visible spectral region p 69 A85-32119

Avalanche hazard mapping integrating Landsat digital

Avaianche azard mapping integraung Landsat digital data and digital topographic data p 58 A85-32120 Transient sea surface height vanation and the Seasat-altimeter data application p 31 A85-32121 The analysis of Landsat MSS data for characterizing sediment dispersal in the Beautort Sea

p 48 A85-32122 Application of remote sensing by means of a satellite in surveying the water resources of the Sahel

p 48 A85-32123 A thermal study of the waters of the St Lawrence estuary by means of the HCMM satellite - Preliminary results

p 48 A85-32124
Operational crop forecasting using remotely sensed imagery p 4 A85-32125

Evaluation of the TM, MSS, and HRV sensors in estimating the surface area of corn within Canada

p 4 A85-32126 Overcoming project planning and timeliness problems to make Landsat useful for timely crop area estimates p 5 A85-32129

Overcoming technical problems to make Landsat useful for timely crop area estimates p 5 A85-32130 SPOT and Landsat-4 simulations Generalization of MRC biophysical-inventory data on the upper St Lawrence

biophysical-inventory data on the upper St. Lawrence Preliminary analysis p 48 A85-32131 Dryland salinity mapping in southern Alberta from Landsat data - A semioperational program

p 5 A85-32132

New remote sensing techniques for monitoring the fescue grasslands of Alberta p 5 A85-32133

A method for enhancing Landsat images for classifying plant cover p 5 A85-32134

A practical method for monitoring and mapping cutovers based on the digital analysis of Landsat data and automated map production p 5 A85-32135

Monitoring earth resource and environmental change -Some limitations and potentials of satellite data p 17 A85-32137

The use of Landsat images in the selection of hydroelectric-transmission comdors on the North Shore Preliminary study of the principal surface-material types

Estimation of bidirectional reflectances by Landsat-image analysis - Problems and possible solutions p 59 A85-32141

Cobalt-abitibi project - Landsat image analysis in the Canadian Shield application of the geological analysis aid package p 23 A85-32144

Fracture mapping of part of northern Ontano using Landsat imagery p 23 A85-32145

Correlations between satellite data and radar, thermographic, and multispectral surveys for the geomorphological characterization of a region of southern Quebec p 48 A85-32146

Basic outline of a guide for the use of Landsat images in geology p 23 A85-32147

Mapping sufficial geology by Landsat - An investigation

Mapping surficial geology by Landsat - An investigation into variations in spectral response patterns

The world's topographic and cadastral mapping operation p 20 A85-3248 Landsat data for operational mineral exploration - The Canadian expenence p 24 A85-35106

Expectations for aerial photography as seen from the side of the user p 71 A85-36287

Dielectric properties and microwave remote sensing p 72 A85-37959

Algorithms for the estimation of failed detector data p 61 A85-38806

extrapolation of thunderstorms from GOES satellite data p 19 A85-39537

On the use of satellite estimates of precipitation in initial analyses for numerical weather prediction p.74 A85-39829

Project PAPA The integration of drifting buoy data into an operational meteorological service p 37 N85-23874

Hydrometric telemetry in Canada p 54 N85-23882
Fourier transform of wave data on ARGOS buoys p 38 N85-24351

Inferences of future operations drawn from past and present applications of drifting buoys p 38 N85-24356

The development of an automated manne meteorological data system p 39 N85-24362

Collecting meteorological reports with the ARGOS

Collecting meteorological reports with the ARGOS ystem p 40 N85-24398

Development of a low cost drifting buoy

p 41 N85-24408 Drifting buoys on the Labrador shelf

P 42 N85-24415

Overview of data processing at AES local user terminals

P 43 N85-24418

# CHILE

Main results and perspectives of some Chilean experiences developed with low cost and accurate spatial remote sensing technology p 72 A85-37957

Use of satellite images to obtain accurate snowmelting runoff forecasts and to survey geothermal activity along Los Andes range, Chile p 50 A85-37975

# CHINA, PEOPLE'S REPUBLIC OF

Application of digital image enhancement processing of Landsat data for terrain mapping of southern Huairou County of Beijing (Peking), China p 61 A85-38813 **DENMARK**FOREIGN TECHNOLOGY INDEX

D

DENMARK

Applications of ARGOS data collection systems in Arctic regions p 37 N85-23875 Applications of ARGOS data collection system for automatic meteorological observationes in Arctic regions p 38 N85-23893 Operational experiences with the ARGOS system in

Operational experiences with the ARGOS system in Greenland p 45 N85-27353

F

FRANCE

Image processing applications for geologic mapping p 23 A85-31736

Automated cartography and geomorphological boundary-unit detection in the Mopti-Bandiagara (Mail) region using multisatellite data from Landsat, SIR-A radar, and SPOT simulation p 58 A85-32116

Companson of Meteosat-2 and NOAA-7 data used for understanding the environment of albacore in the east Atlantic p 31 A85-32118

Seasonal and interannual evolution of the spectral signature in forest environments using Landsat data

p 6 A85-32139 Remote sensing for geological mapping, Proceedings of the Seminar, Orleans, France, February 2-4, 1984

p 24 A85-35101 Importance of pattern recognition for geological remote sensing applications and new look at geological maps

Correlations between spatial remote sensing, geochemical and geophysical data in Western France - An integrative and orientation technique for geological

mapping and ore exploration p 24 A85-35105
Geological cartography of Gabon using side-looking radar imagery - An example of an integrated mapping

Geologic interpretation of Seasat SAR imagery near the Rio Lacantum, Mexico p 25 A85-35109 Contribution to 'spectral signature' research on ore

Contribution to 'spectral signature' research on ore bodies found in south Morocco, at three levels of investigation Satellite, ground and laboratory p 26 A85-35117

Measurement of the condition of the sea by ionospheric backscatter radar p 34 A85-36427 Merging Landsat and spaceborne radar data over Tunisia p 72 A85-37962

Tunisia p 72 A85-37962 Evaluation of local and global deformation models for the registration of simulated SPOT images

p 62 A85-38845

Data Collection and Platform Location by Satellite
ARGOS Users' Conference p 74 N85-23869
The ARGOS system status report after 2 years
operation p 74 N85-23870

System performance, data distribution and technical files p 74 N85-23871
The ARGOS Platform Transmitter Terminals (PTTs)

The ARGOS system and hydrology PA N85-23872
The ARGOS system and hydrology Results obtained by ORSTROM and benefits of a degree of standardization p54 N85-23881
Data Collection and Platform Location by Satellite ARGOS Users' Conference p 38 N85-23883

The ARGOS system status report p 74 N85-23884 Proceedings of the ARGOS Users Conference on Data Collection and Location by Satellite p 75 N85-24348 Automatic hydrological data collection facility using ARGOS p 54 N85-24368 Data Collection and Platform Location by Satellite

Data Collection and Platform Location by Satellite
ARGOS Users' Conference p 39 N85-24366
The ARGOS system main characteristics

p 39 N85-24367 The ARGOS system after 3 years operation

Meteorological buoys developed at the EERM laboratory p 40 N85-24374

The ARGOS contribution to the successful dredging of a deep moored current meter p 40 N85-24381 Measurement of water equivalent of mountain snow cover p 54 N85-24386 The ARGOS system and hydrology. The use of Platform

The ARGOS system and hydrology The use of Platform Terminal Transmitter (PTT) with built-in memory and direct reception by the Seine basin hydrology service

Data Collection and Platform Location by Satellite PARGOS users' Conference p40 N85-24391
The French Ocean Climate in Equational Atlantic (FOCAL) Drifter Program, 1983-1984 p40 N85-24399
Data Collection and Platform Location by Satellite ARGOS Users' Conference p41 N85-24409
The ARGOS program p75 N85-24775
Scientific experiments Preprocessing of scientific data p66 N85-24779

Data Collection and Platform Location by Satellite ARGOS Users' Conference p 44 N85-27333 Long term drifting float for measuring mean oceanic circulation using ARGOS system p 44 N85-27339

Wave directional spectra via ARGOS

A seismic ARGOS data collection platform

p 29 N85-27350 Checking on the position of navigation marker buoys by the ARGOS system p 46 N85-27354

Contribution of the NOAA-7 and 8 and ARGOS partnership to white tuna fishing in the northeast Atlantic p 46 N85-27355

Location and data collection satellite system ARGOS User's guide p 66 N85-27371

Looking down looking forward Earth observation, sciences and applications, a perspective [ESA-SP-1073] p 78 N85-29497

G

GERMANY, FEDERAL REPUBLIC OF

Theory of radar imaging of internal waves

p 30 A85-30980
Probing of the earth's surface and the atmosphere with an airborne laser spectrometer p 68 A85-31397

The World Ocean Circulation Experiment p 31 A85-32166

Texture analysis and classification of airborne radar data with synthetic aperture p 60 A85-34865 Medium to small scale geological maps based on Landsat MSS and RBV data - Case histones of projects

in North Africa p 25 A85-35110
Theory of synthetic aperture radar ocean imaging - A
MARSEN view p 32 A85-35164

A concept for the processing and display of Thematic Mapper data p 63 N85-23196 Circulation pattern of the North Atlantic, part of the

warmwater sphere research effort at Kiel University p 38 N85-23888

Information relative to cartography and geodesy Senes
2 Translations, number 42, volume 1
[ISSN-0469-4244] p 21 N85-29338

Two satellite image maps of Central Europe

Digital image mapping of Antarctica using NOAA-7
AVHRR imagery p67
W85-29340
The significance of orthophoto maps for developing countries p 21
N85-29341

German contributions to the cartography of Antarctica by means of photogrammetry and remote sensing p 22 N85-29342

Reports on cartography and geodesy Senes 1 Original reports, number 93 [ISSN-0469-4236] p 22 N85-29343 Dynamic rectification of airborne scanner digital image recordings p 67 N85-29344

GREECE
Drainage network analysis of Landsat images of the Olympus-Pieria mountain area, northern Greece

p 51 A85-37982

١

INDIA

The evolution of satellite-based remote-sensing capabilities in India p 68 A85-30726 Ecological studies in the Ukai command area

Forest-type stratification and delineation of shifting cultivation areas in the eastern part of Arunachal Pradesh using Landsat MSS data p 1 A85-30728

Evaluation of Landsat and airborne multispectral data and aenal photographs for mapping forest features and phenomena in a part of the Godavan basin

p. 1 A85-30729

Ground water exploration in the Saurashtra peninsula p 47 A85-30730

Inundation mapping of the Sahibi river flood of 1977 p 47 A85-30731 The evaluation of hydrogeological conditions in the

southern part of Tamil Nadu using remote-sensing techniques — 9.48 A85-30732 Application of digitally processed and enhanced Landsat imagery for geological mapping and mineral targeting in the Singhbhum Precambrain mineralized belt, Bihar-Onssa — 9.29 A85-30733

Bihar-Onssa p 22 A85-30733
Targeting areas for mineral exploration - A case study from Onssa, India p 22 A85-30734

Project Indravati I - An appraisal of the natural resources of the Indravati basin, Orissa, Madhya Pradesh and Maharashtra, India p 22 A85-30735 Correlation of Landsat data with surface and subsurface information - A synergistic, quantitative approach to oil

exploration in Gujarat, India p 22 A85-30736 Land-use survey of Idukki District p 16 A85-30737 Land-use and Iand-cover mapping and change detection in Tripura using satellite Landsat data

p 16 A85-30738 Urban change detection and land-use mapping of Delhi p 16 A85-30739 Land use and forestry studies of Himachal Pradesh

p 1 A85-30740

Monitoring changes in ecology in the Kudremukh mining region p 22 A85-30741

Assessment of the role of remote sensing techniques in monitoring shoreline changes - A case study of the Kerala coast Coastal morphology - A case study of the Gulf of Khambhat (Cambay) p 48 A85-30743

Khambhat (Cambay) p 48 A85-30743
Joint experiments programme in remote sensing of manne fish resources p 30 A85-30744
Assessment of water-stress effects on crops

p 1 A85-30745 Indian remote-sensing satellite - Utilization plan p 77 A85-30746

Mapping of land/soil degradation using multispectral data p.16 A85-32127
Vertical component Magsat anomalies and Indian

tectonic boundaries p 26 A85-37150
A decade of remote sensing in India - Some salient results p 72 A85-37952

Capability of Bhaskara-II satellite microwave radiometer brightness temperature data to discriminate soil moisture conditions of Indian landmass p 7 A85-37958 Review of remote sensing applications in hydrology and

water resources management in India p 49 A85-37970 Hydrologic appraisal of rivers plan-form at confluence

zone A case study using Landsat MSS data p 50 A85-37977 Mapping of wolframite region in the Sirohi district (Rajasthan) in India from different digitally enhanced data

products of Landsat p 26 A85-38808
Utility of some image enhancement techniques for reconnaissance soil mapping - A case study from southern India p 10 A85-38829

INTERNATIONAL ORGANIZATION

Use of Landsat imagery to detect hydrologic indicators of the Niger inver regime p 49 A85-33874 Application of space sciences to hydrology and water resources - The potential and practical use as reflected by WMO expenence p 49 A85-37969 ISRAEL

Orbits for earth observation p 71 A85-37199

J

JAPAN

On a ventication plane for MOS-1 (Manne Observation Satelite-1) p 31 A85-32149 Investigation of the atmospheric aerosols and water vapor by the AVHRR radiometer (visible and IR) on board NOAA-7 p 32 A85-32872 p 32 A85-32872

A classification of MSS data for land-cover mapping
p 60 A85-34438
Inference of rain rate profile and path-integrated rain

rate by an airborne microwave rain scatterometer
p 49 A85-36565

An observation of snow melting process from remotely sensed data p 50 A85-37974

General report of the researches of snowpack

properties, snowmett runoff and evapotranspiration in Japan p 53 N85-23225
Snowmelt runoff model in Japan p 53 N85-23227

Application of Martinec-Rango model to river basin in Japan p 53 N85-23228
Distribution of snow and maximum snow water

equivalent obtained by LANDSAT data and degree day method p 53 N85-23229 Studies on physical properties of snow based on multi-

channel microwave radiometer p 54 N85-23231

Analysis of NIMBUS-7 SMMR data p 54 N85-23232

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 1 Measurement of evapotranspiration at the Environmental Research Center and determination of Pnestley-Taylor parameter

p 13 N85-23233

Estimation of regional evapotranspiration using remotely sensed land surface temperature Part 2 Application of equilibrium evaporation model to estimate evapotranspiration by remote sensing technique

p 13 N85-23234

The development of Platform Transmitter Terminal (PTT) and its application for drifting buoys p 75 N85-24353 Drifting buoy development and future programs N85-24406 p 41

# K

#### **KENYA**

Responses to satellite remote sensing opportunit p 72 A85-37953 east and southern Africa

### **NETHERLANDS**

Geological interpretation of Landsat imagery of the Bangladesh Ganges delta p 24 A85-33875 Structures for geo-information and their application in selective sampling of digital terrain models

p 60 A85-36283

Navigation and sensor orientation systems in aerial p 71 A85-36284 photography

The ARGOS communications performance trials p 40 N85-24376

Availability of the ARGOS system based on the orbital characteristics of the TIROS-N satellites

p 45 N85-27352

Developments in remote sensing

(B8580069) p 67 N85-28441 First results of oceanography utilization of infrared high resolution picture transmission images

p 47 N85-29511 (KNMI-TR-59)

#### **NÈW ZEALAND**

Mapping native vegetation using Landsat data p 6 A85-33352

# NORWAY

Operational experiences with the ARGOS system in oceanography and oil spill emergency planning Future plans for the use of the ARGOS system as a component in offshore data collection system p 38 N85-23887 Some experience from ARGOS stations in the open p 38 N85-23891 p 44 N85-27341 Monitoring of marine environment Routine wave and meteorological measurements in offshore areas using ARGOS data surveillance

p 45 N85-27344 An operational buoy network collecting meteorological p 45 N85-27351

# **PORTUGAL**

Automatic buoys to assist the tuna fishery off the Azores p 37 N85-23879

# S

# SINGAPORE

Landsat study of changes in surface cover

p 59 A85-32140

Landsat model for groundwater exploration in Nuba Mountains, Sudan p 49 A85-37961

SOUTH AFRICA, REPUBLIC OF

One thousand days in the brine p 39 N85-24359 Motivation for satellite tracking of southern elephant p 45 N85-27346 seals Mirounga leonina at sea SWEDEN

Classification of mires using multitemporal Landsat MSS and topographic map data p 5 A85-32136 Landsat data for population estimates Approaches to inter-censal counts in the rural Sudan

p 17 A85-37955 Estimating canopy cover in drylands with Landsat MSS p 8 A85-37966 Remote sensing for drought impact assessment - A study of land transformation in Kordofan, Sudan

Mapping of coastal-water turbidity using LANDSAT nagery p 35 A85-37979 ımagery Hydrological data collection from Swedish mountain p 54 N85-24388 areas

# **SWITZERLAND**

ERS economic impace study [ESA-CR(P)-1979] p 47 N85-29847

# T

# TANZANIA

Landsat information as basis for a permanent monitoring of ecology and agricultural situations in tropical zones A85-32128

#### U.S.S R

Study of spectral-polarization characteristics of natural surfaces from various heights p 69 A85-31478 Remote sensing of the atmospheric aerosol from p 16 A85-31882 Optical noncontact methods for the study of the world p 30 A85-31890

Theory of single space photographs

p 57 A85-31893 The use of space photographs for landscape mapping p 59 A85-33598

Applications of space images for neotectonic studies p 24 A85-35104

Investigations of the ocean surface by radiophysical p 34 A85-35832 means from aerospace platforms Airborne measurements of the sea state from mirror reflections of the beam of a continuous-wave lase

p 34 A85-35879 Determination of sea-ice concentration according to

satellite imagery p 34 A85-37114 Experimental land mapping based on photographic data p 7 A85-37117 from space

information content of space images obtained in different spectral bands during the experiment (Mushugai test range -Gobi-Khangai p 26 A85-37118 Gurvan-Bogd)

The application of computerized space image processing techniques to data from large scale aerial rveys of forests p 7 A85-37119
Digital processing of meteorological satellite imagery surveys of forests

p 60 A85-37121 The development and current state of earth expansion

and fluctuation problems p 20 A85-37302 Results of a study of nontidal gravity variations

p 20 A85-37310 A method for determining Antarctic land ice parameters from satellite multichannel microwave measurements

p 35 A85-37511 Versatile airborne laser system for remote probing of p 73 A85-38336 ocean, atmosphere, and farmland Assessment of some methods for increasing the information content of an active-passive microwave remote p 36 A85-38578 sensing system

Calculation of the emissivity of ice and snow covers in p 51 A85-38587 the microwave region Methods for the meteorological interpretation of satellite p 36 A85-38681

spectral measurements Problems related to the collection, systematization and use of a priori data during the digital processing of multispectral data obtained from space

p 73 A85-38701 The possibility of using small unmanned aircraft for studies of terrestrial natural resources

p 73 A85-38702 Features of exposure conditions and photolab processing of materials obtained from aerial photography using the MKF-6M camera p 73 A85-38703 Operational planning for a remote-sensing space p 9 A85-38704

Geographic regionalization and the problems related to space-based monitoring p 18 A85-38705

The use of Meteor satellite images for geographic gionalization of the Soviet Union p 18 A85-38706 regionalization of the Soviet Union A concept for establishing a database for a support databank (through an example of an agricultural block) p 60 A85-38707

A preliminary method for complex aerovisual and ground-based subsatellite observations agrophytocenosis status (through the example of winter p 9 A85-38708 wheatl Modeling of spatially distributed objects using remote sensing data p 51 A85-38709 A graphic approach to the modeling of river discharge

p 51 A85-38710 using remote sensing data An algorithm for reconstructing correlating series of ground-based and remote observations p 61 A85-38711

Distinguishing homogeneous regions of water surfaces on the basis of space imagery p 36 A85-38712 The use of artificial objects in calibrating remote sensing data on the quality of natural waters p 51 A85-38713 Optimization of the reference calibration method for

remote sensing data on natural waters p 51 A85-38714

The sensitivity of the computational scheme for taking into account the contribution of atmospheric haze to vanations in initial data p 61 A85-38716 Assessment of the study and mapping of pastures in semiand zones using remote sensing methods

p 9 A85-38719 Remote sensing of the agrochemical properties of p 9 A85-38809 soils Complex aenal and space remote-sensing studies of ibena p 27 A85-38896

Sibena

Methods of structural geology and geological mapping A85-39341

Utilization of aerial and space remote-sensing data p 52 A85-39347 studies of land water Investigation of the earth by means of neutrinos Neutrino geology p 27 A85-39825 Remote sensing used for study of forest resources

p 12 N85-22440

Experience in combined special mapping using space formation p 62 N85-22449 information

Temperature anomalies above ore bodies p 28 N85-24500

Study of Volga river delta using space photosurvey p 55 N85-25340 in petroleum-Use of space information and gas-prospecting work (example of Southern Mangyshlak) p 28 N85-25341

Example of joint use of data from surface studies and space photographs in investigating dynamics of zone of orth Zeravshan seismogenic faults p 29 N85-25342 Relative geological information yield from small-scale North Zeravshan seismogenic faults multizonal space images (example of Fergama depression nd its mountainous margins) p 29 N85-25343 Identifying land use structures of multizonal aerospace and its mountainous margins) photographs using digital data processing

p 66 N85-25348 Experience in automation of data processing in interpretation and defining of linear elements from space p 66 N85-25349 photographs

Interpretation of space photolineaments p 29 N85-25353

Analysis of hydrometeorological conditions in Antarctic coastal waters according to data from hydrological and p 43 N85-25354 satellite observations Preliminary processing of laser ranging data from LAGEOS artificial Earth satellite during short ment program

observation period p 21 N85-25355 Use of space photographic information to map plant

p 14 N85-25359 Space methods in oceanology

[NASA TM-77652] p 44 N85-26047 Multiple regression analysis of photographic image of pil properties p 14 N85-26825 soil properties Identification of structure of soil-vegetation cover using p 15 N85-26826 aeral and space photographs p 15 N85-26826 Analysis of mesofissuring on space photographs New

technique for study of petroleum and gas deposits p 29 N85-26828

Minimizing influence of Earth's curvature in projective rectification of space photographs into photoplans and p 21 N85-26829 photomaps UNITED ARAB REPUBLIC

Space-borne imagery interpretation - Earthquake studies in Aswan p 27 A85-39095

# UNITED KINGDOM

Geobotany in geological mapping and mineral p 26 A85-35118 exploration Remote sensing in civil engineering

p 17 A85-36990 Remote sensing from satellites, Proceedings of the First and Ninth Workshops and Topical Meeting, Graz, Austria, June 25-July 7, 1984 p 49 A85-37951

Development and application of the Interactive Planetary Image Processing System (IPIPS) in support of remote sensing studies at Impenal College p 72 A85-37956 Evaluation of sensitivity decay of Coastal Zone Colour Scanner (CZCS) detectors by comparison with in situ near-surface radiance measurements p 35 A85-37986

Discrimination of tropical forest cover types using p 12 A85-38843 Landsat MSS data The imaging of internal waves by the SEASAT-A synthetic aperture radar [ARE(PORTLAND)TN-720/84]

p 36 N85-22860 The use of Thematic Mapper data for land cover discrimination Preliminary results from the UK SATMaP programme p 64 N85-23207

Practical considerations when using water quality and structure monitoring sensors as applied to portable ARGOS satellite transmitter equipment p 41 N85-24405

DB2 and DB3 The next generation

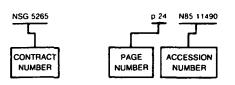
p 44 N85-27337 ARGOS-tracked drifters in the Rockall Trough p 44 N85-27340

Results of an initial trial of a satellite telemetering buoy p 45 N85-27345 measuring near surface current

# VENEZUELA

Applications of Landsat images to geological mapping in tropical jungle environment - Caroni River basin, p 25 A85-35111 Venezuela

# Typical Contract Number Index Listing



Listings in this index are arranged alphanumencally by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

NSERC-A-6043	p 48	A85-32124
	p 48	AB5-32146
NSERC-A-7400	p 31	A85-32121
NSF DAR-80-17836	p 12	N85-23198
NSF DPP-81-7265	p 35	A85-37752
NSF OCE-80-10839	p 40	N85-24400
NSF SER-81-60802	p 56	
NSG-9033	р 8	A85-37981
NTNF-1810 7890	p 45	
N00014-76-C-1105	p 33	
N00014-79-C-0793	p 35	
N00014-80-C-0098	p 21	
N00014-81-K-0460	р 34	
N00014-83-K-0115	p 46	
PROJ AGRISTARS	p 12	
	p 14	
	p 14	
USDA-1-6504-484032-25218		A85-32142
USDA-53-9158-0-6362		A85-32142
USDA-8-484032-25214	p 6	
618-32-33-01	p 37	
010-32-33-01	<b>P</b> 31	1103-23237

NOAA-NA-80-QA-C-101

NOAA-NA-80AAD00120

p 42

N85-24416

A85-37868

BMFT-01-QS-103/0 p 60 A85-34865 DA PROJ 4A1-61102-B-52-C p 67 N85-29347 DA PROJ 4A7-62707-A-855 p 67 N85-29347 DAAK70-81-C-0059 p 67 DE-FG01-83EP-16032 N85-29405 p 78 DEMR-101-4-80 A85-32147 DI-2-07-81-V0256 p 55 N85-27501 DSS-OSZ-81-00110 A85-32132 p 47 ESA-4692/81-F-FC(SC) JPL-956427 p 15 N85-27324 MTI-RG09 p 59 A85-32140 NAGW-334 p 33 A85-35171 NAGW-363 р 35 A85-37752 NAGW-458 p 32 A85-35047 NAG5-184 N85-23238 NAG5-196 р 69 р 13 A85-32212 N85-23213 NAG5-395 p 50 A85-37973 NAG5-398 N85-23271 p 37 NAG9-5 p 62 A85-38832 NAG9-61 р8 A85-37981 NASW-4006 p 44 N85-26047 NAS2-11101 A85-38826 NAS5-26859 p 62 A85-38821 p 19 A85-38825 NAS5-27355 p 63 NAS5-27377 p 12 N85-23190 p 62 A85-38824 p 27 A85-38846 NAS5-27580 p 12 p 50 N85-23198 NAS5-28200 A85-37973 NAS7-100 p 6 A85-32142 p 32 p 33 A85-35165 A85-35169 p 15 N85-27324 NAS7-918 р 74 р 75 N85-23222 N85-24269 p 77 N85-28286 p 46 N85-28529 NAS8-34733 p 77 N85-27463 NAS8-35597 N85-28511 NAS9-15421 p 15 p 15 N85-27320 N85-27322 NAS9-15509 р6 р8 A85-32142 A85-38389 NAS9-16528 A85-38390 p 9 A85-38394 NAS9-16538 A85-38395 p 35 NAVY PROJECT WR03302 A85-37729 NCC5-26 p 18 A85-38811 NGL-23-004-083 p 10 A85-38820

COZTRACT

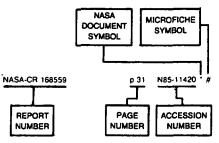
# REPORT

# REPORT/ACCESSION NUMBER INDEX

# EARTH RESOURCES / A Continuing Bibliography (Issue 47)

OCTOBER 1985

# Typical Report/Accession Number **Index Listing**



Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located The

accession number denotes the citation is identified. An that the item is a NASA repoindicates that the item is available.	asterisi ort A p	c (*) indicates ound sign (#)
AD-A150686	р 43	N85-24511 #
AD-A151220	p 21	N85-26050 #
AD-A152169	p 21 p 67	N85-27753 #
AD-A152460	p 46 p 46	N85-28438 #
AD-A153582	p 46	N85-29505 #
AD-A153765	n 47	N85-29507 #
AD-A153926	p 67	N85-29347 #
ARE(PORTLAND)TN-720/84	р 36	N85-22860 #
AS147	p 55	N85-27501 #
BR93397	p 36	N85-22860 #
B8479639	p 47	N85-29511 #
B8580069	p 67	N85-29511 # N85-28441 #
CONF-8406246	p 78	N85-29405 #
DE85-007859	p 78	N85-29405 #
ESA-CR(P)-1979	p 47	N85-29847 #
ESA-SP-1073	p 78	N85-29497 #
ETL-0329	p 67	N85-29347 #
ETL-0376	p 67	N85-27753 #
E85-10070	p 63	N85-23186 * #
E85-10086	p 14	N85-24506 * #
E85-10087	p 14	N85-24507 ° #
E85-10088	p 13	N85-23213 * #
E85-10096	p 65	N85-23214 * #
E85-10097	p 66	N85-27318 * #
E85-10098	p 66	N85-27319 * #
E85-10099	p 15	N85-27320 * #
E85-10100	p 20	N85-23215 * #
E85-10101	p 19	N85-27321 * #
E85-10102	p 15	N85-27322 * #
INPE-3159-PRE/533	p 19	N85-27770 #
INPE-3314-PRE/621	p 77	N85-27329 #
INPE-3322-RPE/468	p 19	N85-27321 * #
INPE-3323-PRE/623	p 66	
INPE-3359-PRE/637	p 15	N85-27545 #
INPE-3386-PRE/657		N85-27319 * #
INPE-3413-PRE/679	р 66 р 44	N85-27331 #
INPE-3492-PRE/729	p 46	N85-27504 #
ISSN-0169-1708 .	p 47	N85-29511 #
ISSN-0396-566	p 78	N85-29497 #
ISSN-0469-4236	0.22	N85-29343 #
	P 24	N85-29343 # N85-29338 #
ISSN-0469-4244	p 21	N03-29330 #

JPL-PUB-84-57

JPL-PUB-85-22	p 46	N85-28529 * #
JPL-PUB-85-2	p 75	N85-24269 * #
JPL-PUB-85-32	p 77	N85-28286 * #
JPL-9950-1026	p 29	N85-25927 * #
JSC-20240 JSC-20241	p 14 p 14	N85-24507 * # N85-24506 * #
KNMI-TR-59	p 47	N85-29511 #
L-15885	p 37	N85-23237 * #
LC-84-600257	p 21	N85-27374 #
LDGO-3708	p 21	N85-26050 #
M-489	°p 77	N85-27463 * #
NAS 1 15 77652 NAS 1 15 84440	p 44 p 43	N85-26047 * # N85-24510 * #
NAS 1 15 85009	a 67	NIGE 20077 * #
NAS 1 15 86199	p 14	N85-24508 * #
NAS 1 15 86204	p 76	N85-27325 * #
NAS 1 15 86219	p 46	N85-29433 * #
NAS 1 26 171863	p 15	N85-24508 * # N85-27325 * # N85-29433 * # N85-27322 * # N85-27320 * #
NAS 1 26 171864	p 15	N85-27320 * #
NAS 1 26 175521	p 14	N85-24506 * #
NAS 1 26 175522	p 14	N85-24507 * #
NAS 1 26 175523 NAS 1 26 175531	p 13	N85-23213 * # N85-23214 * #
NAS 1 26 175531 NAS 1 26 175606	p 03	N85-23214 * # N85-23238 * # N85-27318 * #
NAS 1 26 175612	n 66	N85-27318 * #
NAS 1 26 175613	n 66	NR5.27310 * #
NAS 1 26 175615	p 20	N85-23215 * #
NAS 1 26 175616	p 37	N85-23215 *# N85-23271 *# N85-23222 *# N85-24269 *# N85-25927 *#
NAS 1 26 175639	p 74	N85-23222 * #
NAS 1 26 175665	р 75	N85-24269 * #
NAS 1 26 175711	p 29	N85-25927 * #
NAS 1 26 175785	p 15	N85-2/324 * #
NAS 1 26 175830 NAS 1 26 175871	p 19 p 46	N85-27321 * # N85-28529 * #
NAS 1 26 175875		N85-28286 * #
NAS 1 26 3898	р 77 р 77	N85-28511 * #
NAS 1 26 3901	p 77	N85-27463 * #
NAS 1 55 2355-VOL-4	p 63	N85-23186 * #
NAS 1 55 2363	p 53 p 37	N85-23223 * #
NAS 1 60 2428		N85-23237 * #
NASA-CP-2355-VOL-4 NASA-CP-2363	p 63 p 53	N85-23186 * # N85-23223 * #
NASA-CR-171863	p 15	N85-27322 * #
NASA-CR-171864 NASA-CR-175521	р 15 р 14	N85-27320 * # N85-24506 * #
NASA-CR-175522	p 14	N85-24507 * #
NASA-CR-175523	p 13	N85-23213 * #
NASA-CR-175531 ,	p 65	N85-23214 * #
NASA-CR-175606	p 14	N85-23238 * #
NASA-CR-175612	p 66	
NASA-CR 175613	p 66	
NASA-CR 175615	p 20	N85-23215 * #
NASA-CR-175616 NASA-CR-175639	р 37 р 74	N85-23271 * # N85-23222 * #
NASA-CR-175665	p 75	N85-24269 * #
NASA-CR-175711	p 29	N85-25927 * #
NASA-CR-175785	p 15	N85-27324 * #
NASA-CR-175830 .	p 19	N85-27321 * #
NASA-CR-175871	p 46	N85-28529 * #
NASA-CR-175875	p 77	N85-28286 * #
NASA-CR-3898 NASA-CR-3901	р 77 р 77	N85-28511 * # N85-27463 * #
NASA-TM-77652	p 44	N85-26047 * #
NASA-TM-84440 .	p 43	N85-24510 ° #
NASA-TM-85009	p 67	N85-28877 * #
NASA-TM-86199	p 14	N85-24508 * #
NASA-TM-86204 .	p 76	N85-27325 * #
NASA-TM-86219	p 46	N85-29433 * #

p 37

N85-23237 \* #

p 55 N85-27499 #

NASA-TP-2428

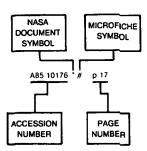
NOAA-TM-NESDIS-8

p 74 N85-23222 \* #

NOAA/TR/NESDIS-12	p 75	N85-23895	#
NORDA-TN-308	р 47	N85-29507	#
NORDA-51	p 43	N85-24511	#
PB85-152502	p 75	N85-23895	#
PB85-163095	p 55	N85-27501	#
PB85-164994	p 55	N85-27499	#
PB85-166478	p 21	N85-27374	#
REPT-84B0036	p 53	N85-23223	• #
REPT-8580115-VOL-4	p 63	N85-23186	• #
REPT-85B0288	p 76	N85-27325	• #
RSL-TR-360F	p 15	N85-27320	• #
YM-15-00404	р 14	N85-24507	• #
YM-15-00405	p 14	N85-24506	* #

OCTOBER 1985

# **Typical Accession Number** Index Listing



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located An asterisk (\*) indicates that the item is a NASA report A pound sign (#) indicates that the item is available on microfiche

A85-30543 A85-30599 p 68 p 30 A85-30726 p 68 A85-30727 p 1 A85-30728 p 1 A85-30729 p 47 A85-30730 A85-30731 p 47 p 48 A85-30732 p 22 A85-30733 p 22 A85-30734 A85-30735 p 22 p 22 A85-30736 A85-30737 A85-30738 p 16 A85-30739 D 16 A85-30740 p 22 p 23 A85-30741 A85-30742 p 48 A85-30743 р 30 р 1 A85-30744 A85-30745 A85-30746 p 77 A85-30826 р 1 р 2 A85-30827 A85-30828 p 55 p 2 A85-30829 р 2 A85-30830 p 2 p 2 A85-30831 A85-30832 A85-30833 A85-30834 p 2 p 3 A85-30835 A85-30836 p 3 A85-30837 ъ 3 A85-30838 p 3 A85-30839 р3 A85-30840 p 3 p 3 A85-30841 A85-30842 p 56 p 56 A85-30844 A85-30845 A85-30951 p 56 A85-30953 p 56 p 56 A85-30955 p 56 A85-30956 p 68 A85-30957

p 57

p 68

p 68

p 57

p 57

p 57

p 4

p 30

A85-30958

A85-30960

A85-30961

A85-30962

A85-30963

A85-30964

A85-30965

A85-30980

A8\$-31200 \*# p 30 p 68 A8\$-31397 A8\$-31478 p 69 p 23 A8\$-31736 A8\$-31882 p 16 A8\$-31890 p 30 A8\$-31893 p 57 A8\$-32101 p 69 A8\$-32102 A85-32103 p 30 A8\$-32104 p 31 A8\$-32105 57 p 57 A85-32107 A85-32108 p 58 A85-32109 58 A85-32110 p 16 A85-32111 p 31 A85-32112 A85-32113 A85-32114 A85-32115 p 58 A85-32116 p 58 A85-32118 р 31 A85-32119 p 69 A85-32120 p 58 A85-32121 p 31 A85-32122 p 48 A85-32123 p 48 p 48 A85-32124 A85-32125 p 4 A85-32126 p 16 A85-32127 A85-32128 p 5 A85-32129 p 5 A85-32130 A85-32131 p 48 A85-32132 A85-32133 p 5 A85-32134 A85-32135 p 5 A85-32136 p 5 A85-32137 p 17 p 48 A85-32138 A85-32139 р6 A85-32140 p 59 A85-32141 A85-32142 р6 p 23 A85-32144 A85-32145 p 23 A85-32146 p 48

p 23

p 23

p 31

p 31

A85-37302

A85-37310

A85-37511

# p 20

#

p 20

p 35

A85-38817

A85-32147

A85-32148

A85-32149

A85-32166

A85-32192

A85-32210 p 59 A85-32211 p 69 A85-32212 \* # p 69 A85-32214 p 69 A85-32215 p 32 A85-32228 p 70 A85-32853 p A85-32863 70 A85-32868 p 59 A85-32871 p 70 A85-32872 p 32 p 70 A85-32936 A85-33352 A85-33448 p 20 A85-33449 p 59 A85-33450 6 p 6 A85-33556 A85-33557 p 17 A85-33558 6 p 59 A85-33598 A85-33874 p 49 p 24 A85-33875 A85-34218 p 78 p 59 A85-34351 A85-34429 p 59 A85-34438 p 60 A85-34534 17 A85-34865 p 60 A85-35047 p 32 A85-35101 24 A85-35102 p 24 A85-35103 A85-35104 p 24 A85-35105 p 24 A85-35106 p 24 A85-35107 p 24 p 25 A85-35108 A85-35109 p 25 A85-35110 p 25 p 25 A85-35111 A85-35112 p 25 A85-35114 p 25 A85-35115 p 26 A85-35116 p 26 A85-35117 p 26 A85-35118 p 26 p 26 A85-35119 A85-35120 р7 p 70 A85-35124 A85-35164 p 32 o 32 A85-35165 p 33 A85-35166 A85-35167 p 33 A85-35169 p 33 p 33 A85-35170 A85-35171 p 33 A85-35172 p 33 p 34 A85-35173 A85-35832 p 34 A85-35879 p 34 A85-35985 p 49 A85-36248 p 71 p 17 A85-36282 AR5-362R3 p 60 A85-36284 p 71 p 71 A85-36286 A85-36287 p 71 A85-36427 p 34 A85-36565 p 49 A85-36570 p 34 p 17 A85-36990 A85-36993 A85-37114 p 34 A85-37117 p 7 A85-37118 p 26 A85-37119 p 7 p 60 A85-37121 A85-37150 p 26 A85-37199 p 71 A85-37269 ρ 35

#

p 71 A85-37726 A85-37729 p 35 A85-37730 р7 p 7 A85-37742 p 35 A85-37752 р 35 A85-37754 A85-37855 0.49 A85-37868 p 49 A85-37951 A85-37952 D 72 A85-37953 A85-37954 p 78 A85-37955 p 17 A85-37956 A85-37957 p 72 A85-37958 p 7 A85-37959 p 72 A85-37961 p 49 p 72 A85-37962 A85-37966 р8 A85-37967 р8 p 49 A85-37969 p 49 A85-37970 A85-37971 p 50 A85-37972 p 50 A85-37973 p 50 A85-37974 A85-37975 A85-37976 p 50 A85-37977 p 50 A85-37979 p 35 A85-37980 р8 A85-37981 A85-37982 p 51 A85-37983 p 72 A85-37986 p 36 A85-37987 p 60 A85-38271 A85-38272 A85-38273 рΒ p 17 A85-38274 A85-38336 р8 р8 A85-38389 A85-38390 A85-38391 A85-38392 p 51 A85-38393 p 9 р9 A85-38394 A85-38395 р9 A85-38578 p 36 A85-38587 p 51 A85-38681 p 36 p 73 A85-38701 A85-38702 p 73 A85-38703 р 73 р 9 A85-38704 A85-38705 p 18 A85-38706 D 18 A85-38707 p 60 A85-38708 p 9 A85-38709 p 51 A85-38710 p 51 A85-38711 p 61 A85-38712 p 36 A85-38713 p 51 A85-38714 p 51 p 61 A85-38719 р9 A85-38801 p 73 A85-38802 p 78 AR5-38803 p 61 A85-38806 p 61 A85-38807 p 61 A85-38808 p 26 A85-38809 A85-38810 p 27 A85-38811 p 18 A85-38812 p 10 p 61 A85-38813 A85-38814 p 62 A85-38815 p 10 A85-38816

p 36 A85-38819 A85-38820 10 A85-38821 p 62 A85-38822 p 18 A85-38823 18 A85-38824 62 p 19 A85-38825 A85-38826 p 52 p 52 A85-38827 A85-38828 10 A85-38829 p 10 A85-38830 p 73 p 62 A85-38832 A85-38833 p 62 A85-38834 p 10 A85-38835 p 10 A85-38836 p 11 A85-38837 p 11 A85-38838 p 11 A85-38839 p 11 A85-38840 A85-38841 p 11 A85-38842 p 11 A85-38843 12 A85-38845 p 62 A85-38846 p 27 A85-38866 36 A85-38896 D 27 p 27 A85-39095 p 27 A85-39341 A85-39347 p 52 p 19 A85-39825 p 27 A85-39829 p 74 N85-22440 p 12 N85-22449 p 62 N85-22860 p 36 N85-23186 p 63 N85-23187 p 63 p 63 N85-23188 \* N85-23189 p 63 N85-23190 p 12 N85-23191 \*# p 27 N85-23192 p 28 p 63 N85-23194 p 28 N85-23195 p 63 N85-23196 p 64 N85-23197 N85-23198 p 12 N85-23199 p 64 N85-23200 p 64 N85-23201 p 12 N85-23202 p 64 p 37 N85-23203 N85-23204 p 52 N85-23205 N85-23206 p 13 N85-23207 p 65 N85-23208 N85-23209 p 65 N85-23210 \* p 65 p 52 N85-23211 N85-23212 p 65 N85-23213 N85-23214 p 65 N85-23215 p 20 N85-23216 \* p 20 N85-23217 p 28 N85-23218 p 28 N85-23219 p 20 N85-23220 p 65 N85-23222 p 53 N85-23223 \* # N85-23224 p 78 p 53 p 53 N85-23226 N85-23227 p 53 N85-23228 o 53 # N85-23229 p 53

p 53

p 54

#

N85-23230 \* #

N85-23231 1

N85-23232 \*# N85-26001 \* # p 54 p 76 N85-23233 \*# p 13 N85-26013 \*# p 76 N85-23234 \* # N85-26047 1 p 44 p 13 N85-26050 p 21 p 14 N85-23235 \*# p 13 N85-26825 N85-23237 \* # p 37 N85-26826 p 15 N85-23238 \* # N85-23271 \* # D 14 N85-26828 p 29 p 21 p 37 N85-26829 N85-23818 \* # p 14 N85-27318 \* # p 66 N85-23820 \* # p 37 N85-27319 p 66 N85-23855 \*# N85-27320 \*# p 15 N85-23869 p 74 N85-27321 \* # p 19 N85-23870 p 74 N85-27322 N85-27322 \* # N85-27324 \* # p 15 p 15 N85-23871 p 74 N85-23872 p 74 N85-27325 \* # p 76 N85-23874 p 37 N85-27329 # N85-27331 # p 77 p 44 N85-23875 p 37 N85-23879 p 37 N85-27333 p 44 N85-23881 p 54 N85-27337 р 44 р 44 p 54 N85-23882 N85-27338 N85-23883 p 38 p 74 N85-27339 p 44 N85-23884 N85-27340 р 44 р 44 N85-23887 N85-23888 p 38 N85-27341 p 38 N85-27343 p 45 N85-23891 р 38 N85-27344 p 45 p 45 N85-23893 N85-23895 p 38 N85-27345 p 75 N85-27346 p 45 N85-24269 p 75 N85-27347 p 45 p 55 N85-24348 p 75 N85-27348 N85-24350 p 38 N85-27349 p 55 N85-24351 p 38 N85-27350 p 29 p 45 N85-24353 p 75 N85-27351 N85-24354 p 38 p 75 N85-27352 p 45 N85-24355 p 45 p 46 N85-27353 N85-24356 p 38 N85-27354 p 39 p 39 N85-24358 N85-27355 p 46 N85-24359 p 66 N85-27371 N85-24360 p 75 N85-27374 p 21 N85-24362 p 39 N85-27463 p 77 p 77 N85-24363 N85-27491 N85-24364 p 39 N85-27499 p 55 N85-24366 p 39 N85-27501 p 55 p 46 N85-24367 p 39 N85-27504 N85-24368 p 39 N85-27545 p 15 N85-24373 p 39 N85-27753 p 67 p 19 N85-24374 p 40 N85-27770 N85-24376 p 40 N85-28286 p 77 N85-24381 p 40 N85-28436 p 15 p 46 p 54 p 54 N85-24386 N85-28438 N85-24388 N85-28441 p 67 p 55 N85-24389 N85-28508 p 77 N85-24391 p 40 N85-28511 p 77 N85-24392 p 19 N85-28529 p 46 N85-24396 p 40 N85-28877 p 67 N85-24398 p 40 N85-29338 p 21 N85-24399 p 40 р 21 р 67 N85-29339 N85-24400 p 40 N85-29340 p 41 p 41 N85-24401 N85-29341 p 21 N85-24402 N85-29342 p 22 N85-24403 p 41 N85-29343 p 22 p 41 p 41 N85-24405 N85-29344 p 67 N85-24406 N85-29347 # N85-29405 # N85-29433 \*# p 67 N85-24408 p 41 p 78 NR5-24409 p 41 p 41 p 46 N85-24410 N85-29449 p 22 N85-24411 p 42 N85-29497 p 78 N85-24412 p 42 N85-29505 p 46 N85-24413 p 42 p 47 N85-29507 N85-24414 p 42 N85-29511 p 47 N85-24415 p 42 N85-29847 N85-24416 p 42 N85-24417 N85-24418 p 42 p 43 p 43 NB5-24421 N85-24422 N85-24500 p 43 p 28 p 14 N85-24506 N85-24507 p 14 N85-24508 p 14 p 43 N85-24510 \* # N85-24511 p 43 N85-24775 p 75 p 66 N85-24779 N85-25340 p 55 N85-25341 p 28 p 29 N85-25342 N85-25343 p 29 N85-25348 p 66 p 66 N85-25349 N85-25353 p 29 N85-25354 p 43 N85-25355 p 21 N85-25359 p 14 N85-25927 p 29 p 76 N85-25988 \* # N85-25989 N85-25990 \* # p 76

1. Report No. NASA SP-7041 (47)	2. Government Access	ion No.	3. Recipient's Catalog	No.	
4. Title and Subtitle			5. Report Date October 1985		
EARTH RESOURCES A Continuing Bibliography	(Issue 47)	-	6. Performing Organia		
7. Author(s)			8. Performing Organiz	ation Report No.	
Performing Organization Name and Address			10. Work Unit No.		
National Aeronautics and S Washington, D.C. 20546	Space Administra	tion	11 Contract or Grant	No	
12. Sponsoring Agency Name and Address			13. Type of Report ar	nd Period Covered	
12, Sponsoring Agency Name and Address		<u> </u>			
			14. Spansoring Agency	Code	
15. Supplementary Notes					
			•		
	· · · · · · · · · · · · · · · · · · ·				
16. Abstract					
This bibliography lists 524 reports, articles and other documents introduced into the NASA scientific and technical information system between July 1 and September 30, 1985. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economical analysis.					
17. Key Words (Suggested by Author(s))		18. Distribution Statement	- <del></del>		
Bibliographies Earth Resources Remote Sensors		Unclassified -	Unlimited		
19. Security Classif, (of this report)	20. Security Classif. (c	if this page)	21 No. of Pages	22. Price*	
Unclassified	Unclassifi	ed	146	\$12.00 HC	

# FEDERAL DEPOSITORY LIBRARY PROGRAM

The Federal Depository Library Program provides Government publications to designated libraries throughout the United States. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and inter-library loans, however, they are *not* sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself.

ARKANSAS STATE LIBRARY

One Capitol Mall Little Rock, AR 72201 (501) 371-2326

### AUBURN UNIV AT MONTGOMERY LIBRARY

Documents Department Montgomery, AL 36193 (205) 279-9110, ext 253

# UNIV OF ALABAMA LIBRARY

Documents Dept —Box S University, AL 35486 (205) 348-7369

# DEPT OF LIBRARY, ARCHIVES AND PUBLIC RECORDS

Third Floor—State Cap 1700 West Washington Phoenix, AZ 85007 (602) 255-4121

# UNIVERSITY OF ARIZONA LIB

Government Documents Dept Tucson, AZ 85721 (602) 626-5233

# **CALIFORNIA STATE LIBRARY**

Govt Publications Section P O Box 2037 Sacramento, CA 95809 (916) 322-4572

# UNIV OF COLORADO LIB

Government Pub Division Campus Box 184 Boulder, CO 80309 (303) 492-8834

# DENVER PUBLIC LIBRARY

Govt Pub Department 1357 Broadway Denver, CO 80203 (303) 571-2131

# **CONNECTICUT STATE LIBRARY**

Government Documents Unit 231 Capitol Avenue Hartford, CT 06106 (203) 566-4971

# UNIV OF FLORIDA LIBRARIES

Library West Documents Department Gainesville, FL 32611 (904) 392-0367

# UNIV OF GEORGIA LIBRARIES

Government Reference Dept Athens, Ga 30602 (404) 542-8951

# UNIV OF HAWAII LIBRARY

Govt Documents Collection 2550 The Mail Honolulu, HI 96822 (808) 948-8230

# UNIV OF IDAHO LIBRARY

Documents Section Moscow, ID 83843 (208) 885-6344

# ILLINOIS STATE LIBRARY

Information Services Branch Centennial Building Springfield, IL 62706 (217) 782-5185

# INDIANA STATE LIBRARY

Serials Documents Section 140 North Senate Avenue Indianapolis, IN 46204 (317) 232-3686

### UNIV OF IOWA LIBRARIES

Govt Documents Department lowa City, IA 52242 (319) 353-3318

# UNIVERSITY OF KANSAS

Doc Collect—Spencer Lib Lawrence, KS 66045 (913) 864-4662

# UNIV OF KENTUCKY LIBRARIES

Govt Pub Department Lexington, KY 40506 (606) 257-3139

# **LOUISIANA STATE UNIVERSITY**

Middleton Library Govt Docs Dept Baton Rouge, LA 70803 (504) 388-2570

# LOUISIANA TECHNICAL UNIV

Documents Department Ruston, LA 71272 (318) 257-4962

# UNIVERSITY OF MAINE

Raymond H Fogler Library Tri-State Regional Documents Depository Orono, ME 04469 (207) 581-1680

# UNIVERSITY OF MARYLAND

McKeldin Lib —Doc Div College Park, MD 20742 (301) 454-3034

# **BOSTON PUBLIC LIBRARY**

Government Docs Dept Boston, MA 02117 (617) 536-5400 ext 226

# DETROIT PUBLIC LIBRARY

Sociology Department 5201 Woodward Avenue Detroit, MI 48202 (313) 833-1409

# MICHIGAN STATE LIBRARY

P O Box 30007 Lansing, MI 48909 (517) 373-0640

# UNIVERSITY OF MINNESOTA

Government Pubs Division 409 Wilson Library 309 19th Avenue South Minneapolis, MN 55455 (612) 373-7813

# UNIV OF MISSISSIPPI LIB

Documents Department University, MS 38677 (601) 232-5857

# UNIV OF MONTANA

Mansfield Library Documents Division Missoula, MT 59812 (406) 243-6700

# NEBRASKA LIBRARY COMM

Federal Documents 1420 P Street Lincoln, NE 68508 (402) 471-2045 In cooperation with University of Nebraska-Lincoln

# UNIVERSITY OF NEVADA LIB

Govt Pub Department Reno, NV 89557 (702) 784-6579

# **NEWARK PUBLIC LIBRARY**

5 Washington Street Newark, NJ 07101 (201) 733-7812

# UNIVERSITY OF NEW MEXICO

Zimmerman Library Government Pub Dept Albuquerque, NM 87131 (505) 277-5441

# NEW MEXICO STATE LIBRARY

Reference Department 325 Don Gaspar Avenue Santa Fe, NM 87501 (505) 827-2033, ext 22

# **NEW YORK STATE LIBRARY**

Empire State Plaza Albany, NY 12230 (518) 474-5563

# UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Wilson Library BA/SS Documents Division Chapel Hill, NC 27515 (919) 962-1321

# UNIVERSITY OF NORTH DAKOTA

Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext 27
(In cooperation with North
Dakota State Univ Library)

# STATE LIBRARY OF OHIO

Documents Department 65 South Front Street Columbus, OH 43215 (614) 462-7051

# OKLAHOMA DEPT OF LIB

Government Documents 200 NE 18th Street Oklahoma City, OK 73105 (405) 521-2502

# OKLAHOMA STATE UNIV LIB

Documents Department Stillwater, OK 74078 (405) 624-6546

# PORTLAND STATE UNIV LIB

Documents Department P O Box 1151 Portland, OR 97207 (503) 229-3673

### STATE LIBRARY OF PENN Government Pub Section

P O Box 1601 Harrisburg, PA 17105 (717) 787-3752

# TEXAS STATE LIBRARY

Public Services Department P O Box 12927—Cap Sta Austin, TX 78753 (512) 471-2996

# TEXAS TECH UNIV LIBRARY

Govt Documents Department Lubbock, TX 79409 (806) 742-2268

# UTAH STATE UNIVERSITY

Merrill Library, U M C 30 Logan, UT 84322 (801) 750-2682

# UNIVERSITY OF VIRGINIA

Alderman Lib — Public Doc Charlottesville, VA 22901 (804) 924-3133

# **WASHINGTON STATE LIBRARY**

Documents Section Olympia, WA 98504 (206) 753-4027

# WEST VIRGINIA UNIV LIB

Documents Department Morgantown, WV 26506 (304) 293-3640

# MILWAUKEE PUBLIC LIBRARY

814 West Wisconsin Avenue Milwaukee, WI 53233 (414) 278-3000

# ST. HIST LIB OF WISCONSIN

Government Pub Section 816 State Street Madison, WI 53706 (608) 262-4347

# WYOMING STATE LIBRARY

Supreme Ct & Library Bld Cheyenne, WY 82002 (307) 777-6344 National Aeronautics and Space Administration Code NIT-4

Washington, D.C. 20546-0001

Official Business Penalty for Private Use, \$300 BULK RATE
POSTAGE & FEES PAID
NASA Washington, DC
Permit No. G-27



POSTMASTER:

If Undeliverable (Section 158 Postal Manual) Do Not Return