E7.4-10339
CR-136850

TYPE I PROGRESS REPORT FOR ERTS-I INVESTIGATION FOR THE PERIOD ENDING FEBRUARY 28, 1974

Submitted by Y.W. Isachsen, Principal Investigator,
New York State Geological Survey, Museum and Science Service

A. Objectives: To evaluate ERTS-I data for usefulness as a geological sensor in the diverse geological terranes of New York State.

B. GSFC ID S348, NAS5-21764

C. Problems: The most severe problem is the limitation placed on field work in southeastern New York State due to the compulsory odd-even day rationing system which applies not only to private vehicles but to State cars as well.

D. Accomplishments:

1. To date more than 5000 film products covering 371 frames over 34 image areas have been received, and most have been cataloged and categorized in terms of geological usefulness.

2. A Stage II analysis was completed for some 1500 ERTS-I linears in southeastern New York State. The area covered includes the eastern part of the Allegheny Plateau, the Hudson Valley, and the Taconics. The data must now be treated statistically. Stage III analysis is continuing in the Catskills but with curtailment due to gasoline odd-even day rationing system.

3. Contact negatives have been made from all U-2 color infrared film positives in order to provide paper prints for linear analysis and annotation. The same applies for the NP3A coverage.

4. A 1:1,000,000 ERTS-enhanced fracture map of the Adirondack region is about 70 percent complete.

5. A map of igneous and metaigneous rocks (including dikes) is about 80 percent complete for the entire State. It will be compared with the ERTS-enhanced fracture map referred to above, in order to analyze the distribution of intrusives in terms of fracture systems.

6. Principal Investigator attended a week-long Wintek course in image processing at Lafayette, Indiana, November 12-16, 1973.

E. Planned:

1. Updating of the 1:1,000,000 ERTS-I anomaly map using new fall and winter imagery.

2. Completion of 1:250,000 ERTS-I anomaly map of the State when imagery on order from EROS arrives.

E74-10339) TO EVALUATE ERTS-1 DATA FOR USEFULNESS AS A GEOLOGICAL SENSOR IN THE DIVERSE GEOLOGICAL TERRANES OF NEW YORK STATE (New York State Museum and Science Service) 7 p HC $4.00 CSCL 08G G3/13 E74-10339 Unclas C0339

3. Systematic analysis of U-2 and NP3A aerial photography for linear data now that black and white work prints have been made.

4. Low-level aerial reconnaissance and photography of selected ERTS-I anomalies, as well as field reconnaissance to study fracture systems in the southeastern part of the State.

5. Completion of igneous rock map and an ERTS-enhanced fracture map of the State at 1:500,000.

6. Preparation of a seismic epicenter map of New York (using only selected, relatively well-located seismic events) in order to compare epicenters with the ERTS-enhanced fracture map of the State.

F. Publications and Lectures:

1. Submitted a paper entitled "Evaluation of ERTS-I imagery for spectral geological mapping in diverse terranes of New York State", for inclusion in a forthcoming NASA/GSFC Symposium Volume on Significant Results from ERTS-I, (with R.H. Fakundiny and S.W. Forster) in press.

2. Presented the above paper at NASA/GSFC Symposium in Washington, D.C., December 1973.

3. "Utilization of ERTS-I imagery in a tectonic synthesis of New York State". Abstract with Programs, Northeast Section, Geological Society of America, page 40, 1974. (copy attached)

4. Presented seminar for the Cornell University Engineering Department on "Spectral geological content of ERTS-I imagery over New York State" as part of a course in remote sensing.

5. "Photogeologic features of ERTS-I linears in southeastern New York: a preliminary phase of regional tectonic analysis" by R.H. Fakundiny (co-investigator). Abstract with Programs, Northeast Section, Geological Society of America; p. 24-25, 1974.

G. Recommendations: None at present.

H. Standing Order: No change.

I. ERTS Image Descriptor Forms: Two pages attached.

J. Data Request Form: Special data requests since the last Type I report were made 26Nov73, 11Feb74 and 14Feb74, and many have been filled to date.

K. Content of Report: Falls under retrieval category 3K.

upward to sandstone, conglomeratic sandstone or (rarely) conglomerate. Directly above the coarse grained beds, grain size abruptly decreases to claystone or siltstone marking the base of an overlying cycle. The cycles range in thickness from six to 250 feet and persist laterally for as far as 50 miles. This lateral persistence of the cycles enables mapping and correlation across south-central Pennsylvania and the establishment of a revised stratigraphic framework defined by the more prominent cycles.

Willard's (1935) expansion and subdivision of the Marcellus is largely abandoned - the Marcellus is now restricted to the black shales directly above the Onondaga Formation. The Mahantango Formation is expanded to include, from the base, the Turkey Ridge, Dalmatia (new name), Fisher Ridge (new name), Montebello and Sherman Creek Members as mappable units. The Tully is included within the Mahantango because of its lithic similarity to the Sherman Creek Member in this area.

GEOLOGY AND POWER PLANT SITING IN NEW YORK: A NEW APPROACH

Fakundiny, Robert H., Geological Survey, New York State Museum and Science Service, Albany, New York 12224

The New York State Public Service Law, Article VIII, 16 NYCRR, Chapter 1, requires limited but carefully undertaken geological studies of sites proposed for fossil-fuel and nuclear plants having a generating capacity of 50,000 kw or more. The Rules and Regulations require geological appraisal in three of its sections: geology and seismology; solid, liquid and gaseous wastes; and water quality and quantity. Each section calls for an evaluation of the environmental compatibility of the plant with its surroundings. Utilities must prove both public need for more electricity and the environmental compatibility of the plant at several alternate sites. The State decides whether the need exists and which site is most compatible. Before the utility submits an application it reviews with the State Geological Survey (Museum & Science Service) all open file data, discusses study programs and identifies anomalous geological conditions near the sites. After application, but before public hearing, the Survey reviews the report for the State to determine completeness, accuracy and pertinence of these studies.

These requirements demand high quality work from consultants, but eliminate unnecessary or esoteric studies while keeping costs at a minimum. In its duties the State Geological Survey retains its traditional, unique and important role in the dual assignment of being advisor to both the public (in this instance through State regulatory agencies) and the business community (utilities), because it has no vested interest in the results of the proceedings other than to insure that quality information is used to make these critical environmental decisions.

PHOTOGEOLOGIC FEATURES OF ERTS-1 LINEARS IN SOUTHEASTERN NEW YORK: A PRELIMINARY PHASE OF REGIONAL TECTONIC ANALYSIS

Fakundiny, Robert H., Geological Survey, New York State Museum and Science Service, Albany, New York 12224

Multi-scale, photogeologic interpretation of southeastern New York (satellite image 1079 15124 of 10 Oct 72) defines 1300 straight and

slightly curved, tonally expressed lines. The image scene spans several physiographic, geologic and tectonic provinces, thus providing a synoptic picture useful for regional tectonic analysis. Of the 11 major linear sets in the scene, some cross geologic provinces. Within a given geologic province each set has diagnostic tonal or topographic expression, length, straightness, areal density, spacing and cross-cutting relationships. In the Catskills eight of the linear sets correspond to existing joint set data. Field confirmation is being sought for the other three. One of the eight, a N20E linear set, is parallel to a mapped fault along the straight portion of the Catskill Front (Wall of Manitou). Comparison of this image at several scales from 1:2,500,000 to 1:250,000 shows how linear characteristics vary with scale. Straight, continuous linears on small-scale images appear, upon magnification to larger scales, to be discontinuous sets clustered in zones. These discontinuous sets may be either aligned or en echelon.

A 1:500,000 mosaic of ERTS-I images covering the southern half of New York and large portions of adjacent states shows linears having characteristics similar to those in the Catskills. If ground identification confirms the geologic significance of ERTS-I linears in this broader area, the imagery may provide a regional base for analysis of subcontinental tectonic problems.

ORIGIN OF CORONAS IN SOUTHEAST ADIRONDACK, N.Y., METAGABBROS

Farrar, Stewart S., Department of Earth and Environmental Sciences, Queens College, City University of New York, Flushing, New York 11367

Undersaturated metagabbros in The Glen Quadrangle, southeastern Adirondacks, N.Y., have well developed coronas which commonly consist of a core of fine grained clinopyroxene and orthopyroxene surrounded by radially oriented orthopyroxene, in turn surrounded by a moat of plagioclase-clinopyroxene. This is surrounded by a rim of garnet in contact with laths of igneous plagioclase densely clouded with minute spinel grains.

Whitney and McLelland (1973) have described Adirondack coronas of two basic types. Type I, found in the Southern Adirondacks, is "cored by olivine which is enclosed in a shell of orthopyroxene that is partially, or completely, rimmed by symplectites consisting of clinopyroxene and spinel." In type II, found in the Adirondack Highlands, "coronas between olivine and plagioclase commonly have an outer shell of garnet replacing the clinopyroxene/spinel shell."

They suggest different metamorphic histories for types I and II, based partially on the close association of the Highland type with the major Adirondack anorthosite massif.

The Glen coronas correspond precisely to one variation of the Highland type, in which the olivine has completely reacted. Since The Glen Quadrangle lies almost equidistant between the Southern and Highland areas, it is suggested instead that the change in metamorphic conditions (gradational or abrupt?) lies between The Glen and the Southern Adirondacks.

UTILIZATION OF ERTS-1 IMAGERY IN A TECTONIC SYNTHESIS OF NEW YORK STATE

Isachsen, Yngvar W., New York State Museum and Science Service, Geological Survey, Albany, New York 12224

ERTS-1 imagery is being used in a regional tectonic synthesis of New York State. Incoming imagery is analyzed as follows: Stage I - photogeologic identification of all linears in the imagery; Stage II - classification of each linear into one of eleven categories using 1:62,500 airfoto index sheets, U-2 aerial photography and existing maps, followed by elimination of "cultural" and lithological linears and previously known faults and topographic lineaments; Stage III - field checking of the Stage II ERTS linears using low level aircraft and conventional ground methods.

Preliminary analysis of linears at 1:1,000,000 shows that: 1. major linear trends in the Adirondack basement are also expressed in Paleozoic cover rocks elsewhere in the State and; 2. prominent ERTS linears occur parallel to the trends of the two highly magnetic belts in southeastern New York noted by Harwood and Zeitz (1973). These relationships suggest basement control of major linears in the cover rocks and fault boundaries for the basement magnetic belts.

The azimuth maxima of Stage II linears in the Adirondacks correspond well with those for mapped faults and topographic lineaments despite differences in relative magnitudes of maxima, which are explainable in terms of solar illumination direction.

Although linears dominate the new ERTS-1 geological information (total lengths exceed 6,000 km and individual lengths range from 1.5 km to 200 km) a number of circular features have been found. The most notable is an elliptical "spoked wheel" anomaly which centers on Cranberry Lake. Neither shatter cones nor megabreccias have been found to date.

HIGH ANGLE REVERSE FAULTING IN THE COASTAL PLAIN OF PRINCE GEORGES COUNTY, MARYLAND

Jacobsen, Frank H., Jr., Washington Gas Light Company, 6801 Industrial Road, Springfield, Virginia 22151 and University of South Carolina, Columbia, South Carolina 29208

An integrated surface mapping, drilling and seismograph study in the Atlantic Coastal Plain in Prince Georges County, Maryland, has disclosed that a shallow near-surface structure is controlled by post-Eocene faulting. This faulting appears to be high angle reverse, up on the east, and has a throw of over 250 feet.

Surface reverse faults have been reported in and near the Coastal Plain in Maryland for many years. Areas both north and south of Maryland have recorded repeated earthquakes of minor to moderate intensity. Lineations of regional extent are notable on topographic maps and even more so on satellite photography. All of these suggest that active faulting is occurring in the Coastal Plain today. Further, the occurrence of reverse faulting indicates the presence of compressive forces affecting sediments of this area.

Structural and stratigraphic anomalies which occur in the Coastal Plain should be viewed as possibly related to causes heretofore unrecognized in post Triassic rocks in the Eastern United States -- compression and reverse faulting.

ERTS IMAGE DESCRIPTOR FORM

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DATE 27 Feb 74

PRINCIPAL INVESTIGATOR Y.W. Isachsen

GSFC S#348

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	Ridge	Linmnt.	Fold	
All are bulk transp.				
1350-15172-5		✓		
1350-15174-5		✓		
1350-15181-5		✓		Barrier Bar, Finger Lake.
1350-15183-5	✓	✓	✓	Finger Lake.
1350-15190-5	✓	✓	✓	
1365-15004-5				Coast, Wave.
1365-15011-5				Barrier Bar, Coast.
1365-15013-5				Barrier Bar, Coast, Wave.
1370-15290-5		✓		Barrier Bar.
1370-15295-5		✓		
1371-15344-5		✓		
1371-15350-5				Excessive Cloud Cover.
1386-15183-5		✓	✓	Estuary.
1387-15232-5				Excessive Cloud Cover.
1389-15342-5		✓	✓	
1400-14552-5				Atlantic Ocean, Coast.
1404-15181-5		✓	✓	
1406-15282-5		✓		Barrier Bar.
1407-15341-5		✓	✓	
1407-15343-5		✓		Barrier Bar.
1407-15350-5		✓		
1420-15062-5		✓		Barrier Bar, Coast.
1421-15103-5		✓		
1421-15105-5		✓		
1421-15112-5		✓		
1421-15114-5		✓		Coast.
1423-15224-5		✓		Finger Lake.
1423-15231-5	✓	✓	✓	Finger Lake.
1438-15053-5		✓		Barrier Bar, Coast.
1438-15060-5		✓		Barrier Bar, Coast.

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1440-15154-5	✓	✓	✓	
1440-15161-5	✓	✓	✓	
1440-15170-5	✓	✓	✓	Anticline, Finger Lake.
1440-15172-5	✓	✓	✓	Anticline, Syncline.
1441-15212-5	✓	✓	✓	
1442-15273-5	✓	✓	✓	Barrier Bar.
1443-15331-5	✓	✓	✓	
1443-15334-5		✓		Barrier Bar.
1455-14592-5		✓		Barrier Bar, Coast.
1456-15043-5	✓	✓		
1456-15050-5	✓	✓	✓	Barrier Bar, Coast.
1456-15052-5	✓	✓		Barrier Bar, Coast.
1457-15104-5	✓	✓	✓	Coast.
1457-15111-5		✓		Barrier Bar, Barrier Island, Coast.
1458-15153-5	✓	✓	✓	
1458-15160-5	✓	✓		Barrier Bar, Finger Lake.
1458-15162-5	✓	✓	✓	Anticline, Finger Lake.
1459-15205-5	✓	✓	✓	
1459-15212-5	✓	✓	✓	
1459-15214-5		✓		Barrier Bar, Finger Lake.
1459-15221-5	✓	✓	✓	Anticline, Finger Lake, Syncline.
1459-15223-5	✓	✓	✓	Anticline, Syncline
1475-15110-5	✓	✓		Barrier Bar, Barrier Island, Coast.
1479-15333-5		✓		
1495-15220-5	✓	✓	✓	Anticline, Syncline.
1495-15222-5	✓	✓	✓	Anticline, Syncline.

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