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E 7.5 - 10405
CR-143398

SEP 24 1975

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DCAF# 10177018

1. ER No. 29020	2. Type of Report Quarterly	3. Recipient's Catalog No.
4. Title Hydrological Investigations in Norway		5. Report Date Aug. 1, 1975
		6. Period Covered April 1. - Aug. 1./1975
7. Principal Investigator Helge A. Ödegaard <i>et</i>		8. No. of Pages 4
9. Name and Address of Principal Investigator's Organization Norwegian Water Resources and Electricity Board Postbox 5091 Majorstua, Oslo 3, Norway		10. Principal Investiga.Rept. No.
		11. GSFC Technical Monitor Frederick Gordon Jr.
12. Sponsoring Agency Name and Address NTNF Wdm. Thranes gt. 98 Oslo 1		13. Key Words (Selected by Principal Investigator) Hydrology, snow
14. Supplementary Notes Coinvestigators send separate reports.		
15. Abstract Due to good weather-conditions in the southern part of Norway the under-flight plans has gone according to plans. Several good Landsat imagery has been received. It seems to be possible to locate areas with a thick snow-cover. (E75-10405) HYDROLOGICAL INVESTIGATIONS IN NORWAY Quarterly Report, 1 Apr. - Aug. 1975 (Norwegian Water Resources and Electricity) 5 p HC \$3.25 N75-33460 CSCS 05B Unclas G3/43 00405		

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II Techniques

Up to this date (August 1.) 46 images have been received of all bands as 70 mm negative film from Landsat II through Sioux Falls. The imagery have a very high quality, and show a lot more detail than we have seen before. A computer listing has been prepared and will be kept up to date covering all imagery available of Norway.

A first cloud-free image has been obtained of the mountain-plateau Hardangervidda (2024 - 10034) as early as February. Hardangervidda is the catchment area for the largest hydroelectric power plants in southern Norway and a considerable economic interest is involved in predicting runoff from snow-melt. Work has started with map-overlays and all measured snow-depths and snow-line measurements will be plotted on the maps.

III Accomplishments

- (1) Up to this date (August 1.) only four images has been received that will be used for the test areas.

Image 2024 - 10034 has shown an area of Hardangervidda where the snow-cover is clearly different from the rest of the mountain-area. This is very interesting as the area where heavy snowcover is reported. If this is correct it will be possible to get information of snowdepth from the imagery.

- (2) The finding reported under (1) has not been verified by later Landsat-imagery or ground-surveys yet. We have been notified by NASA that such imagery will be available at a later date. Ground-surveys are available, but has not yet been compiled.
- (3) We have been very lucky with weather-conditions on all satellite-passings this spring. The planned ground-surveys have therefore been performed successfully according to plans.

IV Significant Results

At this early stage of the work it seems possible to take out areas with extremely thick snow-cover (without use of complicated analysis-equipment) directly visually

from paper-prints.

If this is verified from ground-surveys and experience from later years, it will according to operations personell be a very valuable new tool for water-management in areas with the same landforms.

This specific information can today not be collected by aerial phothography. Only point measurements can be made by ground personell, but we have up to this date been a little hesitant to extend such measurement to greater areas because so many uncertainties are involved.

The method of measuring the reduction in natural gammaradiation corrolated with snow-water equivalent has been used on an operational basis on the Hardangervidda plateau. These conventional methods will now be a valuable compliment to use of satellite imagery.

V. Publications

A serie of articles have been published in newspapers and non technical publications about remote sensing. Radio and TV in Norway has also had a good coverage - but it is a long time to make the new ideas of remote sensing from satellite known to the public. We are pressing to get a receiving station for Landsat imagery in Tromsø in nothern Norway.

Inhouse a report has been made where we have shown what can be done on vegetation mapping with Landsat imagery and a computer. A map was prepared from a printout from LARSY at Purdue of a reindeer grasing-area in nothern Norway. Maps of this type has to be prepared for applications for permission to construct new dams and power plants. Ground crews will check the results in the field.

Several talks have been given, specially one at a convention of owners of hydro-electric power plants. The new ideas aroused great interest.

VI. No problems

VII. Data Quality and Delivery

Quality and delivery is satisfactory. Some of the negative films (70 mm) are too

dark, especially those including snow-covered areas. There is also a variation in the sharpness in the films. Some are pinpoint sharp while others are not reproduced so sharp. Judging from the sharpness of the text it seems that the reproduction equipment is not always adjusted as well as it is possible.

This was also a problem with imagery from Landsat I. Delivery-time is 2 - 3 months. The small films are shipped from Sioux Falls in big heavy envelopes with thick cardboard. The postage for such shipments is considerable, and it should be considered if this material could be shipped in a more practicle way and save on postage.

VIII. Recommendations

It would be valuable to get an idea of how much coverage we can expect this fall from Landsat II if weather-conditions are favorable. This would make it much simpler to plan work by ground crews. Of course we understand that technical difficulties may change the plans.

IX. Conclusions

It is too early to draw any definite conclusions, but it is sure that Landsat has filled all our expectations and we can see many new fields where this new tool will be valuable.

Oslo, August 25, 1975

H. Odgaard
Helge Odgaard

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OERSIKT OVER BILDER FRA LANDSAT TATT OVER NORGE, AJOUR PR. 8/09/75

L W R S	STRIFE-PKT.	ID	SKY%	DATE	MERKNAD
	207 - 11	1362 - 9255	0	20/ 7/73	
	208 - 10	1363 - 9311	10	21/ 7/73	
	- 11	1363 - 9314	20	21/ 7/73	
	- 12	1039 - 9315	0	31/ 8/72	
	- 19	1075 - 9345	10	6/10/72	• SVERIGE
	- 20	1075 - 9352	30	6/10/72	• SVERIGE
	209 - 11	1364 - 9372	10	22/ 7/73	
	- 11	1040 - 9371	20	1/ 9/72	
	- 12	1040 - 9374	30	1/ 9/72	
	210 - 11	1365 - 9430	10	23/ 7/73	
	- 12	1365 - 9433	10	23/ 7/73	
	- 19	1347 - 9464	0	5/ 7/73	NVE-S(+,-) • SVERIGE
	211 - 10	1006 - 9481	30	29/ 7/72	NVE-S(456-)
	- 10	1006 - 9489	70	29/ 7/72	NVE-S(RBV-)
	211 - 11	1006 - 9484	0	29/ 7/72	NVE-S(45-)
	- 11	1330 - 9491	10	18/ 6/73	NVE-S(57+,5-)
	- 11	1006 - 9483	10	29/ 7/72	NVE-S(RBV-)
	211 - 12	1006 - 9490	0	29/ 7/72	
	- 12	1330 - 9494	20	18/ 6/73	NVE-S(57+)
	- 12	1006 - 9485	30	29/ 7/72	NVE-S(RBV12-)
	211 - 15	1330 - 9505	0	18/ 6/73	NVE-S(+,-) • SVERIGE
	211 - 17	1330 - 9514	0	18/ 6/73	NVE-S(+,-)
	211 - 18	1330 - 9521	0	18/ 6/73	NVE-S(+,-)
	- 18	1312 - 9522	30	31/ 5/73	NVE-S(+,-)
	- 18	2164 - 9403	40	5/ 7/75	NVE-S(-)
	- 18	2128 - 9402	50	30/ 5/75	NVE-S(-)
	- 18	2038 - 9404	50	1/ 3/75	NVE-S(-)
	211 - 19	1330 - 9523	0	18/ 6/73	NVE-S(+,-)
	- 19	1456 - 9501	30	22/10/73	
	- 19	1312 - 9524	30	31/ 5/73	NVE-S(+,-)
	- 19	2164 - 9405	40	5/ 7/75	NVE-S(-)
	- 19	2038 - 9410	40	1/ 3/75	NVE-S(-)
	- 19	2128 - 9404	70	30/ 5/75	NVE-S(-)
	- 19	1078 - 9521	70	9/10/72	NVE-S(-)
	211 - 20	1078 - 9523	30	9/10/72	• SVERIGE
	212 - 10	1331 - 9543	0	19/ 6/73	NVE-S(57+)
	- 10	1007 - 9535	99	30/ 7/72	NVE-S(RBV-)
	212 - 11	1331 - 9545	30	19/ 6/73	NVE-S(57+)
	- 11	1223 - 9553	40	3/ 3/73	
	- 11	1007 - 9541	99	30/ 7/72	NVE-S(RBV-)
	212 - 12	1331 - 9552	30	19/ 6/73	NVE-S(57+)
	- 12	1223 - 9555	60	3/ 3/73	NVE-S(-)
	- 12	1367 - 9545	80	25/ 7/73	NVE-V
	- 12	1007 - 9544	90	30/ 7/72	