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AUSTRALIAN COMMITTEE FOR ERTS

SKYLAB PROGRAM QUARTERLY PROGRESS REPORT, MAY - JULY 1974

GEOLOGICAL INVESTIGATIONS

1. Title: A study of the usefulness of Skylab EREP data for earth resources studies in Australia.

2. NASA HQ proposal identification number: SR557

3. Accomplishments: The Australian Government contractor for photographic processing was able to supply coloured and black and white photographs of the SL-3 mission, S190 A cameras, on 11 June and 4 July respectively. The order was placed with the official contractor in mid-January, 1974.

Colour and black and white prints from S190B cameras on the same mission were supplied by the contractor on 7 June. The order was placed in early February.

Transparent positive copies of 6 scenes from each of the 6 S190A cameras taken on 14 December, 1973 during the SL-4 mission were received on 2 July 1974. All of the scenes appear to have from 50% to 60% cloud cover. This original material was sent to the processing contractor in early July 1974. Transparent positive copies of 9 photographs from one of the S190B cameras taken on the same mission were received on 29 July 1974. Several of the frames have extensive cloud cover; this material was sent for copying in early August 1974.

4. Results: Owing to the late arrival of the photographs from the contractor, only a brief appraisal has been made to date. All the photographs examined are from SL-3.

4.1. Canberra test area

S190B photography:

Frames 84-143, 144, 145 colour positive transparencies at 1:1 000 000 scale.

Cloud cover: about 10%

Cultural detail: all main roads, many minor roads and some tracks are visible. Major buildings can be distinguished and towns are readily identified.

Vegetation: natural vegetation can be easily separated from grassland; some information related with type and condition of grass can be interpreted.

Drainage: a large amount of information on stream networks can be obtained. Incised streams only 200m long and about 100m apart can be detected.

Geology: Linear features, such as faults, weathered joints and some bedding trends are well displayed. At least one circular structure of 6 km diameter (which as far as can be determined has not been previously mapped) was detected at the south eastern extremity of Lake Eucumbene. Locally alluvium-rock and soft rock-hard rock boundaries can be detected. Broader morphological units can be identified and these may correspond to specific rock types. To date the study has been too superficial to determine if major rock types can be identified.

Stereoscopic vision: linear features having only a small topographic expression are enhanced. Drainage details and watershed boundaries can be mapped with more reliability. Man made features such as major reservoir retaining walls can be identified more easily. In general stereoscopic viewing allows more reliable interpretation.

Comparison with ERTS-1, 1142-23203: the information content of the ERTS image is considerably less than that of the SKYLAB photographs. Only the large structural features, the broad vegetation differences and the large water courses are visible on ERTS.

S190A photography:

Frames 28-180, 181 (colour) and 27-180, 181 (colour IR) positive transparencies at 1:1 000 000 scale.

Cloud cover: about 10%.

The copies examined (as well as the contact positive transparencies recieved from NASA) are of an inferior quality because of a grainy pattern that masks fine detail. Therefore, these frames were not included in this appraisal.

4.2 Alice Springs test area

Frames: S190B 84-122, 123, 124, colour positive transparencies at 1:1 000 000 scale.

Cloud cover: about 60%.

The copies show an excessive dark red colouring which in some instances helps the interpretability. It is not known at this stage whether the colouration exists in the film supplied by NASA or only in the copies obtained from the contractor.

Comments on the amount of information related to cultural features, vegetation, drainage and geological structure are the same as for the S190B frames of the Canberra test area.

Lithological information: owing to lack of vegetation more rock types can be differentiated and more boundaries mapped than in the Canberra frames.

Comparison with ERTS-1, 1030-00303: in general, much more information of any type is contained in the SKYLAB pictures than in the ERTS image, with the exception of a greater difference in tone between different metamorphic rock types in ERTS band 7.

S190A photography:

Frames 28-162, 163 (colour) and 27-163, 162 (colour IR) positive transparencies at 1:1 000 000 scale.

Cloud cover: about 60%.

The copies examined show grain problems as discussed for the S190A photos of the Canberra area.

In general the true colour copies have more realistic colour rendition than the S190B scenes of the same area, eg. colluvial fans and soil types on the southern side of the MacDonnell Ranges can be separated more readily on S190A.

Colour IR copies have a predominantly green hue which hampers correlation of different rock types and detection of details through thin cloud cover.

5. Problems: The delay in processing the Skylab material has been due to the main supplier, Kodak, being unable to provide the Australian government photographic contractor with suitable copying film from the USA. This problem has now been overcome.

Grainy patterns limit the interpretability of the S190A photographs.

6. Published articles: Nil

7. Recommendations: The origin of the grainy pattern on S190A film should be investigated by NASA and the investigator should be advised whether the problem occurs in the NASA originals or only in the subsequent generations.

Bureau of Mineral Resourecs
Canberra, 13 August, 1974.

Co-investigators C.E. Maffi

C.J. Simpson

W.J. Perry

DIVISION OF LAND USE RESEARCH, CSIRO

Title of the Investigation A study of theusefulness of Skylab EREP data for earth resources studies in Australia. (In particular Vegetation physiognomy, Land use, and Major land forms with reference to thematic mapping.)

Identification Number SR 557

Accomplishments Photos ordered 19th March 1974, colour and black and white SO 242. Only black and white received so far (8th July 1974). Mapping of the land systems (types of country) superimposed on the Skylab photos of the Alice Springs area, for comparison with similar mapping already done on the ERTS imagery. This work will continue, since the Skylab section of it has scarcely begun.

Significant Results The stereo cover of the Skylab photos, their clarity, and their resolution in that order put them far above the ERTS imagery not only in distinguishing between patterns but also in determining the nature of the country. Examples are the following land systems -

Si - plains with sand dunes
Al - ridges, foothills, and alluvial plains
Ew - dune-covered country with stony hills
Td - alluvial plains.

These are in places indistinguishable on the ERTS imagery. The same places are clearly distinguishable on the Skylab photos, together with the character of the dunes (parallel, reticulate, or irregular).

Major Problems Delay in receiving the photos, heavy cloud cover.

Papers etc. None

Recommendations We have not yet had access to all the available photos, nor do we feel competent to make recommendations in respect of those we have received. Our study is inadequate so far.

R. Story
15 Aug 74

FORESTRY AND TIMBER BUREAU

REPORT ON EVALUATION OF SKYLAB IMAGERY

Period ending 8.8.74

There have been further long delays in the imagery becoming available due to the non availability of suitable reproducing material to the contractors.

Brief visual examination of the S190A and B photography reproduced to 1 : 1 000 000 scale followed by a field visit to the imaged area was carried out just prior to the end of the period.

More detailed examination is planned although other work commitments are heavy till the end of November. It is proposed to compare the Skylab imagery with ERTS imagery and available aerial photography at several scales.

Initial conclusions relate to the imagery not yielding significant information in stratifying the native forest beyond 2 or 3 crown density classes. The forest/non-forest boundary is far easier to delineate on the infra red colour film than on colour, particularly when the forested areas are relatively small.

A more detailed report will be available at the next reporting time.

M.L. BENSON
Officer-in-Charge
FOREST RESOURCES SECTION