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Goddard Space Flight Center
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From: Colorado School of Mines
Department of Geology

Subject: Type I report for the period 1 February to 31 March 1974
(NASA Contract NAS5-21778)

Title: Geologic and Mineral and Water Resources Investigations in Western Colorado (Proposal 026)

(GSFC Principal Investigator Identification No. UN 209)

INTRODUCTION

The primary objective of the Colorado School of Mines ERTS-1 Program is to analyze ERTS-1 data for identification and discrimination of geological and hydrological phenomena in central and western Colorado. To facilitate the achievement of this objective, the research has been subdivided into the following tasks:

Task I. Analyze ERTS-1 data for identification and discrimination of:

A. lithology and surface composition
B. geologic structure
C. geomorphic phenomena
D. mineral resources
E. water resources
F. volcanic phenomena

Task II. Determine the atmospheric affects on remote sensor data.

Task III. Investigate and evaluate:

A. the RBV and MSS data for task I, A through F
B. processing and enhancement techniques as applied to ERTS-1 data

Task IV. Educate graduate students and give experience to research personnel in the use of satellite remote sensor data.

Task V. Submission of a final report (Type III) which will discuss in depth the history of the overall project and all significant scientific and technical theories, procedures, techniques, equipment, tests and project results.

(E74-10390) GEOLOGIC AND MINERAL AND WATER RESOURCES INVESTIGATIONS IN WESTERN COLORADO Progress Report, 1 Feb. - 31 Mar. 1974 (Colorado School of Mines) 3 p HC $4.00 CSCL 08G G3/13
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CURRENT INVESTIGATION

Computer analysis and comparison of ground-measured fractures with lineaments derived from aircraft and ERTS data continued during February and March.

The semi-quantitative evaluation of the capability of a photo-geologist to discriminate different rock types, using aircraft photos and ERTS imagery also continued. Data collection was completed and initial statistical analyses procedures were outlined.

Research has continued into the use of color additive viewing as an aid in interpreting ERTS images. Color composites made from the green and red bands of the ERTS MSS have been successfully used to identify areas of alteration in the San Juan Mountains of southwestern Colorado.

ERTS images of the Upper Arkansas River drainage basin were studied to determine the utility of satellite images for water resources studies. Maps showing (1) the drainage basin outline, (2) the drainage network, and (3) the location of ponds lakes, and reservoirs were prepared. The standing water bodies identified on the ERTS imagery are being compared to the water bodies shown on small- and large-scale topographic maps of the area to determine the accuracy of detecting and mapping lakes, ponds, and reservoirs with ERTS imagery.

A substantial portion of February was spent in the preparation of papers to be presented at the 3rd Annual Remote Sensing of Earth Resources Conference at the University of Tennessee Space Institute in late March. The papers to be presented are:

(1) New Uses of Shadow Enhancement by D.L. Sawatzky and Keenan Lee

(2) Geologic Information From Satellite Images by Keenan Lee, D.H. Knepper, and D.L. Sawatzky.

PROJECT STATUS

ERTS-1 satellite and support data analysis, interpretation and evaluation at the Colorado School of Mines is proceeding along a productive course.

NEXT REPORTING PERIOD

During the next reporting period, research will continue into:

(1) Computer analysis and comparison of ground-measured fractures with aircraft and ERTS lineament data,

(2) Semi-quantitative evaluation of the capability of a photogeologist to discriminate rock types, and

(3) Analysis of ERTS images for water resources investigations.

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