

Geologic Questions and Significant Results
Provided by Early ERTS-1 Data

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Introduction

The U. S. Department of the Interior presently has 45 experiments involving over 150 people underway and jointly supported by NASA and the EROS Program to evaluate the uses of Earth Resource Technology Satellite (ERTS-1) data of the United States and selected foreign areas. These studies are in the fields of cartography, land use and management, geology, hydrology, forestry and range management. Our NASA/EROS supported scientists have just begun to receive their satellite data from the Goddard Space Flight Center and we are confident that more detailed scientific analyses and results will soon be forthcoming.

We have also established a system to review data as it becomes available and distribute it to regional Department of the Interior experts who are not yet involved in the space program. The purpose is to solicit their assistance and knowledge of local areas in the interpretation of features seen on satellite images but not recorded on available maps. While the system has not yet been perfected, we are beginning to get some return on this effort.

First, we are bringing to the attention of our people the fact that ERTS-1 is in operation and bringing back excellent data. All recipients have been impressed by the synoptic view these data provide, the better-than-anticipated resolution, the spectral response of the individual bands and the overall information content that are contained therein. We have been flooded with requests from within the agency and without as to how people can get more data. In Sioux Falls, S. D., our EROS Data Center is working overtime to supply these requests.

In the few minutes that are available today, I would like to take this opportunity to briefly describe some highlights of the information we have extracted from data collected during the first two weeks after ERTS-1 was launched on July 23, 1972.

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East Coast Area

ERTS-1 images of the Boston-Cape Cod Region (Fig. 1) have clearly shown the intricate bottom topography of the ocean between Woods Hole and Marthas Vineyard in Band 5 (red) where the sea bottom at depths in excess of 70 feet is clearly visible. These features, however, are masked out in color composites of the same area, but the land features are enhanced.* Comparisons with aerial photography taken within the last few years show that changes in ocean bottom features have taken place. Some of these changes constitute navigational hazards not shown on existing hydrographic charts. It is believed that ERTS data can provide information useful in updating such charts as well as inventorying near-shore resources, such as sand, gravel and aquatic food sources.

This color composite of the Gainesville, Florida, area (Fig. 2) shows the verdant vegetation of river valleys and swamps as pink. The drier areas, where water table is low, are shown as yellow to orange in color, perhaps indicating that vegetation is dry or burned out by the late summer sun. This interpretation has not yet been verified in the field. These observations indicate that ERTS-1 data, recording the distribution of verdant vegetation throughout the seasons of the year, can be used as a guide for ground water exploration. Our local Water Resources Division geologists state that the two bright or highly reflective areas in the northeast quadrant of the scene are strip mining operations where titanium ores are being mined. ERTS-1 data can, therefore, assist in locating and monitoring the extent of mine operations and, possibly, provide information on the effects of strip mining activities.

Central U. S. Areas

This scene of the Texas/Oklahoma area of the Ouachita Mountains (Fig. 3) is significant in that it contains two test sites that have been worked on for several years by USDI scientists. One is a geological test site at Mill Creek, Oklahoma, in the Arbuckle Mountains in the northwest quadrant. The other is Lake Texoma, a large reservoir in the southern half that is of interest to the Bureaus of Reclamation and Outdoor Recreation.

*Perhaps some experimentation in color reproduction could be done to ensure that such information is not lost.

