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HYDROGEOLOGY OF CLOSED BASINS AND DESERTS OF SOUTH AMERICA, ERTS-1 INTERPRETATIONS*

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ABSTRACT

Images from the Earth Resources Technology Satellite (ERTS-1) contain data useful in studies of hydrogeology, geomorphology, and paleoclimatology. Sixteen Return Beam Vidicon (RBV) images and 15 Multi-Spectral Scanner (MSS) images were studied. These covered deserts and semidesert areas in southwestern Bolivia, northwestern Argentina, northern Chile, and southeastern Peru from July 30 to November 17, 1972. The study area is bounded by latitudes $16^{\circ}30'$ and $27^{\circ}30'$ South and by longitudes $66^{\circ}30'$ and $70^{\circ}30'$ West. During the first 4 months after launching, high-quality cloud-free imagery was obtained over approximately 90 percent of the region of interior drainage, or a total area of about 170,000 square miles.

Features interpreted from the images include: (1) principal types of salt crusts on major salars (salt-encrusted playas), some of which are subject to modification by seasonal floodwaters; (2) extent of floodwaters and lakes on the floors of more than 120 closed basins, thus providing a basis for more accurate mapping of hydrologic features in the central Andes; (3) prominent former lake shores of Pleistocene lakes; (4) mid-winter snow cover in the high Andes, data essential to the appraisal of water resources and runoff; (5) volcanoes and volcanic craters numbering more than 500 in the study area, of which 13 are reportedly active and many believed to be associated with playa-type borate deposits and sulfur deposits; and (6) major faults such as the Atacama fault and other prominent geologic structures.

No single source of data previously has permitted identification of all of these features, and observation on synoptic snow cover was not possible prior to ERTS. ERTS thus provides an invaluable data base for earth resources surveys and development in this large and relatively undeveloped area.

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