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THE APPLICATION OF REMOTELY SENSED DATA  
TO  
PEDOLOGIC AND GEOMORPHIC MAPPING  
ON  
ALLUVIAL FAN AND PLAYA SURFACES  
IN  
SALINE VALLEY, CALIFORNIA

D. A. Miller, G. W. Petersen, and A. B. Kahle<sup>1</sup>

Arid and semi-arid regions yield excellent opportunities for the study of pedologic and geomorphic processes. The dominance of rock and soil exposure over vegetation not only provides the ground observer with unique observational possibilities but also affords good opportunities for measurement by aircraft and satellite remote sensor devices. Previous studies conducted in the area of pedologic and geomorphic mapping in arid regions with remotely sensed data have utilized information obtained in the visible to near-infrared portion of the spectrum. Recently, however, a thermal infrared multispectral scanner for the middle-infrared region of the spectrum has been developed that may prove useful for pedologic and geomorphic studies in arid regions. The Thermal Infrared Multispectral Scanner (TIMS) is an airborne scanner with six channels in the range 8.2 - 12.2  $\mu\text{m}$ . TIMS is normally flown at an altitude that produces a ground resolution of about 30 meters. This is similar to the resolution being achieved by the Landsat-5 Thematic Mapper (TM). The TM sensor collects data in six channels between 0.45 and 2.36  $\mu\text{m}$  and one thermal channel (10.2 - 12.5  $\mu\text{m}$ , 120 meter resolution). Therefore, TIMS and TM provide a range of information from the visible through the middle-infrared portion of the spectrum. Extensive work by researchers at the Jet Propulsion Laboratory (JPL) has shown significant promise for TIMS and TM data in geologic mapping of arid and semi-arid areas. The emphasis of a current research effort being conducted jointly by Penn State University's Office for Remote Sensing of Earth Resources (ORSER) and JPL is to evaluate the ability of TIMS and TM data to aid in the mapping of soils and geomorphic units on alluvial fan and playa surfaces. The area selected for this research is located in the Saline Valley of eastern California. TIMS and TM data collected in 1984 are being used in conjunction with maps compiled during a Bureau of Land Management (BLM) soil survey to aid in a detailed mapping of alluvial fan and playa surfaces within the valley. The results from this study may yield valuable information concerning the application of thermal data and thermal/visible data combinations to the problem of dating pedologic and geomorphic features in arid regions.

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<sup>1</sup>Graduate student and Professor, Department of Agronomy, The Pennsylvania State University and Supervisor, Geologic Remote Sensing Group, Jet Propulsion Laboratory.