

GEOLOGIC REMOTE SENSING FIELD EXPERIMENT; R. E. Arvidson, McDonnell Center for the Space Sciences, Department of Earth and Planetary Sciences, Washington University, St. Louis, Missouri 63130; D. L. Evans, Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91109

The intent of this abstract is to introduce the planetary community to the Geologic Remote Sensing Field Experiment (GRSFE) data sets. GRSFE was designed to acquire remote sensing data using advanced instrumentation over sites of planetary relevance (i.e., basalts, aeolian features, surfaces weathered under arid conditions) in the southwestern United States while field observations were made at the same time for selected areas. GRSFE was conducted in July and September of 1989. The airborne and field data are meant to be used by the planetary community to test quantitative models for extraction of surface property information (e.g., refractive index, permittivity, grain size and packing, thermal conductivity, microscopic roughness over variety of length scales) from remote sensing data. The Airborne Visible and Reflected Infrared Imaging Spectrometer (AVIRIS), Thermal Infrared Multispectral Scanner (TIMS), the C,L,P band multiple incidence angle polarimetric SAR, the Advanced Solid-State Array Spectroradiometer (ASAS), airborne laser altimeter (ATLAS), helicopter-borne stereophotography, and associated ground measurements of the atmosphere and surface were conducted. Sites included the Providence Mountain fans, Cima Volcanic Field, Kelso Dunes, Death Valley fans, Death Valley dunes, the Ubehebe volcanic maar complex in California, the Lunar Crater Volcanic Field, and Railroad Valley fans in Nevada. GRSFE was guided by a Science Steering Group with representatives from Arizona State Univ., Univ. of Colorado, Jet Propulsion Laboratory, Univ. of Arizona, Univ. of Washington, Washington Univ., Stanford Univ., and Goddard Space Flight Center. Data and documentation will be published jointly during the first quarter of FY91 by the NASA Planetary Data System and Pilot Land Data System on a set of 8 CDROMs. For reference, Table I lists the characteristics of the prime target (Lunar Crater Volcanic Field) flown during GRSFE. Table II lists the characteristics of the instruments used, and Table III summarizes the data sets acquired.

TABLE I
GEOLOGIC REMOTE SENSING FIELD EXPERIMENT
Lunar Crater Volcanic Field, Nevada

- o 250 km northwest of Las Vegas, NV
- o Middle to late Pliocene and Pleistocene (0.015 to 4.2 m.y.) in age
- o About 95 vents and at least 35 associated basaltic lava flows within a northeast-trending zone, up to 10 km wide and about 40 km long. Some andesitic flows.
- o Vents include cinder cones, elongate fissures, and at least two maars
- o Lava flows range up to 1.9 km wide and 6.1 km long with thicknesses less than 3 m to as much as 25 m
- o Cobble-strewn playa located in center of field used as modeling / calibration site
- o Progressive degradation of the cones and flows similar to that displayed by other basaltic volcanic fields in the southwest Basin and Range (including Cima, Crater Flat, and Coso fields)
- o Many of the flows in the northeast and central parts of the field are veneered with varying thicknesses of air-fall tephra
- o In other areas, all but the youngest flows are mantled with extensive deposits of aeolian silt and fine sand
- o Tertiary rhyolite exposures nearby

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TABLE II
GEOLOGIC REMOTE SENSING FIELD EXPERIMENT
Aircraft Sensor Characteristics

	Airborne Visible and Infrared Imaging Spectrometer (AVIRIS)	Advanced Solid-State Array Spectroradiometer (ASAS)	Airborne Terrain Laser Altimeter System (ATLAS)
Wavelengths	0.41-2.45 micrometers	0.47-0.87 micrometers	1.06 micrometers
Number of Channels	224	29	1
Swath Width (km)	10	2	N/A
Pixel Size (m)	20	4	1-20 m
Nominal Altitude (km)	20	5	1-10 km
Platform	ER-2	C-130	T-39 Sabre Liner
	Thermal Infrared Multispectral Scanner (TIMS)	Aircraft Polarimetric SAR	Field Instruments
Wavelengths	8.2-11.7 micrometers	5.7, 24, 68 cm	Three spectral reflectance instruments; emission radiometer and spectrometer; sun photometer; PARABOLA - measured atmospheric and surface radiance at varying phase angles; thermistors buried in soil
Number of Channels	6	3	
Swath Width (km)	12	10	
Pixel size (m)	20	10	
Nominal Altitude (km)	8	10	
Platform	C-130	DC-8	

TABLE III
GEOLOGIC REMOTE SENSING FIELD EXPERIMENT
Data Archive Approximate Size

Instrument	Data Volume
AVIRIS (16 scenes @ 141 MB/scene)	2.26 GB
ASAS (10 scenes @ 83 MB/scene)	830 MB
TIMS (30 scenes)	670 MB
SAR (26 scenes @ 30 MB/scene)	780 MB
ATLAS (5 profiles)	60 MB
Helicopter, field. lab data, documentation	200 MB
Total	4.8 GB