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81-10063

CR-143770

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GEOLOGIC APPLICATION  
OF THERMAL INERTIA IMAGING  
USING HCM DATA

Helen N. Paley  
Anne B. Kahle  
Jet Propulsion Laboratory  
4800 Oak Grove Drive  
Pasadena, California 91103

October 1980  
Quarterly Report for Period July-September 1980

Prepared for:  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

(E81-10063) GEOLOGIC APPLICATION OF THERMAL  
INERTIA IMAGING USING HCM DATA Quarterly  
Report, Jul. - Sep. 1980 (Jet Propulsion  
Lab.) 5 p HC A02/MF A01 CACL 08B

N81-13419

Unclass

G3/43 00063

RECEIVED

DEC 11 1980

SIS/902.6

HCM-028

Type II

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. HCM-028	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle GEOLOGIC APPLICATIONS OF THERMAL INERTIA IMAGING USING HCMM DATA		5. Report Date October 1980	
		6. Performing Organization Code	
7. Author(s) Helen N. Paley and Anne B. Kahle		8. Performing Organization Report No.	
9. Performing Organization Name and Address Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, California 91103		10. Work Unit No.	
		11. Contract or Grant No. NAS 7-100	
12. Sponsoring Agency Name and Address NASA Goddard Space Flight Center Greenbelt, Maryland 20771 Technical Monitor: James Broderick		13. Type of Report and Period Covered Quarterly Report July - September 1980	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
16. Abstract  During the July-September 1980 quarter of the JPL/HCMM Investigation the final tapes were received completing the order, and preliminary processing was done. Thermal inertia images for each of the three test sites, Death Valley and Pisgah Crater, California and Goldfield, Nevada were created using registered HCMM day/night pairs and the JPL model. A comprehensive study and analysis of the geologic application of all acquired HCMM data is now in progress.			
17. Key Words (as listed by Author(s)) HCMM THERMAL INERTIA GEOLOGY		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*

## Introduction

The JPL/HQMM Investigation is a study of the feasibility of using thermal inertia, inferred from remotely sensed temperature data, to complement Landsat reflectivity data for reconnaissance geologic mapping and mineral exploration.

During the July - September, 1980 quarter of this investigation the remainder of the appropriate HQMM data tapes were received and cataloged. Selected HQMM day/night pairs were registered and the JPL Model, incorporating ground truth data, was run. These data were used to create thermal inertia images of the three test sites. Geologic analysis of these images and comparisons of aircraft and satellite data for each site are now in progress.

## Accomplishments and Significant Results

The remainder of HQMM data tapes, ordered during previous quarters, have been received, logged and images created. All data needed for this investigation have now been received and cataloged (Table 1).

Registration of selected HQMM day/night pairs for each test site has been accomplished. The JPL Model, incorporating ground truth data acquired during the times of aircraft overflights and satellite overpasses, has been run for all the HQMM test sites for the days of interest. Using these data, thermal inertia images of the three test sites, Death Valley, California, Pisgah Crater, California and Goldfield, Nevada, were created. Preliminary geologic analysis of these images has now started and will be included in a comprehensive study of the geologic application of all acquired HQMM data.

Comparison of satellite and aircraft data, collected concurrently over each test site is now underway. It is obvious that much more information is available in the aircraft data owing to their much greater spatial resolution.

## Presentation

Dr. John P. Schieldge presented a paper entitled "Use of Thermal Inertia Properties for Material Identification" at the 24th Annual Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, July 28- August 1, 1980 in San Diego, California. The paper was co-authored by Anne B. Kahle, Ronald E. Alley and Alan R. Gillespie.

Program for Next Reporting Interval

During the next quarter, the production of thermal inertia images for all the test sites from the aircraft and satellite data will be completed. Geologic interpretation of all images will continue. Work on the JPL/HQMM Investigation Final Report will also begin during the next quarter.

Recommendations

None

Funds Expended

Expenditure for July - September, 1980: \$6,089.00

Conclusions

None

TABLE 1

DATA SETS BEING PROCESSED

Site	HCM SATELLITE	AIRCRAFT	SITE
Death Valley, California	5-14-78	6-76	Death Valley, California
	5-30-78	3-77	
	7-6-78	2-78	
	7-17-78	3-78	
	7-22-78	4-79	
Pisgah Crater, California	8-18-78	8-75 6-76 7-77	Pisgah Crater, California
	9-19-78		
	4-4-79		
	5-14-78		
	5-30-78		
Walker Lane, Nevada (Goldfield/Ralston)	7-6-78	6-76 10-76 8-77 8-78  10-76 8-77 8-78	Walker Lane, Nevada  Goldfield  Ralston
	7-17-78		
	7-22-78		
	8-18-78		
	9-19-78		
	4-4-79		
	5-14-78		
	5-30-78		
	7-6-78		
7-17-78			
San Rafael Swell, Utah	8-28-78	5-77 5-77	Tintic, Utah Drum Mtns., Utah