

Pecora file

IC 8-113

PURDUE UNIVERSITY
LABORATORY FOR APPLICATIONS OF REMOTE SENSING

August 10, 1983

Dr. Allen H. Watkins, Chief
EROS Data Center
Sioux Falls, SD 57198

Dear Dr. Watkins:

Enclosed find an abstract for the Pecora Symposium at which I am planning to present a paper.

I hope this is sufficient description of the content.

Sincerely,

Paul Anuta

Paul E. Anuta
Associate Program Leader

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LANDSAT-4 DATA QUALITY EVALUATION RESULTS

by

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Abstract

Landsat-4 Thematic Mapper and multispectral scanner data were evaluated for radiometric and geometric quality as well as for information content. Geometric evaluation consisted of band-to-band registration tests. The visible band and reflective IR bands were found to be in accurate registration but between these groups of bands some misregistration was observed. The thermal IR band was misregistered by four 30 M pixels. Radiometric evaluation was performed by computing means and variances of individual detectors. Very close agreement was observed, indicating a minimum amount of striping in the imagery. The effect of geometric correction and resampling was evaluated by computing means and variances of the before (A tape) and after (P tape) data and the results indicate no significant change. Identical areas were also clustered in A-tape and P-tape data and no significant differences were seen in the clusters, indicating no effect due to resampling and geometric correction.

Information content was first evaluated by performing principal components analysis of the MSS and TM data of Chicago and Iowa data. As expected, two components emerged from the MSS data and in the TM data three components contained

97% of the variance; however, significant image structure was seen in the fourth component, indicating twice the dimensionality in the TM data. Information content was also evaluated by classifying TM and MSS from the Des Moines, Iowa area. Many more subclasses of corn and soybeans were observed in the TM data compared to the MSS. A total of 47 classes was identified in the TM data. New procedures were developed to examine seven dimensional cluster and training class spectral data. Use was made of calibrated spectral plots to display subclasses and to display the TM spectral responses.