Abstract Submitted
for the NWS08 Meeting of
The American Physical Society

Hyperspectral Image Compression STEPHANIE WRIGHT, Seattle University Physics Department, DR. AGNIESZKA MIGUEL, Seattle University Electrical Engineering Department, JASON ASHBACH, Seattle University Electrical Engineering and Physics Departments — Hyperspectral images gathered by satellites or aerial means provide a vast amount of data for geophysicists. A few applications include the exploration of minerals, research of land pollution, and military surveillance. NASA and other agencies are producing gigabytes of hyperspectral images which need to be transmitted and stored daily. As these images require high compression rates and preservation of data integrity, we are presented with an intriguing compression problem. In our research we investigate two compression algorithms: a near-lossless technique based on minimizing maximum absolute distortion (MAD) and a lossy based algorithm which minimizes mean squared error (MSE). Near-lossless algorithms provide high compression rates and a uniform distribution of error. Whereas MSE based algorithms yield high compression rates but a non-uniform distribution of error. Our goal is to determine which algorithm yields high compression rates and minimal data loss without modifying post processing of hyperspectral data. In order to compare these two compression algorithms and determine their effect on post processing we used ENVI's image processing tools. We classified the decompressed images for each algorithm and compared them to the classified original image.

Stephanie Wright
Seattle University Physics Department

Date submitted: 18 Apr 2008 Electronic form version 1.4