

Spectral Mixture Analysis of EO-1 Hyperion data for the identification and detection of clay and silicate minerals in Milos Island, Greece

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Abstract: The present study is focused on the image processing of hyperspectral data acquired by the EO-1 Hyperion sensor for the mineral identification and mapping at Milos Island in Greece. The test area has been selected in purpose since the specific Island appears significant mineralogical variety and complexity. Furthermore, a more challenging task for the given project is the existence of a specific mineral called perlite of which the spectral signature is not included in the common spectral libraries. The methodology that will be followed is based on spectral mixture analysis (SMA) and has been selected appropriately in order to reduce the volume of the data in spectral as also in spatial dimension so as to identify the spectra of the most pure endmembers. Two classifiers have been used for the mineral mapping, SAM and MTMF and their results have been compared for the identification in overall and especially for their effectiveness of perlite's identification. It has been shown that based on this method, the maximum information is derived by the image itself, minimizing that way the dependence from an a priori knowledge for the given test area or the collection of spectral signatures by a ground truth campaign.

Key Words: Hyperspectral Analysis, SMA, Mineral Identification, SAM, MTMF.