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HRSC spectra analyzed by a Multiple-Endmember Linear Spectral Linear Unmixing Model (MELSUM)

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The High-Resolution Stereo Camera (HRSC) [1] onboard the Mars-Express spacecraft has provided spectral data, with five broadband spectral channels acquired by five separated cameras oriented with a different angle to the normal to the surface. This implies that a given spectrum results from different proportions of shade at each wavelength. Thus, shade affects the shape of HRSC spectra on a different way from pixel to pixel. This contribution has to be considered when analyzing HRSC spectra in order to provide compositional and surface property information. The MER landing sites provide us the opportunity to compare image analysis to in-situ observations. HRSC spectral data can be modeled by spectra of bright red dust, dark basalt spectra and shade [2, 3, 5] over the whole globe. We account for shade by performing the Multiple-Endmember Linear Spectral Unmixing Model (MELSUM) [5, 6] two times in cascade: 1) by using a flat spectrum set to zero values for shade as input in the spectral unmixing, and 2) by analyzing the residual spectral shapes in function of the geometry of illumination and observation. Image fractions of surface materials provide information on their spatial distribution and the way they are mixed. Results for shade and residuals are related to topography, surface roughness, aerosol scattering, the geometry of illumination/observation and instrumental noise.

[1] Neukum G. et al. (2004) ESA SP, 90, 1151–1154. [2] McCord et al. (2007) JGR 112.. [3] Combe et al., 2007, 38th LPSC. [4] Wendt et al., 2008, 39th LPSC. [4] Adams and Gillespie, Cambridge Univ. Press. [5] Combe J.-Ph. et al. (2008) PSS, in press. [6] Combe et al. (2008), LPSC #2381.

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