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The Mapping Potential of the HRSC Color Data

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The High Resolution Stereo Camera HRSC acquires images in five color channels in the visible and near infrared[1]. We investigate the potential of this multi-spectral dataset with its large coverage to bridge the gap between hyperspectral datasets of low spatial coverage (CRISM targeted observations) or low spatial resolution (OMEGA). We chose the sulfate deposits of Juventae Chasma [2] in HRSC orbit 243 to test if a specific mineralogical composition can be identified.

Most spectral variations in HRSC multispectral datasets can be explained by a linear combination of three endmember spectra [3]. These are: 1. red material, covers the plains around the chasma. 2. Dark material = unoxidized basalt, covers parts of valley floor. 3. shade component. We applied the Multiple Endmember Linear Spectral Unmixing Model (MELSUM)[4] to model the sulfate outcrops from the three components alone. A significantly increased modeling error would then indicate the presence of a further spectral component.

The multiscattering sulfates are mixed with both red material and dark material. Consequently, their spectra are not distinguishable from the material in a broad zone surrounding Juventae Chasma, where a mixture of bright red plains material mixes with dark dust from the valley bottom to mimic the their spectral signature. Observation and illumination geometry have a strong influence on the observed spectra. We expand our study to other regions to fully understand these effects.

[1] Neukum (2004), ESA-SP 1240. [2] Gendrin A. et al. (2005), Science 307, 5715, DOI 10.1126/science.1109087 [3] McCord, T. et al. (2007) JGR 112, DOI:10.1029/2006JE002769. [4] Combe J.-Ph. et al.(2008), JPSS, DOI:

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