



Surface compositional units at Gusev crater, Mars.

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The multi-spectral aspect of the HRSC data from orbits 24 and 72 of Mars Express is used to derive an evaluation of the composition and distribution of the surface materials in the Gusev crater area. The goal is to provide better-constrained information about the surface processes at play and the regional or local stratigraphy. This investigation identifies several compositional units and assesses the relationships with the geological units.

Both color-ratio compositing and unmixing modeling support the identification and mapping of two to three main compositional units in and around Gusev, at the scale of the observation. Most of the Gusev region can be characterized by the presence of moderate- to high-albedo materials, exhibiting relatively high 748/444-nm ratios and moderate 748/955-nm ratios, which may be consistent with fine-grained, poorly crystalline ferric iron oxides. The color-ratio composite highlights the more iron-bearing characteristic of the moderate-albedo materials within the crater walls. These materials were previously interpreted as wind-related features (Greeley R. et al., *JGR*, 108, E12, 8077, 2003). Their HRSC-measured reflectance is consistent with the value of 0.25+/-0.05 given in (Greeley R. et al., *Science*, 305, 2004; Bell J. F. III et al. *Science*, 305, 2004) from MER Pancam *in situ* broadband measurements. The summit of Apollinaris Tholus exhibits a flat spectral signal in the 748-to-955-nm wavelength interval, tentatively indicating a depletion of iron content with respect to the surroundings.