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Mineralogical Mapping of the Av-5 Floronia Quadrangle of Asteroid 4 Vesta

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Asteroid 4 Vesta is currently under investigation by NASA's Dawn orbiter. The Dawn Science Team is conducting mineralogical mapping of Vesta's surface in the form of 15 quadrangle maps, and here we report results from the mapping of Floronia quadrangle Av-5. The maps are based on the data acquired by the Visible and Infrared Mapping Spectrometer (VIR-MS) and the Framing Camera (FC) (De Sanctis et al., this meeting). This abstract is focused on the analysis of band ratios, as well as the depth and position of the 2-μm absorption band of pyroxenes, but additional information will be presented. Absorption band depth is sensitive to abundance, texture and multiple scattering effects. Absorption band position is controlled by composition, shorter wavelength positions indicate less Calcium (and more Magnesium) in pyroxenes. The inferred composition is compared with that of Howardite, Eucite and Diogenite meteorites (HEDs). Diogenites are Mg-rich with large orthopyroxene crystals suggesting formation in depth; Eucrites are Ca-poor pyroxene, with smaller crystals.
Av-5 Floronia Quadrangle is located between $\sim$20-66°N and 270°-360°E. It covers a portion of the heavily-cratered northern hemisphere of Vesta, and part of it is in permanent night, until August 2012. Long shadows make the visualization of albedo variations difficult, because of limited effectiveness of photometric corrections. Most of the variations of the band depth at 2 μm are partly affected by illumination geometry in this area. Only regional tendencies are meaningful at this time of the analysis. The 2-μm absorption band depth seems to be deeper towards the south of the quadrangle, in particular to the south of Floronia crater. It is not possible to interpret the value of the band depth in the floor the craters because of the absence of direct sunlight. However, the illuminated rims seem to have a deeper 2-μm absorption band, as does the ejecta from an unnamed crater located further south, within quadrangle Av-10 (Tosi et al., 2010, this meeting). The absorption band seems slightly shifted towards shorter wavelengths in the neighborhood of the same crater, which may indicate a more diogenitic composition, consistent with materials of the deeper crust. Relationships between craters, ejecta and composition will be investigated further.
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