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Vesta Compositional Diversity in Quadrangle Av-13 Tuccia

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The Dawn spacecraft is currently orbiting the main belt asteroid 4 Vesta to evaluate the character of this small protoplanet and its role in early solar system evolution. Compositional data from the Gamma Ray and Neutron Detector (GRaND) are being acquired and will be available soon. Spectral data acquired with the Visible and Infrared Mapping Spectrometer (VIR) and the Framing Camera (FC) instruments provide compositional information in a spatial context. Available VIR data provide the high spectral resolution necessary for mineral identification and characterization while FC data provide selected spectral channels, but at a higher spatial resolution that enable geologic relations to be better discerned. As these different data are integrated and analyzed, broad compositional variations are observed in the mineralogy across Vesta. The diversity seen on a global scale and direct associations with HED mineralogy is discussed in DeSanctis et al. and Ammannito et al. [this meeting]. Geologic mapping of Vesta has been initiated for 15 well-defined quadrangles and coordinated mineralogical mapping has commenced at that higher scale. We discuss the mineralogical diversity observed in quadrangle Av-13 Tuccia, which spans a region between 21˚-66˚S latitude and 180˚-270˚E longitude on Vesta. The Av-13 Tuccia quadrangle includes three major geologic terrains [see Kneissl et al., this meeting]: *Vestalia Terra* located in the north of the quadrangle, the *Equatorial Cratered Terrain,* and the *Ridge-and-Groove Terrain* which is part of the Rheasilvia Formation. As such, the Tuccia quadrangle includes regions which transition from the equatorial terrain to the giant impact basin of Rheasilvia. Prominent spectral variations are mapped across the surface by FC and VIR, largely associated with relatively fresh impact craters. Diagnostic absorption bands of pyroxene are readily detected. The relative strength of these absorptions is seen to vary in a regular spatial context, largely correlated with overall albedo of surface material and often at high spatial resolution associated with individual features. Diagnostic variations in absorption band center and shape are also observed. Deposits of an unusual crater located on a steep slope at 59˚S, 200˚E exhibits some of the shortest, most symmetric absorption bands (e.g., centered near 0.920-0.925 μm), but with highly variable band strength in a well-defined spatial context. In contrast, the small fresh crater to the north on the rim of Tuccia crater has exposed material of a different composition that exhibits broader diagnostic absorption bands centered at a longer wavelength, suggestive of pyroxenes that are slightly more Fe-rich. As VIR and FC data continue to be acquired, processed and integrated, additional details of the mineral character and diversity of Vesta will be revealed in order to discern local and regional geologic evolution.

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