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Mineralogical mapping of quadrangles Av - 14 (Urbinia) and Av - 15 (Rheasilvia) on 4 Vesta

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In August 2011, Dawn went into orbit around asteroid 4 Vesta and during the different mission phases mapped most of its surface. The Dawn VIR-MS (Visible and Infrared Mapping Spectrometer) covers the spectral range of wavelengths 0.255 μm - 5.097 μm, giving information about the mineralogical composition of Vesta. For mapping purposes, Vesta's surface was divided in 15 quadrangles: here we analyze the quadrangle Av-14 (Urbinia) located in the southwest part of the asteroid (270°-360° E; 21°, 66° S) and the south pole quadrangle, Av-15 (Rheasilvia). Urbinia and Rheasilvia quadrangles appear less cratered than the north and the equatorial regions, and contains several different geologic units. The central and the southern parts of the Av-14 are characterized by a series of vertical scarps associated with the Rheasilvia ridge and groove terrain (RRGT); the upper part is flat and includes the equatorial cratered terrain (ECT) and two small areas of bright crater ray material (BCRM). The Rheasilvia quadrangle presents three types of terrains: Rheasilvia cratered mount terrain (RCMT) corresponding to the central pick, the RRGT, found also in the near quadrangle Urbinia and four areas of ejecta materials (EM) (Yingst et al., LPSC, 2012).
The spectra of Vesta's surface are similar to those of HED (howardite, eucrite and diogenite) meteorites, characterized by two strong
absorption features at 0.9 μm and 1.9 μm related to pyroxenes. The two features show different band depths and band centers, which can be associated with the grain size distribution, abundance of the absorbing minerals, and the presence of opaque materials. Pyroxenes are everywhere on Vesta at the VIR pixel scale of hundreds of meters. The distribution of the VIR band centers and the band depths shows an evident variability among the different regions of the asteroid. The parameters are often correlated with geological structures and are geographically located in different regions. Within the Urbina and Rheasilvia quadrangles, a particulary strong band depth is observed close to the RRGT and most of the terrains are mineralogically classified as ST-Southern Terrains (De Sanctis et al., LPSC, 2012). ST terrains are those characterized by with very deep 1 and 2 micron bands. HAMO and LAMO high-resolution data will provide more details and will allow for a finer analysis of the two quadrangles and all Vesta's surface.
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