



Spatial correlation between the mineralogic and geologic maps of Vesta: a GIS based approach

Alessandro Frigeri (1), Maria Cristina De Sanctis (1), Eleonora Ammannito (2), Aileen Yingst (3), David Williams (4), Fabrizio Capaccioni (1), Federico Tosi (1), Ernesto Palomba (1), Francesca Zambon (1), Ralf Jaumann (5), Carle Pieters (6), Carol Raymond (7), and Christopher Russell (2)

(1) Istituto Nazionale di Astrofisica, Istituto di Astrofisica e Planetologia Spaziali, Roma, Italy, (2) Institute of Geophysics and Planetary Physics, University of California at Los Angeles, Los Angeles, California, USA, (3) Planetary Science Institute, Tucson, Arizona, USA, (4) Arizona State University, Tempe, AZ, (5) DLR German Aerospace Center, Berlin, Germany, (6) Department of Geological Sciences, Brown University, Providence, Rhode Island, USA, (7) NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA

Between July 2011 and September 2012, the NASA/Dawn mission has mapped the surface of Vesta with images from the Framing Camera (FC), spectral data from the Visible and Infrared Mapping Spectrometer (VIR), and elemental data from the Gamma Ray and Neutron Detector (GRaND).

The successful acquisition of imagery from FC and VIR allowed us to produce image mosaics reaching 20 meters per pixel and global mineralogic maps at 100 meters per pixel.

A global geologic map of Vesta has been recently published. Geologic units and structures have been identified and put into their stratigraphic context using FC image-mosaic and the digital terrain model derived from stereo image processing.

The VIR spectra have been synthesized into spectral parameters or indicators that have been used to produce quadrangle and global maps showing the mineralogic diversity across Vesta, through the variation of the compositional and the physical state of the pyroxene-rich lithologies, which are typical of Vesta.

We have designed a Geographic Information System (GIS) approach to correlate quantitatively the geologic map and the spectral parameters maps of Vesta, applying statistical analysis and informational techniques to the geospatial aspect of the geologic and mineralogic data. The Geographic Resources Analysis Support System (GRASS) Software version 7 has been used for the analysis, while data has been stored in an Open Geospatial Consortium (OGC) compatible digital format, which guarantees the interoperability with other GIS and other computational software packages.

Here we present the work done so far on the most up-to-date global geologic and mineralogic dataset available for Vesta.