**GEOLOGIC MAPPING OF THE AV-12 SEXTILIA QUADRANGLE OF ASTEROID 4 VESTA.** K. Krohn[1], R. Jaumann[1,2], K. Stephan[1], C.M. Pieters[3], R. Wagner[1], R.A. Yingst [4], D.A. Williams[5], P. Schenk[6], G. Neukum[2], N. Schmedemann[2], T. Kneissl[2], M.C. De Sanctis[7], A. Nathues[8], D.L. Buczkowski[9], T. Roatsch[1], F. Preusker[1], E. Kersten[1], C.T. Russell[10], C.A. Raymond[11], [1] Institute of Planetary Research, German Aerospace Center (DLR), Berlin, Germany (Katrin.Krohn@dlr.de), [2] Freie Universität Berlin, Inst. of Geosciences, Planetology and Remote Sensing, [3] Brown University, Providence, RI, USA, [4] Planetary Science Institute, Tucson, AZ, USA, [5] Arizona State University, Tempe, USA, [6] Lunar and Planetary Institute, Houston, USA, [7] National Institute of Astrophysics, Rom, Italy, [8] Max Planck Int. Katlenburg-Lindau, Germany, [9] Johns Hopkins University Applied Physics Laboratory Laurel, USA, [10] UCLA, Institute of Geophysics, Los Angeles, USA, [11] Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA

**Introduction:** NASA's *Dawn* spacecraft entered orbit of the inner main belt asteroid 4 Vesta on July 16, 2011, and is spending one year in orbit to characterize the geology, elemental and mineralogical composition, topography, shape, and internal structure of Vesta before departing to asteroid 1 Ceres in late 2012. As part of the *Dawn* data analysis the Science Team is conducting geological mapping of the surface, in the form of one global and 15 quadrangle maps. This abstract reports results from the mapping of quadrangle Av-12, named Sextilia.

**Data:** The base for mapping this quadrangle is a monochrome Framing Camera (FC) mosaic produced from the High Altitude Mapping Orbit (HAMO) data with a spatial resolution of ~70 m/pixel. This base is supplemented by a Digital Terrain Model (DTM) derived from Survey orbit data (Figure 1). Also used to support the mapping are FC color ratio images from the Survey orbit with a spatial resolution of ~250 m/pixel, slope and contour maps derived from the DTM, and Visible and InfraRed (VIR) hyperspectral images from the Survey and HAMO orbits with spatial resolutions of 700 and 200 m/pixel, respectively.

**Geologic Setting:** Av-12 Sextilia Quadrangle is located between 21° - 66° South and 90° - 180° East. This quadrangle is dominated by the Sextilia crater. The crater is about 20 km in diameter and shows a very well preserved ejecta blanket around the rim. Quadrangle Av-12 is also dominated by two scarps, Argonium Rupes at 108 km in diameter (centered at 53.3°S and 166.7°E) and Matronalia Rupes which continues in Quadrangle Av-11 Pinaria at 180 km in diameter (centered at ~ 49°S and 85°E).The two scarps define the rim of the Rheasilvia impact crater.

**Geologic Units & Features:** Figure 2 shows the geological map of Av-12. Primary geologic features of this region include: (1) Rheasilvia material, including scarp wall material, slump deposits and ridge-and-groove terrain; (2) Dark material; (3) Slump material in impact craters; (4) Old basin material.

*Rheasilvia Material.* The Rheasilvia impact basin extends across the Quadrangles 11-15 and encompasses different units. Av-12 contains scarp wall material, slump deposits and ridge-and-groove terrain. The scarps define part of the rim of Rheasilvia and have steep slopes. Scarp wall material is characterized by a fresh morphology with low crater density and smooth material. The slump deposits have a low crater density and smooth material as well but compared to the scarp wall material the morphology is affected by ramps and a lower slope. The adjacent ridge-and-groove terrain shows ridges and grooves radiating about 90° to 270°.

*Dark Material.* Lower-albedo surface material ("dark material") appears within the boundaries of the quadrangle in the form of ejecta associated with impact craters and as linear features [1]. In this quadrangle it appears within impact craters and associated its ejecta, as well as linear features. In impact craters it normally occurs as streaks along crater walls, indicating that it may be fallback ejecta or remnants of dark material strata [1]. Dark material that slumps down the wall is the result of mass wasting [1]. Linear dark features developed as a straight line through craters, as seen in Sextilia crater.

*Slump material in impact craters.* Quadrangle Av-12 exhibits significant differences in elevation, from -20 km to 12.5 km (Fig. 2). As a result, some craters were formed on slopes. The material from the upslope rims overrun the lower downslope rims and flowed out of the craters, as seen in Helena crater [2].

*Old basin material.* The northern part of the Quadrangle is dominated by an inhomogeneus higher cratered terrain containing several large craters. The South Pole DTM indicates the terrain is a relic of a large basin underlying the Rheasilvia basin (Fig. 3).

**References:** [1] Jaumann, R. et al. (2012), LPSC 43. [2] Jaumann, R. et al. (2011), AGU #U21-B02.

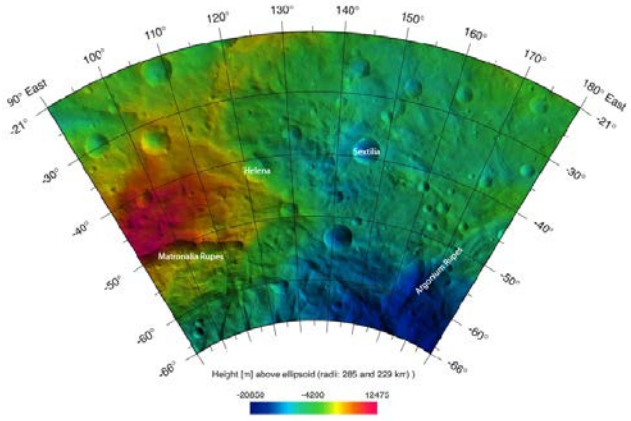


Figure 1: Height color-coded mosaic of Av-12.

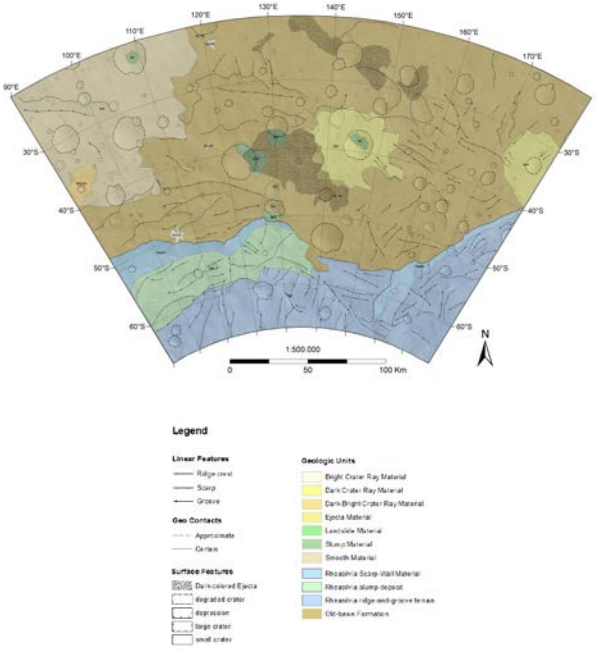





Figure 2: Geologic map and legend of Quadrangle Av-12 Sextilia.

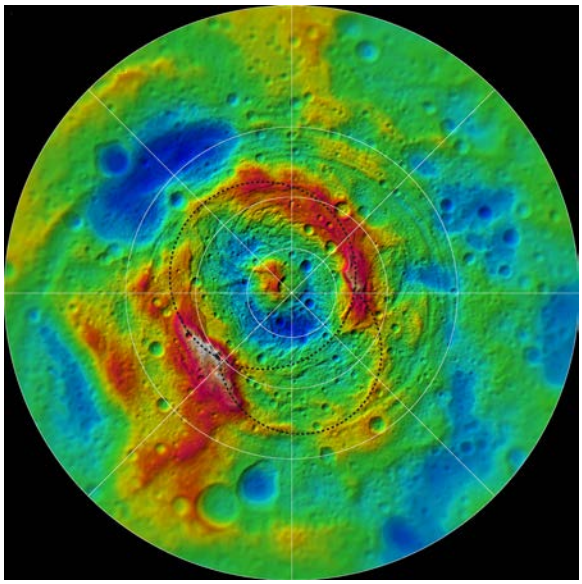

Figure 3: South Pole stereo DTM mosaic. Showing the rim of Rheasilvia and a possible secondary underlying basin.