GEOLOGIC MAPPING OF THE AV-5 FLORONIA QUADRANGLE OF ASTEROID 4 VESTA. C.M. Mercer[1], D.A. Williams[1], J.E. Scully[2], D.T. Blewett[3], D.L. Buczkowski[3], R. Jaumann[4], P.M. Schenk[5], R.A. Yingst[6], W.B. Garry[6], T. Roatsch[4], F. Preusker[4], C.M. Pieters[7], C.T. Russell[2], C.A. Raymond[8], M.C. De Sanctis[9], and the *Dawn* Science Team, [1]School of Earth & Space Exploration, Arizona State University, Tempe, Arizona 85287-1404 (David.Williams@asu.edu), [2]UCLA, Los Angeles, California, USA; [3]JHU-APL, Laurel, Maryland, USA; [4]DLR, Berlin, Germany; [5]LPI, Houston, Texas, USA; [6]PSI, Tucson, Arizona, USA; [7]Brown University, Providence, Rhode Island, USA; [8]NASA JPL, California Institute of Technology, Pasadena, California, USA; [9]National Institute of Astrophysics, Rome, Italy.

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, chemical 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 15 quadrangle maps. This abstract reports results from the mapping of quadrangle Av-5, named Floronia.

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 (Fig. 1). This base is supplemented by a Digital Terrain Model (DTM) derived from Survey orbit stereo image data with a lateral spacing of 450 m/pixel (10 pixels per degree) and a vertical accuracy of ~30 meters (Fig. 2). Slope and contour maps derived from the DTM are also used to support the mapping. FC color ratio images from the HAMO orbit with a spatial resolution of ~70 m/pixel, and Visible and InfraRed (VIR) hyperspectral images from the Survey and HAMO orbits with spatial resolutions of 700 and 200 m/pixel, will also be utilized to aid the mapping as these data sets become available.

Geologic Setting: Av-5 Floronia Quadrangle is located between ~20-66˚N and 270˚-360˚E and covers a portion of the heavily-cratered northern hemisphere of Vesta. This very heavily-cratered terrain is partly obscured by shadows from topographic highs such as crater rims. Crater Floronia is 17 km (W-E) x 19 km (N-S), and its floor is also obscured. A NW-SE-trending trough extends for ~56 km across the SW corner of this quad. As of March 2012 only the southern half of the quad (~20-45˚N) has been illuminated. The remainder will be illuminated in July/August 2012.

Geologic Units & Features: At the global scale [1,2] Vesta has three dominant terrains: A heavily-cratered northern terrain with ancient troughs and grooves, an intermediately-cratered equatorial terrain bearing prominent flat-floored, E-W-trending troughs, and the relatively lightly-cratered south polar region, containing the Rheasilvia impact basin and related terrains. Only the cratered northern terrain is present in this quadrangle.

Craters and crater ejecta. The northern cratered terrain on Vesta is the most heavily cratered surface on the asteroid, suggesting that it represents the oldest exposed surface. Craters are overlapping and many are heavily degraded, with smooth rims and flat rather than bowl-shaped floors indicative of mass wasting processes. In several locations old craters overlap to form irregularly-shaped depressions, perhaps influenced by tectonic fractures. Bright ejecta from several younger, large impact craters has smoothed the underlying older cratered surface.

Troughs on Vesta. Part of a NW-SE-trending trough occurs in the SW corner of this quadrangle. This trough has been degraded by superposed impacts, and has a relatively flatter floor compared to the equatorial troughs. Structural analysis [3] suggests that the formation of this NW-SE-trending trough and grooves with a similar orientation in the northern hemisphere are some sort of tectonic response to the formation of an ancient south polar basin, underlying the younger larger Rheasilvia basin [4].

Ongoing Studies: A complete and thorough mapping of this quadrangle must wait until complete imaging of Vesta's northern hemisphere can be completed later this year (Vesta's rotation axis is tilted ~29˚ with respect to its orbital plane, and *Dawn* arrived during northern winter; thus portions of Vesta north of ~45˚ N are in shadow). In addition to morphology derived from FC clear filter images, we want to take advantage of compositional information derived from FC color ratio images and VIR hyperspectral data. These data do show compositional variations in other parts of Vesta [5].

References: [1] Yingst, R.A., et al., this meeting. [2] Jaumann, R. et al., this meeting. [3] Buczkowski, D.L., et al., *GSA Abstr w/Prog, 13/5*, p. 574. [4] Schenk, P.M., et al., this meeting. [5] De Sanctis et al., this meeting.

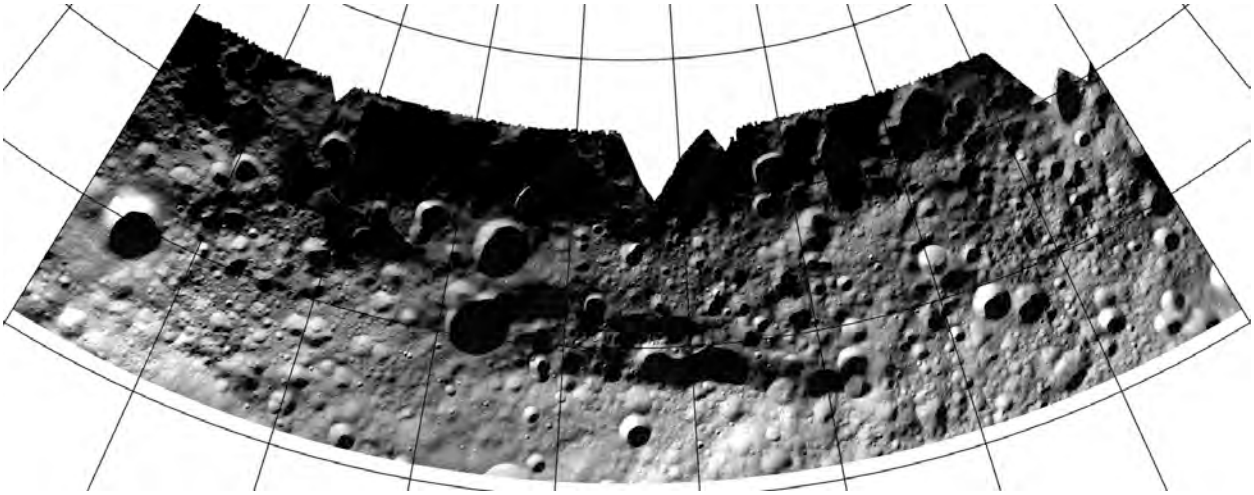

Figure 1. NASA Dawn FC mosaic of quad Av-5.

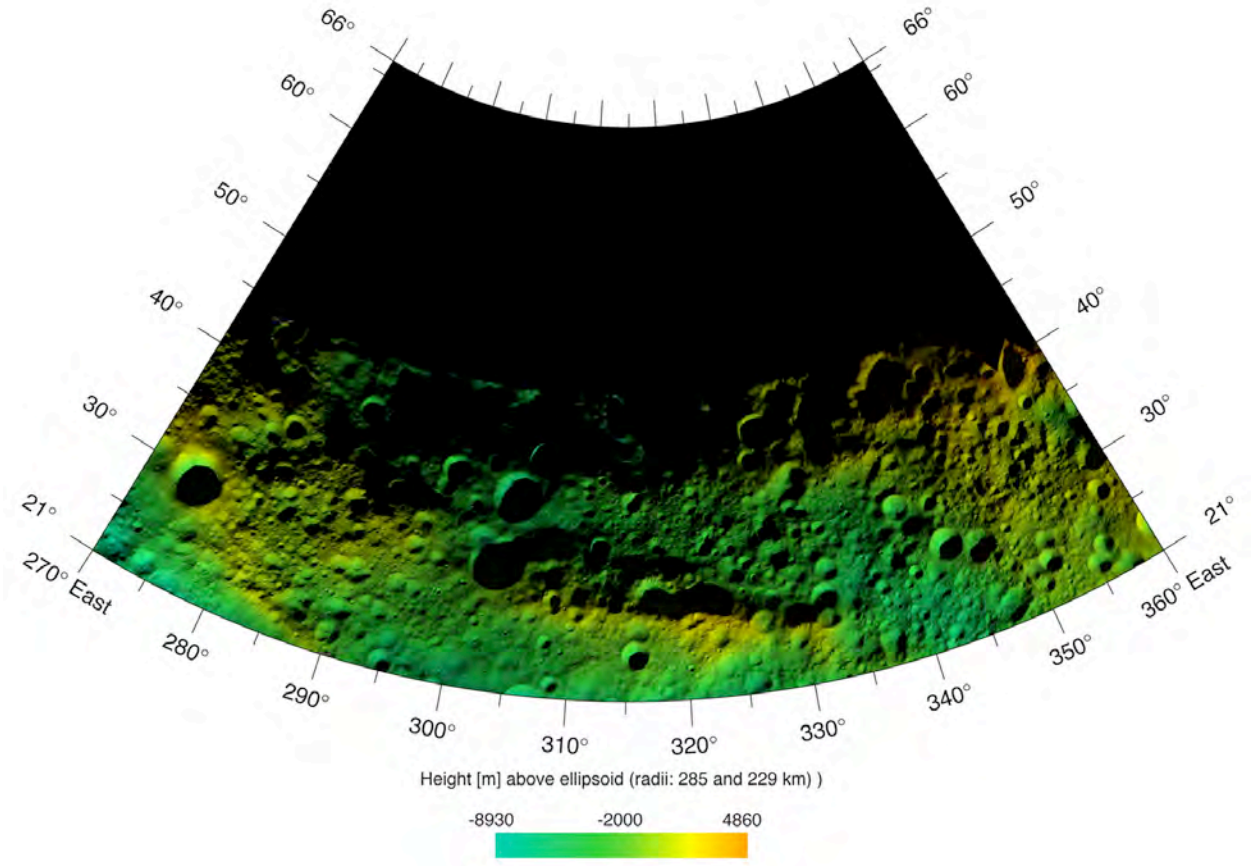

Figure 2. Color-coded Digital Terrain Model of quad Av-5, derived from NASA Dawn FC monochrome imaging.