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# Geologic Mapping of the Av-5 Floronia Quadrangle of Asteroid 4 Vesta

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NASA's Dawn spacecraft is spending one year in orbit of asteroid 4Vesta to characterize its geology, chemical and mineralogical composition, topography, shape, and internal structure. The Dawn Team is conducting geological mapping of the surface in the form of 15 quadrangle maps, and here we report results from the mapping of Floronia quadrangle Av-5. Mapping is based on a Framing Camera (FC) mosaic produced from High Altitude Mapping Orbit (HAMO) data with a spatial resolution of ∼70 m/pixel, supplemented by a Digital Terrain Model (DTM: lateral spacing of 450 m/pixel and vertical accuracy of ∼30 meters), FC color images, and Visible and InfraRed (VIR) hyperspectral images. 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 April 2012 only the southern half of the quad (∼20-45˚N) has been illuminated. 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. 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 suggests that the formation of this NW-SE-trending trough (and grooves with a similar orientation in the northern hemisphere) is some sort of tectonic response to the formation of an ancient south polar basin, underlying the younger larger Rheasilvia basin. 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 topography derived from FC clear filter images, we want to take advantage of compositional information derived from FC color ratio images and VIR hyperspectral data.