GEOLOGIC MAPPING OF AV-10 OPPIA QUADRANGLE OF ASTEROID 4 VESTA. W.B. Garry[1], M.V. Sykes[1], D.L. Buczkowski[2], D.A. Williams[3], R.A. Yingst[1], S.C. Mest[1], R. Jaumann[4], C.M. Pieters[5], T. Roatsch[4], F. Preusker[4], C.T. Russell[6], C.A. Raymond[7], G. Filacchione[8] and the *Dawn* Science Team. [1]Planetary Science Institute, Tucson, AZ (wbgarry@psi.edu); [2]JHU-APL, Laurel, MD; [3]ASU, Tempe, AZ; [4]DLR, Berlin, Germany; [5]Brown University, Providence, RI; [6]UCLA, Institute of Geophysics, Los Angeles, CA; [7]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; [8]INAF-IFSI Via Fosso del Cavaliere, 100, 00133, Roma, Italy.

Introduction: NASA's *Dawn* spacecraft arrived at the main belt asteroid 4 Vesta on July 16, 2011. *Dawn* is collecting a variety imaging, spectral, and elemental abundance data during its one year in orbit to characterize the geology, geochemistry, shape and internal structure of Vesta. The *Dawn* Science Team has begun geologic mapping of Vesta's surface at the global **[1,2]** and of 15 quadrangles at the regional scale. This abstract reports results from the mapping of quadrangle Av-10, named Oppia **(Fig. 1)**. Research supported by NASA Dawn at Vesta Participating Scientist Program.

Data: The base image for mapping quadrangle Av-10 is a monochrome (clear filter) Framing Camera (FC) mosaic using images from the High Altitude Mapping Orbit (HAMO) (70 m/pixel) **(Fig. 2a)**. Variations in surface composition are informed by Visible and Infra-Red (VIR) hyperspectral images from Survey (700 m/pixel) and HAMO (200 m/pixel) orbits and FC color ratio images (250 m/pixel) from Survey orbit. Topography of Av-10, shown in the colorized Digital Terrain Model (DTM) **(Fig. 2b)**, is derived from Survey orbit FC data **[3-5]**. Slope and contour maps derived from the DTM are used to characterize geologic features and the extent of geologic units.

Geologic Setting: Av-10 Oppia quadrangle is located within the equatorial region of Vesta, and covers -22° to 22° latitude and 288° to 0°/360° E longitude. There are three key geographic areas in the quadrangle: 1) cratered terrain in the north, 2) a broad, topographic low (Feralia Planitia) that dominates the central portion of the quadrangle and 3) a topographically higher area towards the south, which most likely related to the Rheasiliva impact basin. Equatorial troughs and ridges cut across the quadrangle between -10° and 10° latitude. The quadrangle is named after Oppia crater **(Fig. 1)**, which is 34 km in diameter and located at -8° latitude and 309° longitude.

Geologic Units and Features: Av-10 Oppia quadrangle shows the complex interaction of several geologic units in the equatorial region of Vesta.

Oppia Crater and Ejecta. The impact that formed Oppia hit along the southern boundary of Feralia Planitia. The sharp rim of the crater and the smooth ejecta near the rim, along with a low abundance of impact craters on the ejecta indicate the crater is relatively young **(Fig. 1)**. In FC color-ratio images using *Clementine* ratios (Red (750/430 nm); Green (750/920 nm); Blue (430/750 nm)), the ejecta blanket has a distinct coloration in comparison the surrounding terrain **[6]**. The ejecta is primarily distributed towards the south.

Feralia Planitia. This topographic low is one of the larger basin-like features on Vesta. It is 270 km across and ~15 km deep in relation to the surrounding topographically higher terrain. Feralia Planitia has been reshaped and partially buried by Oppia crater, as well as an unnamed ~50 km diameter crater in the northwest section of the quadrangle, and by the ridge and trough terrain, including the southern end of Saturnalia Fossa.

Northern Cratered Terrain. The northern cratered terrain is one of the older geologic units in Av-10. A portion of this terrain was excavated by the impact that formed Feralia Planitia.

Troughs and Ridges. A set of E-W-trending equatorial troughs and ridges are present in the eastern half of the quadrangle (Divalia Fossa) (see Av-6 Gegania). A portion of Saturnalia Fossa is present in the northwest corner of the quadrangle (see Av-4 Domitia and Av-9 Numisia). These troughs are linked to the formation of two large basins near the south pole of Vesta **[7].**

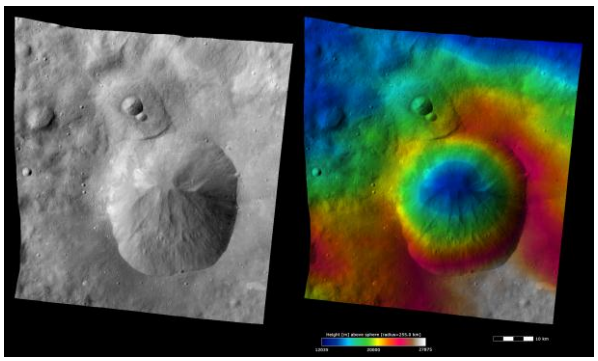

Figure 1. *Dawn* Framing Camera HAMO image of Oppia crater: (left) FC clear filter, (right) overlain with color-coded topography. Resolution: 70 m/pixel. Scale bar: 10 km. Height (m) above sphere (radius: 255 km): Blue: 12035, Green: 20000, White: 27875. Image credit: NASA/ JPL-Caltech/ UCLA/ MPS/ DLR/ IDA.

References: [1] Yingst et al. (2011) Fall AGU, #P43B-0248. [2] Yingst et al. (2012) 43rd LPSC, this volume. [3] Preusker et al. (2011) Fall AGU, #U23B-02. [4] Jaumann et al. (2012) *Science*, in review. [5] Preusker et al. (2012) 43rd LPSC, this volume. [6] Nathues et al. (2011) Fall AGU, #U22A-01. [7] Buczkowski et al. (2011) Fall AGU, #U21B-05.

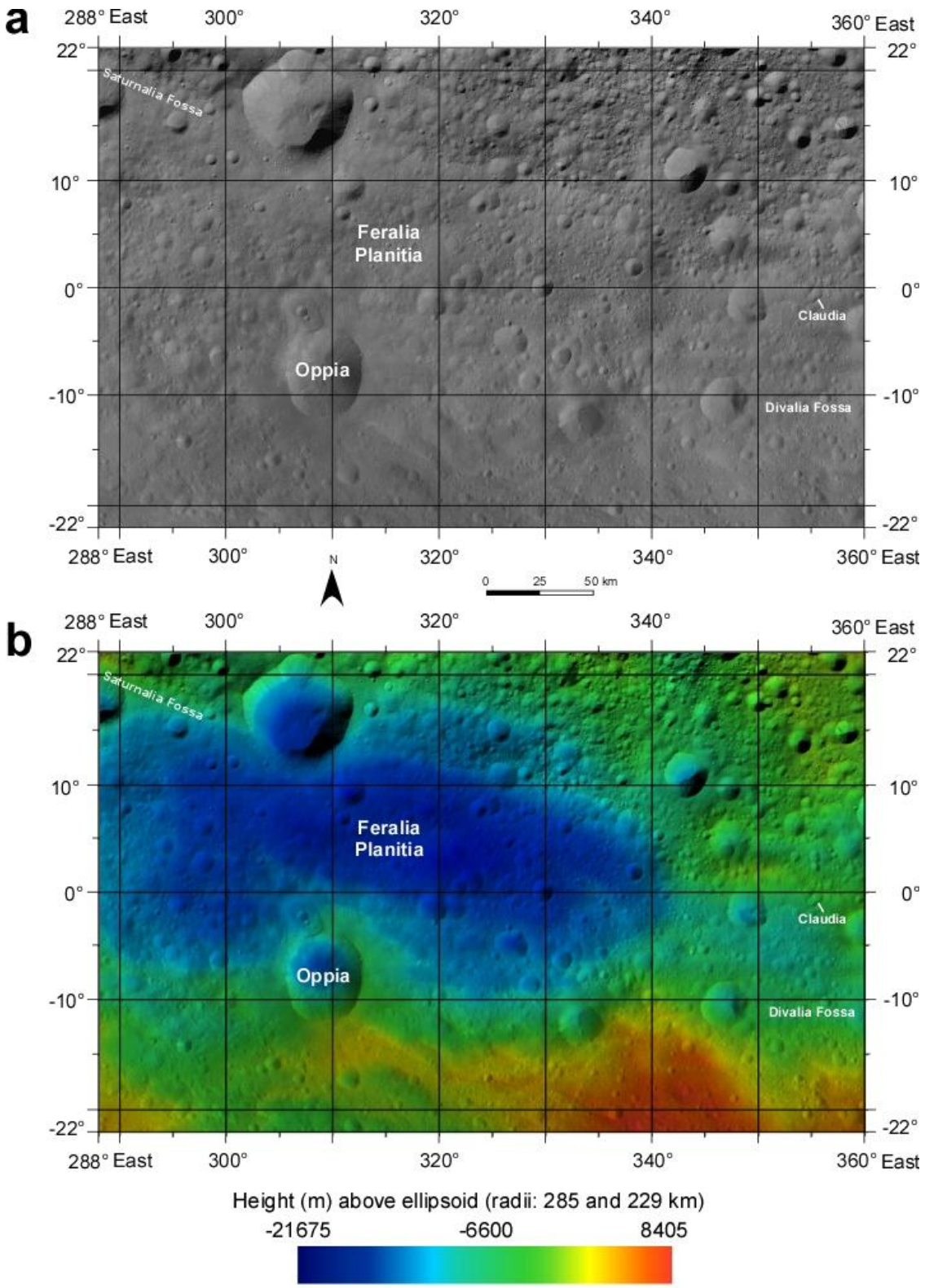

Figure 2. a) Av-10 Oppia Quadrangle mosaic of NASA's *Dawn* Framing Camera High Altitude Mapping Orbit (HAMO) images. Resolution is ~70 m/pixel. **b)** Topography of Av-10 Oppia Quadrangle. Digital Terrain Model (DTM) derived from NASA Dawn Framing Camera monochrome imaging.