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Geologic Mapping of the Ac-H-1 quadrangle of Ceres from NASA's Dawn mission

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The Dawn Science Team is conducting a geologic mapping campaign for Ceres similar to that done for Vesta (1, 2), including production of a Survey- and High Altitude Mapping Orbit (HAMO)-based global map, and a series of 15 Low Altitude Mapping Orbit (LAMO)-based quadrangle maps. In this abstract, we present the geologic map and geologic evolution of the Ac-H-1 Asari Quadrangle. At the time of writing, LAMO images (35 m/pixel) are just becoming available. Thus, our geologic maps are based on HAMO images (140 m/pixel) and HAMO and Survey (400 m/pixel) digital terrain models (for topographic information) (3). Dawn Framing Camera (FC) color images are also used to provide context for map unit identification. The maps to be presented as posters will be updated from analyses of LAMO images. Ac-H-1 quadrangle covers the North Pole area: 65°N-90°N. Key characteristics of the study area are: (i) a high density of impact craters and (ii) only moderate topographic variations across the quadrangle. We measured a crater density of 9.8E-04 km-2 for crater diameters >10 km, the highest on Ceres measured so far. Topographic lows, reaching -4 km, correspond to the floors of impact craters with diameters up to 64 km. A few isolated topographic highs (plateaus), reaching ∼5 km in altitude relative to the ellipsoid are present. Their irregular shape is often sculpted by impacts. A peculiar topographic rise is represented by Ysolo Mons: a ∼5 km high and ∼20 km wide mountain. No downslope striations are preserved on the Mons flanks, indicating an older surface relative to Ahuna Mons, a similar but morphologically fresh appearing mountain at the equator (quadrangle Ac-H-10, (4)). Several impact craters show central peaks and/or mass wasting deposits on their floor. Crater rims often display terraces. These morphologies show varying degrees of degradation. Uncommon crater morphologies are a smooth crater floor (crater located at 79°N–170°E) and a large mass wasting landform inside Ghanan crater floor. The latter feature, similar to a long runout landslide, is ∼20 km wide, ∼25 km long and displays lineations on its surface. It originates from a crater that impacted on the rim of Ghanan crater. Possible formation mechanisms for this and other features will be discussed. References: [1] Williams D.A. et al. (2014) Icarus, 244, 1-12. [2] Yingst R.A. et al. (2014) PSS, 103, 2-23. [3] Preusker, F. et al. (2015), EPSC abstract #186. [4] Platz T. et al. (2015), AGU abstract #P53E-2177.