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Geological Mapping of the Ac-H-3 Dantu 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 discuss the geologic evolution of the Ac-H-3 Dantu Quadrangle. The current map is based on a Framing Camera (FC) clear-filter image mosaic from HAMO data (∼140 m/px) as well as a digital terrain model (DTM) derived from imagery of the Survey phase [3]. Albedo variations were identified and mapped using a mosaic of photometrically corrected HAMO images provided by DLR. FC color images provided further context for map unit identification. LAMO images (35m/pixel), which have just become available at the time of writing, will be used to update the map to be presented as a poster.

The quadrangle is located between 21-66°N and 90-180°E in a large-scale depression north of the impact basin Kerwan. The northern and southeastern parts of the quadrangle are characterized by cratered terrain while the south and southwest are dominated by the partially smooth ejecta blankets of craters Dantu and Gaue. East-west oriented pit/crater chains in the southern half of the quadrangle might be related to tectonic processes [4,5]. Dantu crater (d=∼126 km) is a complex impact crater showing slump terraces and a partially smooth crater floor with concentric and radial fractures. Furthermore, Dantu shows a central pit structure with pitted terrain on its floor as well as several bright spots in the interior and exterior of the crater. High-resolution measurements of crater size-frequency distributions (CSFDs) superposed on Dantu indicate a formation/modification age of ∼200 - 700 Ma. Most of the ejecta appear to be relatively bright and correspond to parts of the #2 high albedo region observed with the Hubble Space Telescope [6]. However, the southwestern portion of the ejecta blanket is characterized by relatively dark ejecta material. The albedo variations and differences in color data indicate materials of different compositions in the subsurface. Interestingly, Dantu is located in a longitude range where the Herschel space telescope might have observed the release of water vapor [7]. In the course of the mission, analyses of LAMO imagery as well as VIR spectral data will help to identify potential water sources, constrain the compositional variations, and the overall geologic history of the Dantu crater region. Further CSFD measurements we will help to determine the formation ages of other impact structures in the quadrangle.

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