

Preliminary Geological Map of the Ac-H-6 Haulani Quadrangle of Ceres: An Integrated Mapping Study Using *Dawn* Spacecraft Data

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ABSTRACT

We used geologic mapping applied to Dawn spacecraft data as a tool to understand the geologic history of the Ac-H-6 Haulani Quadrangle of dwarf planet Ceres. This region, located between 22°S-22°N and 0-72°E, is dominated by the 31km diameter Haulani impact crater in the west. Haulani shows a bright interior and is surrounded by bright ejecta, which preferentially extends westward. Photometrically corrected data show that small rays radially extend over several hundred kilometers to the west. A heavily cratered elevated plain extends around the equator to the NE, interrupted by a trough in the east. This plain seems to be part of a dominant geological unit crossing Ceres. A crater in the southern part of the plain reveals possible flow features extending to the NW, maybe of volcanic origin. The quadrangle is also affected by many impact craters with modified floors: smooth infilling, melted material, central peaks, possible domes and mass wasting. Some candidate volcanic domes occur in the northwestern and southern parts of the quadrangle. Linear depressions cross the quadrangle in W-E direction, with a slight tendency to NW. A set of small linear depressions close to each other are found in the SE. They are orientated in NW direction crossed by one in WE direction. At the time of writing, geologic mapping was performed on Framing Camera (FC) mosaics from the Approach (1.3 km/px) and Survey (415 m/px) orbits, including grayscale and color images and digital terrain models derived from stereo images. In Fall 2015 images from the High Altitude Mapping Orbit (140 m/px) will be available to refine the mapping, followed by Low Altitude Mapping Orbit (35 m/px) images in January 2016. The key goal of the ongoing mapping is to analyze, whether the origin of the bright material of the Haulani crater is endogenic or exogenic. Additionally, domes and linear depressions could be of volcanic and volcanic-tectonic origin.

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