**GEOLOGIC MAPPING OF THE Ac-H-7 KERWAN QUADRANGLE OF CERES FROM NASA's DAWN MISSION.** D.A. Williams[1], S.C. Mest[2], T. Kneissl[3], J.H. Pasckert[4], H. Hiesinger[4], N. Schmedemann[3], A. Neesemann[3], D.L. Buczkowski[5], J.E.C. Scully[6], S. Marchi[7], P. Schenk[8], R. Jaumann[9], T. Roatsch[9], F. Preusker[9], A. Nathues[10], M. Schäfer[10], M. Hoffmann[10], C.A. Raymond[6], C.T. Russell[11]. [1]School of Earth and Space Exploration, Arizona State University, Box 871404, Tempe, AZ 85287 (David.Williams@asu.edu); [2]Planetary Science Institute, Tucson, AZ; [3]Freie Universität, Berlin, Germany; [4]Institut für Planetologie, Westfälische Wilhelms-Universität, Münster, Germany; [5]Johns Hopkins University Applied Physics Laboratory, Laurel, MD; [6]NASA JPL, California Institute of Technology, Pasadena, CA; [7]Southwest Research Institute, Boulder, CO; [8]Lunar and Planetary Institute, Houston, TX; [9]German Aerospace Center (DLR), Berlin, Germany; [10]Max Planck Inst. for Solar System Research, Göttingen, Germany; [11]UCLA, Los Angeles, CA.

**Introduction:** NASA's Dawn spacecraft arrived at Ceres on March 5, 2015, and has been studying the dwarf planet through a series of successively lower orbits, obtaining morphological & topographical image, mineralogical, elemental, and gravity data. 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-7 Kerwan Quadrangle.

**Mapping Data:** At the time of this writing LAMO images (35 m/pixel) are just becoming available. Thus, our geologic maps are based on HAMO images (140 m/pixel) and Survey (415 m/pixel) digital terrain models (for topographic information). Dawn Framing Camera (FC) color images are also used to provide context for map unit identification. The maps to be presented as posters at LPSC will be updated from analyses of LAMO images (~35 m/px).

**Results:** Ac-H-7 Kerwan Quadrangle is located between 22˚S-22˚N and 72-144˚E, and hosts several primary features and terrains:

1) The northern and central parts of the 280 km diameter impact basin Kerwan occur in the center and SE corner of the quadrangle. Kerwan's rim is very degraded and there is no obvious ejecta field, indicating it is one of the oldest large impact basins visible on Ceres. Kerwan's interior is filled with a 'smooth terrain' that also extends beyond the rim to the east and west. This smooth terrain hosts a significantly lower impact crater density than most of the rest of Ceres' surface. Preliminary crater counts of the Kerwan smooth terrain derive cratering model ages of ~3 Ga using the lunar-derived chronology and ~600-800 Ma using the asteroid flux-derived chronology (*H. Hiesinger*, pers. comm., 2016). Our working interpretation is that the Kerwan impact occurred when Ceres' crust had a greater proportion of ice than at present, and that impact heating melted crustal material resulting in resurfacing of the Kerwan region by an icy impact melt, or possibly initiated cryovolcanic flows. There are hints of possible flow margins on the Kerwan floor in HAMO images, that have to be confirmed or denied by study of LAMO images.

2) A portion of the 126 km diameter crater Dantu and its ejecta field covers the NE corner of the quadrangle. FC color data show both bright and dark materials in the ejecta field, suggesting excavation of terrains of different compositions. Alternatively, because Dantu is one of two longitudes on Ceres where water vapor release has been detected [3], another interpretation is that the bright and/or dark deposits in the Dantu region could result from explosive cryovolcanism. Further study of LAMO data is required to investigate these hypotheses.

3) The 68 & 70 km double craters Inamahari-Homshuk occur in the NW corner of the quadrangle, and are surrounded by a distinctive ejecta field.

4) The 12 km diameter crater Rao, located in the north-central part of the quadrangle, has very bright ejecta and is interpreted as a relatively young, unweathered impact crater.

5) The 31 km diameter crater Bonsu, located in the east-central part of the quadrangle within the Inamahari-Homshuk ejecta field, is noted for a lower albedo smooth floor. This is tentatively interpreted as resurfacing material, whose genesis is to be determined with LAMO images.

6) The remainder of the quandrangle is dominated by a heavily cratered plains unit, particularly in the SW corner of the quadrangle, which appears to be the dominant unit across Ceres surface.

**Future Work:** Key goals of the ongoing mapping in Kerwan quadrangle are to use LAMO data to assess further the types of processes that might be responsible for resurfacing by the smooth unit, and understanding the nature of the variably-colored Dantu ejecta.

*Acknowledgments:* Support of the Dawn Instrument, Operations, and Science Teams is acknowledged. This work is supported by grants from NASA, and from the German and Italian Space Agencies.

**References:**

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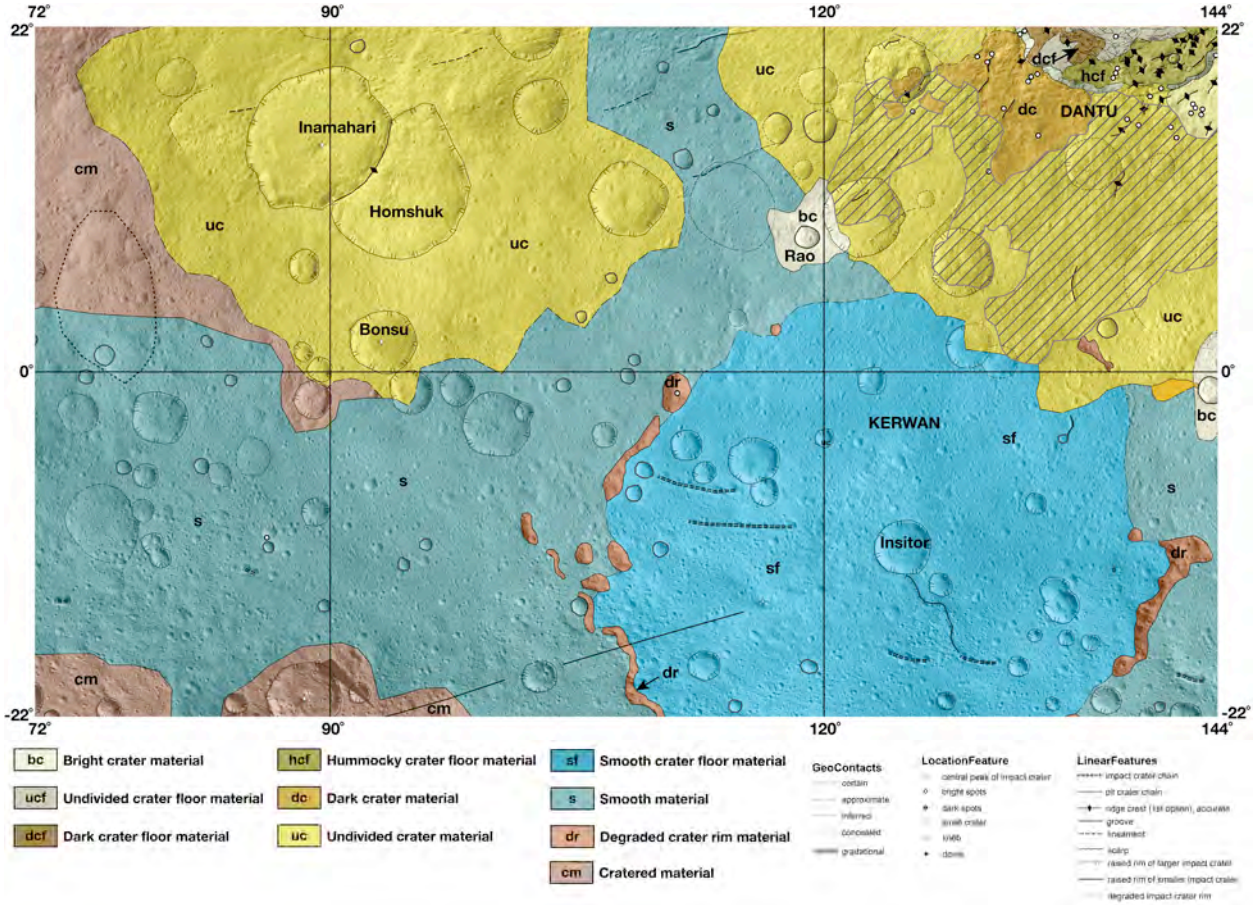


**Figure 1:** Geologic map of the Ac-H-7 Kerwan Quadrangle of dwarf planet Ceres. Mapping base is Dawn FC HAMO mosaic (courtesy DLR).