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Geological Mapping of the Ac-H-7 Kerwan Quadrangle of Ceres from NASA Dawn Mission.

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NASA's Dawn Science Team is conducting a geologic mapping campaign for Ceres similar to that done for Vesta [1,2], including a series of 15 Low Altitude Mapping Orbit (LAMO)-based quadrangle maps. 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 280 km diameter impact basin Kerwan occur in the center and SE corner of the quad-rangle. Kerwan's rim is very degraded and there is no obvious ejecta field, indicating it is one of the oldest visible large impact basins 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) Part 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 ex-cavation 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) Other features include the 68 & 70 km double craters Inamahari-Homshuk with a distinc-tive ejecta field, the 12 km diameter crater Rao that has very bright ejecta and is interpreted as a relatively young, unweathered impact crater, and the 31 km diameter crater Bonsu that has lower albedo smooth floor interpreted as resurfacing material.

References: [1] Williams D.A. et al. (2014) Icarus, 244, 1-12. [2] Yingst R.A. et al. (2014) PSS, 103, 2-23. [3] Küppers, M., et al. (2014). Nature, 505, 525-527.