

GEOLOGIC MAPPING OF THE AC-H-08 NAWISH QUADRANGLE OF CERES FROM NASA'S DAWN MISSION. A. Frigeri¹, M.C. De Sanctis¹, E. Ammannito¹, G. Carrozzo¹, D. Williams³, S. Mest⁴, D. Buczkowski⁵, F. Preusker⁶, R. Jaumann⁶, T. Roatsch⁶, J. Scully⁷, T. Kneissl⁸, C.A. Raymond⁷, C.T. Russell². ¹Istituto di Astrofisica e Planetologia Spaziali, Istituto Nazionale di Astrofisica, via del Fosso del Cavaliere, 00133 Roma, Italy (alessandro.frigeri@iaps.inaf.it); ²Institute of Geophysics and Planetary Physics, University of California at Los Angeles, Los Angeles, California, USA; ³Arizona State University, Tempe, AZ; ⁴Planetary Science Institute, Tucson, Arizona, USA; ⁵German Aerospace Center (DLR), Berlin, Germany; ⁶JHU Applied Physics Laboratory Laurel, Maryland, USA; ⁷NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA; ⁸Freie Universität Berlin, Malteserstr. 74-100, 12249 Berlin, Germany;

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 and 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-08 Nawish Quadrangle, located between -22° and 22° North and from 144 to 216° East. The quadrangle's name comes from the crater Nawish which is located in the northern sector of the quadrangle. The currently approved IAU nomenclature includes four features which are described in table 1.

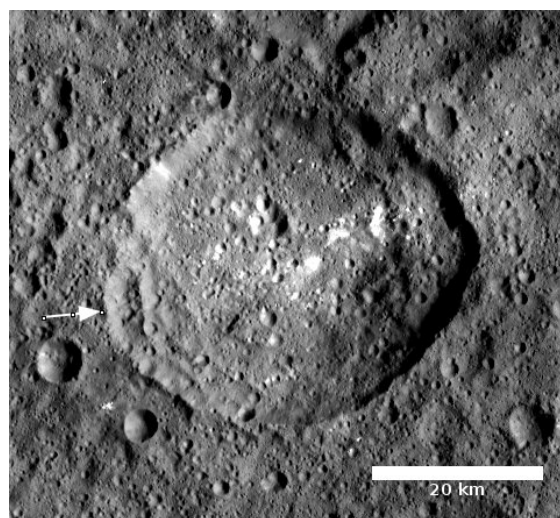
Mapping Data At the time of this writing LAMO images (35 m/pixel) are just becoming available. Thus, our geologic maps are based on HAMO images (140 m/pixel) and Survey (400 m/pixel) digital terrain models (for topographic information). Dawn Framing Camera (FC) color images are also used to provide context for map unit identification. The maps to be presented as

Name	Type	Origin
Nawish	Crater	Acoma (New Mexico, SW USA) guardian of the field.
Heneb	Crater	Egyptian god of grain, produce, and vineyards.
Kumitoga	Crater	Polynesian goddess of plant life.
Samhain Catena	Catena	Gaelic festival at the end of the harvest season. It was observed in Ireland and Scotland during 7 days in October and November, nearly halfway between the autumn equinox and the winter solstice.

Table 1: The names of features in the Ac-H-08 Nawish Quadrangle currently approved by IAU posters will be updated from analyses of LAMO images.

Results The geologic map of the quadrangle is reported in Figure 2.

Samhain Catena is the main tectonic feature of the quadrangle in the south-eastern sector, with a West-northwest trend (108 - 288°). The largest units of the quadrangle are the smooth material (s), and the cratered



(a)



(b)

Figure 1: (a) Heneb crater. (b) unnamed 19 km diameter crater located at 158.2° E and 11.1° N

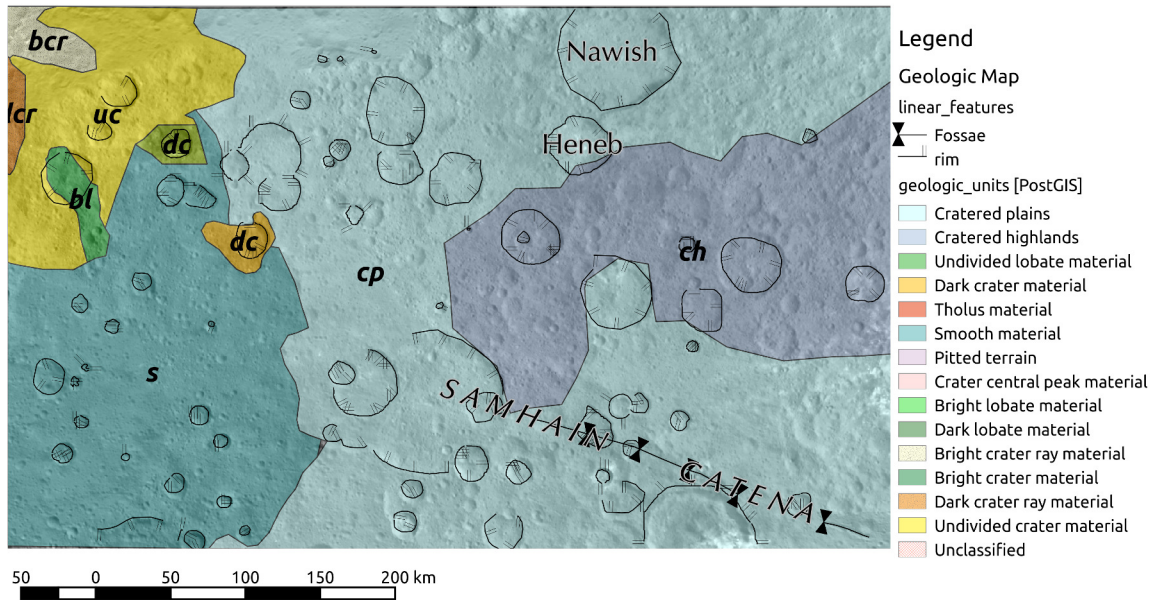


Figure 2: The geologic map of Ac-H-08 Nawish Quadrangle of Ceres, located between -22° and 22° North and from 144° to 216° East. Mapping base is Dawn FC HAMO mosaic (courtesy DLR).

materials. The cratered materials have been divided in cratered plains (cp) and cratered highlands (ch) on the basis of their topography. The north-western sector of the quadrangle shows units related to the 125 km diameter Dantu crater of the Ac-H-3 quadrangle [3], with dark and bright albedo crater rays system. The craters show a very diverse morphology across the study area. The largest crater of the quadrangle is Kunitoga of 95 km diameter, highly degraded and without ejecta blanket, located at 178.6°E and 10.1°S . The 75 km diameter Nawish crater gives the name to the quadrangle and shows a flat bottom and a central pit of 8 km in diameter, which is consistent with other craters of Ceres with a diameter higher than 75 km [4]. Heneb crater (Figure 1a) shows bright spots on the floor and terraced walls in its SW and NE sector. In the western part of the quadrangle there is a dark-albedo unnamed crater (Figure 1b) with very steep and fresh walls showing a very high horizontal albedo variation in the southern part.

Future Work The upcoming Low Altitude Mapping Orbit (LAMO) data represent the higher spatial resolu-

tion data we will receive from the Dawn mission thus they will be used to put constraints in the current mapping work. Color filter data analysis of FC will be used to extract the main compositional variation across the quadrangle, and to address VIR mineralogic analyses [5] over specific targets.

References [1] Williams D.A. et al. (2014) *Icarus*, 244, 1-12. [2] Yingst R.A. et al. (2014) *PSS*, 103, 2-23. [3] Kneissl T. et al. (2016) this conference. [4] Schenk P. et al. (2016) this conference. [5] De Sanctis M.C et al. (2016) this conference.

Acknowledgements The support of R.A. Yingst, C.M. Pieters, A. Nathues, M. Hoffmann, M. Schaefer, S. Marchi, M.C. De Sanctis, C.T. Russell, C.A. Raymond, and the Dawn Instrument, Operations, and Science Teams is gratefully acknowledged. This work is supported by grants from NASA through the Dawn project, and from the German Space Agency (DLR) and the Italian Space Agency (ASI).