DAWN MISSION FINAL HIGH RESOLUTION GLOBAL GEOLOGIC MAP OF CERES. D.A. Williams[1], D.L. Buczkowski[2], D.A. Crown[3], A. Frigeri[4], K. Hughson[5], T. Kneissl[6], K. Krohn[7], S.C. Mest[3], J.H. Pasckert[8], T. Platz[9], O. Ruesch[10], F. Schulzeck[7], J.E.C. Scully[11], H.G. Sizemore[3], A. Nass[7], R. Jaumann[7], C.A. Raymond[11], C.T. Russell[5]. [1]School of Earth and Space Exploration, Arizona State University, Box 871404, Tempe, AZ 85287 (David.Williams@asu.edu); [2]Johns Hopkins University Applied Physics Laboratory, Laurel, MD; [3]Planetary Science Institute, Tucson, AZ; [4]National Institute for Astrophysics, Rome, Italy; [5]UCLA, Los Angeles, CA; [6]Formerly at Freie Universität, Berlin, Germany; [7]German Aerospace Center (DLR), Berlin, Germany; [8]University of Münster, Münster, Germany; [9]Formerly MPI for Solar System Research, Goettingen, Germany; [10]ESA-ESTEC, Noordwijk, The Netherlands; [11]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA.

Introduction: A 1:4M global geologic map of dwarf planet (1) Ceres was completed by the science team from NASA's Dawn mission, derived from images obtained during the Low Altitude Mapping Orbit (LAMO, 35 m/px). The map was published on the cover of *Icarus*, volume 316, December 2018 issue, along with a series of papers describing the geology within Ceres quadrangles. In this abstract we present the final map (Figure 1) and summarize our findings.

Ceres Mapping Campaign: The geologic mapping campaign for Ceres using Dawn Framing Camera images is described in [1]. In summary, we conducted an iterative mapping campaign using images with increasing spatial resolution from Dawn's Survey orbit, High Altitude Mapping Orbit (HAMO), and LAMO. The first Survey map was published in *Science* [2]. The HAMO map with the chronostratigraphy and geologic timescale for Ceres is currently in review. The 15 individual LAMO quadrangle geologic maps of Ceres are published with links included in the References [1, 3-13].

The objectives for geologic mapping using the LAMO mosaics were to investigate geologic features/topics identified from the initial global mapping in more detail and to refine the geologic history. As discussed in [1], there were challenges with this approach, most significantly coordination of 14 individual mappers and their mapping styles and objectives relative to efforts by other Dawn Science Team members. In the end, for the final published maps and mapping papers, individual quadrangles were combined when needed based on the distributions and extents of geologic units and features on the cerean surface. For example, the Urvara and Yalode quadrangle maps were combined because of the proximity of these two large basins and overlap of their deposits and structures [13]. In all, eleven papers were published that discuss important cerean geologic features and processes, including the north polar cratered terrain [3]; the smooth impact melt-like deposits in Ikapati crater in Coniraya quadrangle [4]; the complex crater materials in Dantu crater; water ice-based lobate flows in Ezinu quadrangle [5]; six possibly cryovolcanic tholi (domes) in Fejokoo quadrangle [6]; the bright rayed and complex ejecta materials of Haulani crater [7]; the nature of the smooth material around Kerwan, Ceres' oldest impact basin [8]; the ancient rim of the putative Vendemia Planitia basin in Nawish quadrangle [9]; the nature of floor fractures in craters in Occator quadrangle [10]; the interplay of cryovolcanic domes (e.g., Ahuna Mons), Yalode and Haulani ejecta in Rongo quadrangle [11]; the wide diversity of crater morphologies found in the Sintana quadrangle [12]; and the complex stratigraphy of crater materials in the adjacent large basins Urvara and Yalode [13]. These eleven papers along with an introductory paper discussing the Ceres mapping campaign can be accessed at links below, or in the December 2018 special issue of *Icarus*.

References: [1] Williams, D.A., et al., 2018. Introduction: The geological mapping of Ceres, *Icarus, 316*, 1-13, https://doi.org/10.1016/j.icarus.2017.05.004; [2] Buczkowski D.L. et al. (2016) *Science, 353*, http://dx.doi.org/10.1126/science.aaf4332; [3] Ruesch, O., et al., 2018. *Icarus, 316*, 14-27, https://doi.org/10.1016/j.icarus.2017.09.036; [4] Pasckert, J.H., et al., 2018. *Icarus, 316*, 28-45, https://doi.org/10.1016/j.icarus.2017.06.015; [5] Scully, J.E.C., et al., 2018. *Icarus, 316*, 46-62, https://doi.org/10.1016/j.icarus.2017.10.038; [6] Hughson, K.H.G., et al., 2018. *Icarus, 316*, 63-83, https://doi.org/10.1016/j.icarus.2017.09.035; [7] Krohn, K., et al., 2018. *Icarus, 316*, 84-98, https://doi.org/10.1016/j.icarus.2017.09.014; [8] Williams, D.A., et al., 2018. *Icarus, 316*, 99-113, https://doi.org/10.1016/j.icarus.2017.08.015; [9] Frigeri, A., et al., 2018. *Icarus, 316*, 114-127, https://doi.org/10.1016/j.icarus.2018.08.015; [10] Buczkowski, D.L., et al., 2018. *Icarus, 316*, 128-139, https://doi.org/10.1016/j.icarus.2017.05.025; [11] Platz, T., et al., 2018. *Icarus, 316*, 140-153, https://doi.org/10.1016/j.icarus.2017.08.001; [12] Schulzeck, F., et al., 2018. *Icarus, 316*, 154-166, https://doi.org/10.1016/j.icarus.2017.12.007; [13] Crown, D.A., et al., 2018. *Icarus, 316*, 167-190, https://doi.org/10.1016/j.icarus.2017.08.004.

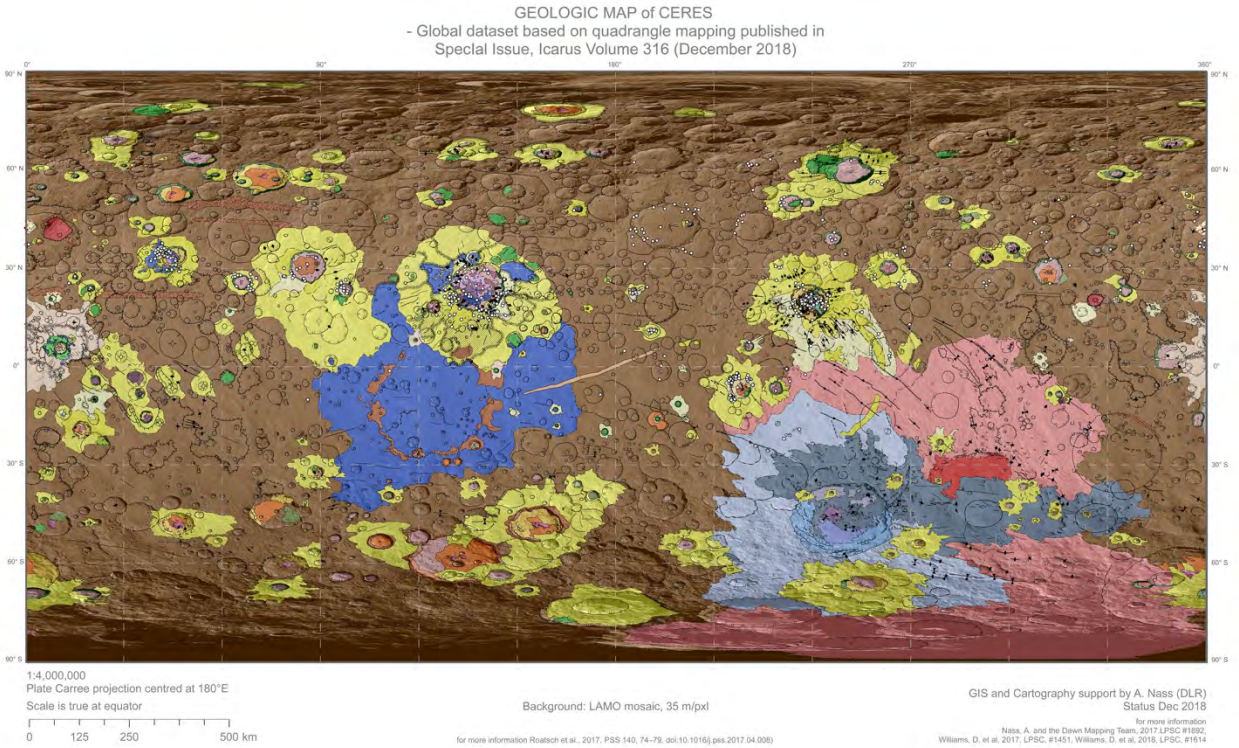

Figure 1a. Final LAMO-derived global geologic map of dwarf planet (1) Ceres (Plate Carree projection, center long. = 180˚, IAU-approved Dawn Kait coord. system). This map was produced using ArcGIS™ software through integration of 15 individual quadrangle maps produced by the coauthors. For citation of the Dawn Ceres LAMO-based map, please use this abstract. For a poster-sized version of the final map, please contact David Williams (David.Williams@asu.edu).

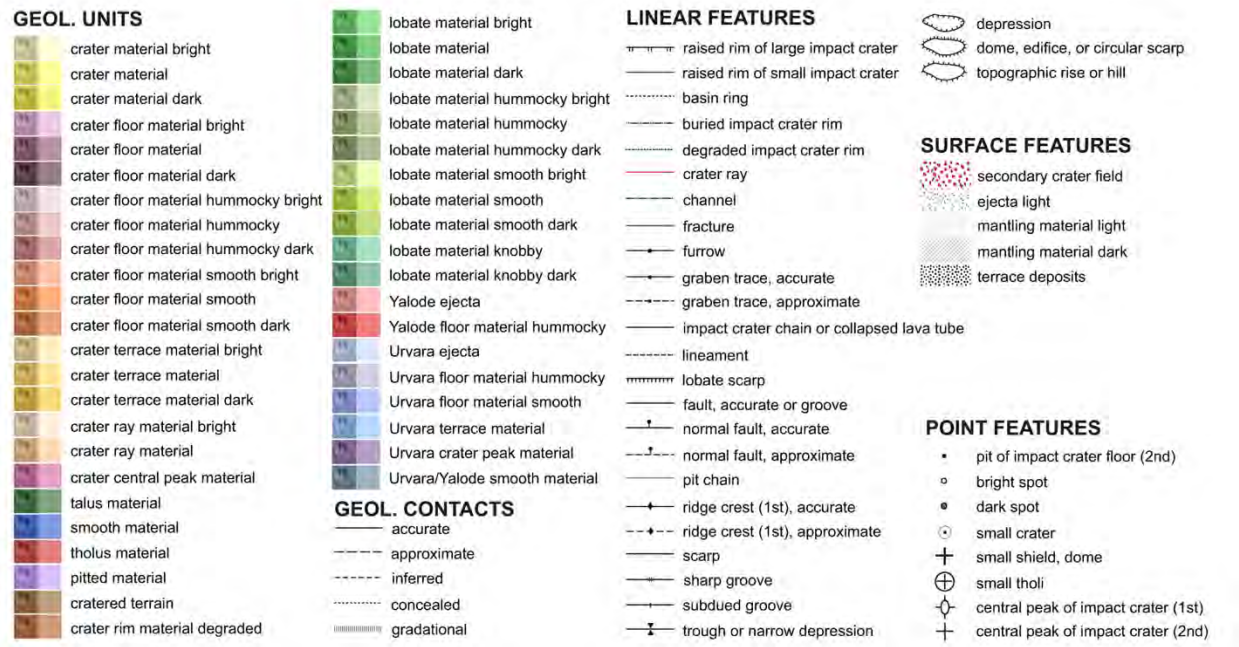

Figure 1b. Legend for Ceres unified LAMO geologic map. After [2].