Geophysical Research Abstracts
Vol. 18, EGU2016-7936, 2016
EGU General Assembly 2016

Geological Mapping of the Ac-H-11 Sintana Quadrangle of Ceres from NASA's Dawn Mission.

Franziska Schulzeck (1), Katrin Krohn (1), Ralf Jaumann (1), David A. Williams (2), Debra L. Buczkowski (3), Scott C. Mest (4), Jennifer E. C. Scully (5), Isabel v. d. Gathen (1), Elke Kersten (1), Klaus-Dieter Matz (1), Andrea Naß (1), Katharina Otto (1), Carle M. Pieters (6), Frank Preusker (1), Thomas Roatsch (1), Maria C. De Sanctis (7), Paul Schenk (8), Stefanus Schröder (1), Katrin Stephan (1), Roland Wagner (1), and the Dawn Team

(1) DLR, Berlin, Germany (franziska.schulzeck@dlr.de), (2) School of Earth & Space Exploration, Arizona State University, Tempe, AZ, USA, (3) JHU-APL, Laurel, MD, USA, (4) Planetary Science Institute, Tucson, AZ, USA, (5) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA, (6) Department of Earth, Environmental, and Planetary Sciences Brown University, Providence, RI, USA, (7) National Institute of Astrophysics, Rome, Italy, (8) Lunar and Planetary Institute, Houston, TX, USA

In December 2015, the Dawn spacecraft delivered the first images of the Low Altitude Mapping Orbit (LAMO) of the dwarf planet Ceres at a resolution of 35 m/pixel. This data will be used to finish the geological mapping of Ceres' surface in order to identify composition and surface forming processes. Mapping was already done using Survey Orbit and High Altitude Mapping Orbit (HAMO) data. With the new images, an updated map will be presented. To this point, the data material consists of a HAMO clear-filter mosaic (140 m/pixel) [1], a digital elevation model (DTM) [2] derived from Survey orbit (415 m/pixel) data, color-filter ratios and photometrically corrected images.

Ceres' surface has been divided into 15 mapping quadrangles. The Ac-H-11 Sintana quadrangle is located in the southern hemisphere of Ceres between 21 66°S and 0 90°E. Geological units identified so far are cratered terrain, which covers most of the area, and a younger unit of relatively smooth material. The latter is characterized by a low crater density. Material of the same unit was found in adjacent quadrangles as well. Interest is taken in the diversity of crater shapes. Many craters show different forms of asymmetries. One and the same crater for instance displays different stages of rim degradation and some crater walls are partly terraced and their slopes' steepness is varying alongside the crater rim. Several mass wasting features, which partly cause the observed asymmetries, have been identified. Next to the multiple collapsed rims, landslides due to later cratering on the primary crater rim are observed. Whereas collapse structures are mostly blocky, single landslides are characterized by lobate margins. Occurrence and type of mass wasting feature might hint to subsurface differences. Further, there is a diversity of inner crater structures, like relaxed crater floors, ridges, central peaks, mounds and smooth plains. Processes like mass wasting and relaxation have modified many craters. Complex craters for instance often lack central peaks. Color composite images allow us to identify fresh craters and accompanying ejecta, even though most craters lack visible ejecta blankets. Secondary crater chains are spread over most of the area, but we were not able to identify primary craters. On the contrary, at current resolution the Sintana quadrangle lacks linear structures that are of tectonic origin. LAMO data will help to refine unit boundaries and to distinguish linear structures.

References: [1] Roatsch T. et al. (2015) Planetary and Space Science, in press. [2] Preusker et al. (2016) LPSC XXXXVII.