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Ceres' deformational surface features compared to other planetary bodies.

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On March 2015, NASA's Dawn spacecraft arrived at the dwarf planet Ceres and has been providing images of its surface. Based on High Altitude Mapping Orbiter (HAMO) clear filter images (140 m/px res.), a Survey mosaic (∼400 m/px) and a series of Low Altitude Mapping Orbiter (LAMO) clear filter images (35 m/px) of the Dawn mission [1], deformational features are identified on the surface of Ceres. In order to further our knowledge about the nature and origin of these features, we start a comparative analysis of similar features on different planetary bodies, like Enceladus, Ganymede and the Moon, based on images provided by the Cassini, Galileo and Lunar Orbiter mission. This study focuses on the small scale fractures, mostly located on Ceres' crater floors, in comparison with crater fractures on the planetary bodies named above. The fractures were analyzed concerning the morphology and shape, the distribution, orientation and possible building mechanisms. On Ceres, two different groups of fractures are distinct. The first one includes fractures, normally arranged in subparallel pattern, which are usually located on crater floors, but also on crater rims. Their sense of direction is relatively uniform but in some cases they get deformed by shearing. The second group consists of joint systems, which spread out of one single location, sometimes arranged concentric to the crater rim. They were likely formed by cooling-melting processes linked to the impact process or up doming material. Fractures located on crater floors are also common on the icy satellite Enceladus [3]. While Enceladus' fractures don't seem to have a lot in common compared to those on Ceres, we assume that similar fracture patterns and therefore similar building mechanism can be found e.g. on Ganymede and especially on the Moon [2]. Further work will include the comparison of the fractures with additional planetary bodies and the trial to explain why fracturing e.g. on Enceladus differs from that on Ceres.
References:
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