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PRELIMINARY INVESTIGATION OF POLYGONAL CRATERS ON (1) CERES

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The Dawn space craft arrived at dwarf planet Ceres in March 2015 [1]. The on-board Framing Camera (FC) collected image data which revealed a large variety of impact crater morphologies including polygonal craters. Polygonal craters show straight rim sections aligned to form an angular shape. They are commonly associated with fractures in the target material [2]. Polygonal craters are known from a variety of planetary bodies such as icy satellites [3].

We use a mosaic composed of FC images to interpret the distribution and geologic setting of polygonal craters on Ceres.

We find polygonal craters with a size of up to 250 km in diameter. A preferential hexagonal shape is observed. Some polygonal craters exhibit central peaks or relaxed crater floors, while other polygonal craters are simple bowl-shaped. Polygonal craters show both relatively distinct and degraded crater rims indicating a continuous formation period. Areas showing a higher density of polygonal craters are evident in the higher latitudes. In the eastern hemisphere, polygonal craters are associated with a set of regional linear structures. The crater rims tend to align with these structures.

We will analyze polygonal crater density, orientation and morphology with respect to Ceres' geology and thus aim to infer structural information on geologic units. Assuming that polygonal craters are caused by fractures in the impacted material, structural regolith variations as well as tectonics of surface units will be discussed and related to Ceres' evolution.

[1] Russell, C. T. et al., 46th LPSC, #1131, 2015. [2] Öhman, T. et al., GSA Special Paper 465, pp. 51-65, 2010. [3] Beddingfield, C. B. et al., 46th LPSC, #1159, 2015.

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