OBSERVATIONS OF RING-MOLD CRATERS ON CERES

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Introduction: We found different shapes of ring-mold craters within the huge ice-rich Occator crater on Ceres. The craters contain either a central pit, bowl or a central peak. The ice-rich material of Occator´s crater floor is supposed to have caused the formation of ring-mold craters. Ring-mold craters are common on lineated valley fill and lobate debris aprons on Mars (Fig. 1). They are thought to be formed on layers with subsurface glacial ice [1]. Impacts into ice warm the ice and cause it to flow into the ring mold shape. We found similar craters within Occator crater on Ceres.

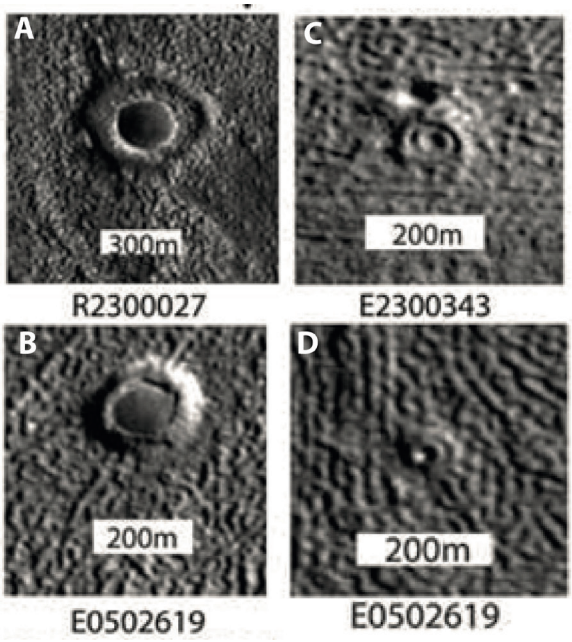

Figure 1: Ring-mold craters on Mars. A shows crater with a central pit. B shows a central plateau, C shows a multi-ring and D shows a bowl with a central mound.

Data: For the analysis of craters Dawn Framing Camera (FC) data from the Low Altitude Mapping Orbit (LAMO) have enabled an initial characterization of the surface. The monochrome and color ratio images [2] have a spatial resolution of 35 m/px. We also used a Digital Terrain Model (DTM) [3] derived from the High Altitude Mapping Orbit (HAMO) data with a spatial resolution of 136 m/pixel.

Observations: The observed craters are found within Occator crater and show an almost circular shape. The craters seem to be subsiding into the surface and, therefore, the rims are less elevated above the surrounding terrain. They show the typical ring-mold shape as known from Mars [1]. The craters contain either a central pit,bowl or a central peak (Fig. 2). The crater diameters range between 0.4 and 1.2 km.

Summary and Conclusions: Latest results by the Dawn Spacecraft indicate that Ceres is a weakly differentiated body containing a shell dominated by an ice-rock mixture [4] and ammoniated phyllosilicates [5]. Recent observations also show that hydrated salts could be warm enough to be mobile at a depth of 1.5-5 km below Ceres´ surface and would explain the buoyancy of ice and salt-enriched crustal reservoirs [6]. Occator is thought to have impacted in such a reservoir layer and triggered the mobility of ice and formed several ice-rich flow features and plain material [7]. The plains and flow materials also originate from the subsurface and their release is triggered by impacts [7]. So, it is likely that impacts hitting this material could form such ring-mold craters.

Future work: We will continue our survey of such craters all over Ceres and compare them to the Martian ones. The location of such craters provide important insight into detection of buried ice on Ceres.

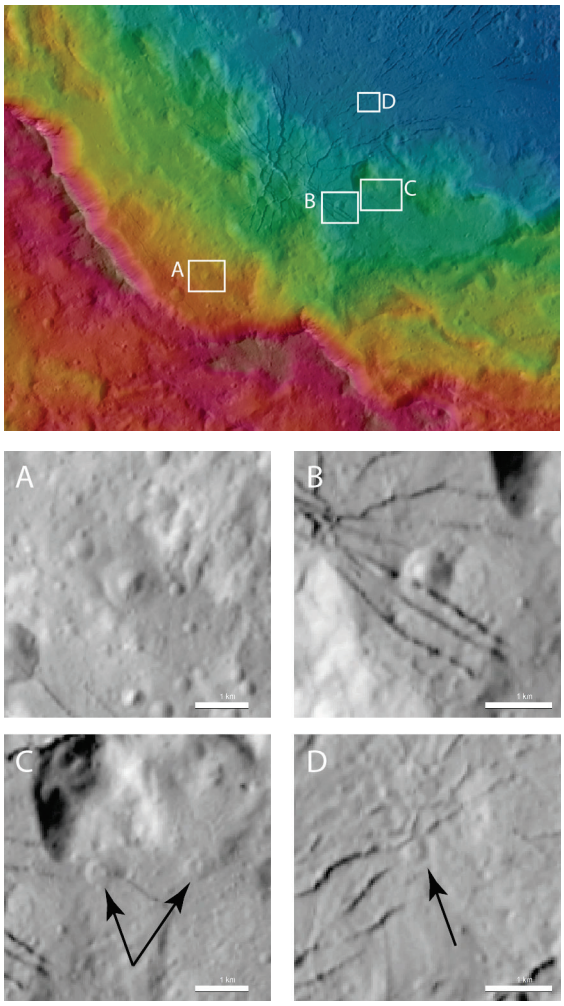

Figure 2: Ring-mold craters in Occator floor. A and B show craters with a central pit. C and D show craters with a central peak (arrows).

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