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Floor Fractured Craters around Syrtis Major, Mars

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High Resolution Stereo Camera (HRSC) and Mars Reconnaissance Context Camera (CTX) images revealed that the region around Syrtis Major exhibits morphologies related to volcanism and fluvial erosion. Craters around Syrtis Major are eroded and/or refilled. Additionally the crater floors are shaped by wind and fluvial activity generating highly weathered morphologies. Syrtis Major is one of the large Hesperian-aged volcanic regions on Mars. Basaltic deposits originating from nearby Syrtis Major cover the floor of impact craters. In particular some craters exhibit a fractured floor. Our work is focussed on this special crater type.

In three areas can be found these floor fractured craters. The first area is located in the south-eastern part of Syrtis Major, it borders to the highlands. Volcanic features like lava flow fronts, lava flows and wrinkle ridges dominate in this region. The crater floor is separated in sharp-edged plates and the interior seems to be flooded by basaltic material from the Syrtis Major volcano. The second area is in the north of Syrtis Major and the passage to the chaotic terrain further north. Nearby the dichotomy boundary fluvial activity was the decisive process. The crater rims are highly eroded, channels are cutting through the crater area and the crater floor is dissected and separated in several plates with a smooth and rounded shape. These features show the presence and activity of water. In the north-west of the volcano the third area can be found. Fluvial and volcanic features can be detected there.

The appearance of the craters depends on the erosion processes, which differs between the three areas. Crater rim and the shape of the fractured plates are indicators for the geologic environment. Floor fractured craters can be developed in volcanic or water-rich areas. The roundness of the fractured plates can be measured and a tool for crater classification. Furthermore the 5 known crater types are not sufficient to classify all floor fractured craters around Syrtis Major. New types have to be defined, especially for craters in volcanic areas.