



Orientation and morphologic age classification of northern hemisphere gullies on Mars using HRSC and MOC data

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Liquid water is required for the formation of young gullies on Mars. However, the current climate in the northern hemisphere does not allow the existence of liquid water today. Therefore the exploration of gullies is necessary to understand the youngest climatic history of Mars. The images of the High Resolution Stereo Camera (HRSC) with a resolution up to 10 m/pixel cover wide parts of the northern hemisphere. For this reason it is possible to measure the orientation of identified gullies representatively. In 50 of 230 evaluated HRSC-orbits north of 30°N we identified approximately 2300 gullies. The preferred direction of all analyzed gullies is southeast. However, the analysis of gullies on crater walls is more representative, because impact craters are at first order circular features. They have a point symmetry and there is a uniform azimuthally distribution of slopes, which is ideal when investigating the influence of insolation on the distribution and development of landforms. 1500 of all identified gullies are positioned on crater walls and the orientation changes with latitude: Between 30°N and 40°N the gullies occur on pole facing slopes and between 40°N and 60°N on all slope directions. The images of the Mars Orbiter Camera (MOC) camera only cover small areas of the northern hemisphere, but the better resolution (up to 1.4 m/pixel) allows a relative age classification based on the morphology of the gullies. We classified them into pristine, degraded and cratered gullies (Reiss et al., this issue). In ~320 of ~35000 MOC-images of the northern hemisphere (0°-90°N) approximately 3200 gullies were detected. The orientations of gullies are in agreement with the HRSC results. In contrast to the southern hemisphere (Reiss et al., this issue), there is no difference between the latitudinal orientations of younger and older

gullies which may indicate equal or similar climatic conditions for their formation in the northern hemisphere.

D. Reiss, R. Jaumann and G. Neukum (2006) Pristine, degraded, and cratered morphologies of southern hemisphere gullies on Mars: Possible indications for a climate change, this issue.