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G. Erkeling, D. Luesebrink, H. Hiesinger, D. Reiss, T. Heyer, R. Jaumann

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The Multi-Temporal Database of Planetary Image Data (MUTED): A Database to Support the Identification of Surface Changes and Short-lived Surface Processes

Erkeling, G.[1], D. Luesebrink[1], H. Hiesinger[1], D. Reiss[1], T. Heyer[1], R. Jaumann[2]

[1]Westfaelische-Wilhelms-Universitaet Muenster (WWU), Institut für Planetologie (IfP), Wilhelm-Klemm-Strasse 10, 48149 Muenster, Germany,

[2]German Aerospace Center (DLR), Berlin, Germany. (gino.erkeling@uni-muenster.de / Ph: +49-251-8336376).

Abstract

Images of Mars taken by spacecraft in the last few decades indicate that the landscape has changed and that current processes are continuously changing the surface. The modifications of the landscape are caused by exogenic processes including eolian activity, mass movement, the growth and retreat of the polar caps, glacial processes and crater-forming impacts. In particular the High Resolution Stereo Camera (HRSC) on board Mars Express (MEx) and the Context Camera (CTX) on board the Mars Reconnaissance Orbiter (MRO) cover large areas at high resolution and thus are particularly well-suited to detect the extent and origin of surface changes on Mars. Multi-temporal observations of variable features on Mars became possible by the increasing number of repeated image acquisitions of the same surface areas. To support the investigation of surface changes that represents a key element in martian research, we developed MUTED, the "Multi-Temporal Database of Planetary Image Data", which is a tool for the identification of the spatial and multi-temporal coverage of planetary image data from Mars. Using MUTED, scientists are able to identify the location, number, and time range of acquisitions of overlapping images from, for example, HRSC and CTX. MUTED also includes images from other planetary datasets such as those of the Mars Orbiter Camera (MOC), the Thermal Emission Imaging System (THEMIS), and the High Resolution