



Martian and Terrestrial debris slopes: Automated recognition attempts using a multi-method approach

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Debris slopes are typically formed at foot of escarpments via various depositional and mass movement processes. Their geomorphological and geomorphometric importance (both on Earth and on Mars) is mainly due to their relatively simple shape, combined with their indicative character: their slope angles are frequently very close to the angle of repose of the constituting material, and the relief they encompass often related to relict geomorphic features and processes.

In order to recognize these types of slopes we apply a multi-method approach: geomorphometric derivatives of digital terrain models are combined in GIS environment, as well as robust filtering methods are applied to find gently varying surfaces of quasi-constant slope angles. The former methods produce index variable coverages of the study area that can be combined into a decision coverage. In this way a raster pattern can be achieved that may outline the patches of potential debris slopes. The latter method is intended to analyse (semi)quantitatively the key areas of their potential presence. In this approach the focus is on the parameterisation of the extracted surface. The robust approach provide means to detect and yield parameters on these areas even if these slopes are dissected by other geomorphic features like rock cliffs, incising valleys, landslides remnants and other landforms pre- or post dating the debris slope itself.

Extensive automated recognition of debris slopes in planetary environments may contribute to the understanding of the surface evolution of the area on regional scale.