

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 2 (3B)

Author: Ms. Csilla Orgel
Eötvös Loránd University, Hungary, csilla.orgel1987@gmail.com

ANALYSIS OF CRYOKARSTIC SURFACE PATTERNS ON DEBRIS APRONS AT THE
MID-LATITUDES OF MARS**Abstract**

The presence of ice-related landforms on the Martian mid-latitudes have been studied on the basis of Viking imagery. These features are evidences in colder climatic conditions in the Martian geologic history. Three types of landforms are distinguished on Mars: lobate debris aprons (LDA), lineated valley fills (LVF) and concentric crater fills (CCF). The primary analogies of the features correspond to the terrestrial rock glaciers, which are located in periglacial and high-mountainous environments. The following cameras have been used to Mars Express (MEX) High Resolution Stereo Camera (HRSC 10m/pixel) as basemap and the Mars Reconnaissance Orbiter (MRO) High Resolution Imaging Science Experiment (HiRISE 0,25m/pixel) as detailed analysis as well as Mars Global Surveyor (MGS) Mars Orbiter Laser Altimeter (MOLA 300m/pixel horizontal and 0,30m/pixel vertical) as 3D elevation model the examined terrains. The data were analyzed with the help of ArcGIS 9.3. software. The Martian cryokarstic surface patterns on rock glaciers are more complex than terrestrial ones. This work focuses on the morphological analysis of the surface textures and types like knobs, furrows, ridges, pits, craters, polygonal and brain like' surfaces based on MRO HiRISE's stereo pairs images. The research may help in recognizing minor changes of the Martian climate. The basic questions are as follows: 1, What are the differences between the surface patterns of the two hemispheres? 2, Currently, are there any seasonal changes in the above-ground? 3, Are there any signs of movement on the rock glacier's surface? Four study locations were made in the Deuteronilus Mensae region and in the eastern Hellas Basin (Promethei Terra, Reull Vallis). The first two observed rock glacier's surfaces (37.4 N, 24.6 W and 39 S, 102.8 W) have a great variety of patterns while some of them do not appear each other's territory. The last two debris aprons surfaces (41.16 N, 29.54 W and 38.1 S, 113.2 W) are smooth and no crater or knob, can be found there. The possible explanation for the unusual lack of ordinary patterns are listed below: 1, The terrains contain a high percent of ice and the surface relaxes quickly. 2, The areas are very young and the patterns did not appear yet. 3, The rock glaciers are moving today. To summarize the seasonal changes and movement have not been finding traces on the test areas.