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Mapping and modeling of periglacial features in Thaumasia Highland, Mars

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We found extensive periglacial-like landforms in Thaumasia Highland, Mars. These landforms include linear to curvilinear ridges, concentric at places, which strongly resemble terrestrial rock glaciers. Some flow features are originating from cirque-like landforms, and they are characterized by longitudinal linear and curvilinear (moraine-like) ridges and frontal arcuate ones. Areas with protalus lobes (or valley side rock glaciers) are also present, mostly facing southward. Lineated or ridged crater fill are also found in the region at various locations. Structures similar to more complex rock glaciers, including well-developed valley fills can be also observed. They include lineated and ridged valleys, with apparent multiple lobes, locally forming piedmont-like rock glaciers as the valleys widen in their distal part. If these are indeed glacier-like feature the question arise whether they are still ice-cored or just the relicts of extinct glacial activity. While ice in low latitudes is generally not stable at the surface over long periods a sublimation till can stabilize ice deposits over extended periods of time. In order to assess the likelihood of finding ice rich deposits within the mapped features we have just started to use the Berlin Mars near Surface Thermal Model (BMST). We are considering scenarios in which a dirty snow mixture has been deposited during past climate cycles. While the snow will sublimate at the surface the water vapor can refreeze in deep layers forming an ice rich soil below a dry surface layer. The orientation of the slopes can benefit as south facing slopes receive less solar input.