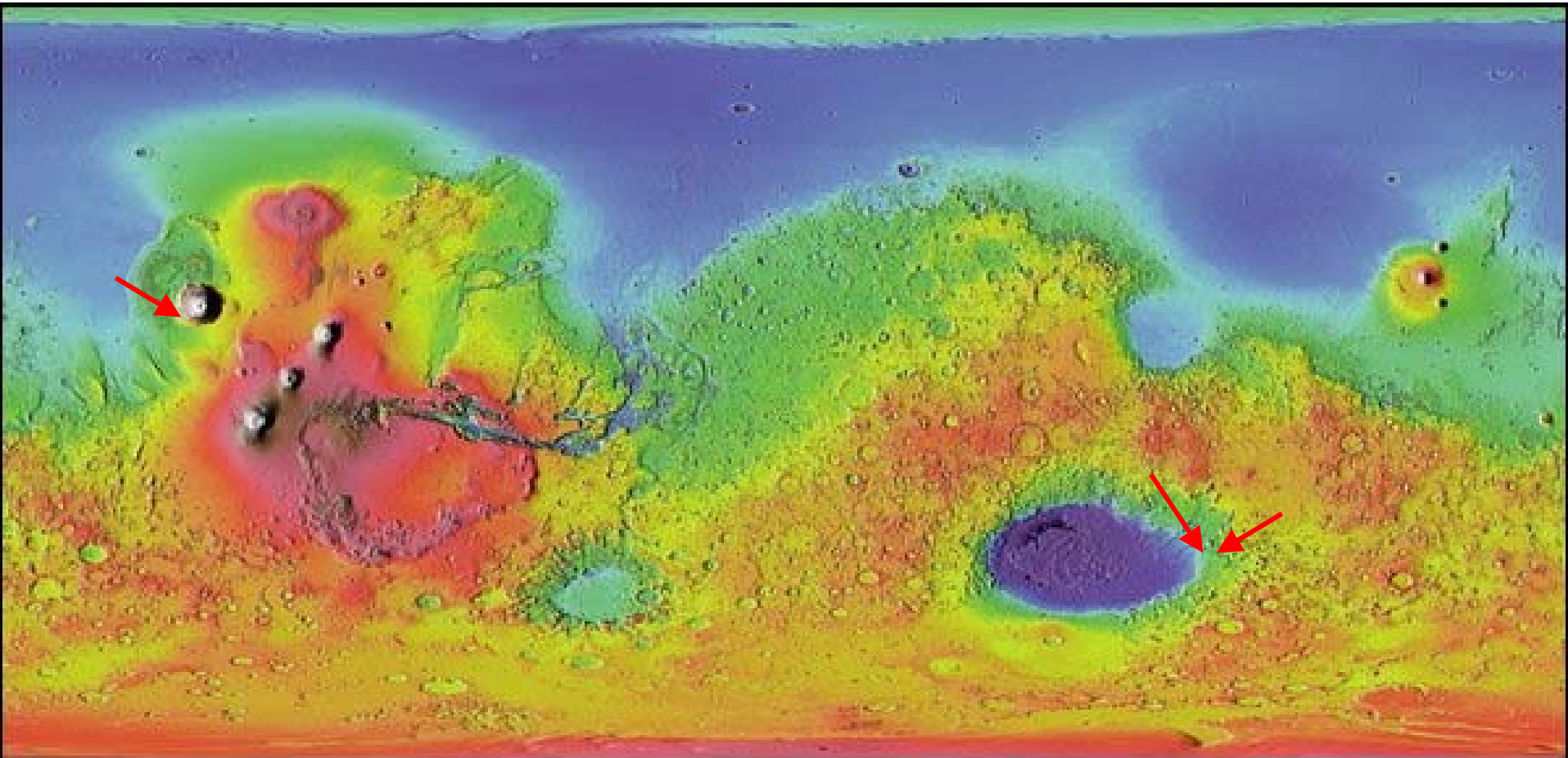
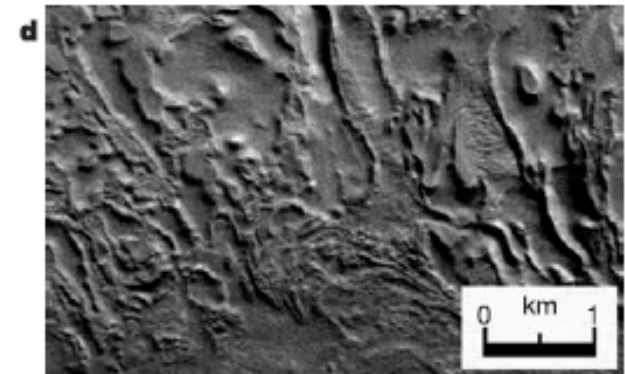
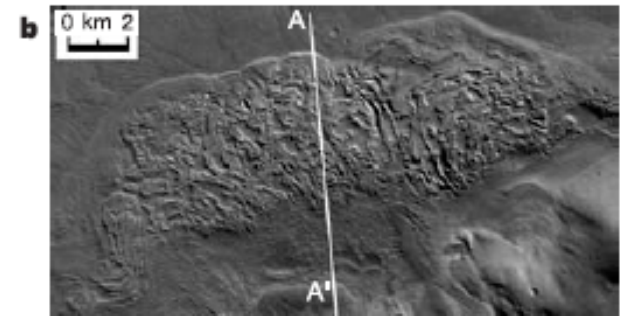
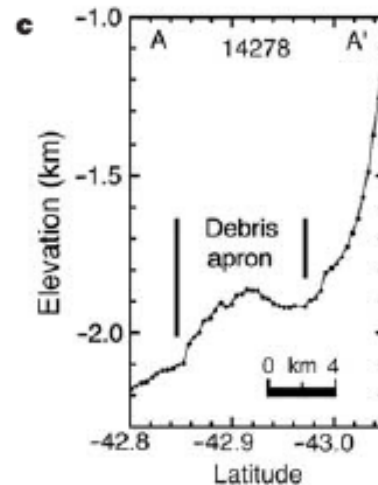
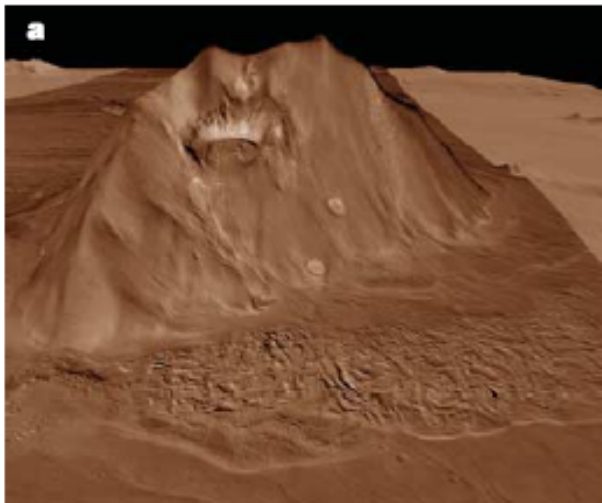


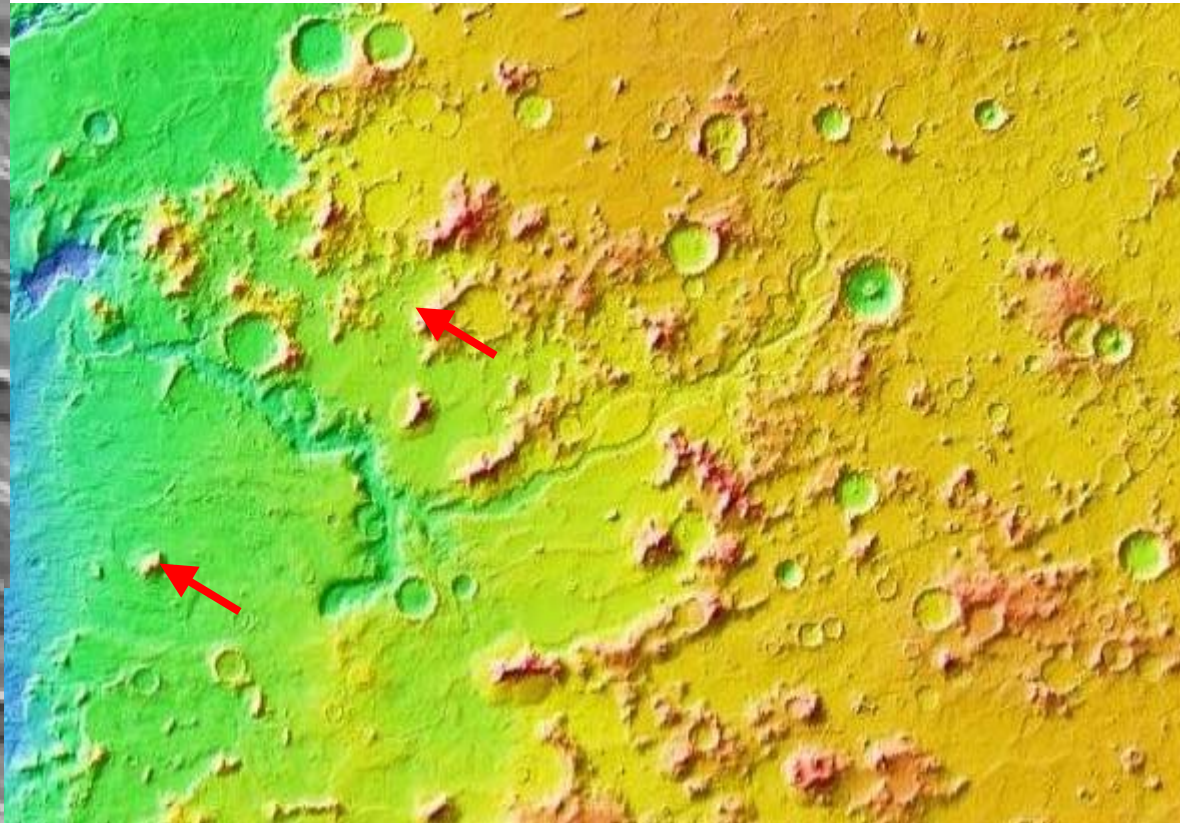
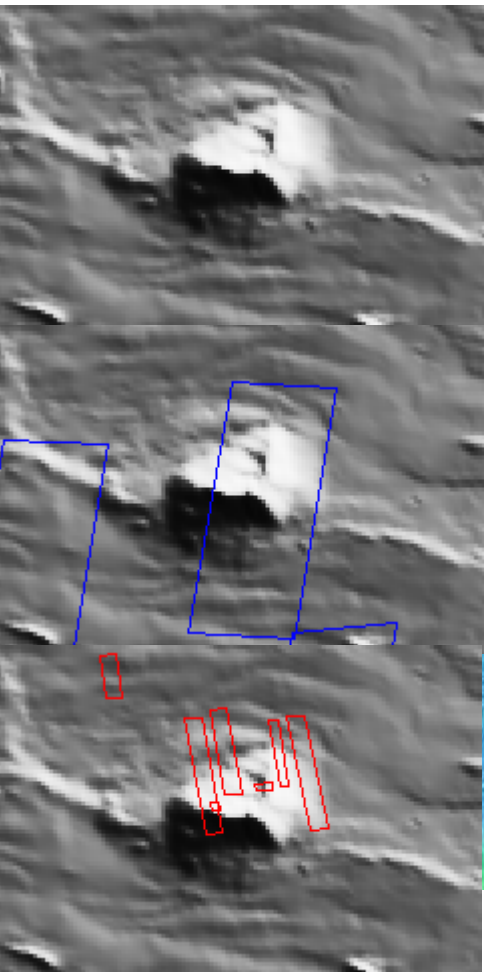
Tropical to mid-latitude snow and ice accumulation, flow and glaciation on Mars

J. W. Head¹, G. Neukum², R. Jaumann³, H. Hiesinger¹, E. Hauber³, M. Carr⁴, P. Masson⁵, B. Foing⁶, H. Hoffmann³, M. Kreslavsky¹, S. Werner², S. Milkovich¹, S. van Gassel² & The HRSC Co-Investigator Team⁺



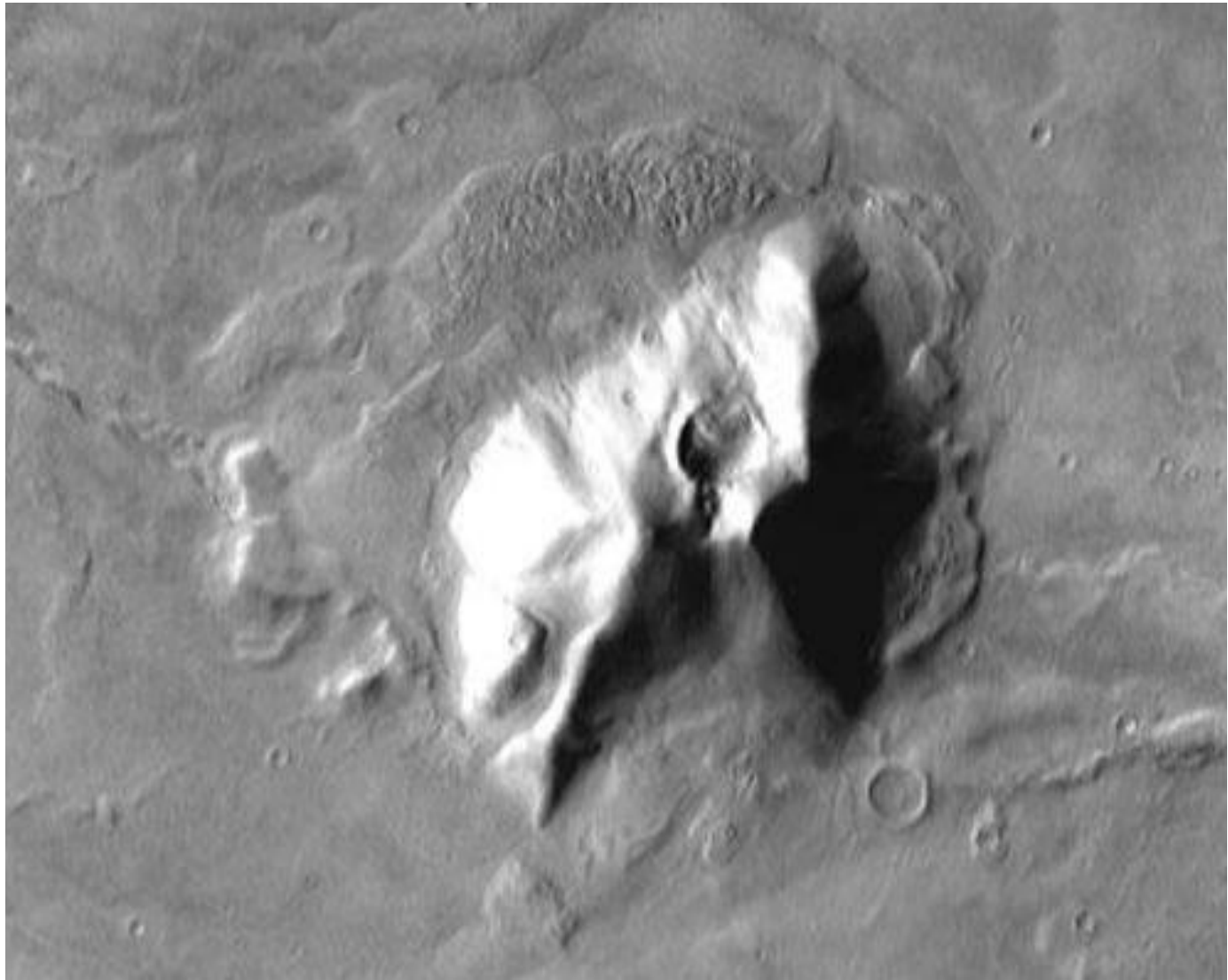
- Broad alcove represents an accumulation zone for snow and ice that incorporates debris from the massif]
- Proposed mechanism: 1) snow and ice accumulation 2) viscous flows of debris-containing ice 3) sublimation of significant volumes of ice leaving behind pitted morphology

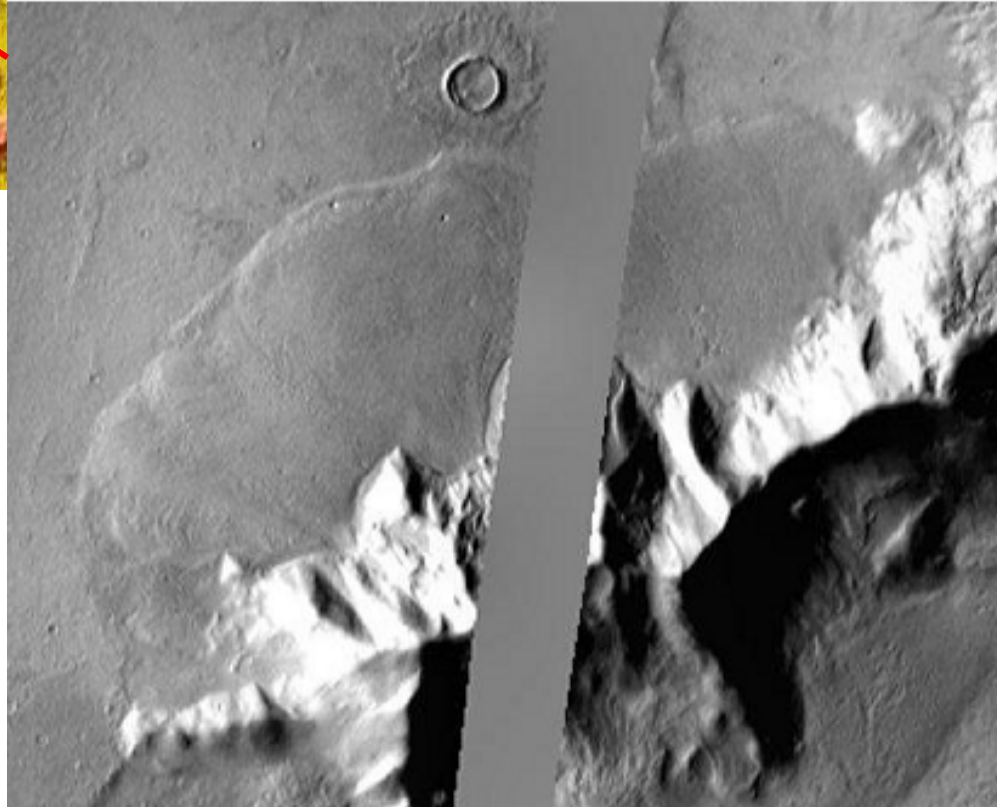
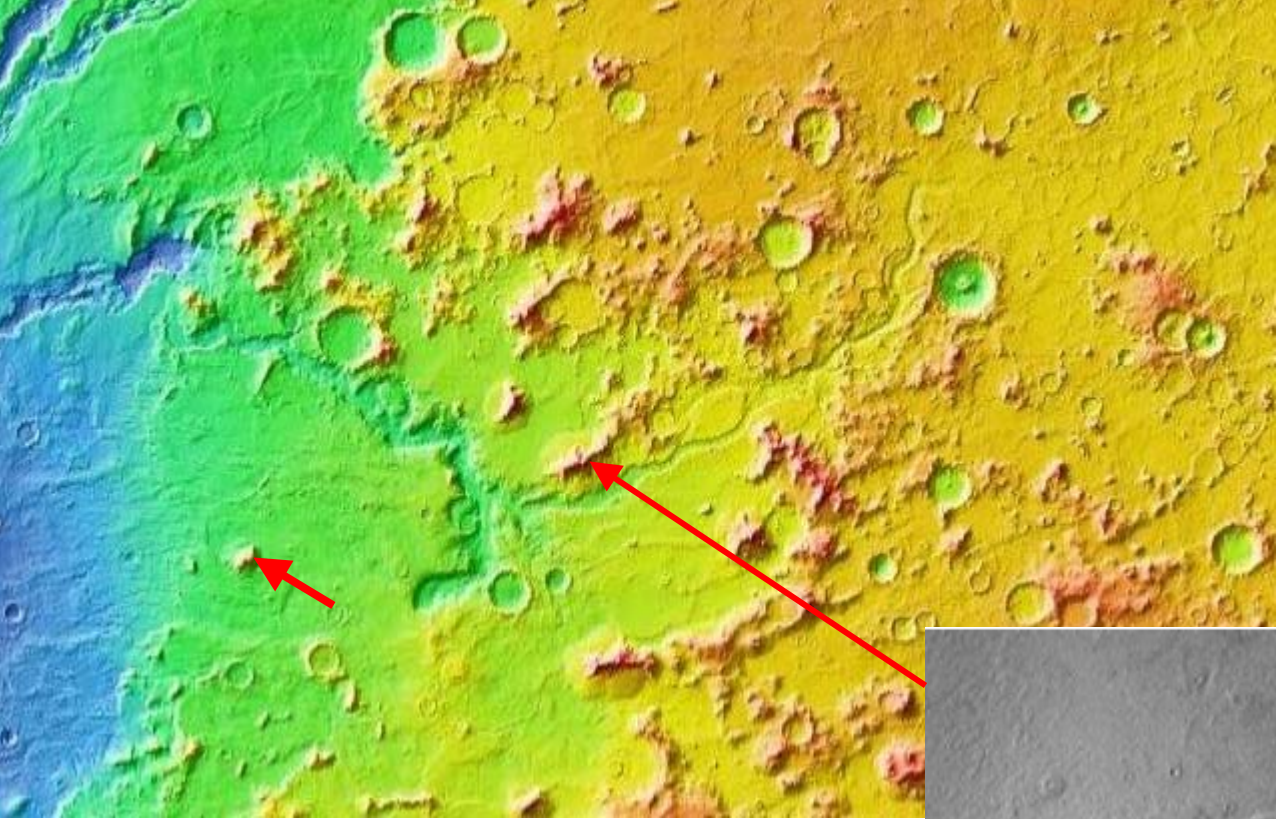


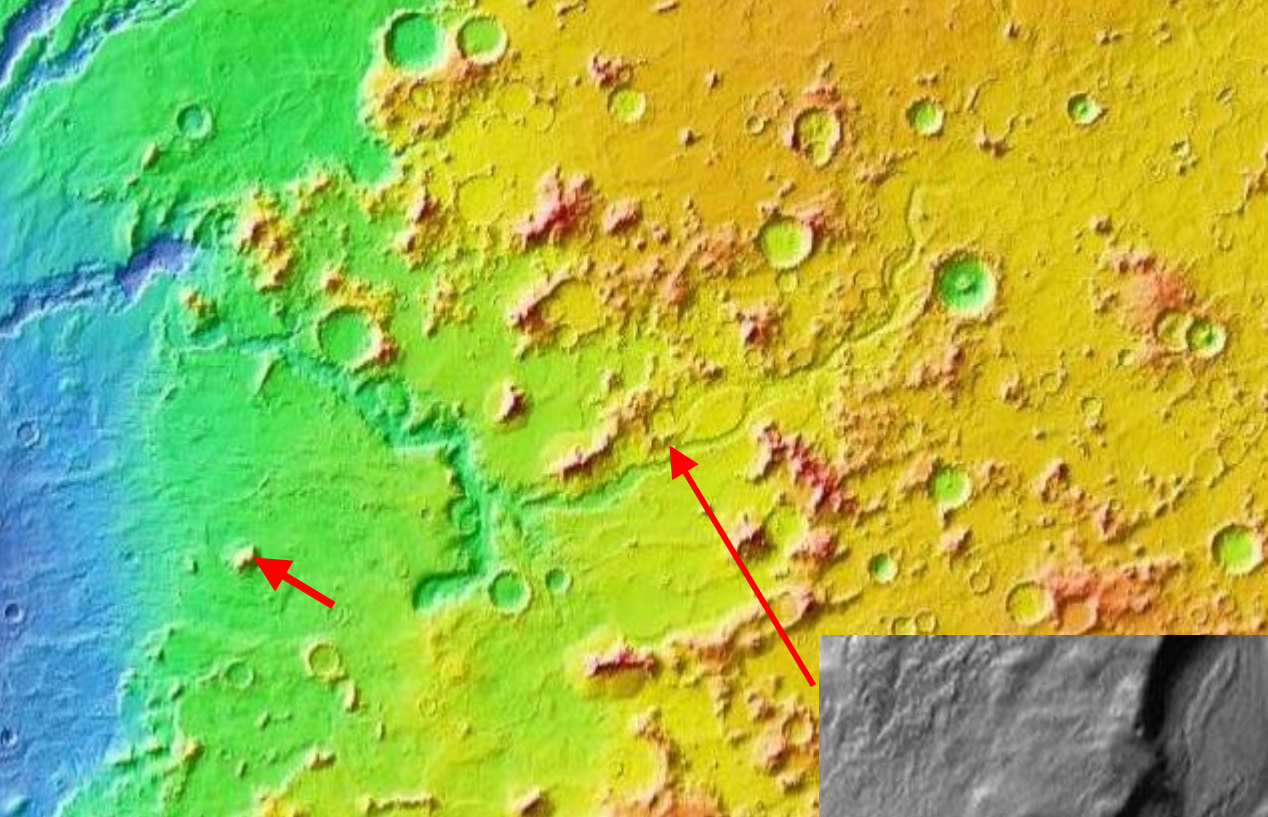


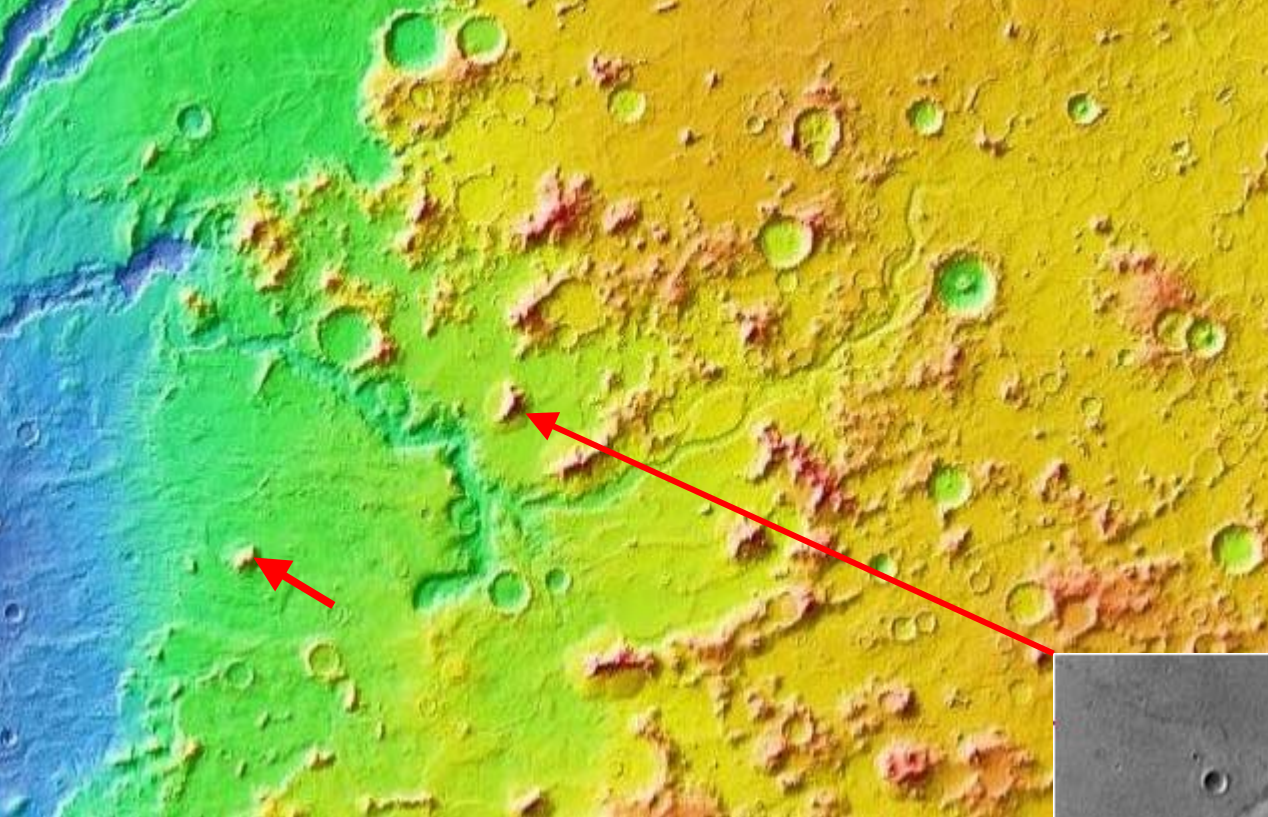
THEMIS

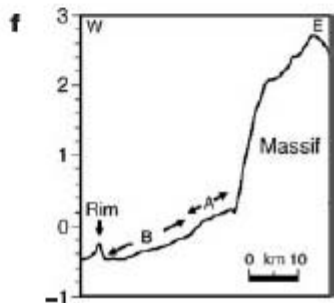
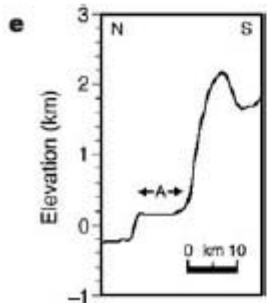
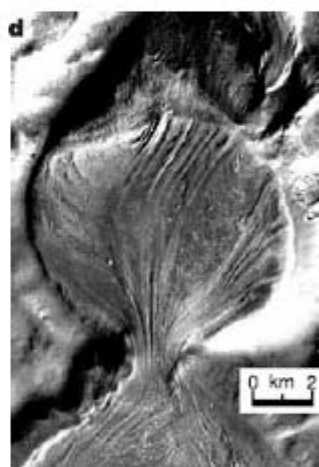
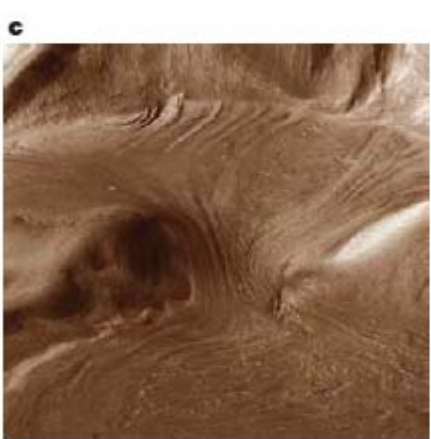
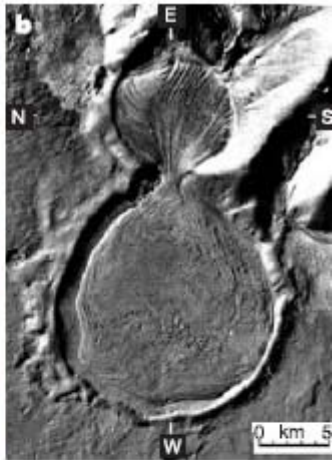
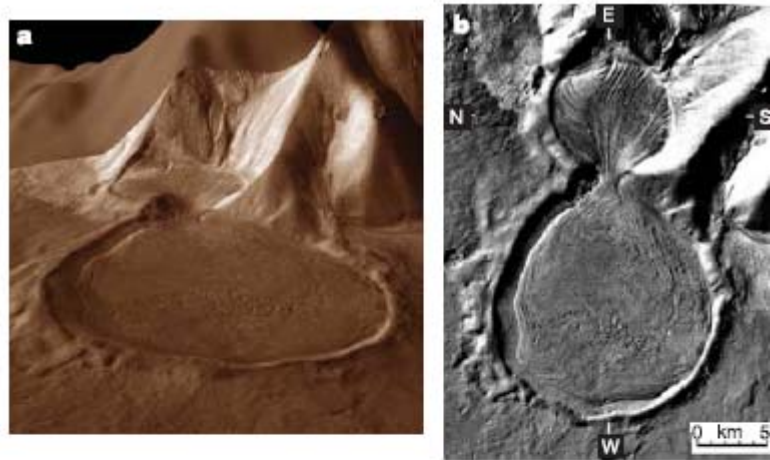
MOC





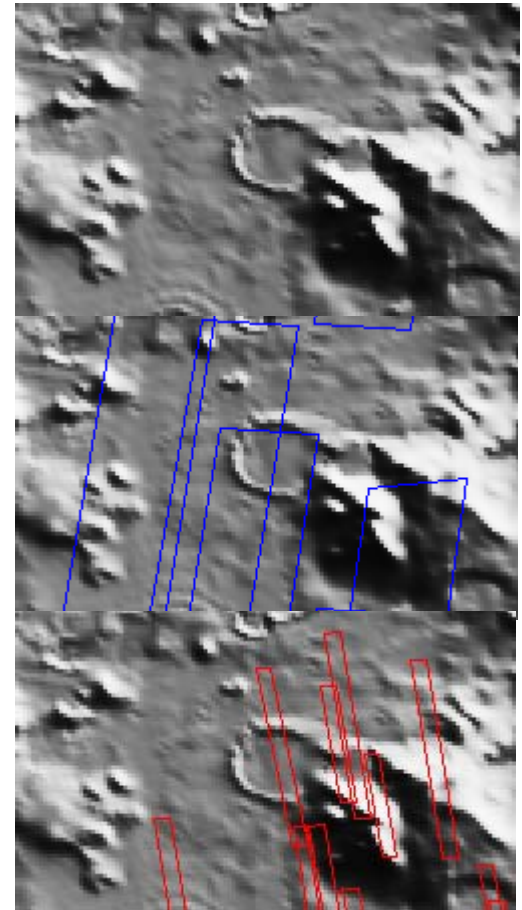
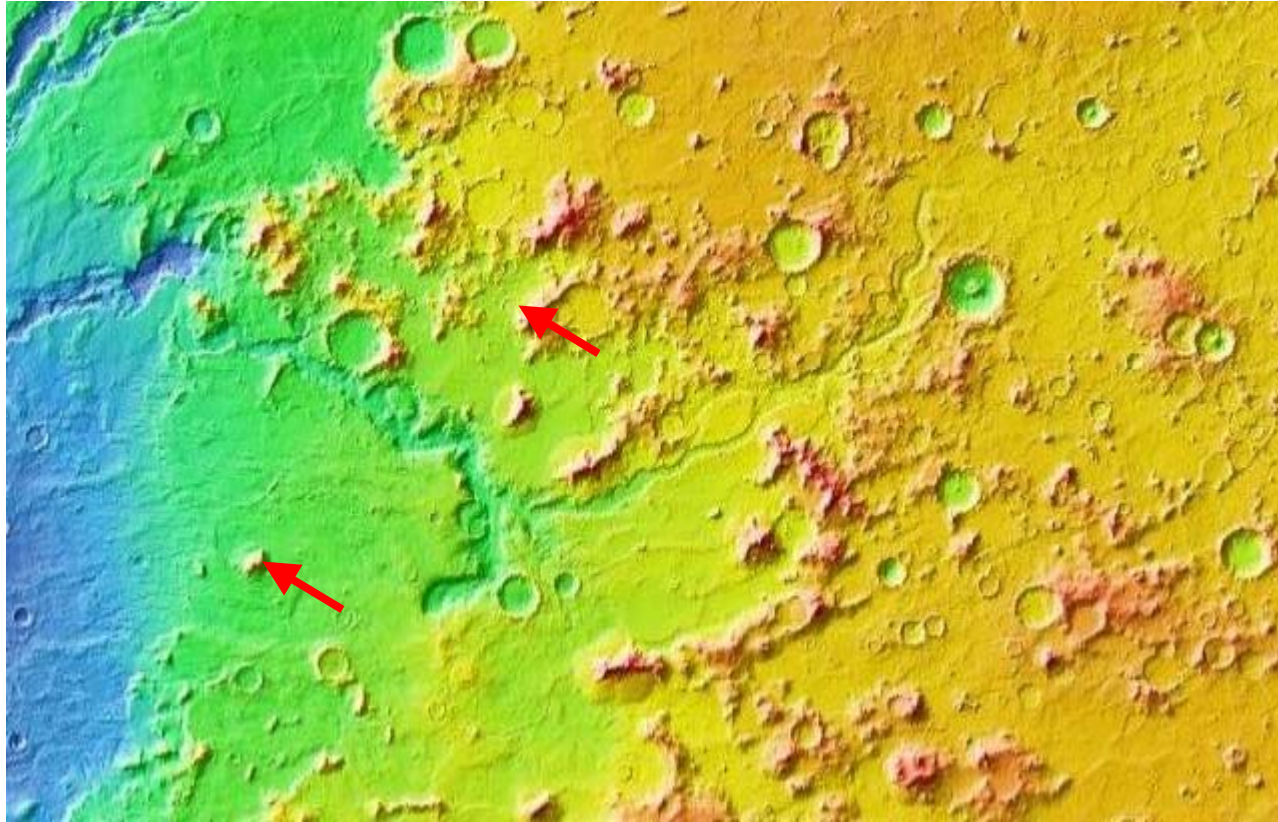






- Streamlines and lobes as evidence for viscous flow
 - Streamlines start “fully formed” at the beginning of the massif
 - Accumulation is done in the alcove within the massif
- But, alcove is extremely steep compared with ice flow slope...
- Flowlines suggest that viscosity is less than that of ice...maybe?

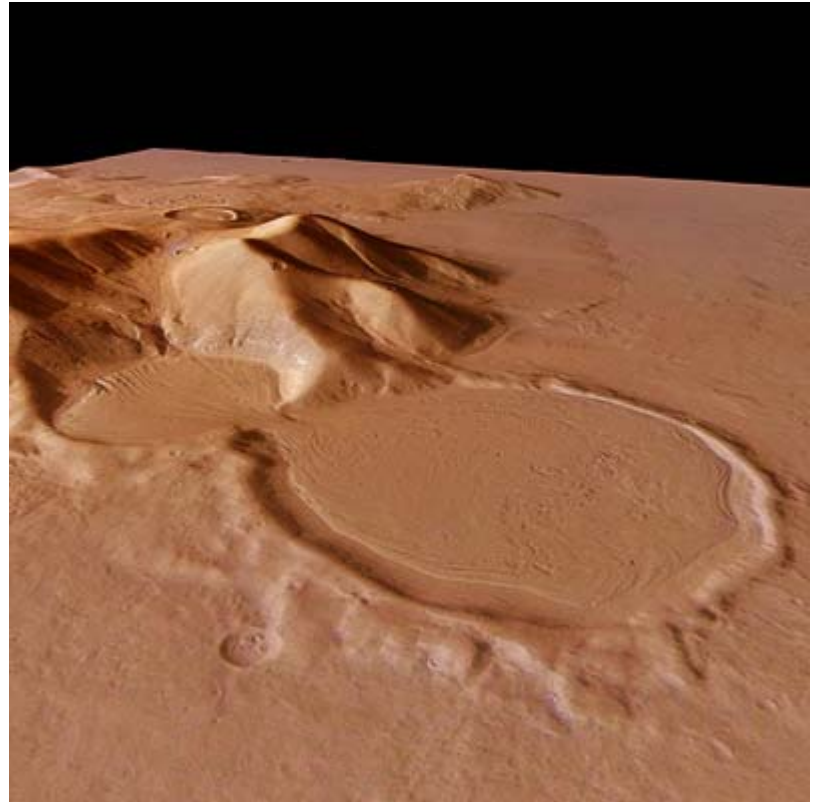
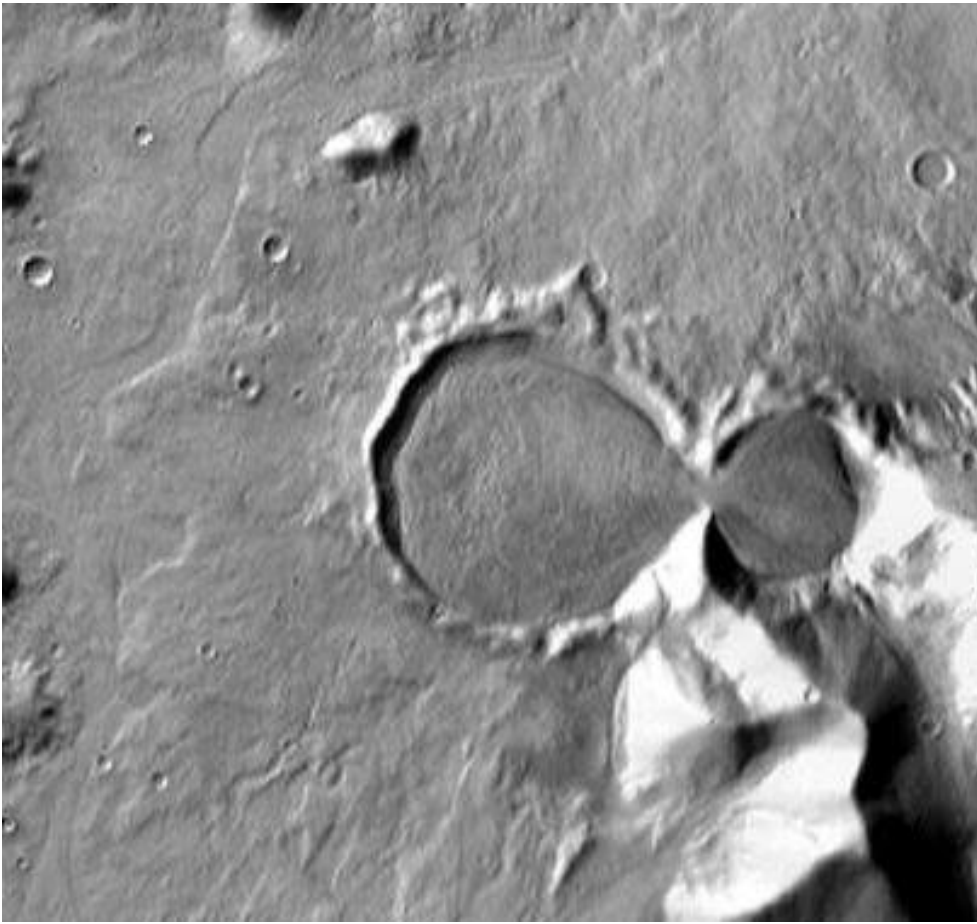
(temperatures on Mars would suggest higher viscosity ice)



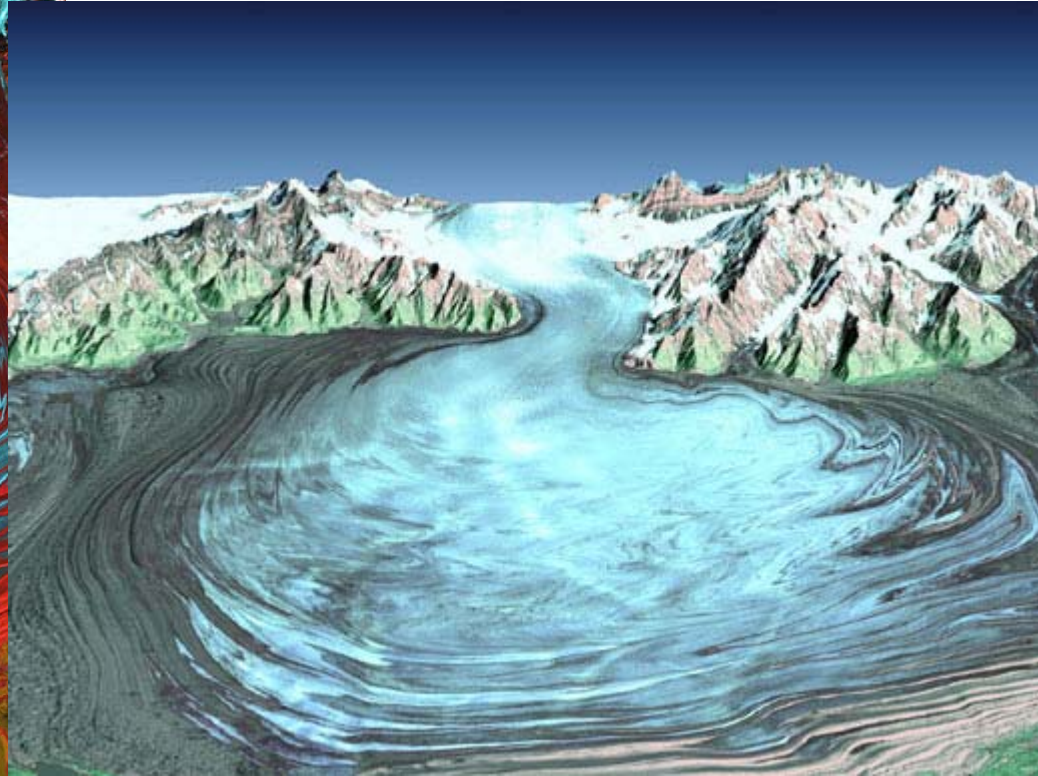
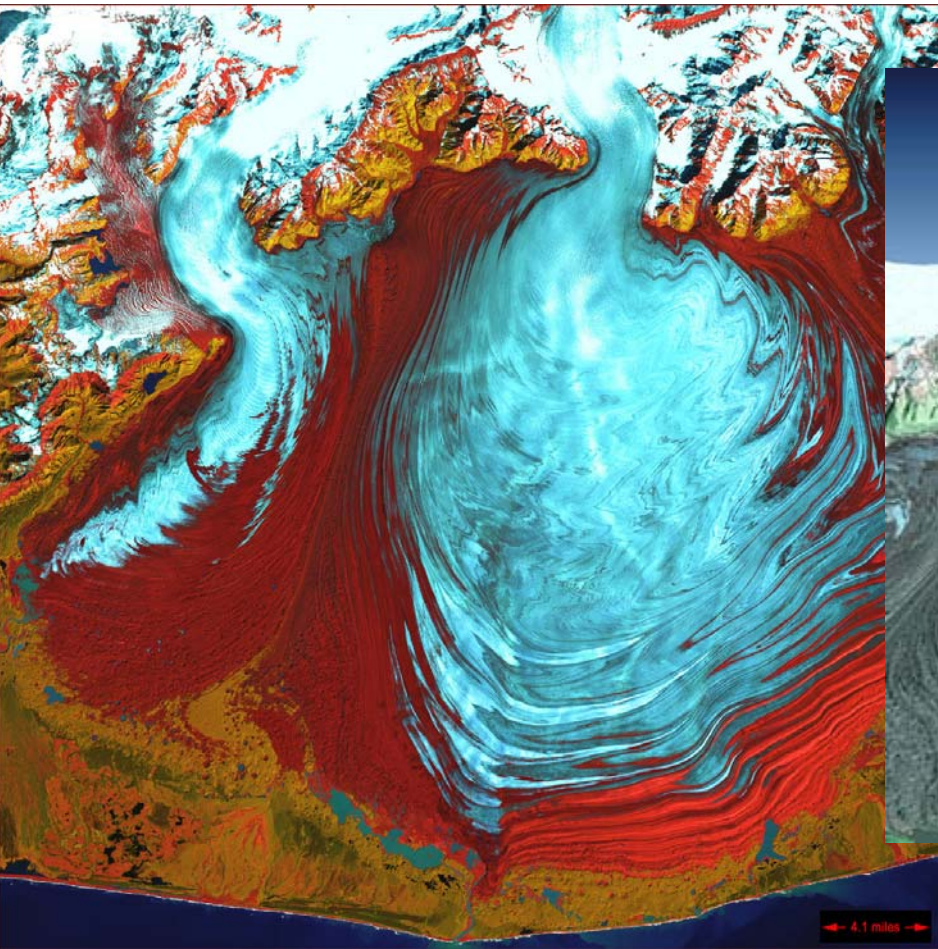
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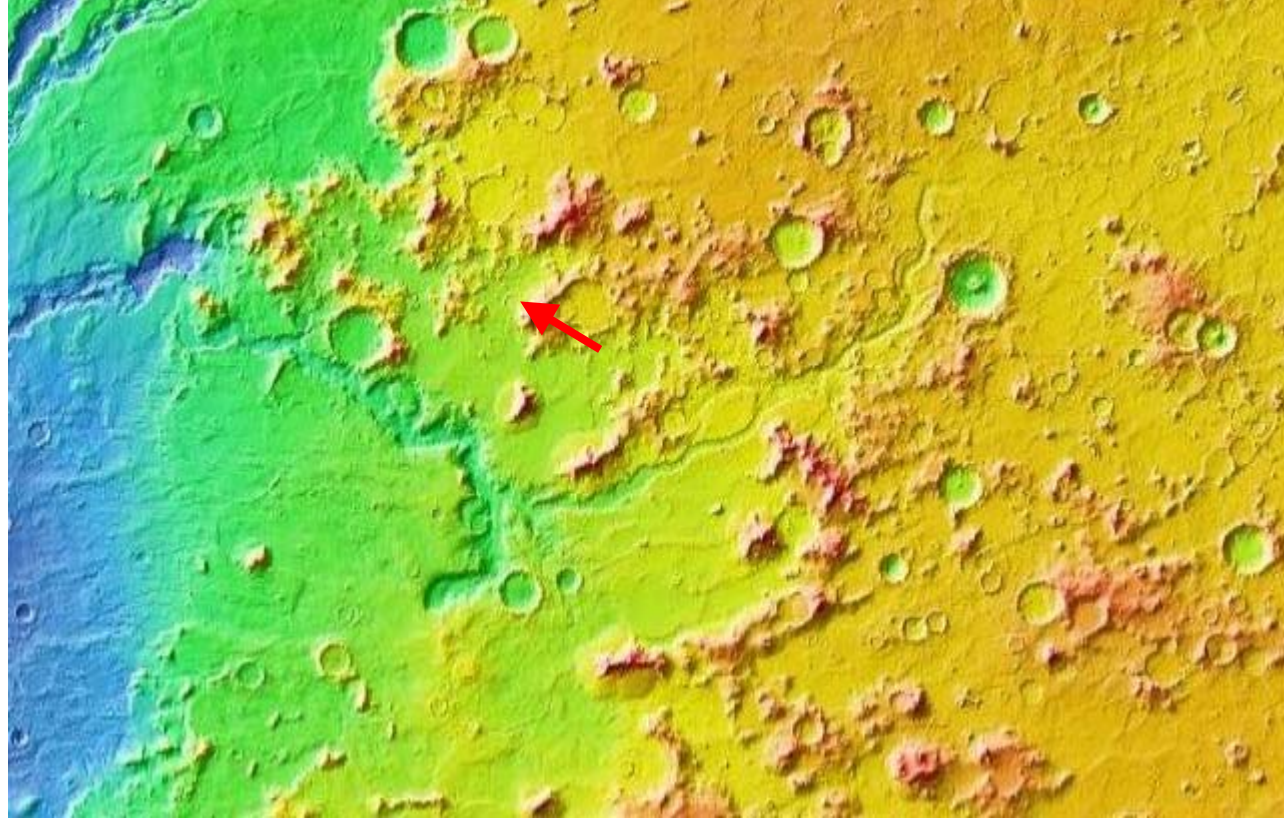
MOC 1

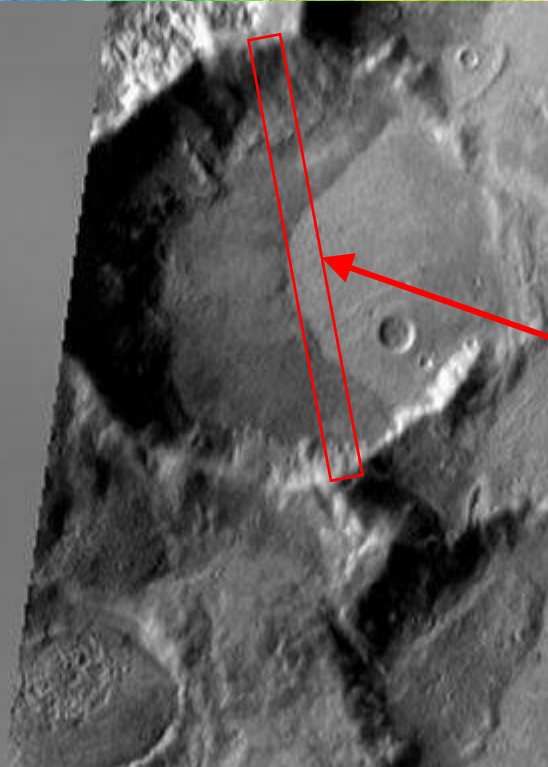
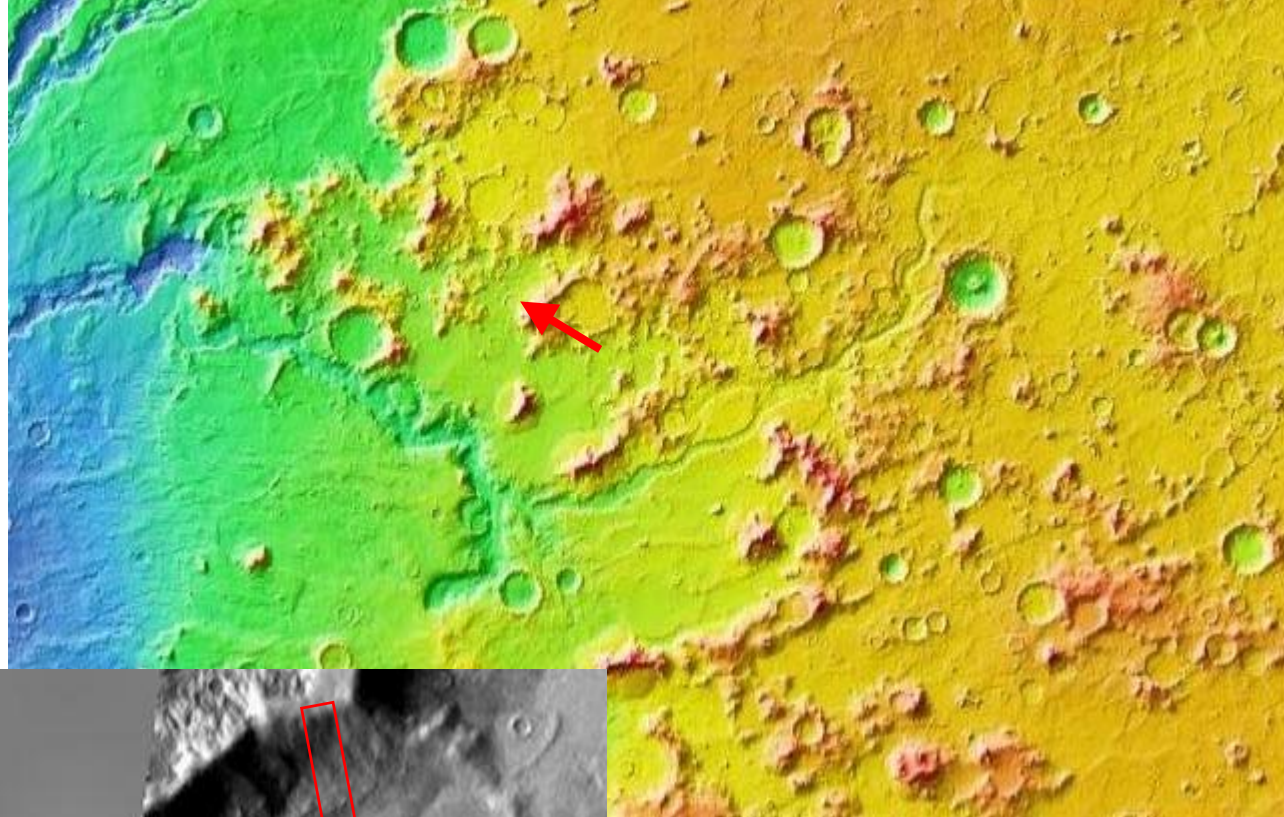
MOC 2



Malaspina Glacier (Alaska): Piedmont glacier







MOC



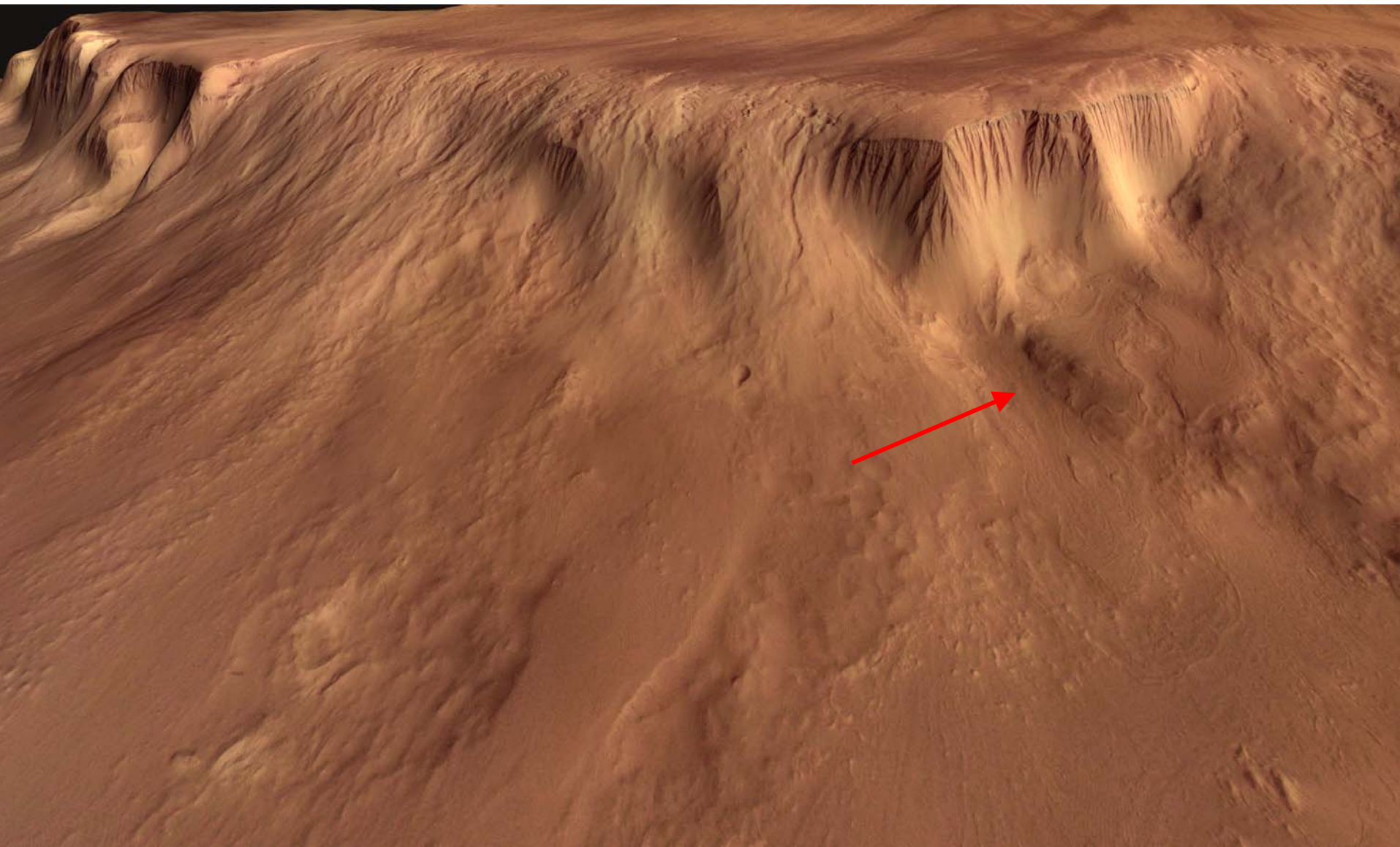


Accumulation zone?

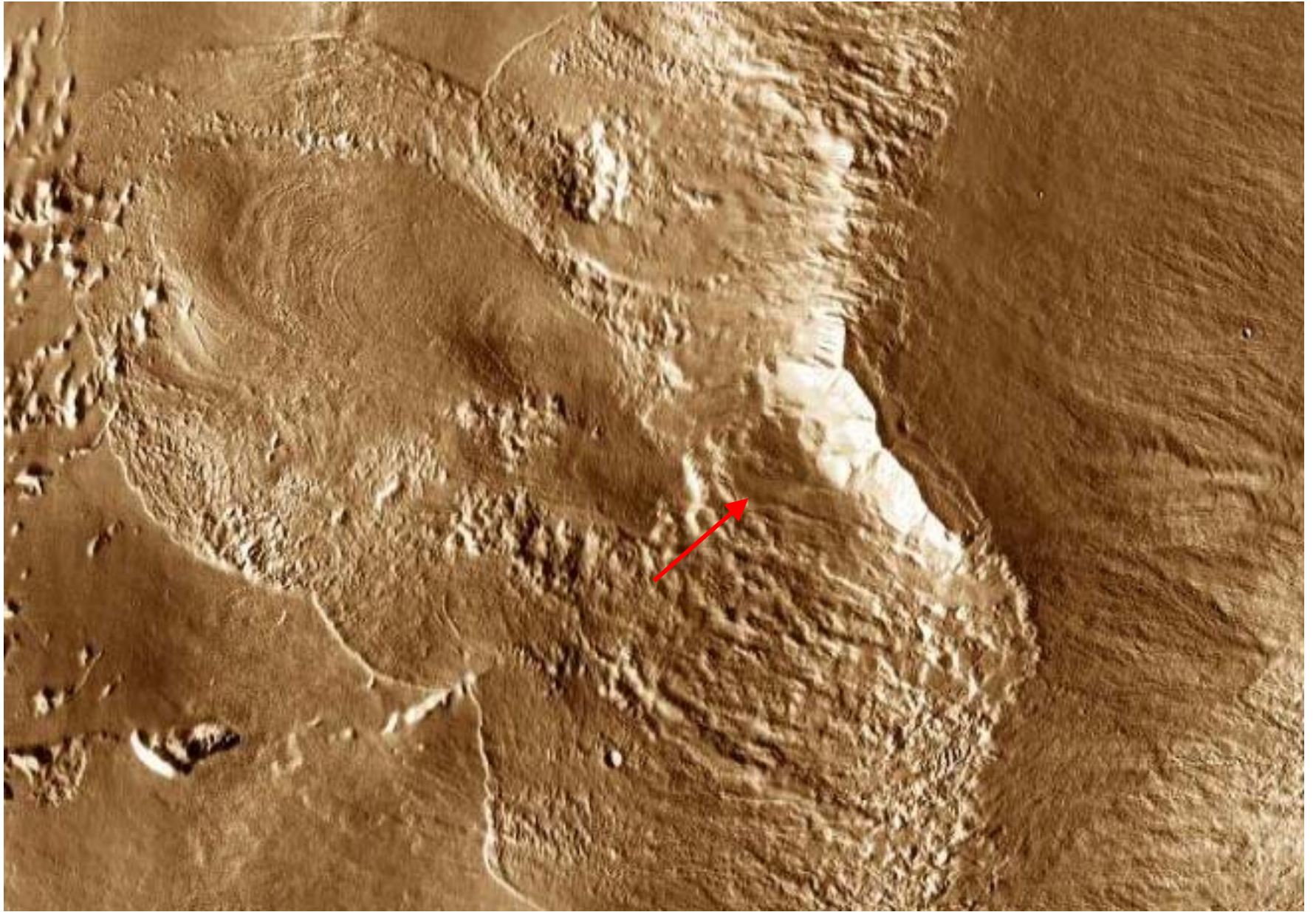
Morraines?

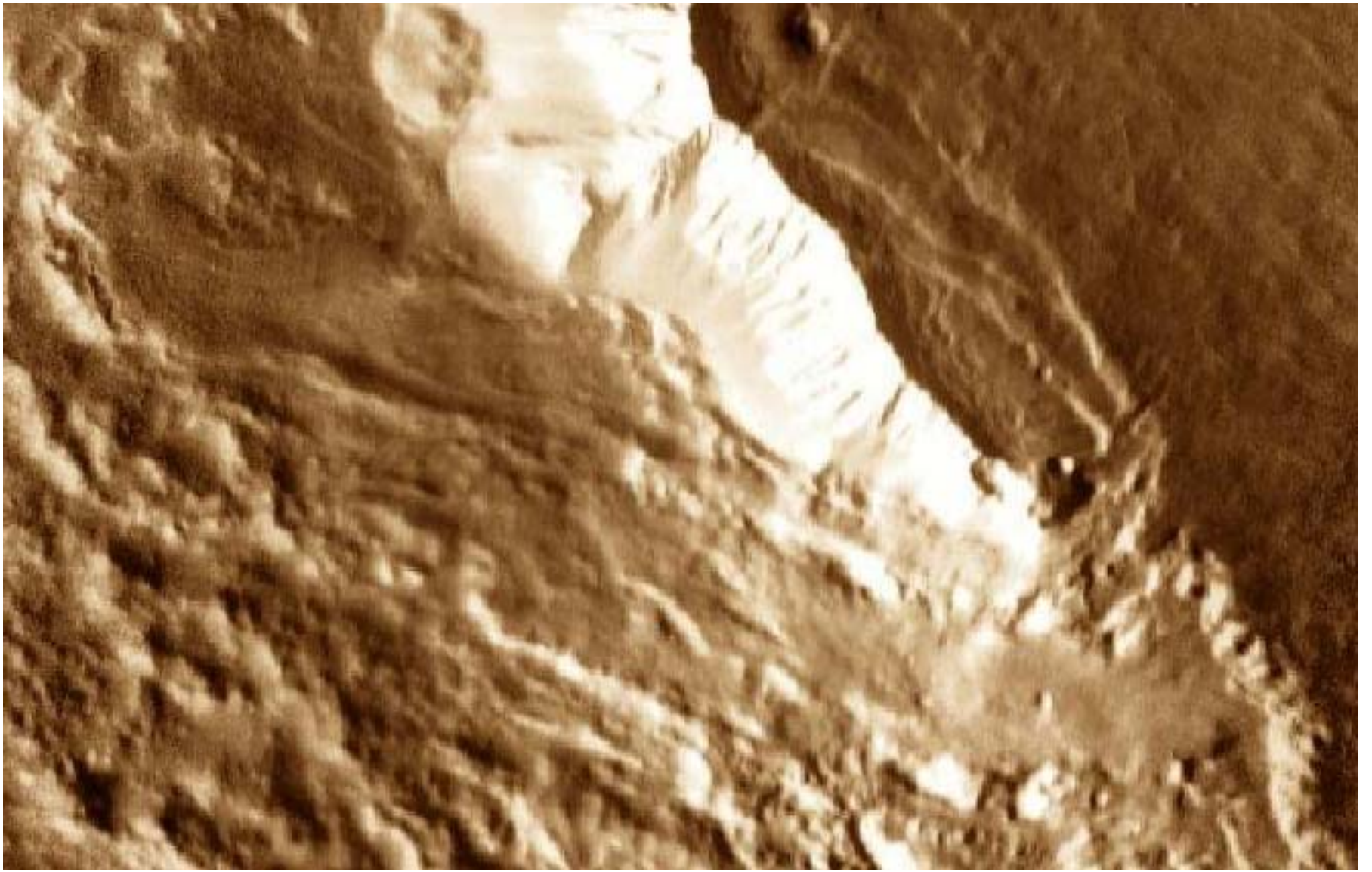
Answer: not a glacier but a mudslide!

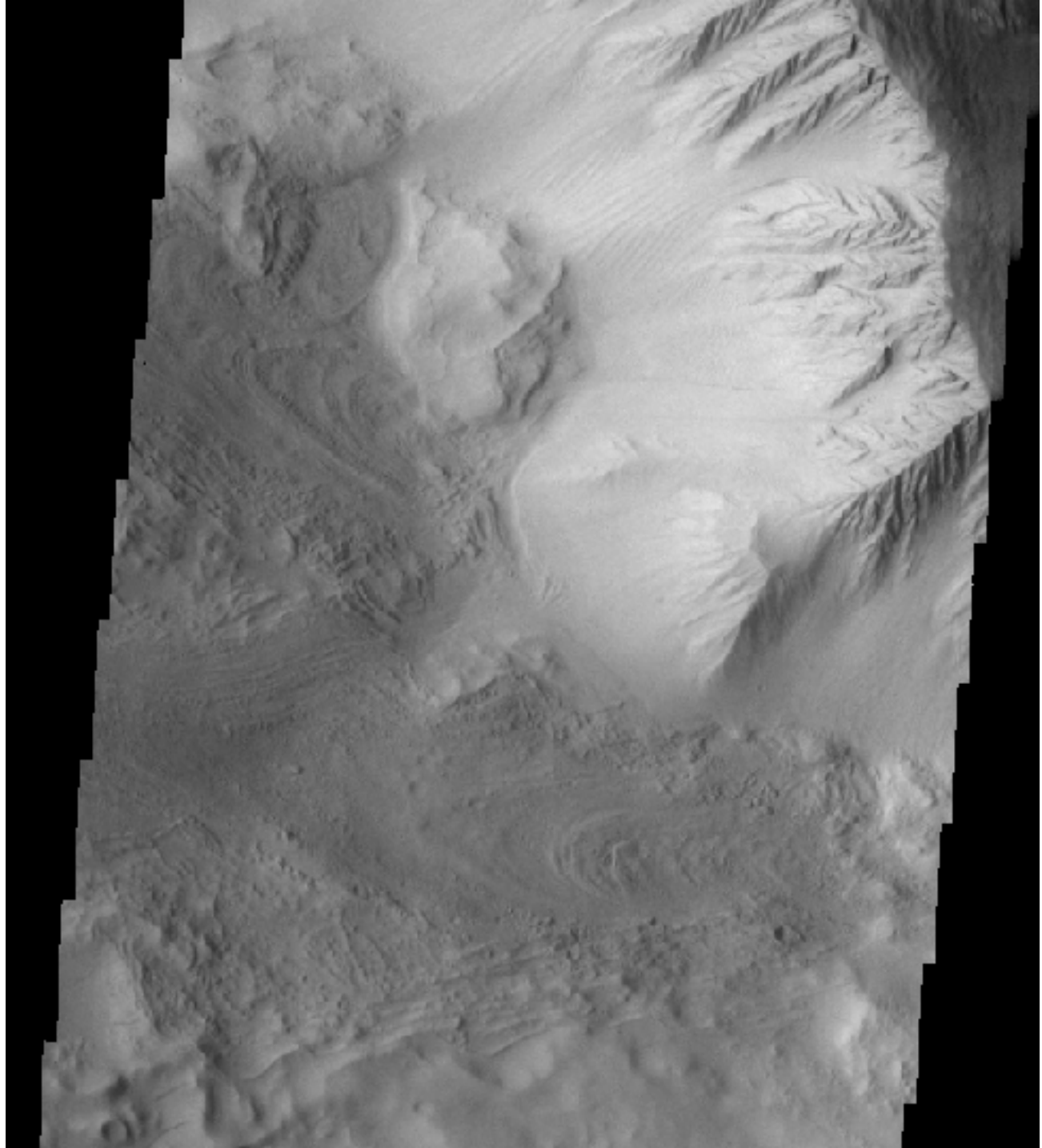












- Evidence presented by Head et al. **inconclusive**
 - Debris Apron on Eastern Hellas massif could be ice but morphologically similar features exist on massifs without alcoves
 - Viscous material within hourglass craters exist in craters that do not have associated massifs
 - Glacier on Mt. Olympus is most probably a mudslide...