

CryoMars

1st March 2021

Virtual meeting hosted by the University of Sheffield

Supported by:



European Research Council
10271 10271 10271 10271 10271



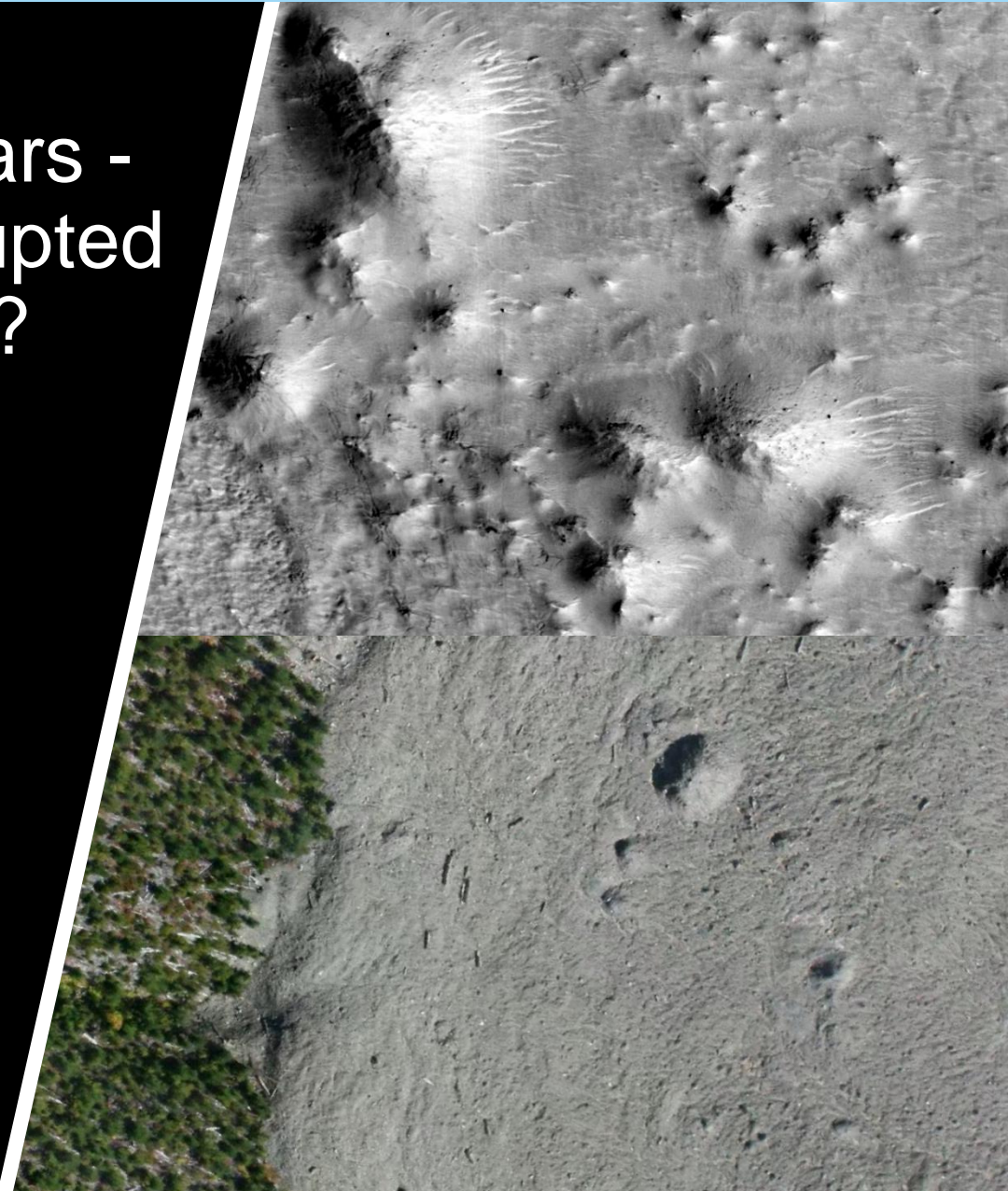
The
University
Of
Sheffield.



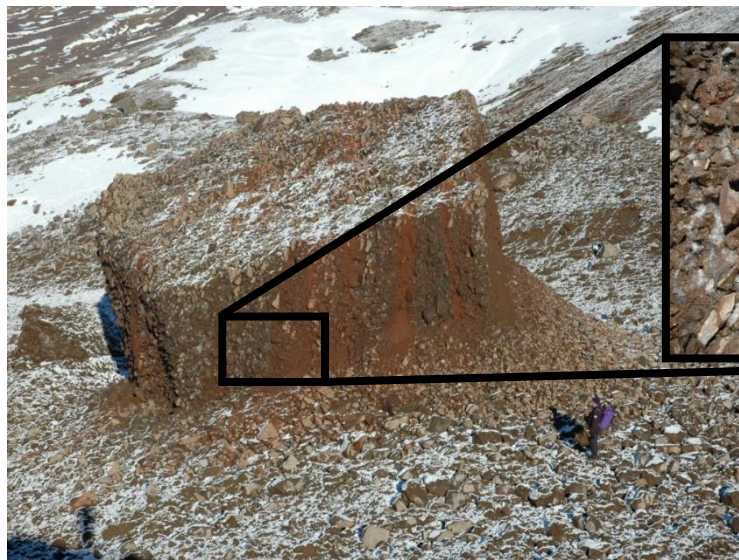
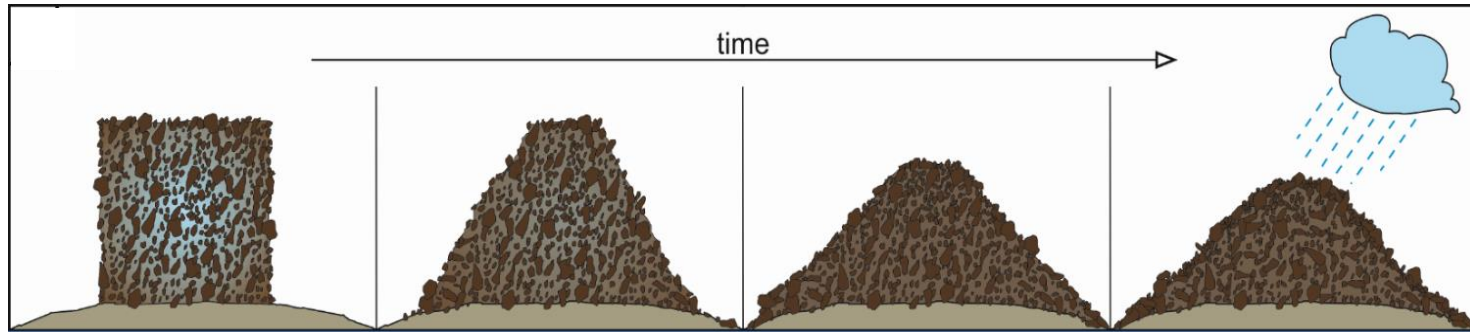
Molards on Mars - Signs of a disrupted cryosphere?

Costanza Morino¹, Susan Conway²,
Coralie Peignaux², Antoine Lucas³,
Kristian Svennevig⁴, Frances Butcher⁵,
Gioachino Roberti⁶, Meven Philippe²,
Jake Collins-May⁷

1 CNRS UMR 5204 Laboratoire Environnements
Dynamiques et Territoires De La Montagne, Le Bourget-
du-Lac, France (costanza.morino@gmail.com)
2 CNRS UMR6112 Laboratoire de Planétologie et
Géodynamique, Nantes, France
3 Université de Paris, Institut de physique du globe de
Paris, CNRS, F-75005, Paris, France
4 Geological Survey of Denmark and Greenland,
Copenhagen, Denmark
5 Department of Geography, The University of Sheffield,
Sheffield, UK
6 Minerva Intelligence Inc., Vancouver, British Columbia,
Canada
7 The School of Geography, Politics and Sociology,
Newcastle University, Newcastle, UK

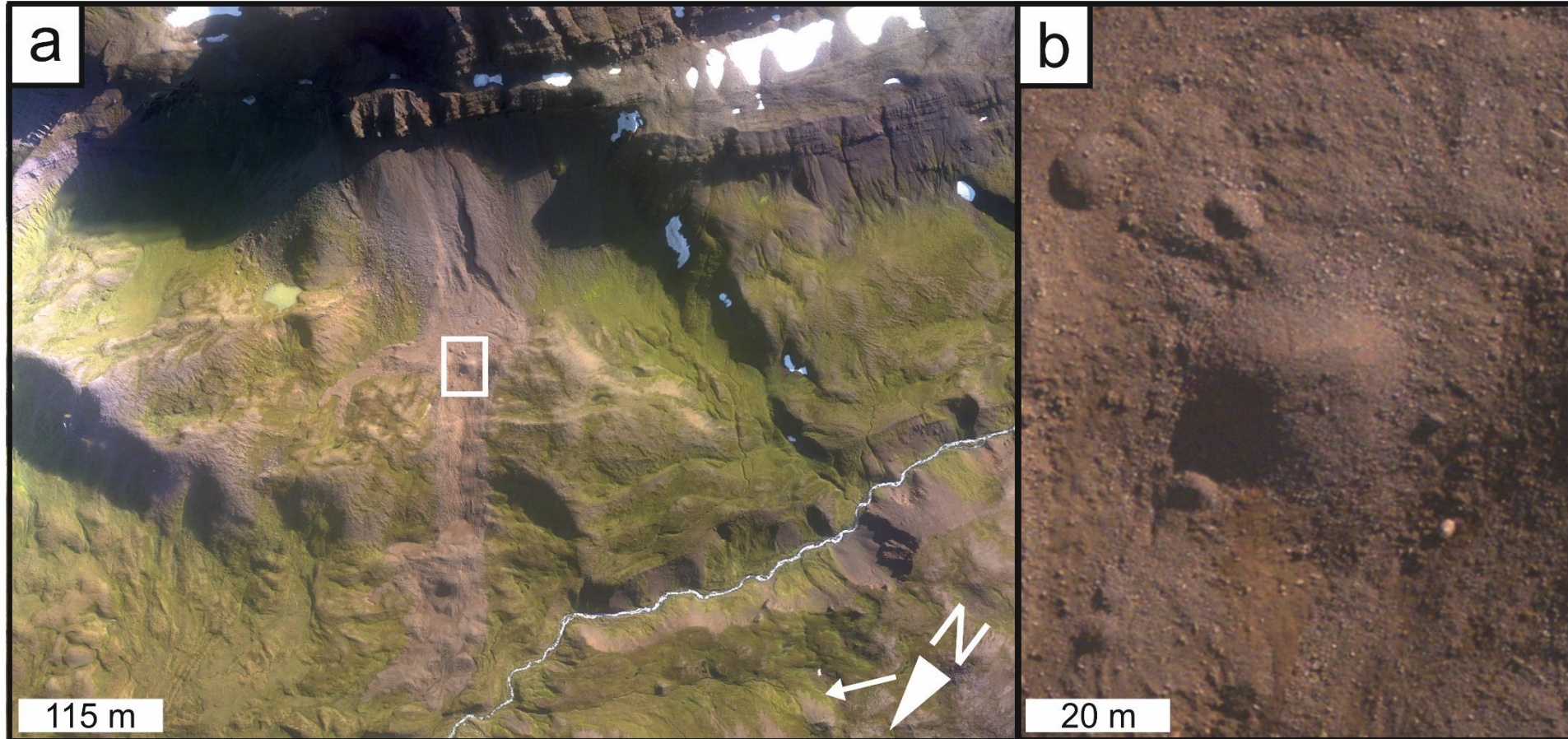


Molards on Earth



from Morino et al., 2019 – EPSL

Molards on Earth



from Morino et al., 2019 – EPSL

Molards on Earth



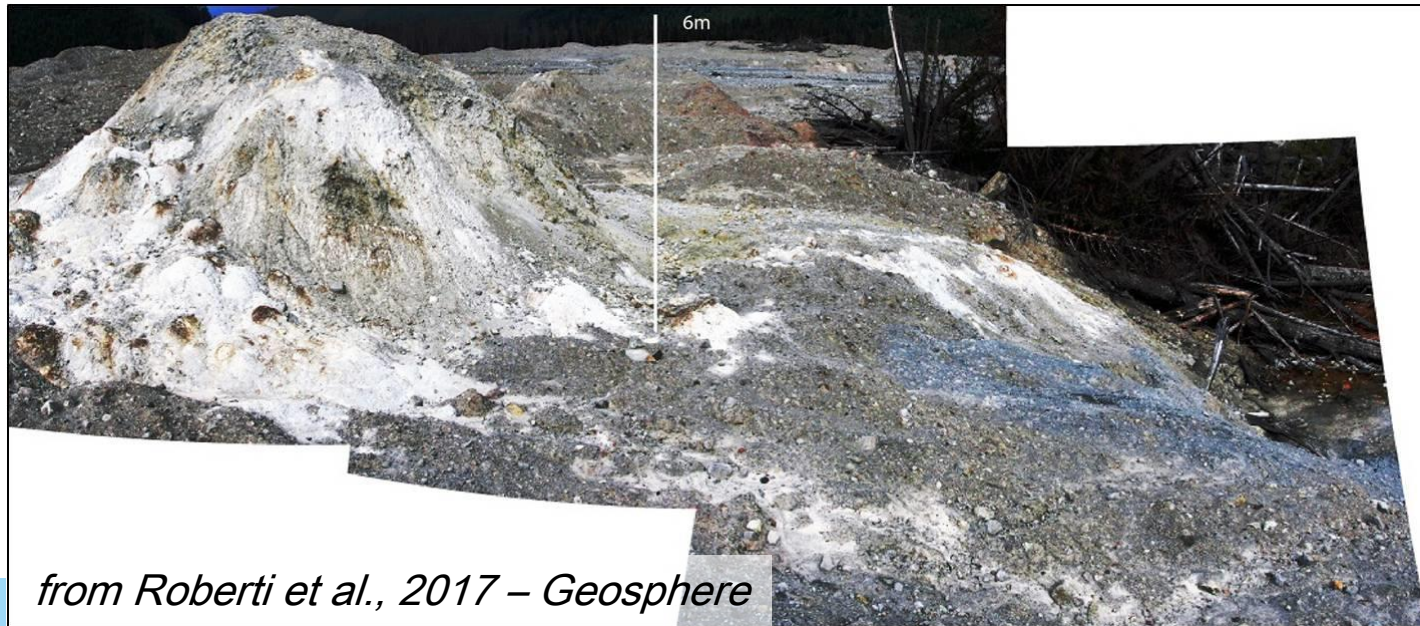
Molards on Earth



D.B. Steers

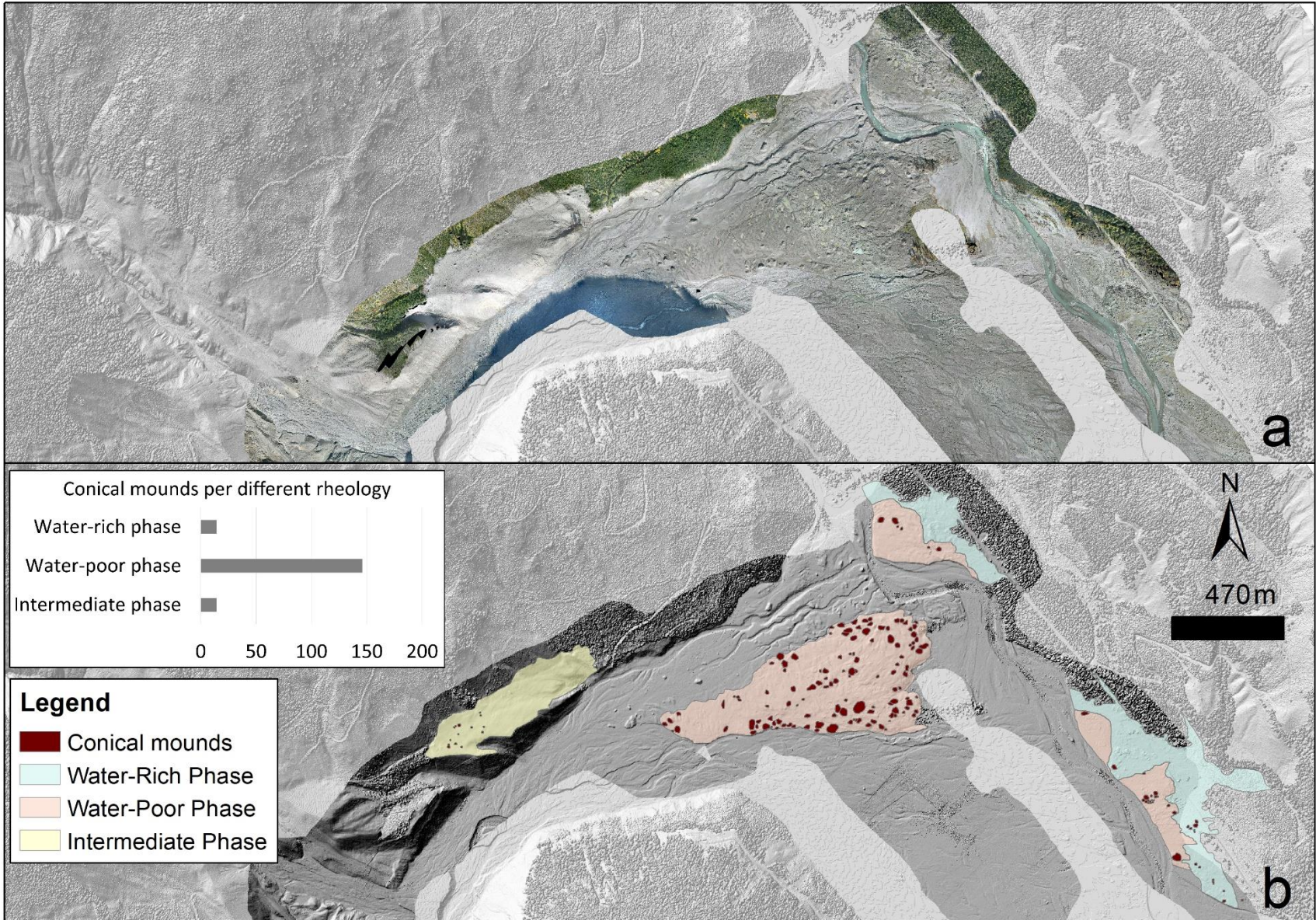


P. Friele

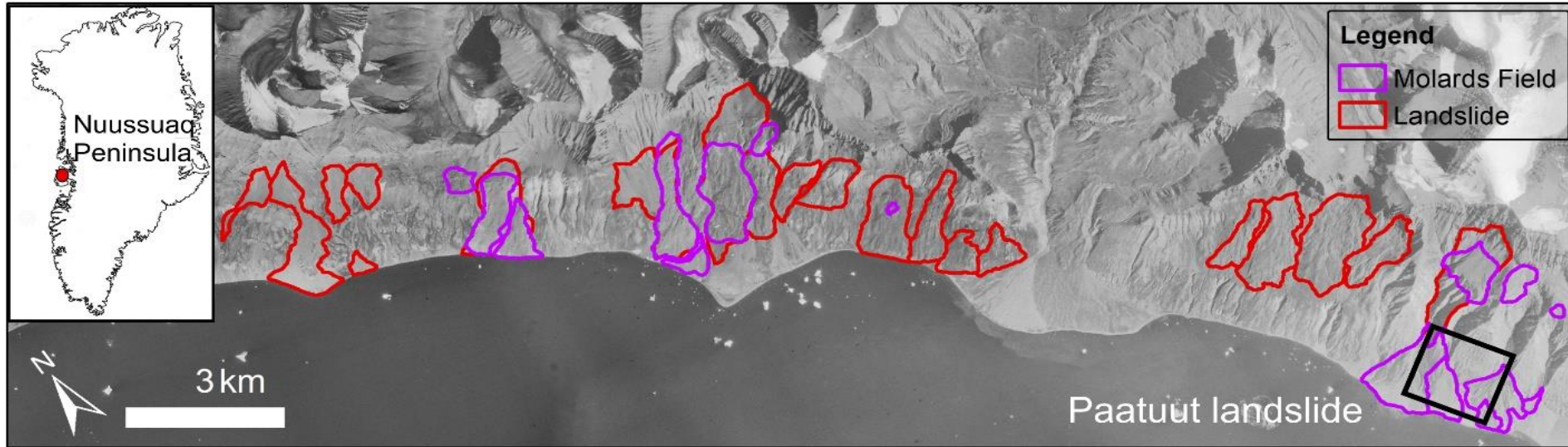


from Roberti et al., 2017 – Geosphere

Molards on Earth

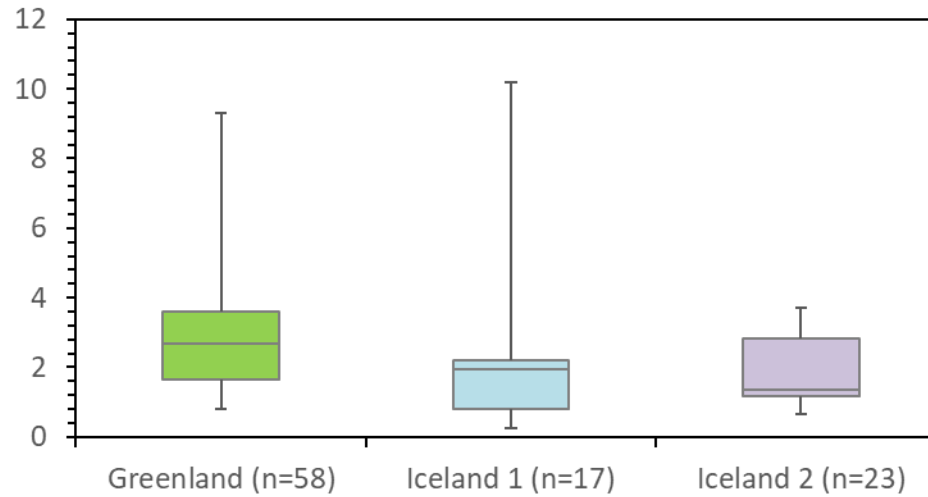


Molards on Earth

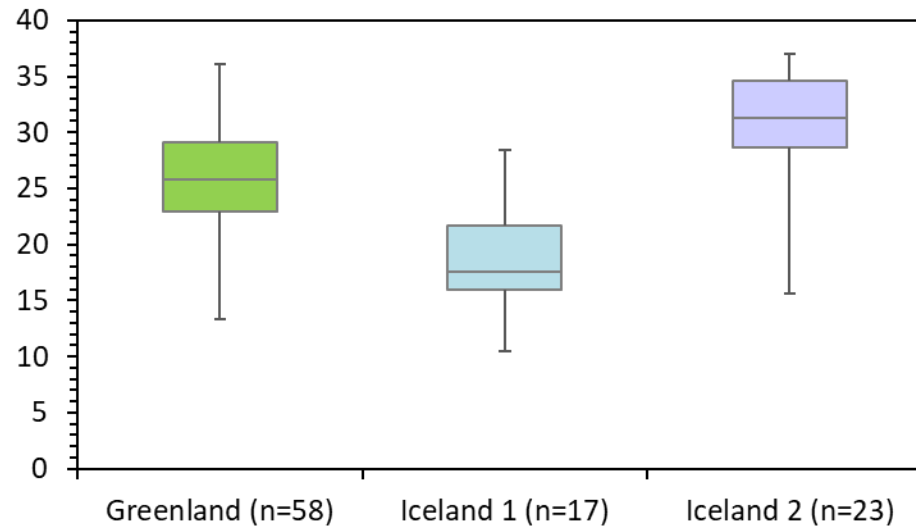


Molards on Earth

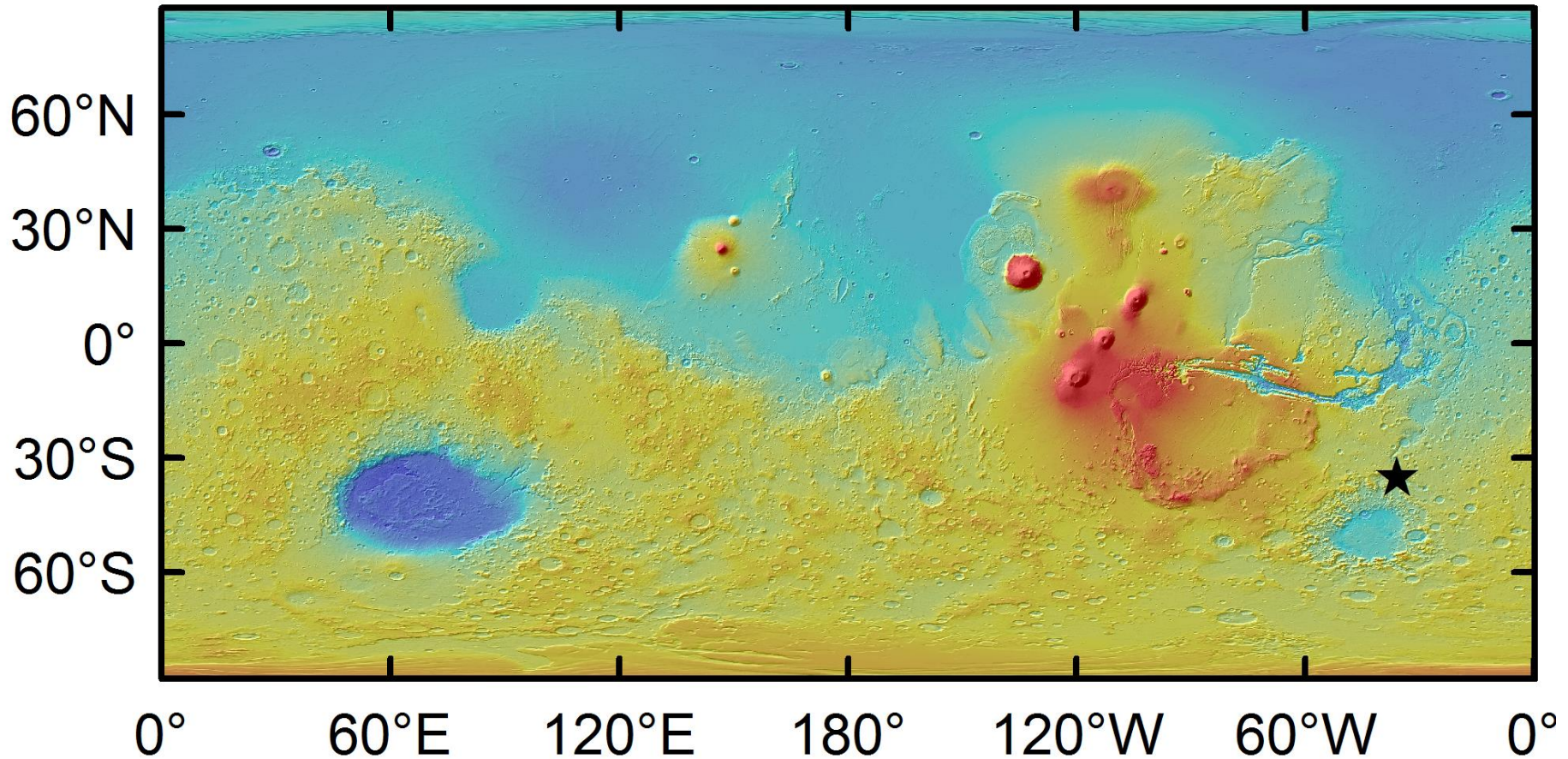
Height (m)



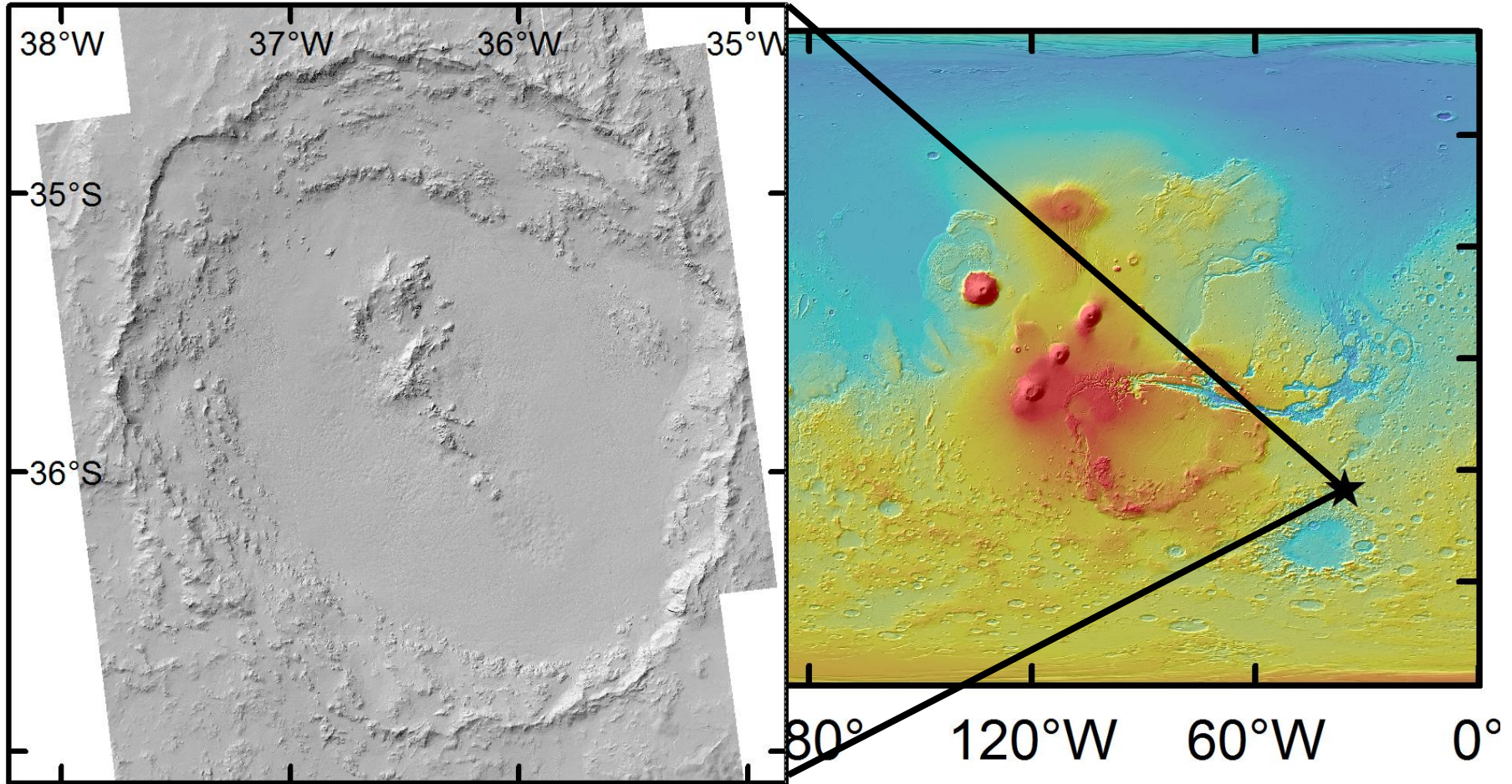
Slope (°)



Molards on Mars

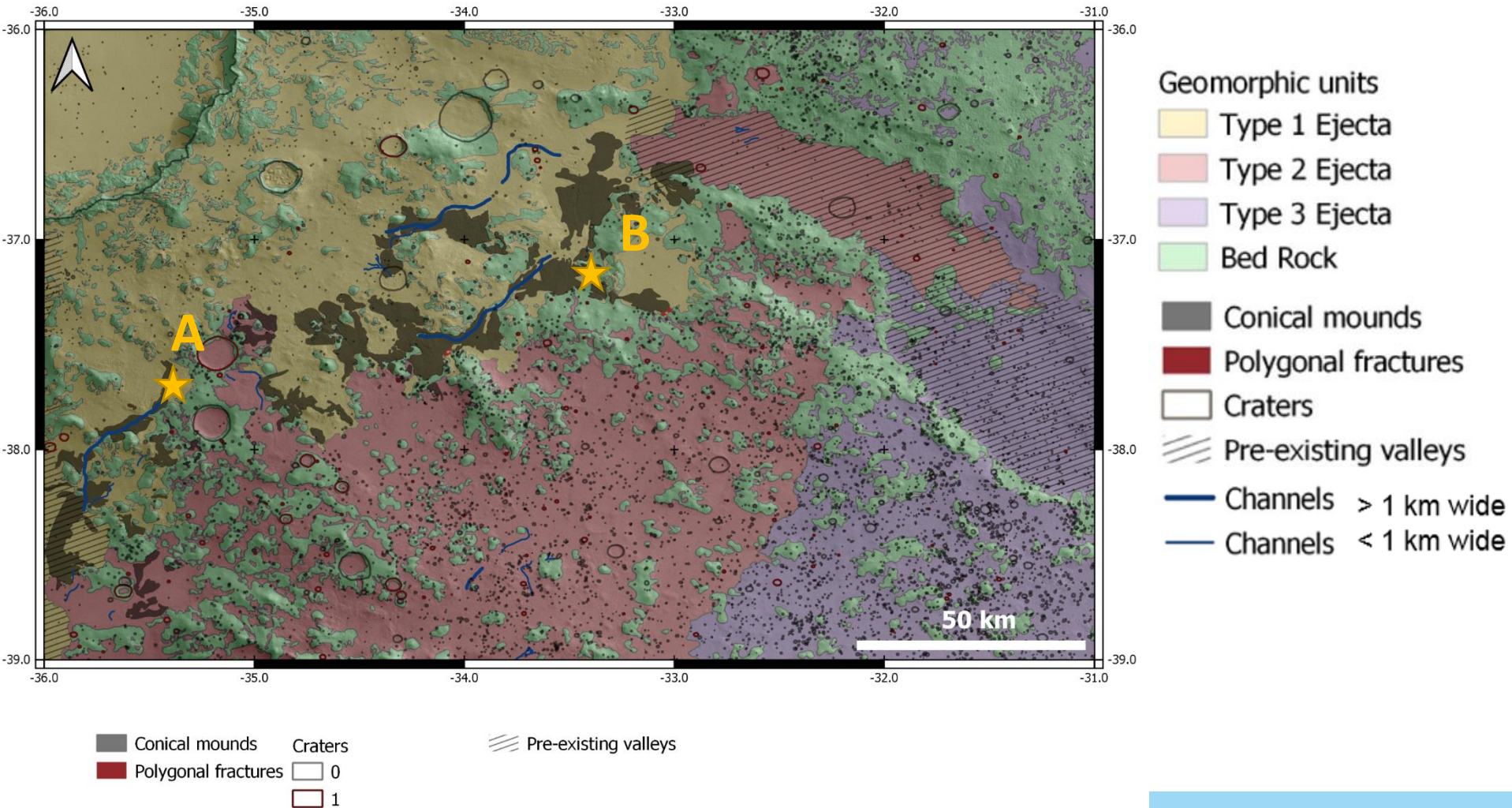


Molards on Mars

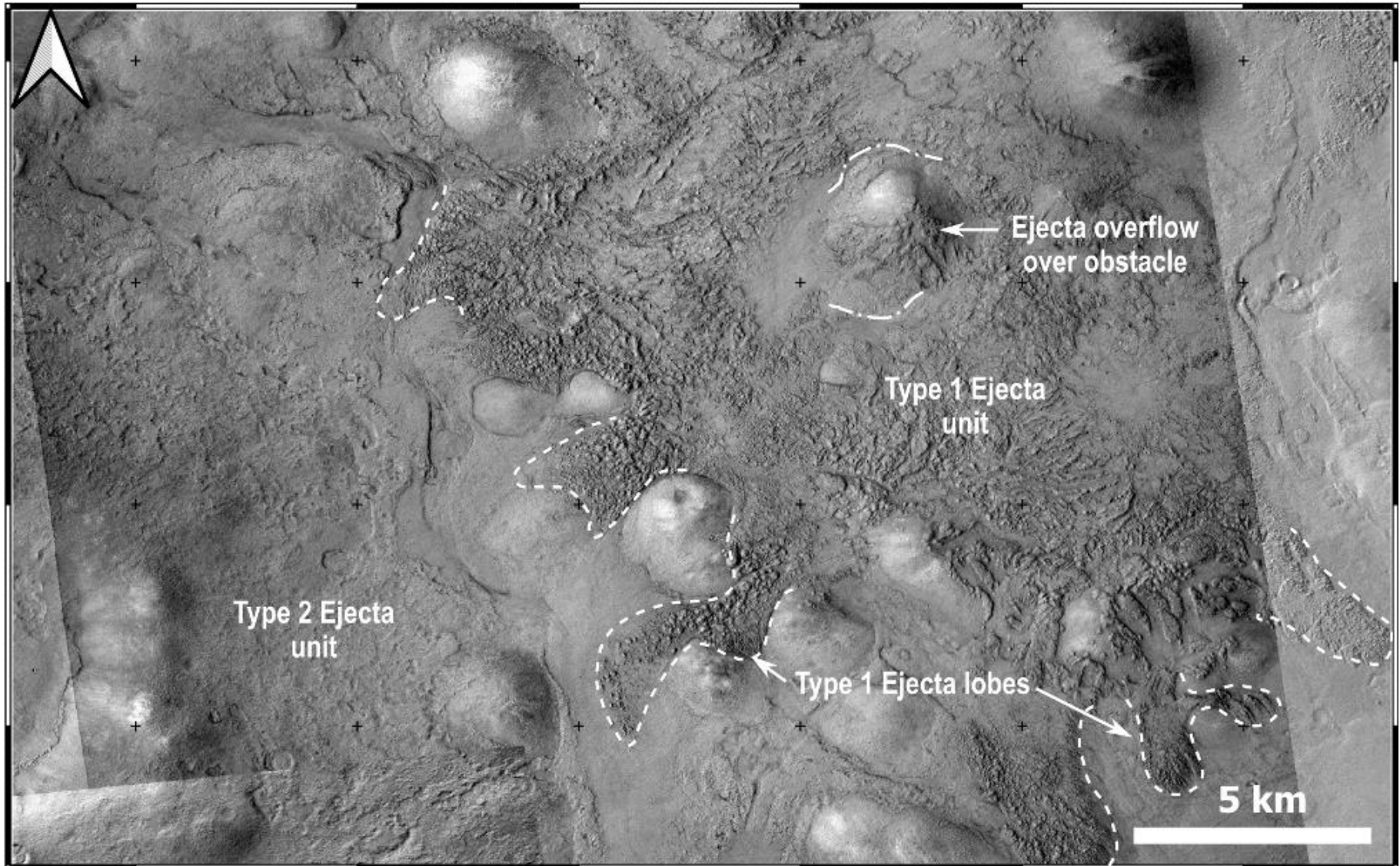


Molards on Mars

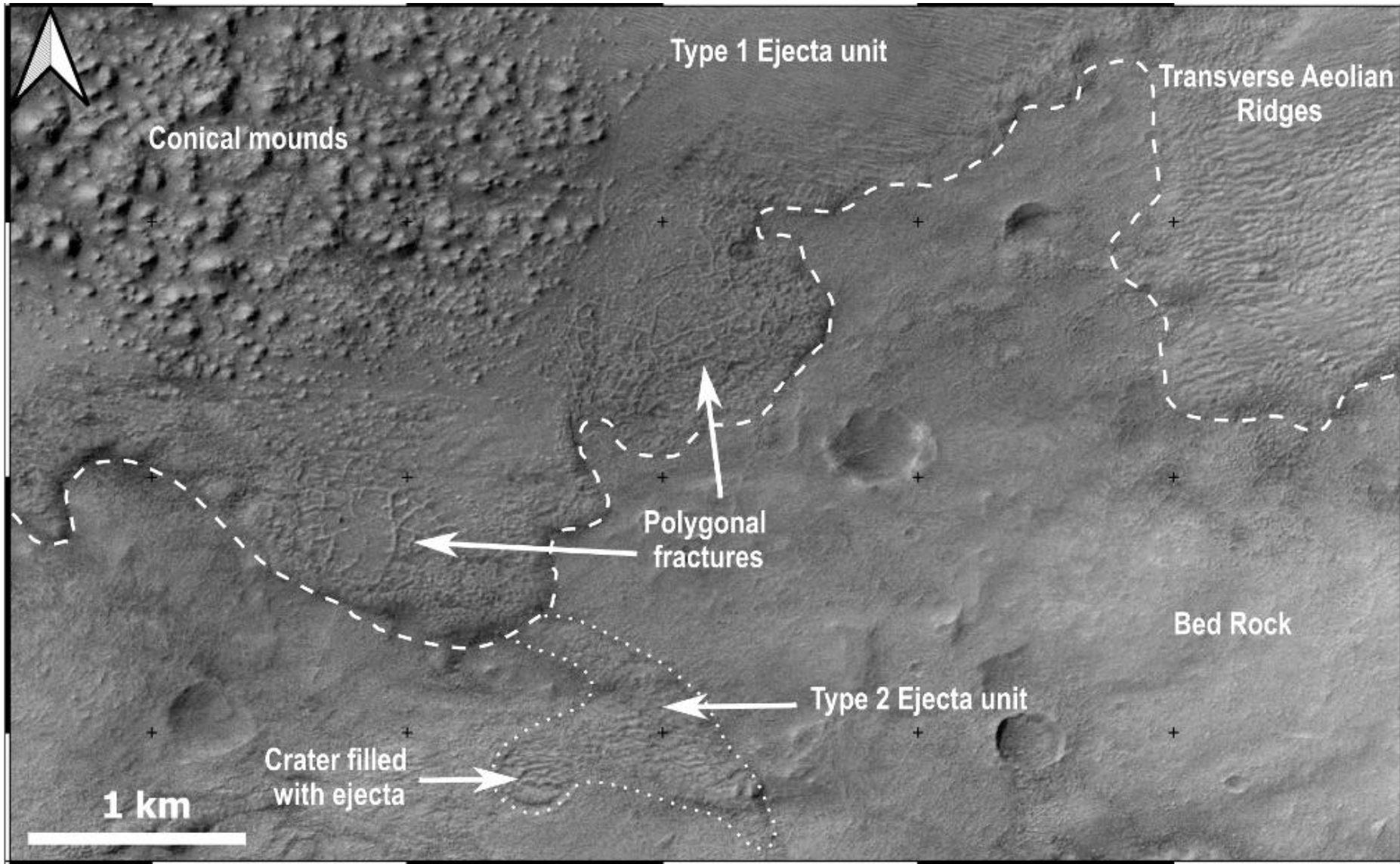
Geomorphic map of the South-East part of Hale crater at 1:1300000



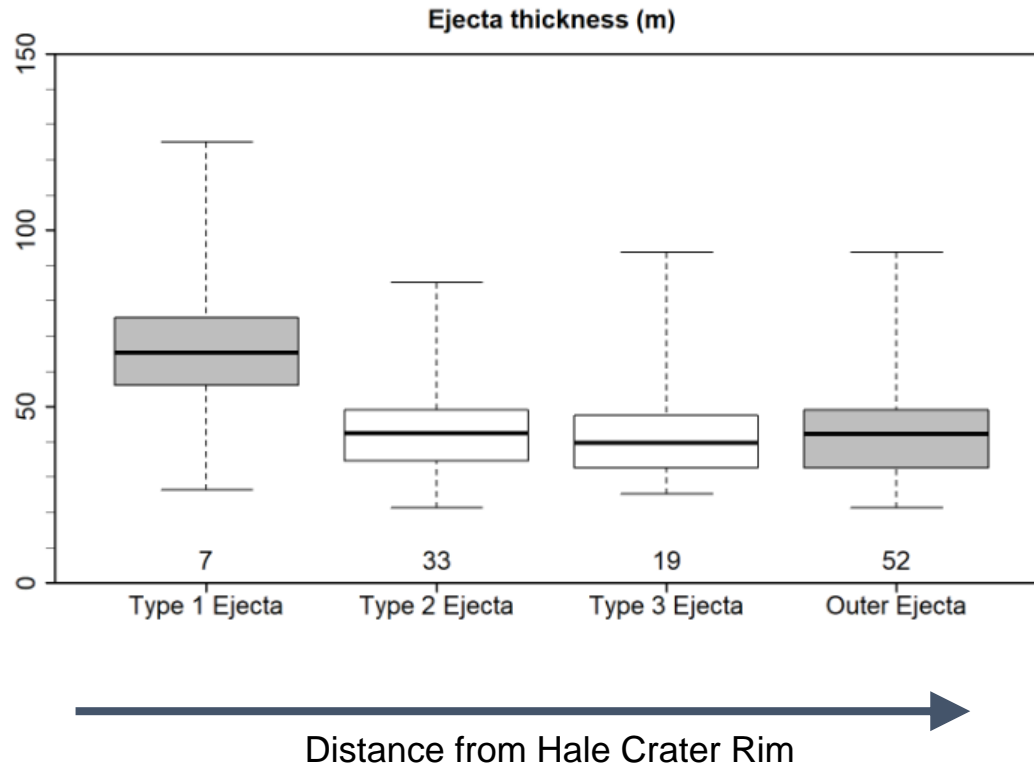
Molards on Mars



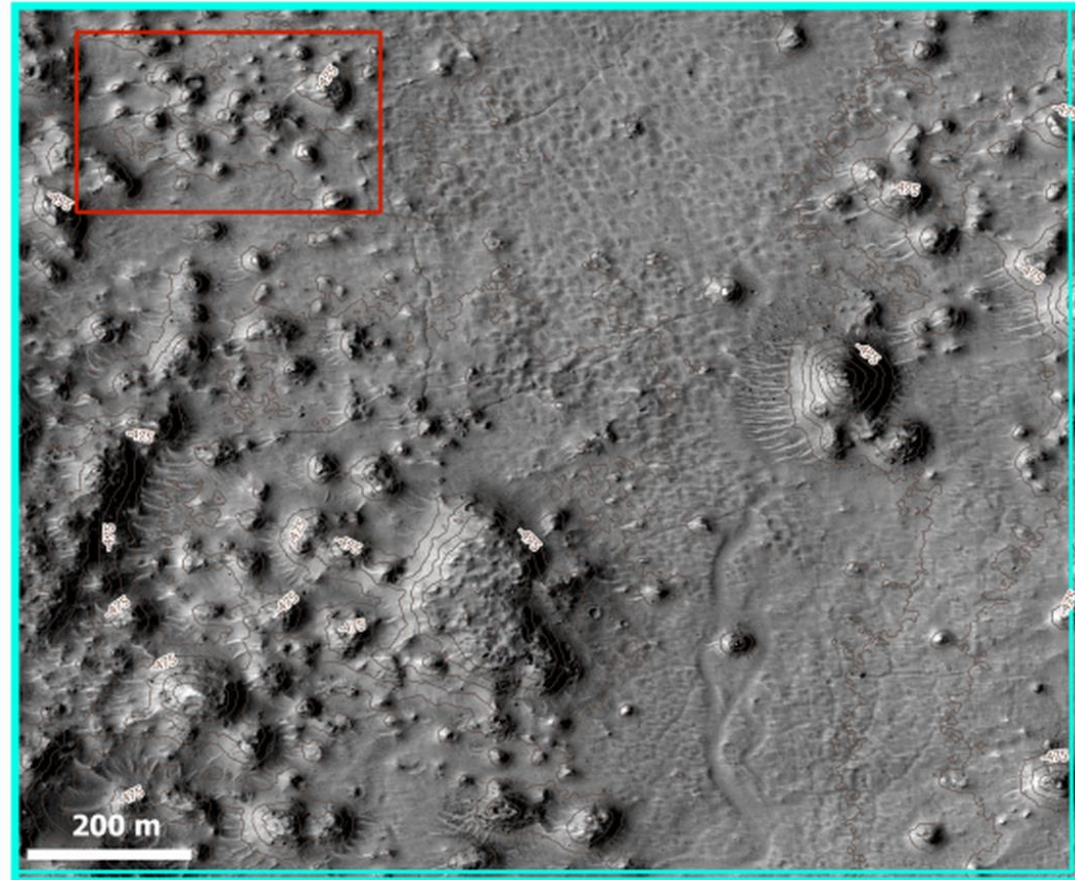
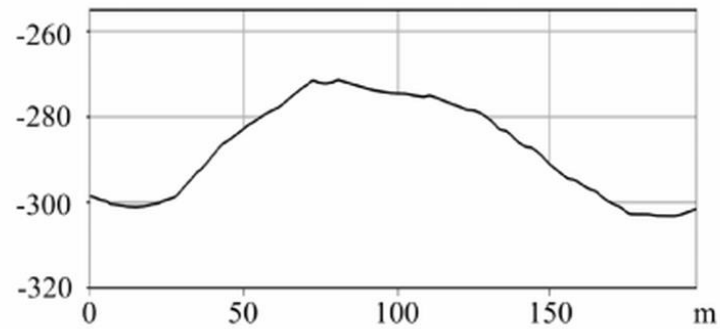
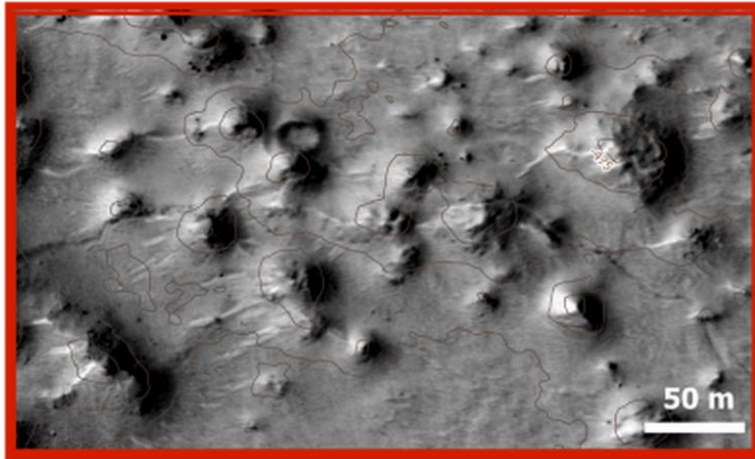
Molards on Mars



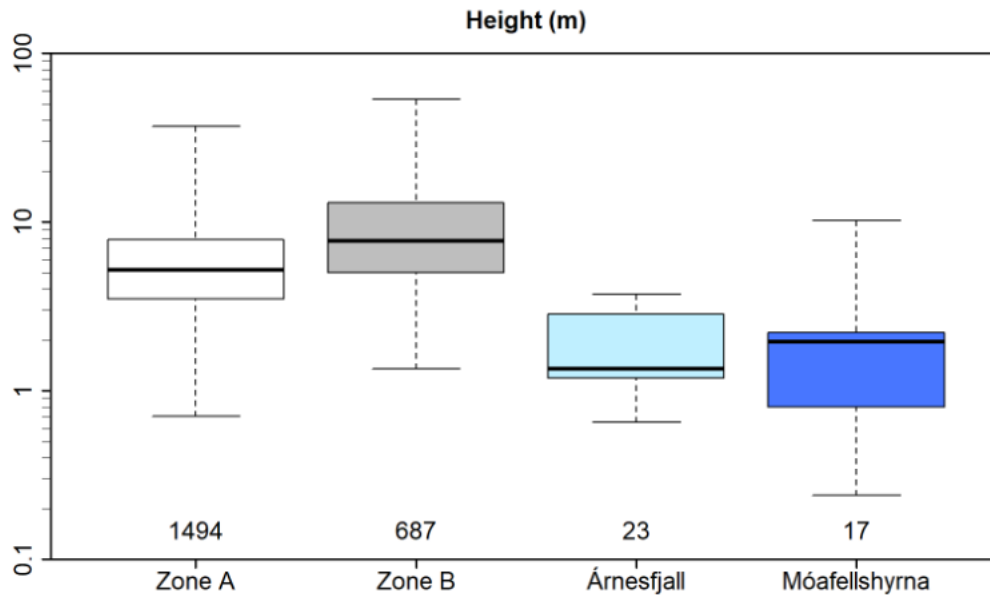
Molards on Mars



Molards on Mars

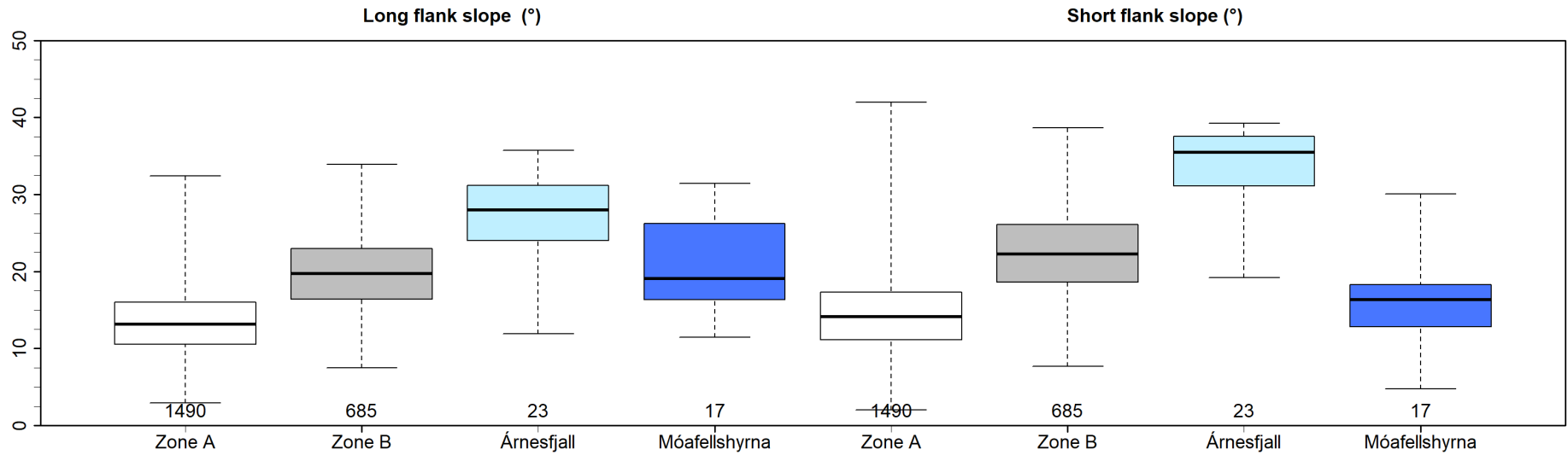


Molards on Mars vs Earth

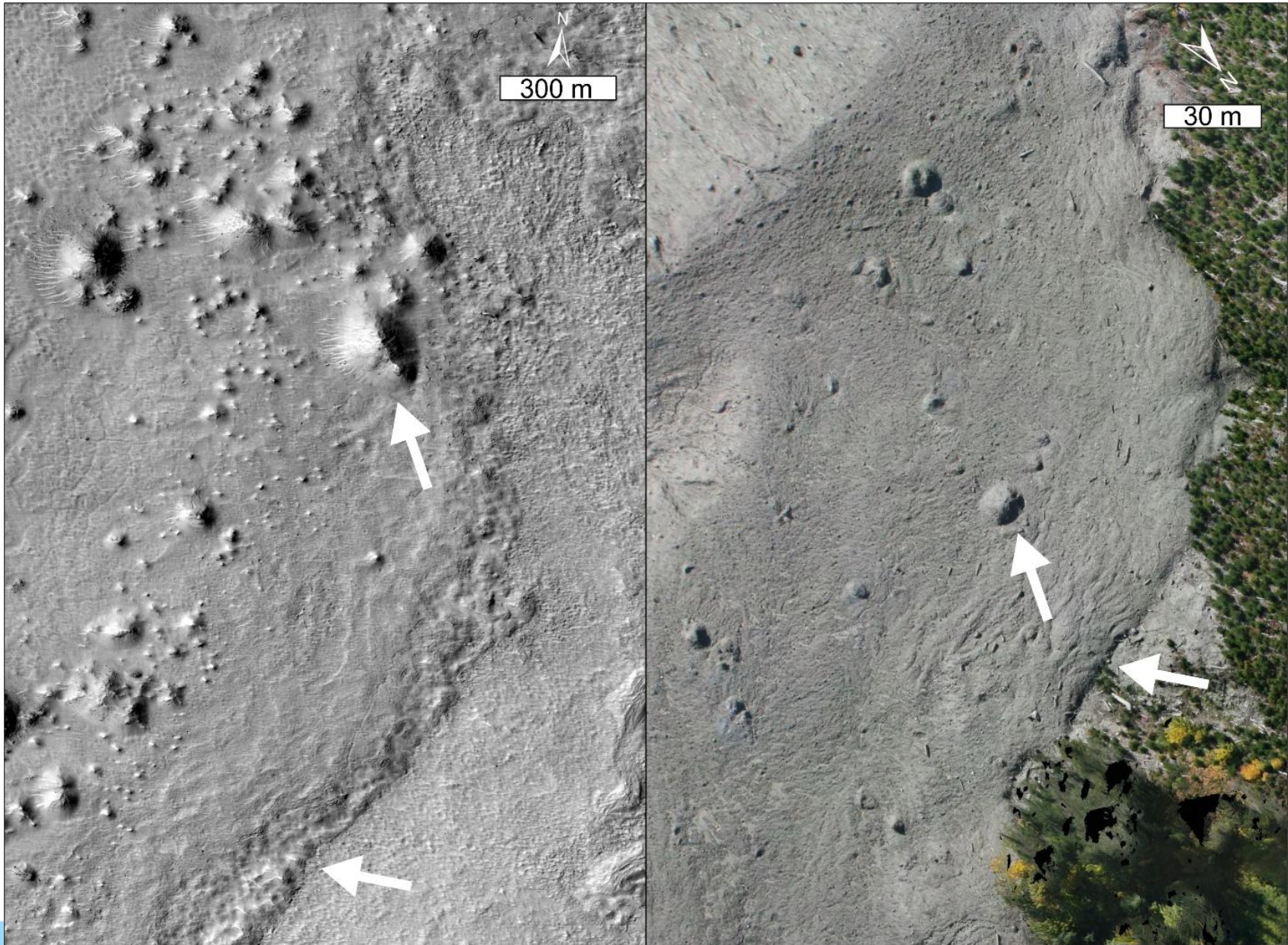


- Móafellshyrna 10.2 → 15-20 m
- Árnesfjall 3.7 → 1-5 m
- Mars A 37 → 40 m
- Mars B 53 → 40 m

Molards on Mars vs Earth



Molards on Mars vs Earth



Conclusions

- The conical mounds in Hale have heights that approach their host flow thickness and similar slopes to molards on Earth.
- The setting of the conical mounds within the lobate deposits of Hale Crater ejecta flows are consistent with molards in landslides on Earth
- Hale mounds result from blocks of ice-cemented ground that were thrown out in the impact and transported by the ejecta flows, which then degraded to cones of debris on loss of the interstitial ice.