Geophysical Research Abstracts
Vol. 17, EGU2015-14187, 2015
EGU General Assembly 2015

Using high resolution topography of the Earth and Moon to infer the "wetness" of slope processes on Mars

Susan Conway and Matthew Balme
Open University, Department of Physical Sciences, Milton Keynes, United Kingdom (susan.conway@open.ac.uk)

The present-day atmosphere of Mars is thin and dry; the surface environment experiences large temperature changes and is generally inhospitable to liquid water. However, we are coming to recognise that Mars has an extensive cryosphere, including polar caps, glaciers and ice-rich permafrost extending from the mid-latitudes to the poles. Recent work has highlighted the presence of landforms indicative of recent (<5 Ma) thaw and even liquid water flow, including, solifluction lobes, sorted patterned ground, and kilometre-scale gullies. Here we use metre-resolution topography of visually-analogous landforms on Earth and the Moon as "wet" and "dry" end-members for comparison to the slope-forms we find on Mars. We use hydrological analysis techniques to characterise the hillslopes in terms of upslope drainage area, local gradient and curvature, from which we derive a topographic fingerprint for each process. Our findings support the wet-interpretation of the martian landforms that was initially proposed based on planform morphology alone, but contested due to the lack of support from climate modelling.