



A Periglacial Landscape in Acidalia Planitia, Mars?

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The freezing and thawing of the permafrost active layer is an important process in shaping the landscape of cold climate regions on Earth and it is possible that it has also played a role in the formation of the martian landscape. The northern plains of Mars contain a variety of possibly thaw-related landforms, including polygonally patterned ground, lobate terraces and scalloped depressions. Many of these landforms resemble the patterned ground, solifluction lobes and thermokarst depressions common in parts of the terrestrial arctic. If similar suites of landforms can be found on Mars then it would indicate that freeze-thaw processes may have played a role in shaping the martian landscape in the geologically recent past.

A survey of Acidalia Planitia, in the northern plains of Mars, is currently underway that aims to examine the distribution of landforms which may be indicative of freezing and thawing of water ice. We describe the landscapes and landform assemblages from key study sites within this area, and discuss the evidence for the landscape being formed by the thawing of water-ice, or by more exotic processes, such as the degradation of hydrated minerals to form liquid 'cryobrine's'.

A classification system for characterising different landforms has been developed. Preliminary results indicate that many of the images in the mid- to high-latitudes contain surface features which could have formed through the action of liquid water, and/or the freezing and thawing of a permafrost active layer. We present initial results showing the geographical distribution of such landforms and examine how their occurrence depends upon latitude.