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On the formational processes of Recurring Slope Lineae on Mars

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Results of recent exploration of Mars indicate that liquid water may exist near its surface at depth at present day. Small surficial features, known as Recurring Slope Lineae (RSL), found by the observations using HiRISE camera onboard Mars Reconnaissance orbiter support the above view.

RSLs are identified on the slopes of a lot of craters in the mid latitude of the southern hemisphere and leave traces like water flow (McEwen et al. 2011). In addition, RSL are thought to be recurrently developed from spring to autumn but fade out in winter. Importantly, RSLs are the currently active events possibly related to the existence of liquid water on Mars. Note that most other surface features considered to be formed by water flows, such as outflow channels and valley networks, are formed during Noachian or Hesperian periods, over 3 billion years ago.

In this work, we study about 100 HiRISE images in the latitudes from 20 to 50 S. We also contrast high resolution Digital Elevation Models in this region. We map out RSLs found on these images and perform a statistical study, particularly focusing on their geomorphology features, such as the gradients the distributions and states of flow. As a result, we find that RSLs are numerously exist on about 30 degree slope at the latitudes around 40S and that the width of a single RSL is generally from 1 to 5 m and the length is up to 500m or so. In this presentation, we will discuss that these results are consistent with the idea that their formations are related to liquid water.

Reference
McEwen, A. S. et al., 2011. Seasonal flows on warm martian slopes. Science 333, 740-743.

Keywords: Mars, Geology, Water, Orbiter images, Life exploration