Briny Liquid Water in Recurring Slope Lineae (RSL) on Mars

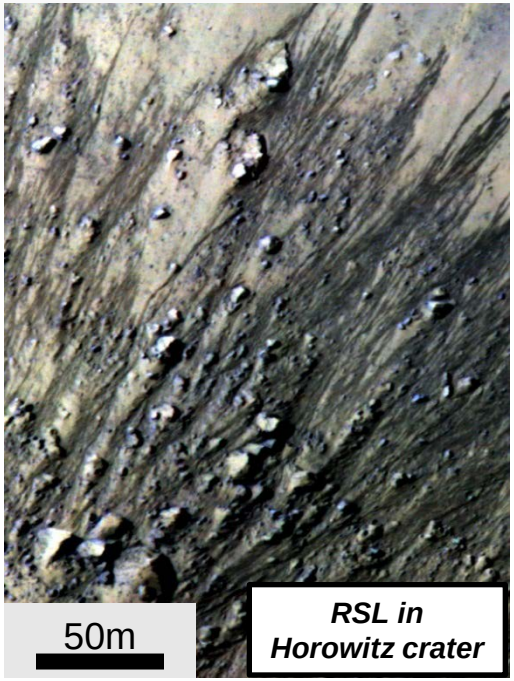
Recurring slope lineae (RSL) continue to be a subject of intense study by the Mars Reconnaissance Orbiter (MRO) science team. RSL form on sunny slopes in local summer, grow downslope, and fade in autumn, consistent with flow of a liquid.

•MRO collected Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) spectra for four locations where RSL had been previously detected. These data indicated that hydrated perchlorate salts were present during the season when RSL grow.

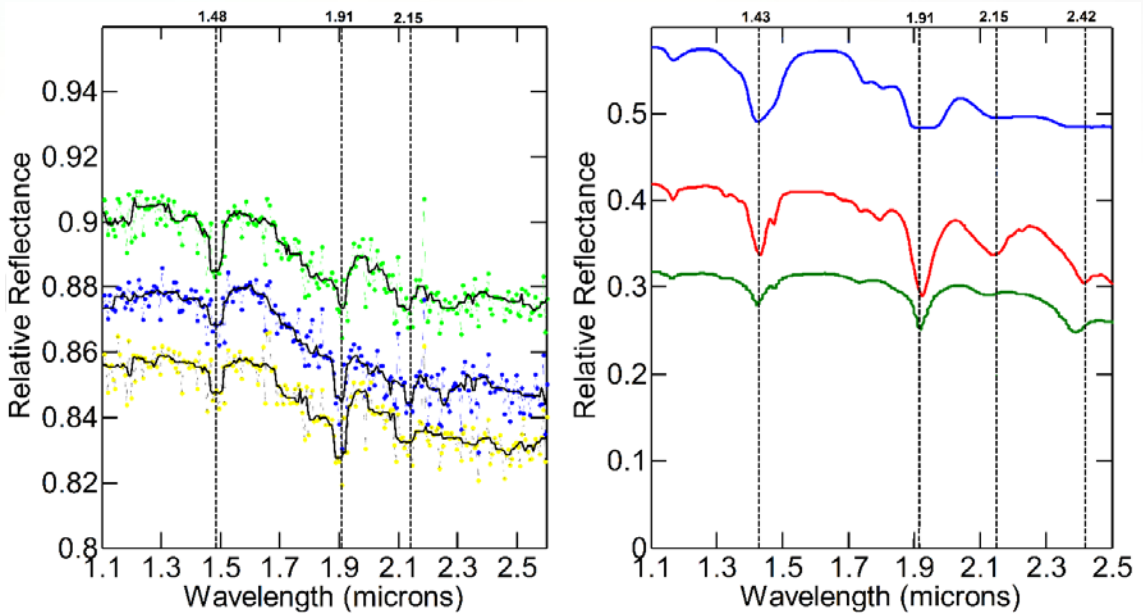
•Perchlorates are a group of minerals that can serve as a powerful freezing point depressant, reducing the freezing point of water to as low as -78˚ C (-108˚ F). With that much freezing point reduction, plus expected daily variations in humidity, briny liquid water could be stable over part of the day and flow to form RSL.

•Perchlorate salts have been identified by Phoenix (by wet chemical analysis) and Curiosity (by the Sample Analysis at Mars, or SAM instrument), and both landing sites have exhibited possible transient brines.

Ojha, L. et al. (2015), *Nature Geoscience*



RSL in Horowitz crater



(Above left) Single-pixel CRISM spectra showing features indicative of perchlorate. (Above right) Perchlorate salts measured in the lab. The RSL are best fit by a mixture of phases.