

# Volcanism and Hydrothermal Activity in Valles Marineris

Groups of pitted cones and associated flow features in Coprates Chasma morphologically resemble scoria and tuff cones, and lava flows [left figure]. Previously, the landforms have been interpreted as mud volcanoes (Okubu, *Icarus* 2016). However, based on morphological observations, textural characteristics of the flow unit surfaces, and possible flow inflation, this latest work, using images from the HiRISE and CTX cameras on MRO, suggests igneous volcanism as the most plausible mechanism. Moreover, the features are very similar to igneous landforms elsewhere on Mars where sedimentary causes are unlikely. Dating by crater counts in this region yields mid to late Amazonian ages, which is younger than most of Valles Marineris. Spectral data from CRISM reveal opaline (silica-rich) material, possibly indicative of hydrothermal processes [right figure].

