

Michalski Data Repository Item DR1: Additional notes

Detection of clay minerals on Mars

The spectral absorptions are interpreted as evidence for phyllosilicates – smectite clay minerals in particular - because in deposits where the (Al,Fe,Mg)-OH absorptions occur, there is also an H-O-H absorption. The occurrence of both of these together can simply be explained by the occurrence of TOT clay minerals with interlayer water, like smectites, though there are other more complicated, alternative explanations that can be explored in future work.

Terminology

In this paper, by “clay” or “clay-bearing,” we are referring to clay minerals and clay mineral-bearing units, not particle size fractions.

By “light-toned,” we mean relatively light-toned compared to the dark unit. In actuality, the “light-toned” unit includes layers that span a range of tonalities/brightness.

OMEGA Data processing

OMEGA data (ORB0353_3) were processed using a minimum-noise-fraction technique to map spectral uniqueness. The principle component extracted here corresponds closely to a 1.9 μm band depth map derived by Poulet et al. (2005). The OMEGA data are draped over a THEMIS daytime infrared mosaic

We measured I/F, the ratio of the observed radiance to the solar irradiance, which is qualitatively similar to albedo.

Crater Counting

We counted 277 craters over an area of 177,000 km^2 , selected to include the known clay exposures in the region at the time of writing. The exposure of light-toned rocks in the walls of large craters in the area

(even the largest crater; see MOC image M1001551) suggest that essentially all of the large craters are either younger than the light-toned units, or roughly contemporaneous with deposition of the unit.