

Martian Iron Silicates as Water Marker: Mineralogical and Grain Size Distribution

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The presence of liquid water on Mars in the past is one of the main issues concerning the Red Planet. Geological suggestions about the ancient presence of liquid water are given by the network valleys and the presence of rubble cones in some craters. From the spectroscopic point of view the presence of liquid water on the surface of Mars can be checked through the detection of carbonate and sulphate deposits. In this work we present an alternative method based on the oxidation process of iron ions in silicates, due to the ancient presence of water. The presence of olivine deposits, one of the most common iron silicates, in some Martian locations, like Nili Fossae or Ganges Chasma, suggests that this mineral could be a good candidate for this test. We focus our attention on two features at 0.45 and 0.65 micron induced by the aqueous alteration of Fe²⁺ in Fe³⁺. The latter spectral feature has been correlated to the grain size distribution by means of a comparison with laboratory measurements. We shall discuss our method and present the preliminary results of its application to the spectra recorded by OMEGA.