



Textures of rocks at Pahrump Hills, Gale Crater, Mars, as revealed by the Mars Hand Lens Imager

R Aileen Yingst (1), Linda Kah (2), Kathryn Stack Morgan (3), Kenneth Edgett (4), Marie McBride (5), David Harker (4), Kenneth Herkenhoff (6), Michelle Minitti (1), and Scott Rowland (7)

(1) Planetary Science Institute, Tucson, United States (yingst@psi.edu), (2) University of Tennessee, Knoxville, USA, (3) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA, (4) Malin Space Science Systems, San Diego, USA, (5) Purdue University, West Lafayette, USA, (6) USGS, Flagstaff, USA, (7) University of Hawaii - Manoa, Honolulu, USA

Expressions of rock texture at the scale resolvable with a terrestrial hand lens (10 μm -10 mm) are critical to interpreting present and past geologic environments. The Mars Hand Lens Imager (MAHLI) acquired sub-mm/pixel scale color images of over 70 individual rocks and outcrops during Curiosity's first 1000 martian days, permitting the study of textures down to the scale of coarse silt. here we describe our investigation of the hand lens-scale the textures of lower Murray formation strata at the Pahrump Hills outcrop.

The Curiosity traverse has crossed portions of two primary bedrock units (described by Grotinger et al., doi:10.1126/science.aac7575): the Bradbury group, which largely consists of fluvial sandstones and conglomerates; and the Mt. Sharp group, for which we have thus far examined about 200 m of the basal Murray formation. The Pahrump Hills outcrop provided our first detailed look at lower Murray strata.

We explored \sim 13 m of section at Pahrump Hills, perhaps the lowest 10% of the Murray formation. It is dominated by finely-laminated, very fine-grained rocks. These lower fine-grained layers are characterized by planar lamination in a very fine-grained matrix; the dominant grain size in this region is smaller than very fine sand. Evidence for diagenetic mineral precipitation was also prominent in these lower layers. Evidence for such activity includes likely in-situ precipitation of lenticular features, preferential cementation of laminae in several layers, precipitation of late-diagenetic crystal clusters, and secondary overprinting of previously-deposited crystals. The \sim 30 cm thick capping upper layer is coarser-grained and varicolored. It is a thick cross-laminated sandstone, with moderately well-sorted, relatively rounded grains averaging 0.6-0.8 mm in diameter. Taken together, these characteristics are consistent with a depositional hypothesis of subaqueous, lacustrine environment capped by interfingering fluvial-deltaic progradation of a different composition.