

P23B-2175: MSL/Mastcam Multispectral Observations of Lower Mt. Sharp Units: Spectral Evidence of Distinct Alteration Environments

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13:40 - 18:00

📍 *Moscone South - Poster Hall*

The Mars Science Laboratory *Curiosity* rover reached the lower units of Mt. Sharp in Gale Crater approximately two years ago. Along the traverse, Mastcam multispectral observations have documented the visible/near-IR spectral variability of drill tailings, bedrock, float rocks, fines, and other materials, recording a set of diverse reflectance properties in twelve unique filters over wavelengths 400-1100 nm. The most recent multi-filter images include new spectral diversity not encountered in near-field imaging acquired earlier in the mission.

Since departing Marias Pass (~sol 1072), the rover has sampled material from the Stimson sandstone unit four times at two widely separated locations. These drill pairs were designed to investigate alteration regions visible as bright haloes bordering fractures in the bedrock. Drill fines and piles of dumped sample material from these sites (at Bridger Basin and on the Naukluft Plateau) were targeted for multispectral observations, which quantify the differences in overall reflectance and spectral shape between the unaltered Stimson material and the light-toned haloes. In the latter, high reflectances and relatively flat spectral shapes are consistent with interpretations of silica enrichment from other instruments.

Mastcam spectra of the portions of the underlying Murray Formation (mudstone) that were encountered on first approach to the Bagnold dunes, and again upon exiting the Naukluft Plateau, are consistent with the presence of crystalline hematite. Variations in the relative strength of hematite absorption features in different locations may suggest possible differences in relative and/or absolute abundances of hematite of varying degrees of crystallinity. Dune materials have low reflectances with a broad, shallow absorption near 1- μm consistent with an olivine-bearing basaltic composition. We present these and other examples of spectral variability encountered by the rover during its ascent up the lower slopes of Mt. Sharp.

Authors

Danika F Wellington *

Arizona State University

James F Bell

Arizona State University

Jeffrey Roy Johnson

Johns Hopkins University

Abigail A Fraeman

*NASA Jet Propulsion
Laboratory*

Kjartan Münster Kinch

Niels Bohr Inst p Rockefeller

Austin Godber

Arizona State University

Melissa S Rice

*Western Washington
University*

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