Mineralogy of Eolian Sands at Gale Crater, Mars

C.N. ACHILLES[1], R.T. DOWNS[1], D.T. VANIMAN[2], A.S. YEN[3], D.F. BLAKE[4], R.V. MORRIS[5], D.W. MING[5], E.B. RAMPE[6], S.M. MORRISON[1], T.F. BRISTOW[4], S.J. CHIPERA[7], B.L. EHLMANN[8], M.G.A. LAPOTRE[8], K.S. EDGETT[9], R. GELLERT[10], A.H. TREIMAN[11], K.V. FENDRICH[1], P.C. SARRAZIN[12], P.I. CRAIG[11], J.A. CRISP[3], J.P. GROTZINGER[8], D.J. DES MARAIS[4], J.D. FARMER[13], J.M. MOROOKIAN[3]

[1]Dept. of Geosciences, Univ. of Arizona, Tucson, AZ 85721, USA, cheriea@email.arizona.edu
[2]Planetary Science Institute, Tucson, AZ, USA
[3]Jet Propulsion Laboratory/Caltech, Pasadena, CA, USA
[4]NASA Ames, Moffett Field, CA, USA
[5]NASA Johnson Space Center, Houston TX, USA
[6]Aerodyne Industries at NASA JSC, Houston, TX, USA
[7]Chesapeake Energy, Oklahoma City, OK, USA
[8]California Institute of Technology, Pasadena, CA, USA
[9]Malin Space Science Systems, San Diego, CA, USA
[10]Dept. of Physics, Univ. of Guelph, Guelph, ON, Canada
[11]Lunar and Planetary Institute, Houston, TX
[12]SETI, Mountain View, CA, USA
[13]Arizona State University, Tempe, AZ, USA

The Mars Science Laboratory rover, Curiosity, is using a comprehensive scientific payload to explore rocks and soils in Gale Crater, Mars [1]. Two eolian sands have been sampled during MSL's mission: the Rocknest sand shadow consisting of armored sediments [2] and Gobabeb, a sample from the active Bagnold dune field at the base of Mount Sharp. The CheMin X-ray diffraction instrument performed quantitative mineralogical analyses of the <150 μm portion of these sediments. Both deposits are dominated by basaltic minerals along with a significant portion of X-ray amorphous material. In addition, the mineral chemistry of olivine and plagioclase is unchanged based on modeled peak positions in the Rocknest and Gobabeb diffraction data. Bulk chemical analyses of the Gobabeb >150 μm fraction from APXS suggest that the mineralogy is more mafic than the CheMin analyzed fraction. This presentation will compare the active, Gobabeb, and inactive, Rocknest, sand deposits and use the mineralogy to explore the weathering histories and sources for each sediment.

[1] Grotzinger, *Space Science Reviews* (2012) **170** 5-56. [2] Blake *et al*. (2013) *Science* **341** 1239505.