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Borehole stratigraphy on Mars

W. Smythe (1), M. C. Boryta (2)

(1) Jet Propulsion Laboratory, Pasadena, CA, USA, , (2) Mount San Antonio College, Walnut, CA USA, (wsmythe@lively.jpl.nasa.gov/Fax: +01 818-393-3218)

Introduction: We have implemented an IR spectrometer miniaturized to fit within a Mars drill. To expedite selection of the spectrometer wavelength range, wavelength resolution and the window material properties, it was necessary to compile models of the classes of compositions and states of aggregation likely to be encountered in the near-subsurface of Mars. The compilations reported here provide a useful summary of data about the subsurface and provide examples of stratrigraphic sections that may be encountered during drilling.

Discussion: The models utilize data from diverse sources including surface compositional information from the Mars orbiters and mineralogic, stratigraphic and soil parameters from the Mars landers and rovers. There is no available lander data on mineralization and soil consolidation at higher latitudes, an area of high interest for Mars drills due to the expectation for near-surface water ice. Models of soil properties at the higher Mars latitudes are guided by the properties of soils extant in the permafrost regions on earth.

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