Sedimentary Deposits on Mars from the Eyes of Rovers and Landers

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Abstract: Mars has a rich sedimentary history. Orbital images indicate vast regions of sedimentary deposits, including alluvial, deltaic, and lacustrine deposits. "Boots on the ground" via landers and rovers has provided mineralogical, geochemical, and morphological properties for some of those sedimentary environments. Timing of the emplacement of these deposits is not only important to interpret Mars' geomorphologic and climatic history, but also for the preservation of organic materials. Spirit landed in Gusev crater and characterized the mineralogy and geochemistry of mature and recent "soils." Opportunity discovered vast deposits of sulfate-rich basaltic sandstones emplaced by eolian processes in conjunction with a progressively wetter environment. The Phoenix lander characterized the solution chemistry of northern latitude (68N) "soil deposits" on polygonal ground with an ice table 10-20 cm below the surface. However, the most detailed stratigraphic section encountered on Mars is ongoing in Gale Crater by the Curiosity rover. Curiosity has traveled up section through conglomerates, sandstones, and mudstones and recent eolian deposits. The objective of this presentation is to describe (briefly) mineralogical, geochemical, organic and morphological properties of these sedimentary deposits on Mars.