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## 2015 GSA Annual Meeting in Baltimore, Maryland, USA (1-4 November 2015)

Paper No. 71-1

Presentation Time: 1:30 PM

# THE SEDIMENTARY ROCK RECORD OF MARS AS VIEWED FROM THE LAST DECADE OF ORBITAL MISSIONS

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Over the last decade, orbital and landed missions have revealed a diverse and extensive sedimentary rock record on Mars. In the absence of plate tectonics, and because of a decline of the geological activity over time, the Martian sedimentary record is well-preserved and much older than terrestrial records. Both clastic and chemical sedimentary rocks occur on Mars, in a wide range of depositional environments. In addition to the expected impact- and volcanic-generated deposits, some sedimentary rocks were formed and deposited in local aqueous environments, i.e., alluvial, fluvial, deltaic, and lacustrine environments. Interestingly, clays that are the most common and widespread alteration minerals on Mars are detected by orbital visible and near-infrared spectroscopy in association with these sedimentary rocks, supporting the existence of past chemical weathering under circum-neutral pH conditions. Therefore, more clement conditions have likely prevailed during the first billion years on Mars. Some regionally extensive sedimentary formations of up to several kilometers thick cover plateaus, fill canyons and other closed basins in the equatorial regions of Mars. Constituted of a variety of sulfates, iron oxides, amorphous silica, sometimes interbedded with clays, their origin is still under debate but likely result from multiple formation processes including lacustrine evaporation, groundwater alteration, hydrothermalism, and eolian reworking. Numerous exposures of chloride-bearing deposits show the existence of ancient ponding brines. The polar regions of Mars show a variety of rock glaciers, eskers and other sulfate-bearing sands inferred to have formed by weathering of dust particles within ancient massive ice deposits. This talk will present an overview of those sedimentary formations as seen from orbital observations, and will discuss the implications on the geologic and climatic evolution of Mars.

Session No. 71

[T171. Exploring the Sedimentary Rock Record of Mars](#)

Sunday, 1 November 2015: 1:30 PM-5:30 PM

Room 344 (Baltimore Convention Center)

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