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# Curiosity explores the base of Aeolis Mons, Gale crater, Mars: Recent Geological and Geochemical Mission Results

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The Mars Science Laboratory (MSL) Curiosity rover has been exploring sedimentary rocks at the foothills of Aolis Mons since August 2014. Here, an array of fluvial, lacustrine and aeolian strata that show a complex pattern of post-depositional alteration are present. This presentation will summarize the most recent geological and geochemical findings of the MSL mission. Basal outcrops that form the lowest stratigraphic unit of Aeolis Mons, the Murray formation, are characterized predominantly by mudstones with minor intercalated sandstones. The mudstone facies, originally identified at the Pahrump Hills field site, show abundant fine-scale planar laminations throughout the Murray formation succession and is interpreted to record deposition in an ancient lacustrine system in Gale crater. Interbedded cross-stratified sandstones are considered to record fluvio-deltaic incursions into the lake. The lacustrine deposits of the Murray formation are unconformably overlain by much younger sandstones of the Stimson formation. Orbital mapping and in situ observations indicate that the basal strata of the Stimson formation show complex onlap relationships with the underlying Murray formation strata signifying that there was metre-scale palaeotopographic relief on the unconformity surface upon which the Stimson accumulated. The Stimson formation itself is characterized by cross-bedded sandstones with cross-bed sets tens of centimetres in thickness. Sedimentological observations suggest that the Stimson dominantly records deposition by aeolian dunes. Curiosity has made detailed measurements of the geochemistry of the Murray and Stimson formations and associated diagenetic features. Perhaps most surprising has been the discovery of extensive silica enrichment both within mudstones of the Murray formation, perhaps of primary sedimentary or later diagenetic origin, also in as fracture-related diagenetic halos within the Stimson formation. We will describe the nature of this silica enrichment and consider the mechanisms responsible. These results indicate that silica is enriched at Gale to the same degree as it is in the Columbia Hills, but at Gale it relates to a lower temperature lacutrine/groundwater setting, thats contrasts with the Columbia Hills volcanic/hydrothermal setting. This broadens our understanding of the diversity of Mars' ancient habitable environments. In summary, stratigraphic and geochemical observations by the Curiosity rover record a rich geological history in the basal strata of Aeolis Mons.