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Chemical diversity among fine-grained soils at Gale (Mars): a chemical transition as the rover is approaching the Bagnold Dunes?

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The ChemCam instrument has the capability to study the chemical composition of soils at a sub-millimeter scale, thus providing an unpreceedented spatial resolution for their study. More than 300 soils have been sampled so far with ChemCam and these targets are analyzed frequently in order to monitor any change in composition along the traverse. Detailed chemical analysis as a function of grain size is of great importance in order to better constrain soils formation. Curiosity is approaching the Bagnold Dunes, the first active dune field accessible for in-situ analyses. One of the main goals is to determine or constrain the dune material chemistry as well as its provenance. This study is focusing on recent soils analyzed when ap-proaching the dunes, for a comparison with previous soil targets, and with dunes specifically.
Chemical composition of fine-grained soils as we approach the Bagnold Dunes has been compared with previous fine-grained soils analyzed along the traverse. These new soils have an average sum of oxides that is significantly higher than what has been previously analyzed. This would suggest that these soils are less hydrated and probably less altered than previous ones.An enrichment in SiO_2, FeO and alkali is also observed in these new fine-grained soils, which could be related to a contamination by local rocks due to erosion. Some coarser grains could correspond to an olivine component. This analysis is on-going and will be detailed as the dedicated Bagnold Dunes campaign starts. We will also report in the hydratation level of the dunes.