

THE HUNGARIAN MARS ANALOGUE EXPEDITION IN MOROCCO AT IBN BATTUTA CENTRE.

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Introduction: Three hungarian and an Italian researchers made a field trip in Morocco between 15-21 September, 2016 at the Ibn Battuta Center [1,2,3]. The roughly 850 km was travelled at the Atlas and Anti-Atlas along the Marrakech-Ouarzazate-Erfoud-Zagora-Ouarzazate-Marrakech by two jeeps.

Methods: During the field work, GPS coordinates and photos were recorded and later correlated with Google Maps based satellite appearance of the given area. Drilling with soil driller and borehole-wall scanning with A4-Tech PK-910H webcamera happened at four sites.



Figure 1.: The drilling process at the last drilling area (0601)

Results: During the field trip 70 stops, 10 sampling places, four drilling sites were made. For the comparison of remote and in-situ images the surface features at the Ibn Battuta field sites were classified to groups of cliffs, hills rock desert surface, sand desert surface, lakebeds, wadis, and borders between different surface texture areas. At the four drilled sites (3 wadis, 1 lakebed) the boreholewall scans were correlated with nearby outcrops and later laboratory data. Stratigraphic differences were identified regarding textures, internal organisation and grain size. The identified minerals at the field were quartz, carbonates (calcite), Fe-oxide, some dark minerals. Moreover evaporite was identified in one sample.

four sites. Aeolian dune sand, fluvial sand from wadis and lacustrine sediment from dried-up lake were sampled to measure with NIKON Eclipse E600 POL optical microscope, Shimadzu 3600 infrared spectrometer and Raman spectroscopy coupled with morphological analysis by Morphologi 3G ID facility at the home institute.



Figure 2.: The microscopy photo from 1 cm depth of the last drilling area (0601). Quartz, carbonate, dark minerals and clay can be seen. The shape of the grains are variable (rounded, irregular), rough surfaces with sharp and sometimes blunt edges.

Preliminary conclusions: the samples and the data acquired during the field work are currently under analysis. Our observations suggest that it is possible to differentiate rocky desert types both in satellite and in-situ images. However more work is required to identify the exact connection between them and extrapolate rocky desert characteristics from only satellite images. The field work gave examples how the targeting of sampling at wadis could be supported by observing the exposed outcrop strata produced by the latest flood cut channels. The identification plus analysis of particulate sediments and agglomerates are strongly influenced by the sampling method. Local geological and morphological context is, of course, of primary importance in selecting a suitable site for in-situ field-work. The rationale for the selection of the best sampling location should be further developed regarding methodology.

References: [1] Ori G. G et al. (2014) *American Geophysical Union, Fall Meeting 2014*, abstract #P11C-3774. [2] Ori G. G. et al. (2014) *Eight International Conference on Mars*, LPI Contribution No. 1791, p.1456. [3] Ori G. G. et al. (2015) *European Planetary Science Congress 2015*.

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