CONTROL ID: 2568318

TITLE: Spectral characterization of volcanic rocks in the VIS-NIR for martian exploration

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): Igneous effusive rocks cover much of the surface of Mars [1,2,3]. Initially only two types of lithologies were thought to constitute the Martian crust, i.e. a basaltic one and a more andesitic one [1,2], while more evolved lithologies were ruled out.

Nevertheless a more complex situation is appearing in the last years. Recently several observations have highlighted the presence of evolved, acidic rocks. High-silica dacite units were identified in Syrtis Major caldera by thermal IR data [4]. Outcrops in Noachis Terra were interpreted as constituted of felsic (i.e. feldspar-rich) rocks essentially by the observation of a 1.3-μm spectral feature in CRISM data, attributed to Fe^{2+} in feldspars [5]. However different interpretations exist, invoking plagioclase-enriched basalts [6] rather than felsic products.

The increasing of high-resolution and in-situ rover-based observations datasets and the changing of the initial paradigm justify a new systematic spectral study of igneous effusive rocks. In this work we focus on the spectral characterization of volcanic effusive rocks in the 0.35-2.5-μm range. We are carrying out measurements and spectral analyses on a wide ensemble of effusive samples, from mafic to sialic, with variable alkali contents, following the classification in the Total-Alkali-Silica diagram, and discussing the influence on spectral characteristics of different mineral assemblages and/or texture ([7], [8]).

[1] Bandfield J.L., et al., Science, 287, 1626, 2000; [2] Christensen P.R., et al., J. Geophys. Res., 105, N.E4, 9609-9621, 2000; [3] Ehlmann B.L. & Edwards C.S., Annu. Rev. Earth Planet. Sci., 42, 291-315, 2014; [4] Christensen P.R., et al., Nature, 436, 504-509, 2005; [5] Wray J.J., et al., 44th LPSC, abs. n.3065, 2013; [6] Rogers A.D. & Nekvasil H., Geophys. Res. Lett., 42, 2619-2626, 2015; [7] Carli C. and Sgavetti M.,Icarus, 211, 1034–1048, 2011; [7] Carli C. et al., SGL, doi 10.1144/SP401.19, 2015.

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