EPSC Abstracts
Vol. 8, EPSC2013-620-2, 2013
European Planetary Science Congress 2013

UPGRADE OF THE MARTIAN IRON MINERALOGY MAPS

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The goal of this paper is the mapping the 1 μm in order to study the Martian mineralogy on a global scale using the OMEGA spectrometer on board of Mars Express.
OMEGA [2] is the imaging spectrometer on board of Mars Express probe. It consists of three spectral channels: the VNIR channel working in the visible-near infrared wavelengths (0.35-1.05 μm), the SWIR channel operating in the 0.92-2.7 μm range and the LWIR channel covering the 2.7-5.1 μm one. An automatic method to co-register the VNIR and SWIR channels to recover the whole spectral range where they overlap has been implemented, thus allowing the study of the 1 μm band.
This work is an upgrade of Carrozzo et al. [1] where a gap in the data coverage existed. The previous maps were based on the data coverage until December 2005, while now they are built using the data acquired up to August 2010. The extended maps are based on the nine spectral indices reported in Table 1. The method used to co-register the VNIR and SWIR channels has been also implemented with a new algorithm that allow a better spatial and spectral alignment. This work, together with the results of other authors [3, 4, 5], completes the global mapping of the Martian mineralogy.

Reference:

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Name	Spectral index	Formula
λVNIR	λ position of the peak in the VNIR	-
λSWIR	λ position of the peak in the SWIR	-
RHP685	relative height of peak at 0.685 μm	R685/(0.5*R625+0.5*R782)
BW1000	band width at 1 μm	λSWIRpeak - λVNIRpeak
BI1000	band integral at 1 μm	$\frac{1}{\Delta\lambda}\frac{\sum Rch\,\delta\lambda ch}{ch(VNIRpeak,SWIRpeak)}$
SHVNIR1000	shoulder height at 1 μm in the VNIR	RVNIRpeak/R937
SHSWIR1000	shoulder height at 1 μm in the SWIR	SWIRpeak/R1124
DUSTINDEX	dust index	SWIRpeak/VNIRpeak
OLVINDEX	olivine index	$\frac{R1743/R1543}{R1300/R1213}$

Table 1. Summary of OMEGA spectral indexes used in this study.