UV-Visible reflectance of Phobos from SPICAM and OMEGA and comparison with Deimos

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Mars Express made several encounters with Phobos and a few with Deimos since 2004. Observations with SPICAM and OMEGA imaging spectrometers on board Mars Express covers the range from UV (110-312 nm) to visible and mid IR up to 5 μm. In the following we consider the ultraviolet (UV) channel of SPICAM and only the visible channel of OMEGA and its small UV extension down to 390 nm, in order to compare with SPICAM. Preliminary results were presented already in the past [1]. Since then, a more detailed analysis was carried out, subtracting some internally scattered light affecting the SPICAM UV retrieved reflectance.

The combined spectrum of Radiance Factor from SPICAM and OMEGA suggests the presence of a deep absorption feature. Both instruments, taken separately, support also this absorption feature.

In the visible part of CRISM [2] on board MRO, one feature is centered at 0.65 μm, with an absorption depth varying from 0 to 4%, an other one is centered at 2.8μm. These two Visible IR features were interpreted [2] either to highly desiccated Fe-phyllosilicate minerals indigenous to the bodies, or to a surface process involving Rayleigh scattering and absorption of small iron particles formed by exogenic space weathering processing.

In this rather uncertain situation, the UV band detected by SPICAM and OMEGA on board Mars Express is of great importance to attempt discriminating between the two scenarios proposed above to explain the Visible-IR reflectance spectra of Phobos.

[1] Bertaux J.L. et al. (2011) EPSC/DPS conference abstract, Nantes, November 2011, [5] Freaman A.A. et al. (2014) Icarus, 229 , 196–205.