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Determining the contribution of aerosols in near-IR observations of the "cryptic region" on Mars using OMEGA and CRISM.

M. Vincendon, Y. Langevin, F. Poulet, J.-P. Bibring and B. Gondet
Institut d'Astrophysique Spatiale, Université Paris Sud, Orsay,
91405, France (mathieu.vincendon@ias.fr)

Recent studies of the "cryptic region", a cold and dark region within the south seasonal CO2 cap of Mars, have shown that surface dust is a constituent which plays a substantial role in the dynamic of the seasonal cap [1, 2]. The OMEGA imaging spectrometer is ideally suited for the study of CO_2 ice properties such as dust contamination due to the major absorption features of the ice in the near-IR [3]. Separating the respective role of surface dust and atmospheric dust contribution in the OMEGA dataset is not straightforward. Using a Monte-Carlo based model of radiative transfer and observations with different geometries, it is possible to infer the optical depth of aerosols and to recover surface spectra free of aerosols contribution [4]. Set of observations obtained with different solar incidences can be used to separate aerosols and surface contribution except for terrains with intermediate albedos ranging from 0.25 to 0.45, which is the case for the cryptic region as the ice spectrum exhibit a strong dust contamination [1]. The few EPF sequences acquired by OMEGA above different surface types have been analyzed and demonstrate that it is possible to recover surface spectra free of aerosols contribution whatever the albedo of the surface using this observation mode. The CRISM imaging spectrometer implements targeted mode of observation and provides EPF sequences as a nominal observation strategy [5]. Observations of the cryptic region by CRISM and OMEGA are planned in February 2007. EPF sequences will be used to constrain the contribution of aerosols and to retrieve the surface spectrum.

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