DIVERSITY OF ATMOSPHERIC COMPONENTS, DETECTED BY OMEGA/MEX LIMB OBSERVATIONS

B. Gondet, J.-P Bibring, M. Vincendon , *Institut d'Astrophysique Spatiale, UniverSud, Paris, Orsay France (Brigitte.gondet@ias.u-psud.fr*

Introduction: Since 2004 OMEGA has acquired more than 500 vertical limb profiles at various locations, seasons and illuminations. With its 1 mrad IFOV, the vertical sampling is in the kilometer scale. At each altitude step, OMEGA acquires the full spectrum, in more than 300 spectral channels covering the range .5 to 5.1 µm. The spectral features (continuum slope, absorption and emission bands) are diagnostic of all atmospheric constituents: molecules, grains, icy particles, clouds. Their monitoring in time and space offers a unique means to decipher the atmospheric processes taking place in the Mars environment. We will present and discuss them, primarily within the frame of the H_2O and CO_2 cycles.

Results:

Herebelow are shown some examples of the diversity of the spectra acquired by OMEGA through limb profiling .

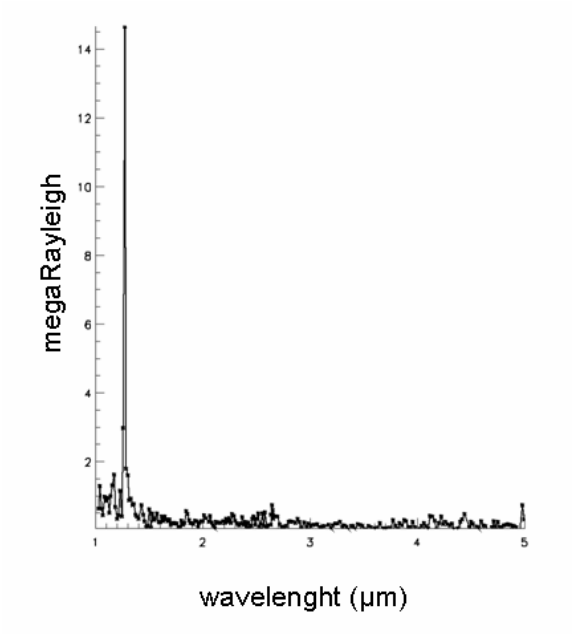

Figure 1: spectrum (O2 nightglow [1]) acquired at night over the South Pole at an altitude of ~ 42 kms; Ls: 195, local time: 10 pm

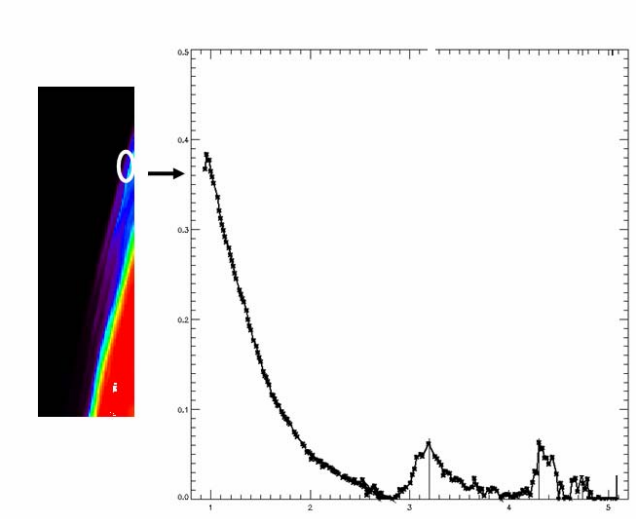

Figure 2: detached layer (~ 40 kms) and the associated spectrum over Hellas basin with 2 emissions at 3.2 µm (H_2O ice) [2] and 4.7 µm (CO) [3]; Ls: 310, local time: 6 pm

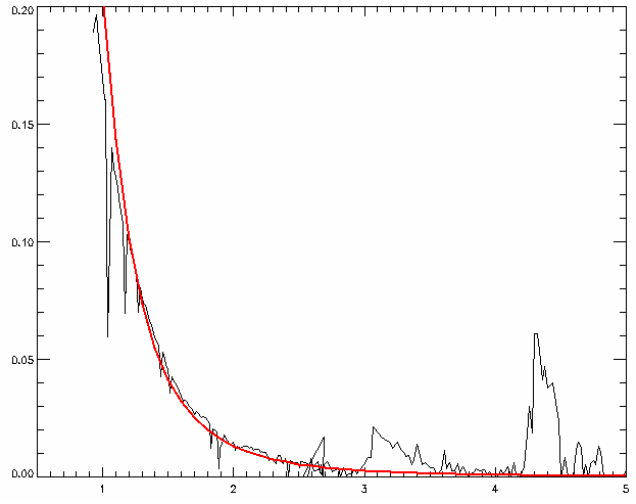

Figure 3 this spectrum can be fit by a Rayleigh diffusion with a grain size of .05 to .1 µm (2).

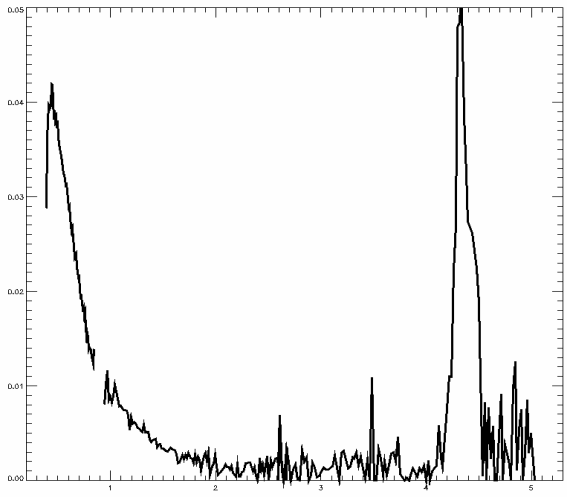

Figure 4: spectrum at altitude of 83 kms over the South Pole during dust storm (MY28) [4] the emission at 4.3 µm is the well-knowned non-LTE emission; Ls: 290, local time: 10 am

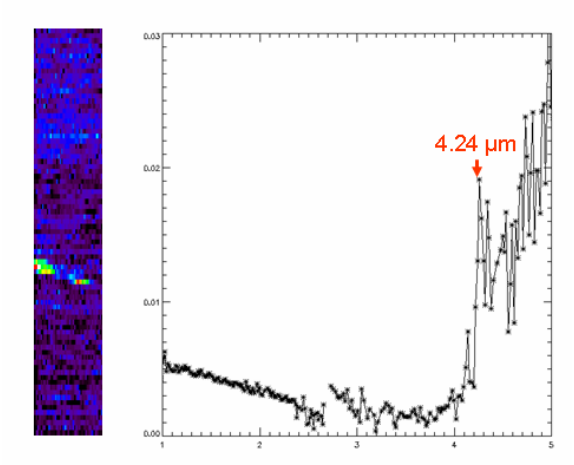

Figure 6: CO_2 ice cloud over Aram Chaos and its associated spectrum at ~ 65 kms; the map represents the location where the emission at 4.24 µm [6] is observed; Ls: 60, local time: 4 am

Spectra of figures 5 and 6 are acquired the same day.

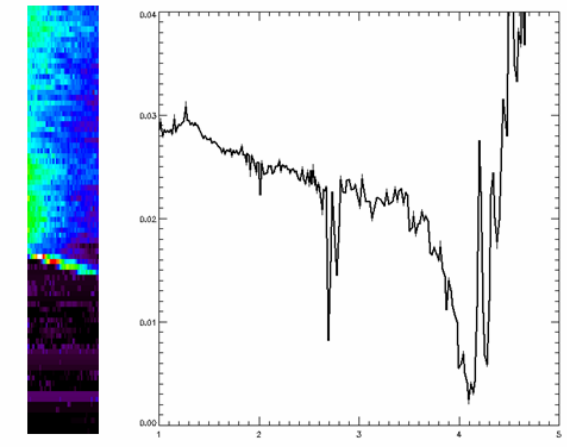

Figure 5: water ice cloud over Pavonis with its associated spectrum at ~ 40 kms; the map represents the locations where the emission at 2.7 µm, corresponding [5] to the typical emission of O_2 at 1.27 µm, is observed; Ls: 60, local time: 4 am.

References [1] B. Gondet et al. EGU 2010; [2] M. Vincendon et al., this conf. [3] Billebaud et al PSS, 2009, 57; [4] Vasilyev et al., 2009, Solar System Research 43, 5, 392-40. [5] J.-B. Madeleine et al., 2010, submitted to J. Geophys Res. [6] F. Montmessin et al 2007, J. Geophysic . Res 112, E11S90.