WAVES PATTERNS TRACED BY OZONE ON MARS POLAR REGIONS. F. Altieri[1] , L. Zasova[2] , L. Montabone[3], A. Spiga[3], G. Bellucci[1] , J-P. Bibring,[4] [1]IFSI – INAF Rome, Italy (francesca.altieri@ifsi-roma.inaf.it), [2]IKI, Space Research Institute, Moscow, Russia, [3]Labotatoire de Météorologie Dynamic, Université Paris VI, Paris, France , [4]Institute d'Astrophysique Spatial, Orsay, France.

Introduction: In this paper we report on atmospheric wave patterns traced by O_2 emission at 1.27 μm in the OMEGA data [1, 2]. The wave patterns have been observed over the polar regions of both hemispheres in the respective late winter/early spring. The O_2 emission at 1.27 μm has been converted in ozone apparent abundances (μm-atm) following the method in [3]. An example of ozone apparent abundance map acquired over the south pole at Ls = 180.6° (beginning of the southern spring) and showing atmospheric waves is shown in Fig. 1. OMEGA ozone detection limit is of the order of 1 μm-atm [2].

Data sets: OMEGA is the imaging spectrometer on board the ESA mission Mars Express [3]. It can acquire images with a spatial resolution ranging from 380 m to 5 km and provide for each pixel of the image a spectrum from 0.36 to 5.1 μm (mean spectral resolution ≈ 15 nm). OMEGA nadir observations in the polar regions have been systemically analyzed searching for atmospheric patterns.

Northern hemisphere. Over the north pole atmospheric waves have been observed only in orbit 68 at Ls = 342.5°, late winter of MY26. The spatial scale of the patterns is about 100 km and the intensity fluctuation is of the order of 1 μm-atm. Few orbits have been acquired during the early spring of MY27. The coverage of the terminator in those cases is poor and no waves have been observed. A better coverage of the North Cap has been made possible during the spring of MY28, but no waves have been observed.

Southern hemisphere. Over the south pole wave patterns above the OMEGA detection limit have been observed in orbits 3947 and 3972 at Ls = 176.7° and 180.6°. In the first case the spatial scale and intensity fluctuations are of the same order of the ones observed in the north hemisphere. In the second case they are ~ 130 km and 2 μm-atm respectively. Atmospheric patterns have not been observed during the same season in MY27.

Discussion: Waves are observed always close to the terminator (white line in Fig. 1). In the case of orbit 68 and 3947 the patterns are parallel to it and they show comparable spatial scale and intensity. On the contrary in case of orbit 3972 the patterns cross the terminator and the spatial scale and intensity fluctuations are higher. Orbit 3972 is just above Hellas basin (OMEGA track ending at ~ 65° S, Fig. 2) and the high topographic discontinuity may play an important role in perturbing the shape of the wave fronts and in increasing its intensity. The role of topography, night side-day side thermal gradients, polar vortex and atmospheric dust loading is under investigation to explain the nature and the origin of the observed patterns.

References: [1] Zasova L. et al. (2006) *Cosmic Research*, 44, 4, 305-316. [2] Altieri F. et al. (2008) *submitted*. [3] Bibring J-P. et al. (2004), ESA SP 1240, 37-49. [4] Novak et al. (2002) *Icarus*, 158, 14–23.

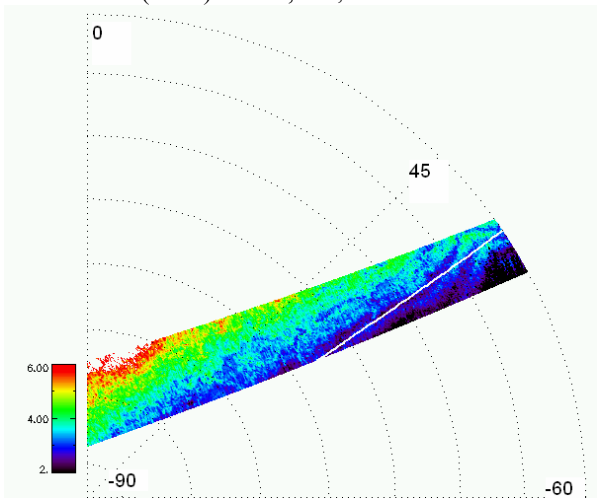

Fig.1 – Ozone apparent maps from orbit 3972. White line shows the position of the terminator.

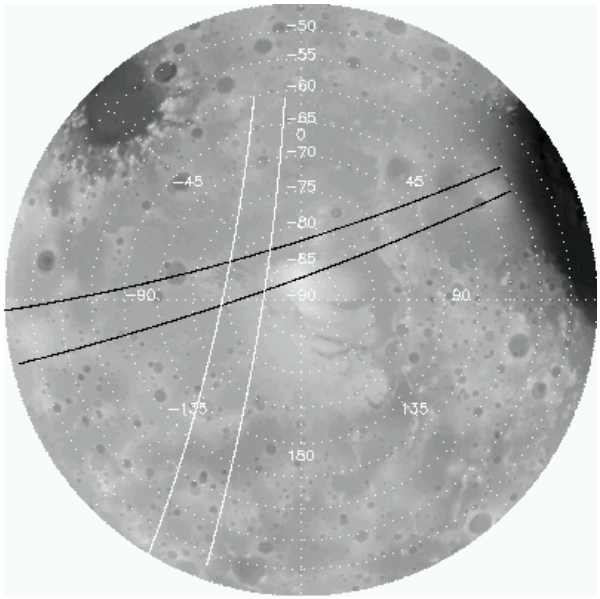

Fig. 2 - Location of the orbit 3947 (white track) and 3972 (black track) on the MOLA altimetry map in the southern hemisphere.