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Ground-based observational constraints on the mesosphere and lower thermosphere : Coordinated campaigns with Venus Express

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One of the main objectives of the Venus-Express (VEx) mission is the study of general circulation and dynamical processes in the mesosphere and thermosphere (80-200 km). Several VEx instruments (e.g. SPICAV, VIRTIS) and ground-based observations have allowed to characterize upper atmosphere structure and dynamics over the last solar minimum, and the coupling with the troposphere. The purpose is to establish a climatology of these structures, combining VEx, Pioneer-Venus and ground-based data over several decades, in a comparative planetology perspective. In particular, nightglow emissions (NO-UV, O2-IR and OH-IR), temperature distribution, trace compounds distribution (CO, SO2, SO, HDO, O, O2) are used to constrain global characteristics of circulation (and their variations) above the clouds (e.g. Gerard et al., 2009 ; Piccioni et al., 2008, 2009 ; Bertaux et al., 2007 ; Bailey et al., 2008 ; Clancy et al. 200 ; Iwagami et al., 2010).

A first international campaign was organized in 2007, followed by two campaigns coordinated in 2009 and 2010. Ground-based measurements allow to (i) perform direct wind measurements by Doppler spectroscopy, (ii) obtain cross-validation and record different diagnostics of similar phenomena, (iii) obtain simultaneous measurements over a large range of altitudes and (iv) improve the temporal baseline on time-varying phenomena. The 2010 campagin was supported by several international teams including Ohtsuki et al. (IRTF/CSHELL, 1.27 μm), Iwagami et al. (IRTF/CSHELL, 1.7-2.3 μm), Encrenaz et al. (IRTF/EXES, 7-8 μm), Young et al. (IRTF/SpeX, 2.26-2.52 μm), Sornig et al. (Kitt Peak/THIS, $\sim$10 μm), Livengood et al. (IRTF/HIPWAC, $\sim$10 μm), Bailey et al. (AAT/IRIS2, APO/ARCES, 1.1-2.4 μm), Sandor et al. (JCMT, 330-360 GHz CO, T(z), winds), Liao et al. (Mt Lulin, Taiwan), Limaye et al. (2-m HCT/ HFOSC 2.3 μm), Widemann et al. (CFHT/EsPADOnS, 0.35-1.05 μm), Slanger et al. (10-m Keck I/HIRES, APO, nIR O2 and Vis. airglow), Jessup et al. (Hubble Space Telescope/STIS). We will present a few selected results of the 2010 coordinated campaign at the meeting.