Geophysical Research Abstracts Vol. 20, EGU2018-5766, 2018 EGU General Assembly 2018 © Author(s) 2018. CC Attribution 4.0 license.



## The Dome C Tropospheric Observatory

Giovanni Bianchini (1), Luca Palchetti (1), and Gianluca Di Natale (2)

(1) INO-CNR, UOS Sesto Fiorentino, Sesto Fiorentino, Italy (giovanni.bianchini@ino.it), (2) IFAC-CNR, Sesto Fiorentino, Italy

Since 2011 an infrared Fourier transform spectroradiometer is operating, along with supporting auxiliary instrumentation, at Concordia Station, in the Dome C region, East Antarctica.

The spectroradiometer provides downwelling atmospheric radiation spectra in the 100-1400  $\text{cm}^{-1}$  spectral range, thus including spectral bands corresponding to water vapor, carbon dioxide, ozone and several other atmospheric components. Acquisition is performed continuously and autonomously, including the winter period, with a repetition rate of about 10 minutes.

Analysis of the spectra allows a near-real-time retrieval of vertical profiles of water vapor, temperature, optical thickness of clouds and columnar amounts of minor constituents like  $N_2O$  and  $O_3$ .

The main limitation to data analysis is the occurrence of clouds lower than about 3 km, which is the maximum sensitivity range of the retrieval process. In this case an accurate estimate of the cloud geometry is needed to produce reliable results.

A low power diode laser vertical profiler, based on the pseudo-random modulation detection method, has been recently installed in order to overcome this limitation. The observation setup thus now provides a self-consistent, reliable and compact system for the monitoring of the troposphere capable of operating in remote and extreme environments.

The observation system in Concordia Station is currently operating in the framework of several projects funded by the Italian Antarctic program, for the characterization of the climatic trends in the Antarctic troposphere and of the radiative properties of clouds.