Ozone and Temperature Lidar observations in mid-latitude NDACC station at Río Gallegos (51°36‘ S, 69° 19‘ W), Patagonia Argentina

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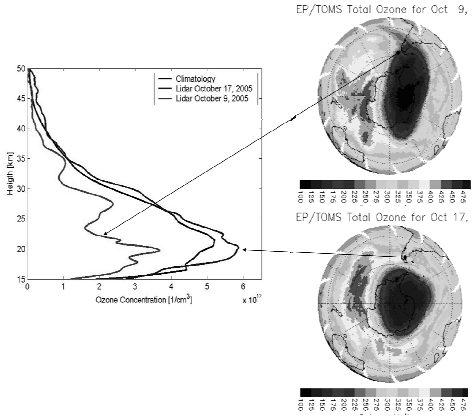
The CEILAP Lidar group joined with Japanese and French researchers, with the financial support from Japan International Cooperation Agency (JICA) has carried out a modern observational site at southern America. The Atmospheric Observatory of Austral Patagonia (OAPA) is a remote sensing site located near the Río Gallegos city in South Patagonia-Argentina (51º 55'S, 69º 14'W), in subpolar region affected by the polar vortex. It is a convenient monitoring site of the atmosphere in the southern hemisphere especially for ozone, temperature and UV radiation studies. This site is operating a differential absorption lidar instrument (DIAL) for the measurement of ozone vertical distribution. This instrument is part of Network Data for Atmospheric Composition Change (NDACC) since December 2008. The altitude range of the ozone measurement is 14-45 km, which provides the opportunity to monitor the perturbations due to the passage of stratospheric polar air over Río Gallegos city. Other products were retrieved in addition to the ozone profiles from the DIAL system, such as stratospheric aerosols and temperature profiles using the off-wavelength signal at 355 nm typically in the range 14-60 km. We have identified in this presentation three major perturbation related to the polar vortex on the stratospheric profiles (ozone and temperature) record in Río Gallegos: extension of the polar vortex towards the station during late winter, passage of the ozone hole over the station in middle spring and dilution process during late spring. All these three processes change the shape of the stratospheric ozone and temperature profile and produce variations in the total ozone column over the OAPA.

Since October 2010 with the aim of contribution to the study of atmospheric ozone layer, a new sensitive radiometer for atmospheric minor constituents was installed in the OAPA site. The multispectral millimeter wave radiometer developed in STEL (Solar Terrestrial Environment Laboratory), Nagoya University, Japan. This passive remote sensing instrument is able to measure the ozone profiles (O3) in the higher stratosphere and mesosphere continuously and automatically with a high time resolution. The millimeter wave radiometer ozone profiles will be supplemented with the ozone profiles obtained from the DIAL system existent in the same place.



The stronger reduction of ozone column over Rio Gallegos for 2005 was produced at October 8 with total ozone column of 196 Dobson Units (DU). The lidar profile measured for this day is showed in figure above together the ozone profile measured at October 17 witch correspond to normal ozone conditions outside ozone hole (357 DU). Also in this figure the climatologic profile (black line) of SAGE II measurements is showed.

Acknowledgements

The author would like to thank JICA (Japan International Cooperation Agency) Argentina by financial support of UVO3 Patagonia Project; the Japan Society for the Promotion of Science (JSPS) for support me activities of researching at Nagoya University during January to February 2013.