



Retrieval and merging of stratospheric ozone profiles from OMPS, SCIAMACHY and MLS limb observations

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A constant monitoring over a global scale of the stratospheric ozone layer is carried on by means of several techniques. The limb geometry of observations from satellite platforms enables to obtain ozone profiles with a good vertical resolution, spatial and temporal coverage.

SCIAMACHY and OMPS-LP are two satellite instruments able to collect shortwave scattered radiance in limb geometry. Ozone profiles from OMPS-LP and SCIAMACHY have been retrieved at the University of Bremen using the same radiative transfer model, a similar algorithm and same spectral ranges. The aim of this study is the merging of these two data sets, to obtain a consistent time series of ozone global distributions. Since OMPS' scientific operations started at the beginning of 2012, the overlapping period of these 2 missions consists of only 3 months and a transfer function is needed to overcome issues related to the instrument calibration. To this aim, we used measurements performed by the MLS suite as a reference: this sensor has been operating from 2004 till present, collecting atmospheric emission in the microwave spectral region in limb geometry.

Latitude- and longitude-resolved time series of ozone profiles retrieved from the three instruments have been calculated, thanks to the high spatial resolution of the data sets. After an inter-comparison of the three time series, their merging has been then performed minimizing the differences between OMPS-LP and SCIAMACHY ozone number density profiles and MLS values, for each latitude, longitude and altitude independently. The seasonal cycle was not subtracted, because it was found to be consistent enough among the three instruments.

Linear trends over the 2003-2017 merged time series were calculated considering QBO, ENSO and a solar forcing: first results are shown in this presentation.