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Merged ozone record from SAGE II / MIPAS / OMPS instruments and trends on overpasses with ground-based instruments

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MIPAS (Michelson Interferometer for Passive Atmospheric Sounding) on board the ESA ENVISAT satellite has taken limb emission measurements of ozone profiles from June 2002 to April 2012.The Stratospheric Aerosol and Gas Experiment II (SAGE II) performed solar occultation measurements of ozone number densities from 1984–2005 and has been used in many studies of long-term ozone trends. The Ozone Mapping and Profiler Suite (OMPS) Limb Profiler (LP) instrument, launched in October 2011 and currently operating, measures solar radiances scattered from atmospheric limb in the UV and visible spectral ranges to retrieve vertical ozone profiles from cloud top to 60 km with a vertical resolution of about 2 km.

This information is used to merge the three ozone records, SAGE II, MIPAS and OMPS, into a single ozone record from 1984 to the present. First, the overall agreement of MIPAS with SAGE v7.0 and OMPS v2.0 and biases between the datasets are investigated. Ozonesondes and Umkehr are used as transfer standard instruments. Then, ozone piecewise linear trends are derived by multivariate regression from obtained 30-years long ozone record. The comparison with trends from two of three parent datasets and the standard transfer instrument will be discussed. The comparison with trends from previously merged SAGE II / OSIRIS and SAGE II / GOMOS datasets will be presented as well. Finally, the trends obtained will be compared with trends calculated on satellite overpasses over ground stations providing ozone measurements by ozonesondes, lidars, microwave radiometers and lidars. The impacts of:

- the choice of the transfer instrument

- the way the standard is generated

- the effect of neglecting any longitudinal structure in the transfer standard samples

on ozone trends derived from the merged datasets will be discussed.