



Ozone trends from merged SAGE II + MIPAS ozone datasets: impact of the transfer instrument

Alexandra Laeng, Thomas von Clarmann, Irina Petropavlovskikh, Joe Zawodny, and the MIPAS IMK Team
Germany (alexandra.laeng@kit.edu)

Ozone trends derived by multivariate regression from a 30-years long ozone record will be presented. The record is obtained by merging the ozone records from the strongly improved version 7 of the “golden standard” SAGE II data (ref. Zawodny) and MIPAS data produced by the winning processor of the MIPAS Round Robin comparison within the Ozone-CCI Project, the MIPAS KIT IMK/IAA (ref Laeng et al, 2013) research processor. As transfer standard for the merging of two sets of satellite records the Umkehr measurements are chosen. The Umkehr ozone profile dataset is comprised of long-term records from multiple ground-based stations. . It thus provides a data record that is sampled regularly in time and reasonably well distributed over latitudes. The Umkehr measurements are processed in a harmonized way with the algorithm optimized for capturing the long-term variability of monthly mean ozone derivatives (Petropavlovskikh et al, 2005).

The comparison with trends from both parent datasets (Terra0, et al 2007, E. Eckert et al, 2013) and the standard transfer instrument (Reinsel et al, 1999) will be discussed . The comparison with trends from previously merged SAGE II + OSIRIS (Sioris, C.E. 2013) and SAGE II + GOMOS (Kyrölä et al, 2013) datasets will be presented as well. 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.

References:

- Eckert, E. et al., Drift-corrected trends and periodic variations in MIPAS IMK/IAA ozone measurements”, ACPD, 2013
- Kyrölä, E. et al., Combined SAGE II-GOMOS ozone profile data set 1984–2011 and trend analysis of the vertical distribution of ozone, ACPD, 2013
- Laeng, A., The Ozone Climate Change Initiative: Comparison of four Level 2 Processors for the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS), Remote Sensing of Environment, submitted, 2013.
- Petropavlovskikh, I. et al., New Umkehr ozone profile retrieval algorithm optimized for climatological studies, J. Geophys. Res. 32, 2005.
- Reinsel, G.C. et al., Update of Umkehr ozone profile data trend analysis through 1997, JGR, 1999
- Sioris, C.E. et al., Trend and variability in ozone in the tropical lower stratosphere over 2.5 solar cycles observed by SAGE II and OSIRIS, ACPD, 2013
- Terra0, Y., and Logan, J.A., Consistency of time series and trends of stratospheric ozone as seen by ozonesondes, SAGE II, HALOE, and SBUV(2), J. Geophys. Res. 112, 2007.