QOS2016-300, 2016
Quadrennial Ozone Symposium of the International Ozone Commission

Statistical significance of estimated trends in stratospheric ozone profiles

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Correct characterization of uncertainties is crucial in analysing time series of ozone. Traditionally, time series have been analysed by fitting piecewise linear model to the data. Recently so called state space approach for modelling the ozone time series was developed by Laine et al, 2014. This method allows more flexibility to the data analysis and a full uncertainty characterization.

The state space approach is applied to the combined ozone profile data set of the Stratospheric Aerosol and Gas Experiment (SAGE) II and the Global Ozone Monitoring by Occultation of Stars (GOMOS) instruments covering the years 1984–2011(Kyrölä et. al. 2013). Compared to the traditional method the state space approach allows trend to change continuously, similarly also other regression coefficients can be defined as time varying. By expanding the methodology further to two-dimensional analysis, by considering several altitudes simultaneously, the statistical significance of trends on successive orbits can be analysed.

Here we discuss the advantages of the state space method in analysing ozone profile time-series and in the interpretation of the statistical significance of the trends of the combined SAGE II and GOMOS ozone profile data set.

References:

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