



## **Analysis and validation of long-term chemistry-transport model simulations of middle atmospheric ozone**

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Global middle atmospheric simulations have been performed with the FinROSE chemistry-transport model (FinROSE-CTM) using the 6 hourly ECMWF ERA-40 and operational analysis winds and temperatures. The temporal and spatial distribution of ozone, covering the period 1957-2005, will be analyzed and compared to observations, mainly ozone soundings. Profile data from both individual stations and zonal mean data will be used. The simulation covers the evolution of the stratospheric ozone depletion as well as a two decades period of pre-ozone loss years.

Despite of some reported problems in the ERA-40 data the ozone distribution and variability in the model data seem reasonable, at least in a qualitative sense, based on comparisons with ozone sounding, satellite and climatology data. However, the ozone column in the tropics is thin, which is likely due to the strong up-welling in the tropics. The strong meridional circulation in the ERA-40 data can be seen as in the stratospheric age-of-air, which in the FinROSE run does only slightly exceed 2 years. The age-of-air decreases with a few months going from the 60s to the 70s, which indicates a change in the circulation in the meteorological data. This shows up e.g. as a corresponding increase in Arctic total ozone.

The simulations were run with a horizontal grid resolution of 10x5 deg (long-lat) at 32 levels up to 0.1 hPa. The model features detailed middle atmospheric chemistry including a detailed parameterization for heterogeneous processing on/in PSCs and liquid binary aerosols, and PSC sedimentation and a NAT-rock parameterization. The chemistry scheme includes 27 long-lived species/families, and 14 species in photochemical equilibrium with about 200 reactions.