



Multimodel analysis of the sensitivity of the tropospheric chemical composition to emissions: Comparison of RETRO and ACCENT/IPCC Photocomp simulations

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The RETRO project (Reanalysis of the chemical composition of the troposphere) focusses on the simulation of the trace gas concentrations in the troposphere for the period 1960-2000. The year 2000 was already analysed by three of the models participating in RETRO (TM4, LMDZ-INCA, MOZECH) in a similar model setup in the framework of the ACCENT/IPCC Photocomp exercise. In both studies, common emission data sets were used. These emissions differ in (i) anthropogenic CO emissions which are higher in the RETRO run and have a seasonal cycle and (ii) NO_x and CO biomass burning emissions which are lower in the RETRO run. In RETRO, the models use common CH₄ surface concentration fields derived from CMDL measurements instead of a constant value throughout the atmosphere as in the ACCENT/IPCC calculations. In some cases, biogenic emissions also differ between the simulations. For the TM4 and the LMDZ-INCA model slightly different upper boundary conditions were used in both calculations.

We present a comparison between individual model results of the RETRO and ACCENT/IPCC calculations, and refer these to the mean ACCENT/IPCC model. We discuss the global tropospheric ozone budget, the OH burden and the CH₃CCl₃ and CH₄ lifetimes. Generally, OH and O₃ burdens seem to be lower in the RETRO calculations compared to the ACCENT/IPCC study. The emission changes between the ACCENT/IPCC and RETRO calculations show a considerable influence on CO and

O₃ concentrations near the surface especially in China, but changes of background values are also observed. We will assess the quality of model prediction for CO and O₃ concentrations for selected measurement sites. In particular, we investigate the seasonal cycles in the different calculations. The influence of different meteorological analyses (ERA40 versus operational data) on the TM4 model will be considered.