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A modelling study on trends and variability of the tropospheric chemical composition over the last 40 years - sensitivity to emission and meteorological variability and insights from multi-model ensembles

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We present an analysis of trends in the chemical composition of the atmosphere during the last 40 years using the global circulation chemistry model ECHAM5-MOZ. This model is based on the chemistry scheme of MOZART2.4 and the global circulation model ECHAM5. A 40-year run was done within the framework of the RETRO project. We analyze the trends and intra-annual variability of the ozone, NOx, and CO budget over various regions of the world and their sensitivity to the trends and seasonal cycle in the natural and anthropogenic emissions. Our comparison with measurements focuses on observations of NOx, O3 and CO. We also investigate trends in OH based on the CH3CCl3 and CH4 lifetimes and compare these to the results of other models which have participated in the RETRO and ACCENT/IPCC Photocomp modelling exercise and to the literature.