



Long-term changes in the global emissions of CO and NO_x and implications for the tropospheric chemical composition

M.G. Schultz and the RETRO team

ICG-II, Forschungszentrum Jülich (52425 Jülich, Germany, m.schultz@fz-juelich.de)

In the European research project RETRO (REanalysis of the TROpospheric chemical composition over the past 40 years; funding period 2003-2006) new comprehensive data sets on the global-scale emissions of CO, NO_x and a range of NMVOC compounds were developed and employed in several chemistry transport models for unprecedented long-term simulations of changes and variability in the tropospheric budgets of ozone and its precursors. The project activities with respect to emissions focused on the development of a new data base system for anthropogenic activities, technologies and technology use and on the compilation of a detailed data set on wild-fire occurrence and their spatial and temporal variability patterns. The RETRO project generated many interesting results from the interactions between various project partners. Here, we focus on the analysis of temporal and spatial variability in the emission data and their correspondence with the model results. Depending on the geographical location and the status of development, different regions can have distinct emission characteristics (dominance of the residential or traffic sector or of vegetation burning). The temporal variability of emissions generally depends on the ratio of vegetation burning versus fossil fuel combustion. The variability of tropospheric ozone and precursor concentrations is only partly depending on the changes in emissions, but can be influenced very strongly by meteorological variability. However, when seen over the 41-year period of the RETRO project, significant changes in the background concentration of tropospheric pollutants can be detected which are related to the long-term changes in emissions.