



Trends and interannual variability of tropospheric ozone concentrations over Europe from 1960 to 2000

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During the second part of the 20th century, anthropogenic emissions of ozone precursors and greenhouse gases have continuously increased on a global scale. While many countries in Europe have reduced their emissions of volatile organic compounds and nitrogen oxides during the last decade, other regions on the globe (especially in Southeast Asia) continue to show a fast rise in emissions. Furthermore, concentrations of trace gas species have significant interannual variability linked to the variability of climate and biogenic precursor emissions making difficult the interpretation of scattered observations. In this context, the RETRO European project proposed to simulate the chemical composition of the troposphere from 1960 to 2000 on the basis of the ERA40 meteorological data reanalysis and up-to-date emission datasets and stratospheric boundary conditions. The 40 years simulation performed with LMDz-INCA (a general circulation model coupled with a chemical module) is analysed in order to determine seasonal trends and interannual variability over Europe. Furthermore, additional simulations were carried out using a European-scale chemistry-transport model, CHIMERE, nested in the global-scale LMDz-INCA model, in order to evaluate more precisely the predicted evolution of ozone especially during the nineties. These simulations are compared with the observations across Europe and we discuss whether the simulated trends are consistent with observed trends.