Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09262, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09262
EGU General Assembly 2008

Trends of tropospheric background ozone over the world during the last decades: How significant are the modelled trends over the 80's and 90's?

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During the 20^{th} century and especially during its second half, anthropogenic emissions of ozone precursors and greenhouse gases have continuously increased on a global scale. While many countries in Europe and United States 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 to interpret scattered observations. For these reasons, trends deduced from long term observations are difficult to harmonize and their causes (e.g. stratospheric changes or emissions modifications) are still poorly understood.

In this context, the RETRO European project set out 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. Three global tropospheric models performed this 40 years simulation. The ozone trends are compared with the ones deduced from long series of observations at several locations around the world. We discuss whether the simulated ozone trends are consistent with observed trends and to which extent state-of-the-art tropospheric models are able to reproduce them. Then, the significance of the trends computed and

in particular the difference between summer and winter trends will be discussed.