Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03498, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03498
EGU General Assembly 2008

Modelling the changing chemical composition of the atmosphere: Impacts from the stratosphere, transport modes and climate variability

V. Grewe

Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, 82230 Wessling, Germany (volker.grewe@dlr.de)

The chemical composition of the atmosphere is permanently changing, driven by changes in emissions (natural and anthropogenic) as well as natural climate variability (e.g. El Nino, stratospheric variability). Here, an ensemble climate chemistry simulation for the period 1960 to 2020 is presented in which stratospheric and tropospheric chemistry are regarded consistently (Dameris et al., 2005; Grewe, 2007). It shows:

- a reduced tropospheric ozone increase in the 90s caused by a decrease of stratospheric ozone influxes due to stratospheric ozone depletion.
- a reduced tropospheric ozone column in the equatorial pacific region due to El Nino (in agreement with observations), however an increase in lightning and related tropospheric ozone.
- a peak in ozone production efficiency due to a NO_x emission in around 1990
- decrease in lightning NO_x emissions over the whole period due to less (though stronger) convective events.

Grewe, V., Impact of climate variability on tropospheric ozone, Science of The Total Environment, 374, 167-181, 2007.

Dameris, M., Grewe, V., Ponater, M., …., Long-term changes and variability in a transient simulation with a chemistry-climate model employing realistic forcing, ACP 5, 2121-2145, 2005.