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Evaluation of the MOZART-3 global CTM with MOZAIC data

K. Thomas (1), O. Stein (2, 1), M. G. Schultz (1), H.-W. Pätz (1), A. Volz-Thomas (1), P. Nedelec (3), V. Thouret (3)

(1) Institut für Chemie und Dynamik der Geosphäre 2, Forschungszentrum Jülich, (2) Max-Planck Institut für Meteorologie, Hamburg, (3) Laboratoire d'Aerologie, CNRS, Toulouse (k.thomas@fz-juelich.de)

We present a comparison of global CTM simulations for O3, CO and NOy with measurements made aboard in-service aircraft in the MOZAIC (Measurement of ozone, water vapour, carbon monoxide and nitrogen oxides aboard Airbus in-service aircraft) programme. The comparison, which focuses on the year 2003, comprises the climatology in the upper troposphere and probability distribution functions (PDF) of the chemical species as a function of different vertical coordinates (height, potential temperature and potential vorticity) for different geographical regions (Europe, US East coast, East Asia).

In winter, NOy concentrations in the upper troposphere (UT) are usually below 0.5 ppb, whereas concentrations of several ppb are observed in spring and summer, in particular over the western North Atlantic, but also over Europe and the Arabian Peninsula, due to lightning and convective transport from the boundary layer. Very high CO concentrations are observed over East Asia and Northern Canada as a result of biomass burning. The MOZART-3 simulations do not reproduce the high values in the UT, which points to the need for improving the convection scheme, in particular for biomass burning (injection height).