Geophysical Research Abstracts,
Vol. 11, EGU2009-13157, 2009
EGU General Assembly 2009

Major differences between models in the rapid vertical transport of short lived species

C.R. Hoyle (1,7), J. Arteta (2), M. Chipperfield (3), O. Dessens (4), W. Feng (3), M. Herzog (5), S. Hosking (4), V. Marecal (2), P. Telford (4), and O. Wild (6)

(1) University of Oslo, Department of Geosciences, Oslo, Norway (c.r.hoyle@geo.uio.no), (2) Laboratoire de Physique et Chimie de l'Environnement,CNRS/Université d'Orléans, France, (3) School of Earth and Environment, University of Leeds, Leeds, UK, (4) Centre for Atmospheric Science, University of Cambridge, UK , (5) Department of Geography, University of Cambridge, UK , (6) Department of Environmental Science, Lancaster University, Lancaster, UK, (7) Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland

Convective events provide a method for the rapid vertical transport of tracers from low levels of the troposphere, up into the tropical tropopause layer (TTL). They have the potential to have a significant effect on the chemical composition of the TTL. As part of the EU project SCOUT-O3, a model intercomparison was carried out, to assess the parameterisation of this transport pathway in a variety of different models, with scales ranging from the global chemistry transport models, to the regional, but highly resolved, mesoscale models. An idealised tracer with a lifetime of 6 hours was used in the analysis, so that individual transport events could be differentiated. The results show remarkable differences between the models. Despite many of the models using meteorological fields derived from the ECMWF forecast model, average peak outflow heights in November range from around 150 hPa to 300 hPa, in the area where the 2005 measurement campaign in Darwin took place. Further, the timing of intense vertical transport differs between different models. While the differences in outflow heights affect the rate at which lower tropospheric air reaches the TTL, the differences in the timing mean the models may be lifting different air masses into the TTL. Both these variations between the models therefore have important implications for the chemical composition of the TTL. Here, we present the results of the study, and explore the reasons for the differences between the models. We also compare the model data with measured quantities in order to determine the accuracy of the models.