Geophysical Research Abstracts
Vol. 14, EGU2012-785, 2012
EGU General Assembly 2012

Comparison of NO_2 long-range transport events in GOME-2 observations and CTM simulations

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Atmospheric long-range transport (LRT) events relocate trace gases from emission to downwind regions on an intercontinental scale, drastically altering the atmospheric chemistry in remote regions. Tropospheric NO_2 is a very short-lived, mainly anthropogenic trace gas with strong impact on the ozone chemistry. Emissions are very localized and allow identification of individual LRT events.

Here, the phenomenon of NO_2 LRT is investigated by satellite remote sensing observations and global chemical transport modelling, which both provide good spatial and temporal coverage as well as sufficient resolution for the identification of large-scale, multi-day events. This allows the modelled and measured estimation of seasonal, regional and global LRT statistics.

We use a non-cloud-filtered GOME-2 NO_2 observational data set and model data from global GEOS-Chem simulations. A dedicated algorithm is used to identify and verify LRT events in observational and model data. We present the comparison of these results concerning the occurrence of NO_2 LRT events. We discuss seasonalities in frequency and typical routes of LRTs and compare estimations of the transported mass from observations to results from the model. Further, we discuss peculiarities in the comparison between results from models and observations.