Geophysical Research Abstracts, Vol. 9, 07084, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07084

Analysis of the Observations from the GABRIEL Field Campaign (Surinam, October 2005) using three dimensional Global Atmospheric Chemistry Models.

T. M. Butler, H. Fischer, H. Harder, P. Joeckel, M. G. Lawrence, M. Tanarhte, J. Williams, J. Lelieveld

Max Planck Institute for Chemistry

We present a comparison of the detailed set of measurements taken by aircraft over Surinam during October 2005 for the GABRIEL (Guyanas Atmosphere- Biosphere exchange and Radicals Intensive Experiment with the Learjet) campaign with the Offline Chemistry-Transport Model MATCH-MPIC and the Chemistry-Climate Model EC\-HAM5/\-MESSy1, and examine the sensitivity of the comparisons to various model parameters. MATCH-MPIC performs particularly well in simulating several episodes of biomass burning influence observed during the campaign, which are not reproduced well by ECHAM5/MESSy1. The use of an updated biomass burning emissions inventory improves the representation of both the background CO (which is found to be largely due to African biomass burning emissions) and the observed plumes (which are due to South American biomass burning emissions in the model). There are significant differences in the simulation of OH radical concentrations between simulations done with different model configurations. In the upper troposphere, a simulation performed with a free-running version of ECHAM5/MESSY1 (which calculates its own meteorology) calculates OH concentrations which are in much better agreement with the observations than simulations done with either a nudged version of EVHAM5/MESSy1 or the fully offline MATCH-MPIC (both of which are forced to some degree with observed meteorology). All model configurations significantly underestimate OH radical concentrations in the planetary boundary layer. Comparison amongst the different model simulations shows that these differences in OH are very sensitive to the simulated concentration of isoprene.