Geophysical Research Abstracts
Vol. 19, EGU2017-12007, 2017
EGU General Assembly 2017

Assessment and quantification of uncertainties in the evaluation of global surface ozone simulations

Najmeh Kaffashzadeh (1,2), Andreas Hense (2), Olaf Stein (1), Sabine Schroeder (1), Scarlet Stadtler (1,2), and Martin Schultz (1)

(1) Forschungzentrum Jülich, IEK-8, Jülich, Germany (n.kaffashzadeh@fz-juelich.de) , (2) Meteorological Institute, University of Bonn, Bonn, Germany

It is common practice to evaluate global chemistry climate models (GCCMs) with in situ measurements to identify the overall assessment of the models' performance. However, there are only few studies which systematically address the uncertainties of such comparisons or try to define objective criteria for data selection and filtering. Typical issues in this regard are differences in spatial scales between model and observations (a.k.a spatial representativeness), or the unknown impact of simplified model parameterizations (e.g. missing variability in emissions or deposition fields). To investigate some aspects of these uncertainties, we performed a multiple linear regression (MLR) of the short (period less than 2 days) and medium (period of 2-21 days) spectral components of ozone concentration (O_3) and a few meteorological variables, i.e. atmospheric temperature (AT), relative humidity (RH) and wind components (U and V) of the year 2012 at 18 measurement stations around the globe. These data are compared to the results of two GCCMs, i.e. MACC-reanalysis and ECHAM6-HAMMOZ.
The results of MLR analysis for models and observation data confirm that there is a positive correlation between O_3 and AT for all stations except for tropical sites and a negative correlation between O_3 and RH. Wind components have either positive or negative correlation with O_3 concentrations. While both GCCMs show the same relationship, in a sense of positive or negative correlation, between O_3 and meteorological variables as observation, the absolute value of the correlation coefficient deviate. The correlation between O_3 and meteorological variables is larger than 50% for the short-term frequency components at European stations while at other sites this is true only for the medium-term frequency terms.