

A tropospheric chemistry reanalysis for the years 2005--2012 based on an assimilation of OMI, MLS, TES and MOPITT satellite data

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Abstract

I will present the results from an eight-year tropospheric chemistry reanalysis for the period 2005--2012 obtained by assimilating multiple retrieval data sets from the OMI, MLS, TES, and MOPITT satellite instruments. The reanalysis calculation was conducted using a global chemical transport model and an ensemble Kalman filter technique that simultaneously optimises the chemical concentrations of various species and emissions of several precursors. The optimisation of both the concentration and the emission fields is an efficient method to correct the entire tropospheric profile and its year-to-year variations, and to adjust various tracers chemically linked to the species assimilated. Comparisons against independent aircraft, satellite, and ozonesonde observations demonstrate the quality of the analysed O₃, NO₂, and CO concentrations on regional and global scales and for both seasonal and year-to-year variations from the lower troposphere to the lower stratosphere. The data assimilation statistics imply persistent reduction of model error and improved representation of emission variability, but also show that discontinuities in the availability of the measurements lead to a degradation of the reanalysis. The northern/southern hemisphere OH ratio was modified considerably due to the multiple species assimilation and became closer to an observational estimate, which played an important role in propagating observational information among various chemical fields and affected the emission estimates. The consistent concentration and emission products provide unique information on year-to-year variations of the atmospheric environment.

Thursday, March 19th

10:15 a.m. - Refreshments

10:30 a.m. – Seminar

FL2-1022, Large Auditorium

(Please note the day)