



Modeling the impact of increasing Asian emissions on the chemical composition of the UTLS: Seasonal comparisons against CARIBIC measurements

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The rapid growth of anthropogenic emissions in Asia over the last decade is changing the composition of troposphere at a regional scale. Here we present results from a decadal simulation for the period 1999-2008 performed with the 3D global chemistry transport model TM5-chem-v3.0 (Huijnen et al, 2010) using the Regional Emission inventory in Asian (REAS) (Ohara et al, 2007), which accounts for the annual growth in anthropogenic emissions for each year between 10S-50N and 60-150E. For biomass burning we adopt the GFEDv2 emission inventory for the whole period. The model is driven for the entire period with the ECMWF ERA-interim re-analysis to provide consistent meteorological fields. To differentiate the change in the anthropogenic signature due to these increasing Asian emissions we perform a sensitivity simulation where emissions for the REAS region are fixed at year 2000 values. Moreover, we perform a further simulation where meteorology and biomass burning activity are fixed for the year 2004. By comparing interpolated model output against CARIBIC measurements made over the Asian region during 2007 and 2008 we quantify the changes introduced in the upper troposphere as a result of the rapid growth of these developing economies and differentiate whether it is important compared to meteorological variability.

Ohara et al, *Atms. Chem. Phys.*, 7, 4419-4444, 2007.

Huijnen et al, *Geosci. Model Dev.*, 3, 445-473, 2010.