



Changes in tropospheric CO and O₃ concentrations due to rising anthropogenic emissions from East Asia

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Rapid economic development in the East Asian region has lead to associated increases in anthropogenic emissions from e.g. growth in manufacturing, transport and energy production. Here we present results from decadal simulations 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) estimates (Ohara et al, 2007), which accounts for the annual growth in anthropogenic emissions for each year between 10S-50N and 60-150E. Analysing the annual emission fluxes shows that there is a ~13% (~19%) increase in anthropogenic CO (NO_x) emissions released from this region over the decade, equating to increases of ~10% in global anthropogenic emissions for both species. By comparing model output from decadal simulations both with and without these increases in Asian anthropogenic emissions we show that increases over the last decade account for between 2-3% (2-5%) of tropospheric O₃ (CO) over East Asia region, with maximal differences occurring over China. Using a variety of measurements for the period 2006-2008 (including ground stations, ozonesondes, and satellite composites), we quantify the impact of local anthropogenic emissions on local air quality and the outflow into more remote locations.

Ohara et al, Atms. Chem. Phys., 7, 4419-4444, 2007.
Huijnen et al, Geosci. Model Dev., 3, 445-473, 2010.