Geophysical Research Abstracts
Vol. 17, EGU2015-6819-1, 2015
EGU General Assembly 2015

Model-simulated trend of surface carbon monoxide for the 2001–2010 decade

Jongmin Yoon and Andrea Pozzer
Max-Planck-Institute for Chemistry, Atmospheric Chemistry Department, Mainz, Germany (jongmin.yoon@mpic.de)

We present decadal trend estimates of surface carbon monoxide (CO) simulated using the atmospheric chemistry general circulation model EMAC (ECHAM5/MESSy for Atmospheric Chemistry) based on the emission scenarios Representative Concentration Pathways (RCP) 8.5 for anthropogenic activity and Global Fire Emissions Database (GFED) v3.1 for biomass burning from 2001 through 2010. The spatial distribution of the modeled surface CO is evaluated with monthly data from the Measurements Of Pollution In The Troposphere (MOPITT) thermal infrared product. The global means of correlation coefficient and relative bias for the decade 2001–2010 are 0.95 and -4.29 %, respectively. We also find a reasonable correlation (R =0.78) between the trends of EMAC surface CO and full 10-year monthly records from ground-based observation (World Data Centre for Greenhouse Gases, WDCGG). Over western Europe, eastern USA, and northern Australia, the significant decreases in EMAC surface CO are estimated at -35.5 ± 5.8, -59.6 ± 9.1, and $^{-1}3.7\pm9.5$ ppbv per decade, respectively. In contrast, the surface CO increases by $+8.9\pm4.8$ ppbv per decade over southern Asia. A high correlation (R =0.92) between the changes in EMAC-simulated surface CO and total emission flux shows that the significant regional trends are attributed to the changes in primary and direct emissions from both anthropogenic activity and biomass burning.