

2.088 Comparison of biomass burning inventories processed by GEOS-Chem with total column and satellite data in Australia..

Early Career Scientist

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Abstract:

Australia contributes approximately 6% of global biomass burning CO₂ emissions, mostly from savanna type fires. This estimate comes from biomass burning inventories that use emission factors derived from field campaigns performed outside Australia. The relevance of these emission factors to the Australian environment has not previously been evaluated and therefore needs to be tested. Here we compare predictions from the chemical transport model GEOS-Chem and the global chemistry-climate model ACCESS-UKCA run using different biomass burning inventories to total column measurements of CO, C₂H₆ and HCHO, in order to identify the most representative inventory for Australian fire emissions. The measurements come from the Network for Detection of Atmospheric Composition Change (NDACC) and Total Carbon Column Observing Network (TCCON) solar remote sensing Fourier transform spectrometers and satellite measurements from IASI and OMI over Australia. We evaluate three inventories: the Global Fire Emission Database version 4 - GFED4 (Giglio et al. 2013), the Fire Inventory from NCAR - FINN (Wiedinmyer et al. 2011), the Quick Fire Emission Database - QFED from NASA and the MACCity emission inventory (from the MACC/CityZEN EU projects; Angiola et al. 2010). From this evaluation we aim to give recommendations for the most appropriate inventory to use for different Australian environments. We also plan to examine any significant concentration variations arising from the differences between the two model setups.