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Model sensitivity to global fire emissions: GFED versus GFAS

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The Global Fire Assimilation System (GFAS, Kaiser et al. 2012) was developed during the MACC project and is now used as a fire emission inventory in MACC and MACC-II reanalysis and forecast simulations. GFAS emissions are derived from fire radiative power observations from the MODIS instrument onboard the Terra and Aqua satellites. It has the advantage of detecting fires with high spatial and temporal resolution in real time which allows the emissions to be integrated into the routine air quality forecasts, e.g. at ECMWF.
We present global model simulations for the year 2008 with the MOZART Chemistry Transport Model to show how the model is able to reproduce realistic atmospheric concentrations of reactive gases like CO, NO_x, and VOCs when using three different fire emission inventories: 1) The Global Fire Emission Database (GFEDv3, van der Werf et al. 2010), 2) The Global Fire Assimilation System (GFASv1, Kaiser et al. 2012), 3) A modification of GFAS using emission factors from Akagi et al. (2011) instead of the GFAS updates to Andreae and Merlet (2001). The performance of the inventories in reproducing surface and column-integrated atmospheric observations for several reactive gases will be evaluated.

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