Geophysical Research Abstracts
Vol. 16, EGU2014-4336, 2014
EGU General Assembly 2014

Impact of using injection heights for biomass-burning emissions on global atmospheric composition forecasts

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Emissions of reactive gases and aerosols from wildfires are estimated by the Global Fire Assimilation System (GFAS) and then used in the MACC-II (Monitoring Atmospheric Composition and Climate) global atmospheric composition model. In a newer version of GFAS, injection heights for the biomass-burning emissions are also estimated, using a Plume Rise Model developed by King's College, based on earlier work by S.Freitas. The Plume Rise Model uses satellite data and modelled atmospheric profiles together with a shallow convection scheme to represent the detrainment profile from a fire plume.
Injection heights are derived from these detrainment profiles and then applied to reactive gases and aerosol emissions from biomass-burning events in the MACC system. Biomass burning Aerosol Optical Depth (AOD) at 550 nm is increased by a factor of three when taking into account injection heights. The impact is smaller on a selection of reactive gases. A few selected case studies will be shown.