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Global Ozone and Organic Aerosol sensitivity to biomass burning emission inventories

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Volatile Organic Compounds (VOC's) are known to affect oxidant levels, particularly ozone (O¬3) and hydroxyl radicals (OH) as well as organic aerosol (OA). Their impact on air quality depends on the emitted amounts, their transport driven by meteorology and transformation in the troposphere. It also depends on the height of the emissions and the co-emissions of other short lived pollutants and in particular on nitrogen oxide availability. The complexity of the VOC mixture and chemistry in the atmosphere induces the simplification of their parameterization in the models that can thus differ in the considered compounds and their oxidation products. It also impedes the construction of accurate inventories of VOC emissions from various sources. These uncertainties propagate in chemistry transport model results. Recently, significant effort has been put on developing biomass burning emission databases for global atmospheric chemistry and transport models. These inventories differ in the spatial and temporal distribution as well as the total amount of pollutants emitted.
The present study investigates the sensitivity of OA and O_3 simulations to different biomass burning emission inventories in the atmosphere using the global chemistry-transport model TM4-ECPL. Different available datasets for biomass burning emissions have been investigated with regard to their impact on the calculated tropospheric budgets of O_3 and OA. Simulations have been evaluated for ozone against observations from EMEP monitoring network. Global OA simulations are further evaluated as part of the AEROCOM (Aerosol Comparisons between Observations and Models) intercomparison OA exercise.