2.012 Global and regional comparison of biomass burning emissions.

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Abstract:

Currently available global and regional inventories of biomass burning emissions of gases and particles were compared over the 20th century until the year 2014. Considered datasets were created based on different approaches to emission estimation, such as historical reconstruction of burnt area, use of satellite products for burnt area, active fire data, fire radiative power, fixed or dynamical land cover and associated parameters as well as fire emission models in combination with land surface model. We compare annual totals and seasonal variation of emissions of total carbon in 14 geographical regions from the following data sets: ACCMIP, AMMABB, FINN, GFAS, GFED, GICC, MACCity, QFED and RETRO. This comparison study informs about differences among the datasets and serves as a basis for the community effort in harmonizing and creating a consistent inventory spanning through the studied period.
For most of the 20th century the inventory will need to rely on the fire emission models since the satellite observations were not available yet. We compare results of two fire emission models – mechanistic model SPITFIRE implemented in the MPI Earth system model and SIMFIRE model which is a combination of satellite-based burnt area with terrestrial ecosystem model LPJ-GUESS. We try to identify the common features and differences between the models as well as in their main driving variables.