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Fire emissions in Euro-Mediterranean area: evaluation of the impact on trace gases composition using satellite and surface observations

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Wildfires are one of the main sources of trace gases and aerosols. However, their impact remains poorly quantified due to large uncertainties especially on the emissions, as well as on the transport processes and chemical evolution of the pollution plumes.
In the framework of APIFLAME project a new high resolution fire emission inventory is developed. Simulations performed with the regional chemistry transport model CHIMERE, are carried out in order to assess the effect of the emissions scenarios on air quality in Europe and Mediterranean basin. For a comprehensive evaluation of the processes involved with fire emissions and a validation of simulations, the modeled species are compared to satellite observations and ground measurements. The latter data have good accuracy with high temporal resolution, but they are collected at specific locations and, in general for our case study, are far away from the location where wildfires occur. On the other hand, the satellite data, due to their high spatial coverage, can be a useful tool for monitoring pollution plumes transport, but their vertical resolution is often limited to a total column amount. In this study, the modeled concentrations are compared to the ground measurements (CO, O_3 and NO_2 concentrations) that come from AirBase database, and to CO partial columns and CO, NH3 and C2H4 total columns from the IASI instrument, to NO_2 and CH_2O total columns from GOME2 (both on MetOp-A satellite) and to NO_2 total columns from OMI (on Aura). In the presented work we focus on strong biomass burning episodes that occurred in summer 2007. Particular attention is given to the evolution of the plume characteristics.
The same fire inventory setup is used for both reanalysis and near-real time analysis. The first evaluation of the air quality forecasting system including fires will be presented.