



Numerical modelling and forecasting the impact of wild-land fires on atmospheric composition

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This paper considers an impact of wild-land fires on atmospheric composition in Europe as seen with two versions of the Fire Assimilation System (FAS) jointly developed by Finnish Meteorological Institute and Russian State Hydrometeorological University. The system versions are based on (partly) independent satellite products from the MODIS instrument: Temperature Anomalies (TA) of the Rapid Response systems (hot-spot counts) and the Fire Radiative Power (FRP). The observed quantities – the pixel absolute temperature and radiative emissivity – are converted to emission fluxes via empirical emission factors. Both versions of FAS are integrated with the Air Quality and Emergency Modelling System SILAM, which uses the estimated emissions for the atmospheric composition simulations merging them with the anthropogenic and natural emission fluxes. Using the SILAM simulations of selected episodes and MODIS aerosol optical density observations for comparison, the recalibration of the literature-available emission factors has been done.

Several episodes have been analysed and the impact of fires with contribution from anthropogenic sources have been compared. Furthermore, the model predictions have been compared with available information from ground-based monitoring sites and the satellites retrievals.

The results of the operational air quality forecasts with the integrated system are available from <http://silam.fmi.fi>.