4.172 The Southern European fire season 2017 as seen by the Copernicus Atmosphere Monitoring Service.

Presenting Author:
Johannes W. Kaiser, Max Planck Institute for Chemistry, Atmospheric Chemitry Department, Mainz, Germany, j.kaiser@mpic.de

Co-Authors:
Imke Hüser, Max Planck Institute for Chemistry (MPIC), Atmospheric Chemitry Department, Mainz, Germany
Mark Parrington, European Centre for Medium-range Weather Forecasts (ECMWF), Reading, UK
Johannes Flemming, European Centre for Medium-range Weather Forecasts (ECMWF), Reading, UK
Ana Carvalho, SMHI, Norrköping, Sweden
Lennart Robertson, SMHI, Norrköping, Sweden
Matthieu Plu, Meteo-France, Toulouse, France

Abstract:

The 2017 fire season across southern Europe was extraordinary in terms of duration and intensity of individual events.
The operational Copernicus Atmosphere Monitoring Service (CAMS, https://atmosphere.copernicus.eu) is monitoring and forecasting global atmospheric composition and European air quality using, amongst others, a comprehensive set of satellite and in-situ observations, which yield information on the fire activity and emissions as well as the associated atmospheric smoke plumes. The Global Fire Assimilation System (GFAS) of CAMS uses satellite observations of fire radiative power (FRP) to estimate the emissions of forty smoke constituents.
The operational version of GFAS, shows an extraordinarily long fire season in Portugal and Spain with noteworthy burning in April, June, August and October, which lifted the total fuel consumption to 15 Mt in 2017. This is the largest value in the GFAS record 2003-17. The fires in October are of particular interest because they were fanned by strong, hot and dry winds, which were part of the ex-tropical hurricane system Ophelia, which travelled a record distance to the north-east. Smoke from these fires was transported across Europe and affected the atmospheric composition in places as distant as Estonia.
A new version of GFAS has been developed, which allows for 1-hour time resolution and the assimilation of fire observations from the geostationary SEVIRI instrument alongside the two polar-orbiting MODIS instruments. It better represents the onset of the extreme fires and estimates a fuel consumption that is about half of the operational estimates.
We present simulations of the European atmospheric composition and air quality during the fire events based on the new GFAS version and the global and two European atmospheric compositions, resp. air quality, models. Furthermore, satellite observations of the smoke plumes and ground-based estimates of fuel consumption are used to validate the new emissions.