Forest fire impact on air quality: the Lancon-de-Provence 2005 case.

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The objective of this work is to evaluate the impact of forest fire on air quality downwind of the burning region. Forest fire are known to be significant sources of gas and aerosols. Depending on the meteorological conditions, these emissions can efficiently perturb the air quality and visibility far away from the sources.

This study presents the first attempt to include the propagative nature of fires in a meteorological mesoscale model. Wildfire behavior is simulated using a semi-physical model developed at the University of Corte, based on a analytical resolution of the rate of spread and integrated with a front tracking method.

The fire model is used to provide gridded heating and water vapor fluxes and radiative temperature at high temporal and spatial resolutions, which are then used as surface forcings in the mesoscale non-hydrostatic meteorological model Meso-NH. A $O_3$-NOx-VOC chemical scheme is coupled to the meteorological model to account from air quality evolution. Chemical emissions are scaled to the heating fluxes, based on emission factors for the mediterranean vegetation.

The grid-nesting capability of the meteorological model is then used to integrate the effect of the fire dynamics and chemistry from the local to the regional scale.

In 2005, an arson forest fire burned approximately 700 ha near Lancon in Provence, France.

The fire spread model was tested successfully on this case. Simulated ozone and its precursors are tested against the air quality survey network available in the south-eastern France.