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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
developped 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.