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Characterising an intense PM pollution episode in March 2015 in France from multi-site approach and near real time data: Climatology, variabilities, geographical origins and model evaluation

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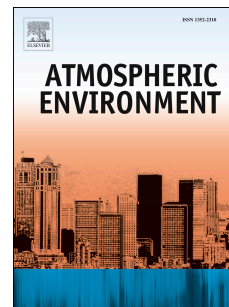
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1 **Characterising an intense PM pollution episode in March 2015 in France**
2 **from multi-site approach and near real time data: climatology, variabilities,**
3 **geographical origins and model evaluation.**

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22 **Abstract**

23 During March 2015, a severe and large-scale particulate matter (PM) pollution episode occurred in
24 France. Measurements in near real-time of the major chemical composition at four different urban
25 background sites across the country (Paris, Creil, Metz and Lyon) allowed the investigation of
26 spatiotemporal variabilities during this episode. A climatology approach showed that all sites
27 experienced clear unusual rain shortage, a pattern that is also found on a longer timescale, highlighting
28 the role of synoptic conditions over Wester-Europe. This episode is characterized by a strong
29 predominance of secondary pollution, and more particularly of ammonium nitrate, which accounted
30 for more than 50% of submicron aerosols at all sites during the most intense period of the episode.
31 Pollution advection is illustrated by similar variabilities in Paris and Creil (distant of around 100 km),
32 as well as trajectory analyses applied on nitrate and sulphate. Local sources, especially wood burning,
33 are however found to contribute to local/regional sub-episodes, notably in Metz. Finally, simulated
34 concentrations from Chemistry-Transport model CHIMERE were compared to observed ones. Results
35 highlighted different patterns depending on the chemical components and the measuring site,
36 reinforcing the need of such exercises over other pollution episodes and sites.

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