

# **Analysis of Meteorological Conditions during Photochemical Episodes over a South-West area of the Iberian Peninsula**

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The frequent occurrence of stagnant high-pressure over Spain makes the area prone to a build up of air pollutants. Additionally, its complex topography (coasts, mountains) leads to the existence of meso-scale recirculation patterns which might amplify air pollution problems, specially such concerned secondary contaminants. Pollutants (precursors) originating from local sources, regional or/and long-range transport can lead to specific pollutant concentration being exceeded. Episodes can be enhanced by the interaction of phenomena on different meteorological scales. It is therefore vital to understand the underlying meteorological, physical and chemical processes that lead to the formation of air pollution episodes.

Meteorological conditions during two photochemical episodes are analyzed in this paper. High ozone levels occurred along the whole Iberian Peninsula, but detailed description is focused over the Huelva region, in the south-west corner, where an intense industrial activity exists. The emission and photochemical model results are presented in separated papers. Numerical simulations have been carried out using the MM5 meteorological model and the CAMx photochemical model independently. Both models make use of the nested grid capabilities to include interactions between the different scales involved. Trajectories are analyzed using HYSPLIT model. The purpose of having several levels of resolution is to simulate the cross border fluxed of pollutants between scales, consider the contribution of local and regional pollutants to Huelva's levels and describe in detail the intra-urban dispersion and transformation of local emissions.

In this paper, the major goal of the examination of candidate episodes is to evaluate the performance of the meteorological model that was chosen for which to derive meteorological input fields for the photochemical model. The quality of meteorological simulations plays a crucial role in the accuracy of the air quality modeling results. The study is based in two case-study periods that are representative of different meteorological and air quality situations that has a high occurrence in the Huelva region, leading to high photochemical activity. The final purpose of the study is to use the two pilot cases for evaluation of various emission strategies, supporting the decision making to locate new industrial facilities in the area.