



Synoptic circulations related to air quality levels at a regional scale

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It is known that the synoptic situation affects to local pollutant concentrations, as it affects to regional and local circulation patterns. In order to relate this scales, we use the classification of Objective Synoptic Processes (OSP) and air quality mesoscale models.

The OSP was applied over Iberian Peninsula for the two month period July-August from daily synoptic maps for years 1990 to 1999. This classification results in 22 categories, but for this study we have analyzed and modelled the categories which cause more different pollutant patterns in Catalonia. This area is a political and complex orographic region in North-Eastern of Spain, characterized by Mediterranean coast, mountain ranges near coast and the Pyrenees in the North.

The first category analyzed is characterized by a high pressure system located over Azores Islands and a weak easterly flow over the Iberian Peninsula and the Mediterranean Basin, as the pressure gradient is very low. In Catalonia, this situation favours the development of local winds as sea-breeze. The second one is characterized with a low pressure system over South-Escandinavia and a high pressure system over Azores expanding towards North Atlantic Area producing a northwesterly-northerly flow over Catalonia region.

To simulate the mesoscale circulations and pollutant distributions related to categories refers before, we use MM5/CMAQ and TAPM models in summer 2001 and 2003.

Preliminary results have shown meteorological agreement in local wind pattern circulations as sea-breeze development and mesoscale flow. Although differences in maximum temperatures, wind velocity and pollutants concentrations over the area show that a more accurate study is needed. Finally, concluding observations about the capabilities of models in this situations will be presented.