

Seasonality of the meteorological processes governing the regional transport of atmospheric pollutants.

<http://www.ceam.es/transreg>

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Summary:

To better understand the processes involved in transport and dispersion of atmospheric pollutants on the Western Mediterranean basin, we must consider the regional scales. In this sense, the results of studies financed by the European Commission during the last 20 years with respect to this basin have shown the importance of mesoscale phenomena in air quality on Mediterranean urban areas.

The purpose of this project is the seasonal characterization (spring versus summer) of the meteorological processes that regulate the dispersion and transport of pollutant gases and aerosols, as well as the feedbacks and synergism associated to them. It is hence that this investigation is framed inside the seventh thematic priority of the *National Subprogram of Atmosphere, Climate and Climatic Change*, belonging to the National Program of Biodiversity, Earth Sciences and Global Change (National Plan of Scientific Investigation and Technological Innovation 2004-2007).

It is an *applied investigation* project that seeks to give answer to the growing necessity of a better characterization of the air quality. This way, the general aim of this project is *the characterization of the seasonality of the meteorological processes that govern the dispersion and the transport of atmospheric pollutants throughout the mediterranean coasts of the Iberian Peninsula, as well as the feedbacks and synergism associated to the same ones.*

This general aim is approached starting from the development of three specific objectives:

1. To characterize the seasonal variation of the probable paths of regional transport and of their continuity with the mechanisms of transport in Southern Europe. In order to do so, a meteorological model (RAMS) will be run. This model will allow to describe, at a regional scale, the transport conditions in scenarios that are representative of the spring and summer seasons in Southern Europe (particularly in the Mediterranean western basin); identifying (a) the main paths of the air masses, (b) the mechanisms of regional transport, and (c) the continuity with the mesoscale processes that are developed in the Iberian Peninsula.
2. To identify and characterize the scenarios that are representative of the inter-regional transport of atmospheric pollutants throughout the Mediterranean coast of the Iberian Peninsula during spring and summer. To achieve this, it is sought to characterize, by means of mesometeorological (RAMS) and dispersive (HYPACT) simulations, the influence that the mesoscale atmospheric dynamics has in the advection of pollutants in coastal mountainous areas. The analysis of the seasonal variations will be carried out by means of the comparative study of (a) the drainage winds, (b) the interface earth-sea, (c) the orographic injections, (d) recirculations, and (e) the disturbance of atmospheric synoptic flow.
3. To divulge the results on a national-wide scale (mainly through an Ozone project with the Ministry of Environment and the atmosphere working groups that this Ministry coordinates) and on the European-wide scale (mainly through the Network of Excellence ACCENT, the COST 728 action and the integrated project CarboEurope-IP).

The obtained results are expected to be useful to complement the tasks of surveillance and prediction of the air quality in the regions of the Mediterranean side, when increasing the knowledge of the relationships between the mesoscale meteorology of the Mediterranean basin and the levels of concentration of expected atmospheric pollutants. Additionally, in the European scientific scope in which the investigating group requesting this project participates, the results of this project are expected to supply additional evidences to the existing ones in connection with the peculiarities of the dispersion of pollutants in the Mediterranean basin, so that they are compared to the dispersive processes observed in Northern Europe (mainly under neutral stability conditions).