

INFLUENCE OF LONG-RANGE TRANSPORT ON AIR QUALITY IN NORTHWESTERN IBERIA

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Atmospheric transport and dispersion of air pollutants are key factors in the study of air quality. These processes can promote the *cleaning* of the local atmosphere and/or the arrival of pollutants from sources located far away from the study point. These pollution incomings can cause important impacts on the levels of air pollutants of the places affected. In Spain, some of the most important sources related to the long range transport (LRT) are Sahara Desert, biomass burning (mainly forest fires) and european sulphates incoming. Sahara Desert constitutes a primary source of dust aerosols, with an estimated load of mineral dust uplifted into the atmosphere of 1400 Tg per year (McKendry et al., 2007). Regarding sulphate, several studies have pointed out that LRT can have a significant impact on the fine fraction of aerosols at surface level (Wagstrom and Pandis, 2011). On the other hand, the smoke plumes generated during the forest fires can travel long distances, affecting areas located at thousand of kilometers from the fire. Some authors have detected an important increase in the number of hospital admissions under these smoke plumes influence. A complete description of these source emissions as well as the meteorological processes leading to the emissions transport are of key importance for evaluating the impacts of pollutants under some LRT episodes.

The aim of this study is to analyse the frequency of the arrival of pollutants from three different sources: i) Saharan Desert, ii) biomass burning and iii) sulphates from Europe to the northwest sector of the Iberia Peninsula during the period 2004-2016. The database containing the occurrence of these episodes has been obtained from the CALIMA network (www.calima.ws). Data are provided as a result of the collaboration agreement for the study and evaluation of air pollution by suspended particulate matter in Spain between D.G. of Quality and Environmental Assessment of the Ministry of Environment, the Higher Council of Scientific Research and the National Institute of Meteorology of the Ministry of Environment.

Furthermore, the impact of these events on the air quality of the city of León has been studied in detail.

León (42° 36' N, 05° 35' W and 838 m above sea level) is located in a mining region, with a population of about 150 000 inhabitants. Due to the low industrial activity, the main local air pollutant sources are road traffic and combustion processes in domestic devices (biomass and mineral coal). Data from four air quality stations, corresponding to the Castilla y León air quality network (www.jcyl.es), have been analysed. The concentrations of PM₁₀, NO, NO_x, SO₂, O₃ and CO have been studied and the variations registered during the pollution episodes evaluated. Furthermore, a weather type classification (Lamb, 1972) has been carried out in order to identify under which meteorological conditions these three types of events take place.

According to CALIMA network, during the thirteen years studied, a total of 389, 545 and 69 days were affected by Saharan dust outbreaks, biomass burning and incoming of sulphate from Europe, respectively. Sahara dust intrusion occurs mainly during summer months and PM₁₀ exceeds in 82 days the daily concentration limit of 50 µg m⁻³ established by the Directive 2008/50/EC. Regarding biomass burning and european sulphates emissions, this limit concentration was exceeded in 46 and 4 days, respectively. The events with higher impact on the air quality of León have been analysed in detail.

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