

## AIR QUALITY IN LEÓN AND ALMERÍA (SPAIN): IMPACT OF SAHARAN DUST INTRUSIONS IN THE NORTH-SOUTH CONTEXT

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Saharan dust intrusions are a recurrent phenomenon that impact air quality in Spain, especially in southern regions and sometimes even in more northerly areas. Saharan dust is transported by air currents from North Africa to southern Europe, and can cover large areas of the country, causing significant repercussions on air quality and public health. When Saharan dust reaches Spain, it can increase the levels of suspended particles in the atmosphere, which has an impact on visibility and air quality. These particles can contain organic compounds, heavy metals and other pollutants that can be harmful to human health, especially for people with respiratory and cardiovascular diseases. For instance, they cause variations in the airborne biological content (Rodríguez-Arias et al., 2023), mainly in south of Iberian Peninsula (Rojo et al., 2021), which leads to an increase in allergies among the population. Saharan dust intrusions can also affect the climate and the environment (Oduber et al., 2019). For example, they can influence precipitation patterns and cloud formation, as well as soil fertility and the health of terrestrial and marine ecosystems.

Although Saharan dust intrusions are a natural phenomenon, their impact on air quality and the environment can be aggravated by factors such as human activity, climate change and local meteorological conditions. This phenomenon has attracted increasing interest in the scientific community due to its potential implications for the environment, economic and public health.

In this context, the present study aims to analyze the air quality in León (NW of Spain) and Almería (SE of Spain), focusing specifically on the impact of Saharan dust intrusions. Over a 10-year period, data on air pollutant concentrations (gases and particles) in both cities will be analyzed. Seasonal, annual, and monthly average values in León and Almería will be determined and compared. These data will be obtained from the air quality networks of Castilla y León and Andalucía (for León and Almería, respectively). The number of exceedances of the limit values established by current legislation (Directive 2008/50/CE) for the various pollutants studied will be determined. The PM10 exceedances will be analyzed in-depth in an attempt to correlate them with the presence of Saharan dust particles in the air.

To achieve these objectives, the Hysplit model will be used to determine the origin of the air masses and other tools, such as the NAAPS and Multimodel models, which provide information on the arrival of Saharan dust to the peninsula. Their presence will be confirmed with

official data from the Ministry for Ecological Transition and the Demographic Challenge. Factors such as geography and meteorology will be examined to understand possible differences between the results obtained for the two cities. Finally, patterns will be established, and the potential environmental and public health implications of Saharan dust intrusions will be analysed.

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