Study of air pollution in selected stations in Spain: one year study

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Currently, air pollution is a worldwide problem, increasing greatly due to the development of industrial and economic activities, especially in the last century (Calvo, 2009). This problem not only affects the environment, but also affects human health causing respiratory and cardiovascular diseases, including bronchial cancer, pulmonary emphysema, thrombosis, blood clots and heart attacks that, in some cases, have caused death (Rückerl et al., 2011). Of the 3 million deaths due to atmospheric pollution that have been estimated in the world, around 193,000 have occurred in Europe and 7,000 in Spain (Ortiz et al., 2017).

Despite reductions in the emissions of some air pollutants produced by the actions contemplated in the new air quality policies, high concentrations continue to be registered in some urban areas (EEA, 2017), with road traffic being the main cause of these high concentrations, exceeding in some cases the limits established by current regulations (RD 2008/50 / CE).

There is a great diversity of atmospheric pollutants among which we can find tropospheric ozone (O_3), nitrogen oxides (NO_x), sulphur dioxide (SO_2), carbon monoxide (CO) and aerosols or particulate matter (PM), among others (Ballester, 2005). The present study aims to find possible patterns in the evolution of the concentrations of these pollutants in the Spanish cities of A Coruña, Santander and Murcia in 2016.

To carry out this study, the daily data of the pollutant concentrations were obtained from eight stations of the Air Quality Networks of the three mentioned cities (Table 1). Subsequently, a monthly and seasonal analysis has been carried out. A non-parametric Kruskal-Wallis test has been applied in order to identify the possible differences between the types of stations and cities. Finally, a deeper study has been developed to check the eventual exceedances of the limits established by current regulations and to identify the most likely sources.

Table 1. Air quality stations type and.

City	Station	Type of station
A Coruña	Sta. Margarita	Urban
A Coruña	Castrillón	Urban
A Coruña	San Diego	Urban
A Coruña	San Pedro	Urban background
Santander	Santander Centro	Traffic
Santander	Tetuán	Urban background
Santander	El Astillero	Industrial
Murcia	San Basilio	Traffic

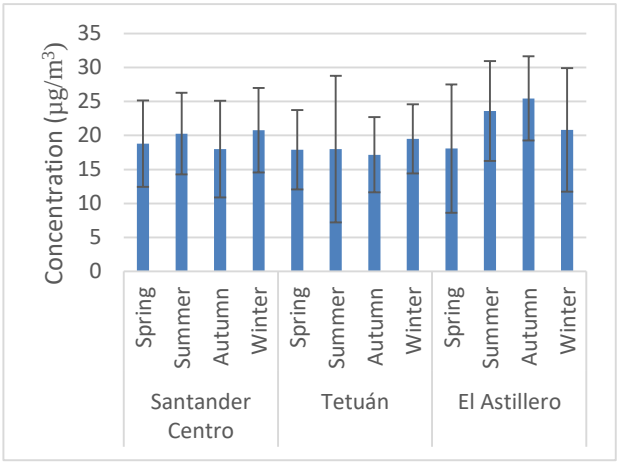

Figure 1. Seasonal PM_{10} concentration in Santander stations.

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