Introduction

Nowadays, air pollution is a global problem due to greatly industrial development and economic activities (Cahou, 2009). As a consequence, some air quality policies have been developed with the aim of reducing the emissions to the atmosphere. Despite reductions in the emissions of some air pollutants produced by the actions contemplated in the new legislation on air quality, high concentrations continue to be registered in some urban areas (EEA, 2017). The road traffic is the main cause of those high concentrations, exceeding in some cases the limits established by current regulations (RD 2008/50/CE).

The aim of this study is to determine the significant correlations between some pollutants concentration and several meteorological parameters in A Coruña (Spain) during 2016.

Study Area

- The higher concentration of pollutants was recorded during winter months.
- The current legislation (RD 102/2011) has been compiled, although in A Coruña, the limit value was exceeded on 12/08/2016 in Santa Margarita (61 μg/m³) on 13/08/2016 in Castrillón (53 μg/m³) and in San Diego (57 μg/m³) and on 10/30/2016 in San Diego (52 μg/m³).
- Anticyclonic, Northeast, North and Cyclonic weather types represent close to 50% of the days of 2016. Anticyclonic types predominate with 18% of the days.
- The higher pollutant concentrations were recorded in the Cyclonic weather type.
- The majority of pollutants measured in the four measurement stations presented a statistical negative correlation with wind speed at surface, at 850 hPa, at 500 hPa and at 200 hPa, LFC, SWEAT, S/H, BRN Shear, and wind direction. They also have a positive correlation with Cap Strength, Boyden Index, Convective temperature, CCL, LCL and the thickness of the different atmospheric layers.
- The ozone presented a different behavior from the rest of the pollutants, presenting opposite correlations than the rest.

Material and Methods

- The data of pollutant concentration were obtained from four stations (Fig. 1) of the air quality network of A Coruña (http://coruna.es/insambiental/es/calidad-del-air/red-de-vigilancia.html): i) Sta. Margarita (urban); ii) Castrillón (urban); iii) San Diego (urban) and iv) San Pedro (urban background).
- The weather types have been calculated according to the Lamb (1972) classification (Table 1).
- The data of the meteorological parameters were obtained from the daily radiosounding provided by the Meteorological Information Service of OGIEMET (www.ogiemet.com). The data for parameters and the meteorological index, after their treatment through the RAOB computer program (Rádirsonne Observation), have been analyzed (Fig. 2) (Table 2).

Table 1. Weather types according to Lamb classifications (Lamb, 1972).

<table>
<thead>
<tr>
<th>Anticyclonic types</th>
<th>Pure directional</th>
<th>Cyclonic types</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mediterranean</td>
<td>Cyclonic</td>
</tr>
<tr>
<td>NE</td>
<td>Southeast</td>
<td>Mediterranean</td>
</tr>
<tr>
<td>E</td>
<td>Northeast</td>
<td>Mediterranean</td>
</tr>
<tr>
<td>W</td>
<td>South</td>
<td>Mediterranean</td>
</tr>
<tr>
<td>SW</td>
<td>Southwest</td>
<td>Cyclonic</td>
</tr>
</tbody>
</table>

Table 2. Annual, monthly and daily average and maximum concentrations of each station in A Coruña during the study.

Conclusions

- The higher concentration of pollutants was recorded during winter months.
- The current legislation (RD 102/2011) has been compiled, although in A Coruña, the limit value was exceeded on 12/08/2016 in Santa Margarita (61 μg/m³) on 13/08/2016 in Castrillón (53 μg/m³) and in San Diego (57 μg/m³) and on 10/30/2016 in San Diego (52 μg/m³).
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REFERENCES


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