

Study of the air quality in the surroundings of an urban park: A micrometeorological approach

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In this work we study the differences showed by two types of pollutants, particulate matter (PM) and NO_x , by comparing ambient concentration measurements within an urban park versus the corresponding values nearby (but outside) it. The results are linked to both proximity to emission sources, such as road traffic, and the microscale atmospheric conditions.

The work is motivated by the fact that poor air quality is a crucial issue of current cities. For some of them it is not uncommon to face this problem with occasional traffic restrictions when high concentrations of pollutants are reached. These events occur more frequently with specific large-scale atmospheric conditions, for example when a strong anticyclone is present. As the meteorological conditions may significantly influence the pollutants concentrations, the research project TECNAIRE-CM (Innovative technologies for the assessment and improvement of urban air quality) aims to provide new approaches to obtain proper descriptions of the urban pollution and its dynamics at different spatial and temporal scales, not only the synoptic scale. So far, a few field campaigns have been developed within TECNAIRE-CM at two locations in the city of Madrid, which are considered hot spots according to the air quality network records.

Here we use the data from a field campaign carried out during summer 2016, which consider standard pollution and meteorological measurements, as well as sonic anemometer data. The latter help to include atmospheric turbulence as a significant agent for air quality characterization. The instrumentation was deployed at a location with considerable traffic density, but nearby a border of the main urban park of the city, so that its influence might be investigated. Supplementary data considered for this work correspond to permanent instrumentation within the park. With this extra information we can compare both measurements inside and outside the park. Therefore, we study the effect on wind, turbulence or air quality when we measure at a site either directly exposed to traffic emissions or partly protected and with a reduced influence of typical atmospheric urban phenomena.

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