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Meteorological Conditions Favouring Development of Urban Air Pollution Episodes

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The causes of urban air pollution episodes are complex and depend on various factors including emissions, meteorological parameters, topography, atmospheric chemical processes and solar radiation. The relative importance of such factors is dependent on the geographical region, its surrounding emission source areas and the related climatic characteristics, as well as the season of the year. The key pollutants are PM10, PM2.5, O_3 and NO_2, as these cause the worst air quality problems in European cities.
The main aim of this study realised within the MEGAPOLI project was to describe and quantify the influence of meteorological patterns on urban air pollution especially high-level concentrations air pollution episodes in megacities. Several European urban agglomerations and megacities, including the Po Valley, Helsinki, London, Paris, Moscow, Vilnius, were considered in the study.
The study also carried out analysis of meteorological patterns leading to urban air pollution episodes considered by the development of suitable indicators linking particular meteorological conditions/ parameters to increased air pollution levels in the urban areas. These indicators constitute a useful tool for regulators in suggesting effective policies and mitigation measures. Finally, a combination of modelling and analysis of observations data can allow both the quality assurance of the new parameterisations as well as the verification of input emissions.