



Spatio-temporal variability of ozone and nitrogen dioxide concentrations at background locations in the Paris area in 2007 and 2008

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With 11 million of residents, Paris area is a demographic and economically important, generating a high concentration of human activities and therefore relatively high air pollution. Currently, ozone (O₃) and nitrogen dioxide (NO₂) are among the most problematic pollutants, especially in a situation of high pressure (few clouds, little or no wind). Moreover, these pollutants are inter-related: NO₂ is a precursor of O₃. Hourly and daily data of ozone and nitrogen dioxide concentrations from 14 monitoring stations Airparif at background locations (urban, suburban and rural) are used from 2007 to 2008 to determine when concentrations of O₃ and NO₂ are highest for this period. These data are also employed to characterize spatial variability and to compare concentrations in urban, suburban and rural locations. Furthermore, hourly meteorological data (wind speed and direction, temperature, visibility and humidity) from Météo-France stations and hourly traffic data measured by DIRIF are related to pollution concentration to understand the spatio-temporal variability of NO₂ and O₃ concentrations.

Besides the study of distribution pattern of O₃ and NO₂ concentrations, principal component analysis (PCA) is applied to analyze O₃ and NO₂ variability. PCA results show that there are two principal components (89,5% of variance). The first component (73,0%) is associated with an opposition of the daily variation between concentrations of O₃ and NO₂ and, an other opposition, between values in summer and in winter for these two pollutants. These differences are attributed to meteorological conditions. The second component (16,5%) shows higher concentration in rural location for O₃ and in urban location for NO₂.