



Local and regional oxidant levels ($\text{OX} = \text{O}_3 + \text{NO}_2$) measured in a polluted area in central-southern of Iberian Peninsula

A. Notario (1), I. Bravo (2), J.A. Adame (3), Y. Díaz-de-Mera (1), A. Aranda (1), A. Rodríguez (4), and D. Rodríguez (4)

(1) Departamento de Química Física, Facultad de Ciencias Químicas, Universidad de Castilla la Mancha. Avenida Camilo José Cela s/n, 13071 Ciudad Real, Spain, (2) Departamento de Química Física. Facultad de Farmacia, Universidad de Castilla-La Mancha, Campus de Albacete, Edificio Polivalente, s/n, 02071 Albacete, Spain, (3) Atmospheric Sounding Station-El Arenosillo. National Institute for Aerospace Technology (INTA), Atmospheric Research and Instrumentation Branch. Mazagón-Huelva (Spain). , (4) Departamento de Química Física Facultad de Ciencias del Medio Ambiente, Universidad de Castilla La Mancha, Avenida Carlos III, s/n, 45071 Toledo, Spain

The relationship between ambient concentrations of O_3 , NO , NO_2 , NO_x and oxidant ($\text{OX} = \text{O}_3 + \text{NO}_2$) was investigated for the first time in central-southern of the Iberian Peninsula. This is the area with the highest concentration of heavy industry in central Spain, which experiences frequent photochemical pollution events. A detailed air pollution database was observed from two monitoring stations, over a 24-month period (around 210000 data, during 2008 and 2009). For the purpose of this analysis, the concentration of OX was calculated using the sum of a NO_x -independent 'regional' contribution (i.e. the O_3 background), and a linearly NO_x -dependent 'local' contribution. First, monthly dependence of regional and local OX concentration was observed to determine when the maximum values may be expected. The variation of OX concentrations with levels of NO_x was then measured, in order to pinpoint the atmospheric sources of OX in the polluted areas. The ratios $[\text{NO}_2]/[\text{OX}]$ and $[\text{NO}_2]/[\text{NO}_x]$ vs $[\text{NO}_x]$ were analyzed in order to firstly, find the fraction of OX which is in the form of NO_2 and secondly, the possible source of the local NO_x -dependent contribution. Finally, a surface plot study of annual variation of the daily mean oxidant levels, the first of its kind for this polluted area, was completed. This plot may be used to improve the atmospheric photochemical dynamic in this region of the Iberian Peninsula, where there are undeniable air quality problems.