

Spatially resolved MAXDOAS measurements of Nitrogen Dioxide and Formaldehyde at Madrid (41°N)

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A multi-instrumental campaign has been carried out at a polluted environment in the city of Madrid (Spain, 41°N) in order to determinate the distribution of NO₂ and HCHO in a South-North axis of the city. The instrumentation was deployed at the terrace of the ICA-CSIC (Institute of Agrarian Sciences) premises located in the North-East part of city which height provides free-horizon observations.

The campaign was held during the end of September and beginning of October 2015, being in its most part characterized by a high pressure system located over Madrid with clear skies although at the end of the campaign broken clouds during the late evening and rain was also observed.

The instruments involved in the campaign were two MAXDOAS spectrometers, observing towards North and South axis respectively. A CIMEL to obtain AOD total column, a NO_x in situ monitor in order to provide NO₂ concentration at the level of the observations and a weather station.

During the beginning and in the middle of the campaign, both MAXDOAS spectrometers were deployed to observe the same air-mass in order to assess the consistency of measurements when both instruments are observing different air-masses.

Observations show a different daily pattern in the South-North axis of the city probably related to the distribution of population, the industrial activities and traffic. Observed columns at the level of the observations are always greater towards South, except during the weekend, when an increasing on NO₂ columns is observed northwards. A more detailed discussion of the differences in the North-South observations in HCHO and NO₂ is presented in this work.