



Assessment of the ozone concentration at Ebre Observatory (Northeast of Spain)

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Ebre Observatory, located at the low Ebre valley (Northeast of Spain) is a research center founded a century ago to study Solar-Terrestrial relations. The ozone concentration measurement programme started in 1994. In this study the ozone data base until 2005 has been analysed. In addition, in order to know the most relevant meteorological aspects in that area, the meteorological data collected during the period 1986-2005 have also been used. Accordingly, the monthly and daily evolution of hourly ozone concentrations have been studied.

With an annual mean of $63 \pm 10 \mu\text{g m}^{-3}$ and maximum daily concentrations that easily exceed the $160 \mu\text{g m}^{-3}$ during the summer months, the ozone shows a marked both monthly and daily cycle. The lower concentrations are registered in the wintertime, with an annual minimum of $43 \pm 5 \mu\text{g m}^{-3}$ on December, due to non favourable atmospheric conditions for the ozone formation, low radiation and temperature levels, as well as a wind regime blowing from NW and with high wind speed. From May on, the solar radiation and temperature increases enhance to the photochemical mechanism, favouring a major mixed layer depth and the development of mesoscale processes.

The maximum ozone concentration is found on July with a mean value of $88 \pm 10 \mu\text{g m}^{-3}$. The daily evolution shows a clear cycle following the solar activity. During the night the ozone concentrations remain almost constant ($40 \mu\text{g m}^{-3}$ in winter and $60 \mu\text{g m}^{-3}$ in summer). From 6:00 to 7:00 h (UTC) occurs the daily minimum. The maximum is achieved during the 14:00-15:00 h period with values ranging from $50 \mu\text{g m}^{-3}$ to $70 \mu\text{g m}^{-3}$ during winter, spring and autumn. Nevertheless, in summer the

concentrations remain at $100 \mu\text{g m}^{-3}$ during the period 11:00 to 18:00 h.

Moreover, from May to September the target value to protect the human health established in the European ozone directive is frequently exceeded. The high ozone values are measured under breeze conditions or with wind blowing from SW. The occurrence hour of the daily maximum and the characteristics of this rural region (without important traffic or industrial sources of precursor emissions) indicate that these concentrations could probably have their origin in the transport from other regions. At present, the study is focused at determining the levels and behaviour that shows the ozone under the different meteorological scenarios, having special interest the knowledge of the origin of the ozone events occurring in this region.