



Weekend effect of O₃, NO, NO₂, CO and PM10 concentrations in the south of Spain during 2003-2008

Jose Antonio Adame Carnero (1), Antonio Lozano (3), Mar Sorribas (1), Juan Contreras (2), Miguel Ángel Hernández-Ceballos (1), Francisca Godoy (2), Mercedes Fernández-León (1), Juan Pedro Bolívar (4), and Benito A. De la Morena (1)

(1) IAtmospheric Sounding Station "El Arenosillo". Atmospheric Research and Instrumentation Branch. National Institute for Aerospace Technology (INTA). Ctra. Huelva - Matalascañas, Km. 34. 21130 - Huelva (Spain). adamecj@inta.es, (3) Empresa de Gestión Medioambiental (EGMASA). C/ Johan G. Gutenberg, 1 - Isla de la Cartuja. 41092 - Sevilla (España)., (2) Consejería de Medio Ambiente de la Junta de Andalucía. Avda. Manuel Siurot 50, 41071. Sevilla (Spain)., (4) Departamento de Física Aplicada. Facultad de Ciencias Experimentales. Universidad de Huelva. Campus de El Carmen, s/n. 21007. Huelva (Spain).

The weekly evolutions and the difference between labour and non-labour days for O₃, NO, NO₂, CO and PM10 concentrations have been analysed in the south of Spain (Andalusia). The hourly data have been collected in 70 stations (urban, suburban and rural) belong to the Air Quality Network of Andalusia. The data period used was 2003-2008. The study has been focused in order to identify the weekend effect for those pollutants. The weekly patterns has been evaluated using daily mean of O₃ and CO and 90th percentile daily values of NO, NO₂ and PM10. The mean daily ozone concentrations show similar values during the week days with a maximum increase of the concentrations during weekend days of 5 $\mu\text{g m}^{-3}$ in urban stations. The NO and NO₂ levels present in general a decrease of 90th percentile daily values during weekend days. The maximum decrease observed was of 50 and 25 $\mu\text{g m}^{-3}$ for NO and NO₂ respectively. The most of stations show similar concentrations for the mean daily CO levels during the week. In the event of PM10 while some stations present an increase of the concentrations during the weekdays others have similar values during all days with 90th percentile of 45 $\mu\text{g m}^{-3}$. The daily pollutants variation between week and weekend days has been evaluated from the hourly differences between weekend and week concentrations. The ozone daily evolution show negative differences from 00:00 to 5:00 local time (LT) while during the rest of the day the differences are positives. The maximum differences were registered early in the morning ranging between 4 $\mu\text{g m}^{-3}$ for rural stations to 14 $\mu\text{g m}^{-3}$ for urban stations. The NO and NO₂ show positive differences between 00:00 to 7:00 (LT) with negative values within the next hours. The higher differences could reach 80 $\mu\text{g m}^{-3}$ for NO and 25 $\mu\text{g m}^{-3}$ for NO₂, both in urban stations, with values lower than 10 $\mu\text{g m}^{-3}$ and 5 $\mu\text{g m}^{-3}$ in suburban and rural stations respectively. The CO daily evolution show similar values in week and weekend days. The behaviour of the PM10 daily differences is similar to the observed for NO and NO₂, with higher differences between 10:00 to 14:00 and values between 5 to 20 $\mu\text{g m}^{-3}$. The results obtained in this work point out a weak or absence for weekend effect of O₃ and CO concentrations over the study area. Nevertheless, for NO, NO₂ and PM10 concentrations present a decrease during the weekend. This phenomenon has been observed with more intensity over the metropolitan areas, mainly in urban stations. The results obtained in this study are being used to define the air quality plans in the south of Spain. These plans will start to apply during 2010 with the purpose to reduce the levels of these air pollutants in Andalusia.