



Atmospheric Electric Field of Lisbon (Portugal) affected by the week urban pollution cycle

Hugo Gonçalves da Silva (1), Ricardo Conceição (1), Marta Melgão (1), Paula Mendes (2), Mouhaydine Tlemçani (1), Claudia Serrano (1), and António H. Reis (1)

(1) University of Évora, Geophysical Centre of Évora, Physics Department, Évora, Portugal, (2) Landscape, Environment and Planning Department, University of Évora, Portugal

Atmospheric electric field was recorded at Portela meteorological station (Lisbon, Portugal) in the period from 1955 to 1991. Using the Lomb-Scargle strategy to calculate the spectral record of the atmospheric electric field a clear evidence of the existence of a weekly cycle is found. Additionally, this cycle becomes more significant in the last years of the time-series. To further confirm this finding we performed a simple statistical approach that showed consistency with the spectral analysis. Two datasets were considered: (i) all days in the period, and (ii) fair-weather days only. The weekly cycle was attributed to urban pollution that has a weekly cycle (working days produce more pollutants than non-working days) while there is no other meteorological mechanism imposing such periodicity. Finally, the growing significance of the weekly cycle over the years is attributed to an increase in urban activity, namely motorway traffic in Lisbon.