



Inverse modelling of air quality data through a neural network approach

A. Russo (1), A. Soares (1), R.M. Trigo (2), and M.J. Pereira (1)

(1) Instituto Superior Técnico, Universidade Técnica de Lisboa, Lisbon, Portugal, (arusso@ist.utl.pt), (2) Centro de Geofísica da Universidade de Lisboa, Lisbon, Portugal

Air quality is usually driven by a complex combination of factors where meteorology, physical obstacles and interaction between pollutants play significant roles. Considering the characteristics of the atmospheric circulation and also the residence times of certain pollutants in the atmosphere, air pollution is, nowadays, considered to be a global problem that affects everyone. As a result, a generalized and growing interest on air quality issues led to research intensification and publication of several articles with quite different levels of scientific depth.

The main objective of this work is to produce an air quality model which allows forecasting critical concentration episodes of a certain pollutant by means of neural network modelling. In this paper, we describe the development of a neural network tool to forecast the daily average NO₂ concentrations in Lisbon, Portugal, one day ahead. This research is based upon measurements from 22 air quality monitoring stations during the period 2001–2005.

The analysis revealed that the most significant variable in predicting NO₂ daily concentration is the previous day value of NO₂ concentration followed by the 5a.m. NO₂ concentration. This approach shows to be very promising for urban air quality characterization, allowing further developments in order to produce an integrated air quality and health surveillance/monitoring system in the area of Lisbon.