



1 Prediction of ozone air quality in an urban area using the low-pass KZ filter

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This paper presents the results of assessing and modelling ozone (O_3) air quality at a location with high traffic density, using the Kolmogorov-Zurbenko (KZ) filter and regression models. The automatic monitoring site is located in the urban area of Valencia (Spain), close to a motorway access. The study period is 1994-2006. The highest missing rate is observed for ozone (13.15%). Filtered nitrogen dioxide (NO_2) concentrations are also used as explanatory variable (indicator of traffic density). The meteorological data are hourly observations of wind speed and direction, temperature, relative humidity, pressure and solar radiation. The temporal data variability is decomposed into periodicities below 24 hours (daily cycle) and above 24 hours. A logarithmic transformation is applied. Therefore periodicities above 24 hours is the product of long-term trends and seasonal variability (monthly and weekly cycles). Trends above 1 year are significant but represent a very small portion of the total observed variability. The daily cycle explains around 40% of the total variations of O_3 and NO_2 , with peaks that may be explained by the traffic congestion produced at rush hours. The meteorological conditions explain a low rate of the variability observed in the daily cycle and in periodicities above 24 h. The predictions of $\log(O_3)$, when considering the meteorological, long-term trend and traffic influences, explain around 30% of the observed variability. This paper also presents the results of a simulation study to analyse the robustness of the approach when the missing O_3 rate is above 13.15%.