PREVQUALAR

CENSE
Center for Environmental and Sustainability Research
Sustainability Engineering Research Group (SustE) - Air Quality

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Objectives

The PREVQUALAR project aims to provide a forecasted air quality index (AQI) on Portuguese zones and agglomerations for air quality assessment and management purposes. This index is achieved using a statistical approach to forecast air pollutants concentrations, subsequently converted to indexes for each PM_{10} and O_3 pollutants. The global AQI is given by the contribution of the worst pollutant index. The project involves the collaboration between the Portuguese Environment Agency (APA), the Portuguese Institute of the Ocean and Atmosphere (IPMA) and the Faculty of Sciences and Technology of New University of Lisbon (FCT/UNL). At the present we are working on renewing de established models and the development of models for the remaining stations of the QUALAR monitoring network.

Methodology

- Validation of air quality observational data.
- Validation of meteorological observations .
- Computing daily values of observed hourly PM_{10} , NO_2, CO and O_3 concentrations.
- Establishment of derived meteorological parameters.
- Classification and Regression Trees (CART) Analysis.
- Multiple Regression (MR) model development.
- Model Validation.

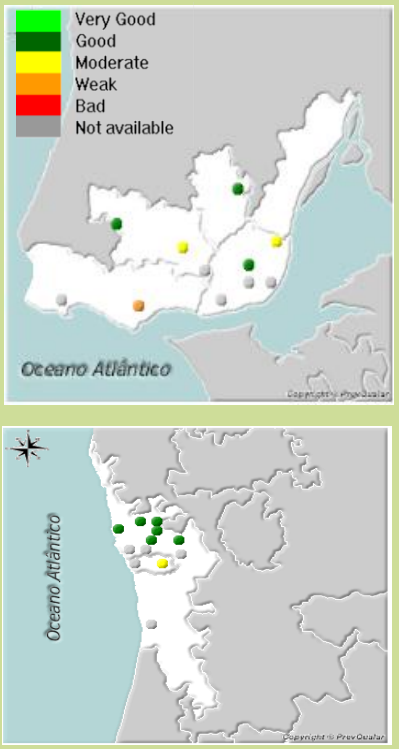

Fig.1.Lisbon (top) and Oporto air quality observation network.

Expected Results

Statistical models based on multiple regression analysis (MR) and classification and regression trees analysis (CART) were developed and applied in forecasting the average daily concentrations for particulate matter (PM_{10}) and average maximum hourly ozone levels (O_3), for the next day. The obtained results show a good agreement between the forecasted and measured concentrations on both pollutants however the results obtained for O_3 are better. The length of the historical data used in the development of the models is an important aspect on the quality of the outcome results.

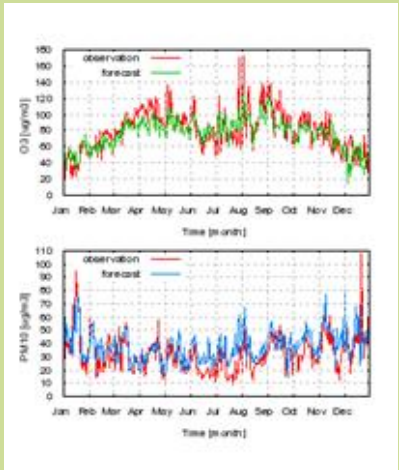

Fig. 2.- Observed and predicted O_3 (top) and PM_{10} (bottom) mean concentrations in Lisbon 2007.

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