A full forecast system of air quality for the South East of the Iberian Peninsula.

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Air pollution forecasting can be used to alert about dangerous health effects caused by airborne pollutants and, in consequence, to take actions to reduce pollutant concentrations (i.e. reducing traffic, control industrial activities, etc.). Therefore, the development of reliable air quality forecast systems is of great interest.

The system consists of two main branches. A statistical method based on Neural Networks is used to forecast (10 days) several daily air quality index at the sites where historical data is available (i.e. pollution measurement stations). A dynamical method based on WRF-CHEM to forecast hourly (48h) values of a large variety of species in a high resolution domain (2km). Both subsystems use GFS and ECMWF forecasts as driving conditions. The dynamical subsystem incorporates 4DVAR data assimilation of meteorological data (first 12 hours of forecast), and dynamical emissions. The dynamical emissions consist in changing the emissions of large factories and traffic. The emissions data are obtained by machine learning methods based on historical series and meteorological conditions (mainly big energy factories). The WRF-CHEM configuration consists of several domains one way nested. The mother domain covers the entire Saharian desert in order to incorporate the dust transport contribution to particulate matter concentration. In addition, the base emission data is continuously updated. The system also incorporates a module for automatic verification by comparing forecast with observed data, and analysis runs (in order to minimize meteorological forecast uncertainty). This verification process permits us to construct a MOS (Model Output statistics) in order to correct possible model bias.