Examination of potential predictors for the forecast of particulate matter concentration in Augsburg (Germany)

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An experimental prediction platform for particulate matter, based on near-real time data is going to be established within the project "Smart Air quality network" to warn the population of high concentrations of particulate matter. Thus, they can better assess health risks when staying outdoors, doing sports or ventilating the home. When forecasting a low-exchange weather situation, people may also be able to consciously avoid emissions, such as using public transport or bicycles or dispense with the fireplace stove.

Large-scale air pressure distribution determines the predominated wind direction on the macro and mesoscale and thus the long range transports of aerosol but also determine the conditions for local ventilation and transport of precursor gases. Therefore a weather type classification scheme, based on the cost733class software is used to extract specific situations for particulate matter concentration. In order to improve the explained variance, a weather type classification is to be created which is specially conditioned by particulate matter concentrations in Augsburg, by including the concentration data already in the process of type definition.

This study examines the improvement of the weather type classification for prediction particulate matter by adding different predictors such as wind speed, wind direction, temperature but also predictors measured at the small scale like atmospheric stability by operational soundings with unmanned aerial systems and SODAR/RASS or boundary layer height by a ceilometer or precipitation. The predictor screening presented in this study should finally lead to a statistical model setup using artificial neural network approaches.