

Meteorological correction of air concentration data
How well do we know our trends?

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Evaluation of air pollution data is hindered by noise, caused by meteorological variability. Here we present a method which is able to correct nearly every kind of concentration data series for meteorological fluctuations. In principle all kinds of statistical endpoints, such as annual averages, percentiles, number of exceedances above a standard etc can be corrected. The method has proven its value to recognise changes in trends in an early phase and to aid the comparison of air concentration measurements with emission data.

The method is based on regression tree analysis. Advantages of this approach are amongst others, that it allows more general interactions between predictor variables and that it is more adept at capturing non-additive behaviour. It has no problems with circular parameters as wind direction, in contrast to more usual additive techniques such as multiple linear regression. Also, missing variables are treated in a more satisfactory way. Interpretation of results with mixed discrete and numeric variables is easier.

The approach follows three steps. The first step is to classify the meteorology in such a way, that the variance in the classified concentration data is minimised. The second step is the derivation of weighting factors for each year and each meteorological class. At the end, meteorologically corrected statistical data are calculated.

The method is used for trends on SO₂, NO_x and PM₁₀. It is intended to include also ozone trends. Concentration and emission data for these substances match fairly well.