



Meteorological factors governing tropospheric ozone concentrations relevant for health in cities of Southern Germany

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Besides air pollutants like particulate matter and nitrogen oxides exposure to ground level ozone can have considerable health effects particularly with respect to respiratory and cardiovascular diseases and mortality. From epidemiological studies different thresholds have been defined above which health impacts have to be expected. Frequent exceedances of these thresholds have been observed for stations located in cities of Bavaria, Southern Germany.

In cities of Southern Germany high tropospheric ozone concentrations occur mainly in spring and summer. They are connected with specific weather patterns. Multivariate statistical analyses like principal component analysis are used to identify typical weather patterns associated with high ground level ozone concentrations. Anticyclonic patterns play an important role in this regard, but do not suffice to explain extreme ozone conditions. Further meteorological factors are needed to explain the spatio-temporal ozone patterns. Linear models and extreme value theory are used to relate high ozone concentrations to the specific weather patterns as well as to further explanatory variables like air temperature, humidity and wind conditions.