



## **Exceedance of PM10 and ozone concentration limits in Germany – Spatial variability and influence of climate**

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High concentrations of particulate matter (PM) and ground-level ozone (O<sub>3</sub>) have negative impacts on human health, e.g., increased risk of respiratory disease, and the environment. European Union (EU) air policy and air quality standards led to continuously reduced air pollution problems in recent decades. Nevertheless, the limit values for PM10 (particles with diameter of 10 micrometers or less) and ozone – defined by the directive 2008/50/EC of the European Parliament – are still exceeded frequently. Poor air quality and the exceedance of limits result mainly from the combination of high emissions and unfavourable weather conditions.

Datasets from German monitoring stations are used to describe the spatial and temporal variability of the exceedance of concentration limits for PM10 and ozone for the federal states of Germany. Time series are analysed for the period 2000–2012 for PM10 and for the period 1990–2012 for ozone. Furthermore, the influence of weather patterns on the exceedance of concentration limits on a regional scale was investigated. Here, the “objective weather types” of the German Weather Service were used. As expected, for most regions anticyclonic weather types (with a negative cyclonicity index for the two levels 950 and 500 hPa) show a high frequency on exceedance days, both for PM10 and ozone. The results could contribute to estimate the future exceedance frequency of concentration limits and to develop possible countermeasures.