Für Mensch & Umwelt

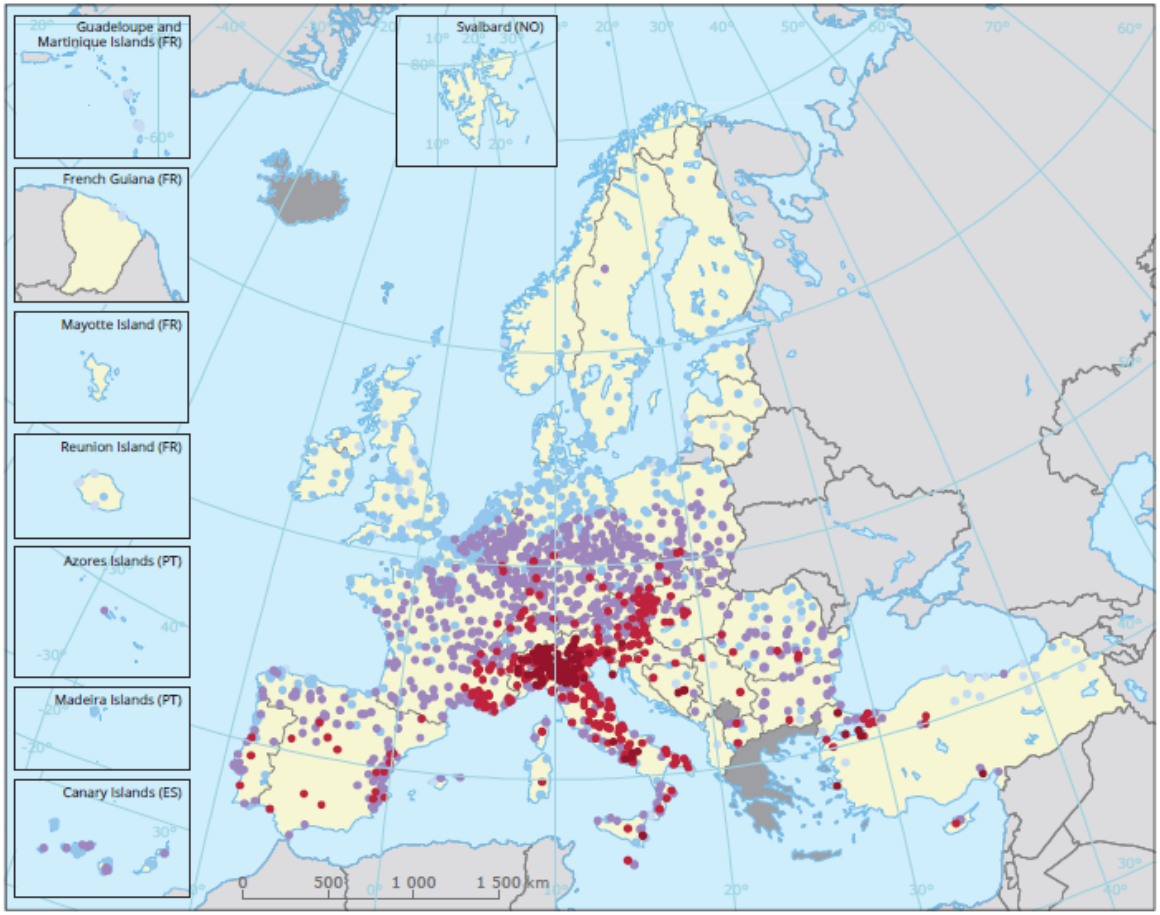
Umwelt Bundesamt

Accurate Monitoring of Surface Ozone
Virtual Workshop 5-9 October 2020

Impact of surface ozone on human health and the environment

Marion Wichmann-Fiebig

Risk to human health



Source:
Europäische Umweltagentur,
Air quality in Europe — 2019 report, EEA Report No 10/2019.

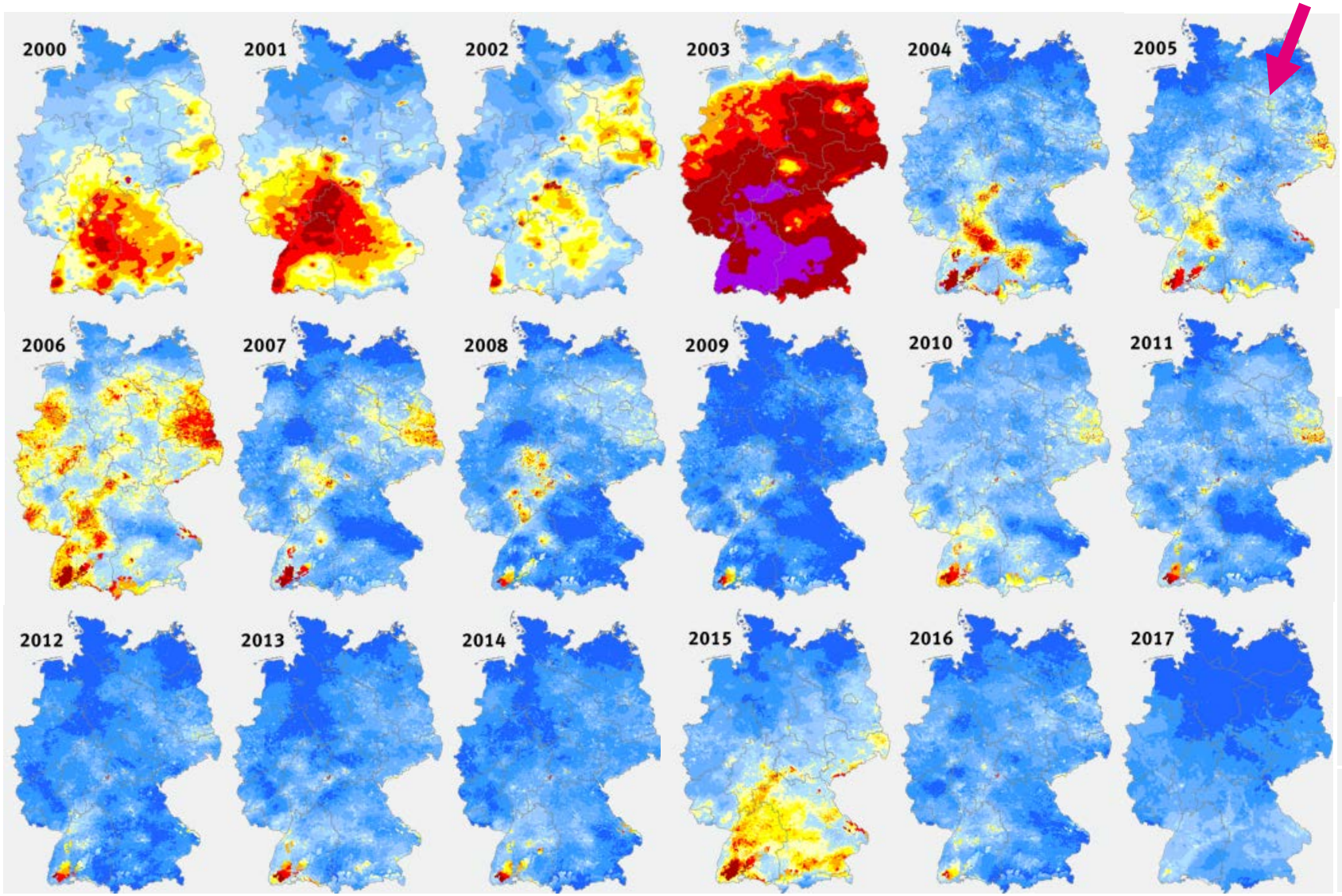
Note: Observed concentrations of O_3 in 2017. The map shows the 93.2 percentile of the O_3 maximum daily 8-hour mean, representing the 26th highest value in a complete series. It is related to the O_3 target value. At sites marked with dots in the last two colour categories, the 26th highest daily O_3 concentrations were above the 120 µg/m³ threshold, implying an exceedance of the target value threshold. Please note that the legal definition of the target value considers not only 1 year but the average over 3 years. Only stations with more than 75 % of valid data have been included in the map.

Source: EEA, 2019c.

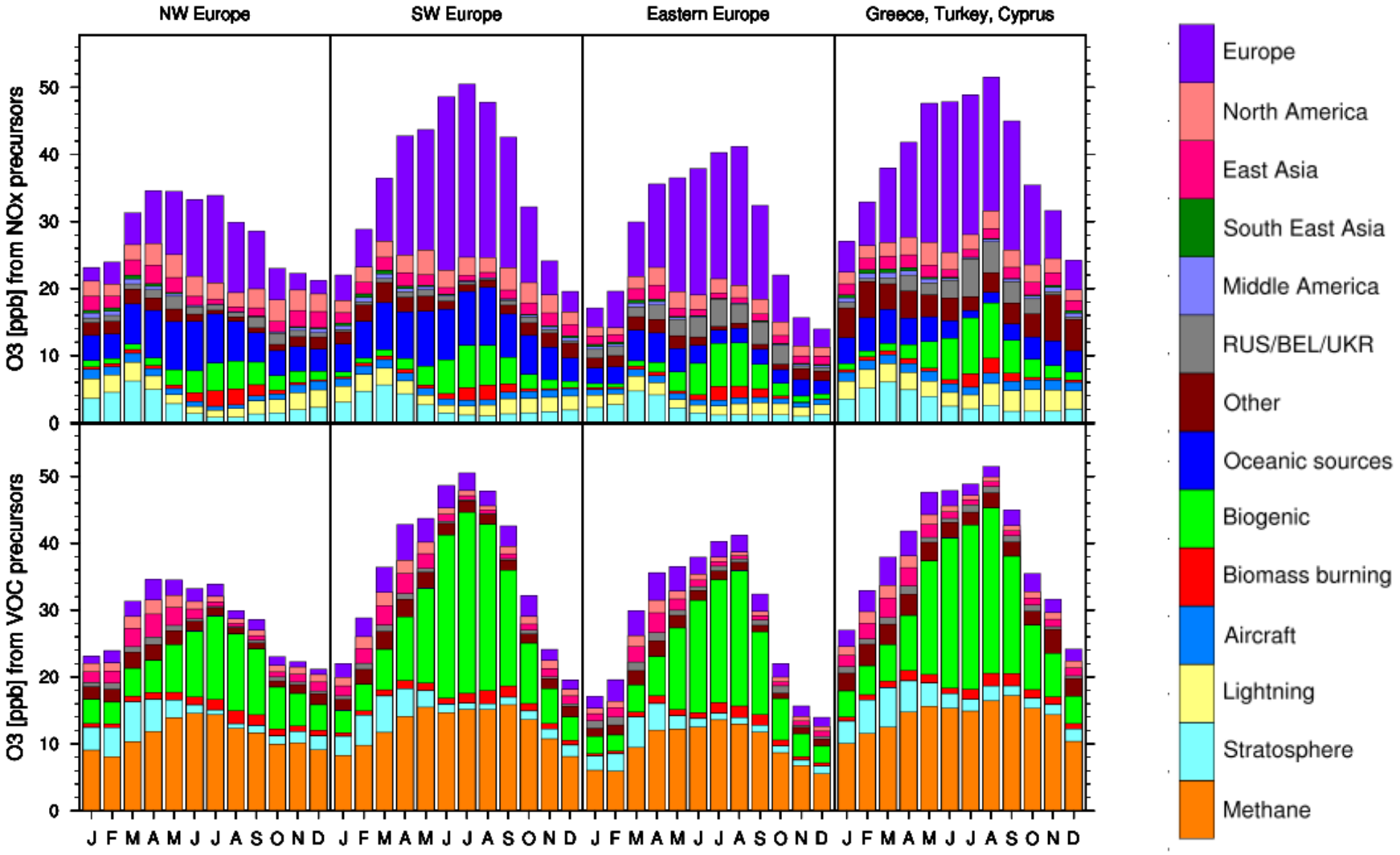
Regional patterns and annual variation

Number of days >120 µg/m³ as daily 8h mean

calcutalted by data assimilation, i.e. monitoring + modelling

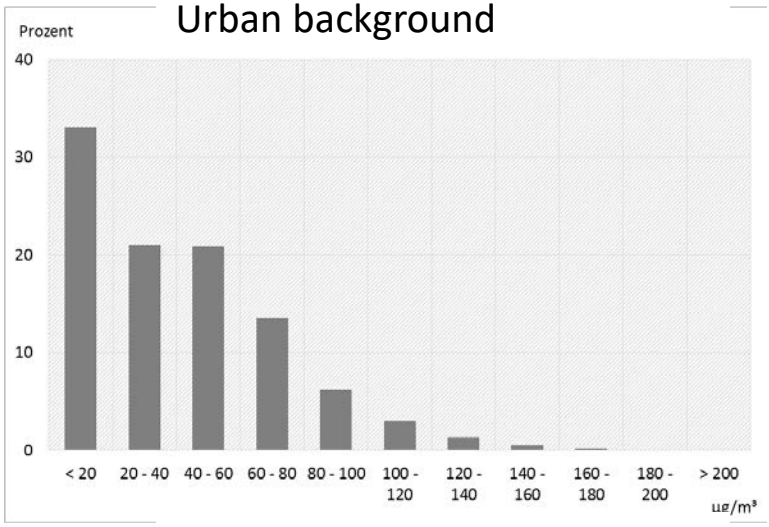


Ozone precusors:
source region and source type by „tagging“

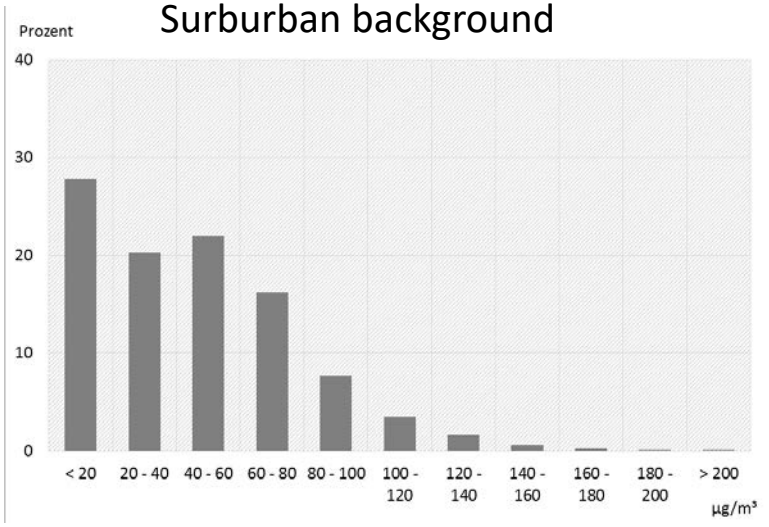


Frequency distribution of hourly mean ozone concentrations - average for the years 1991-2018

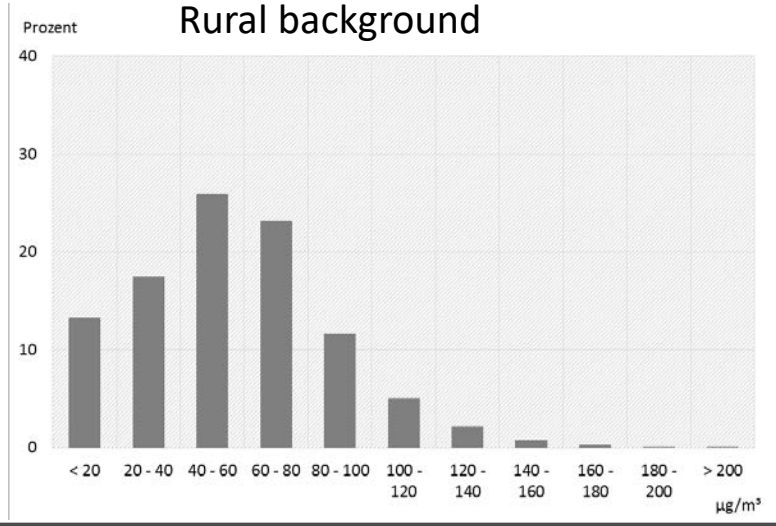
Urban background



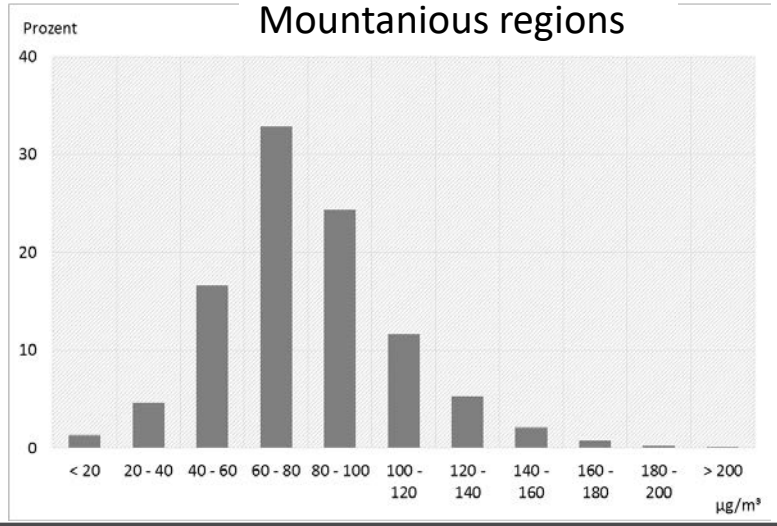
Surburban background



Rural background

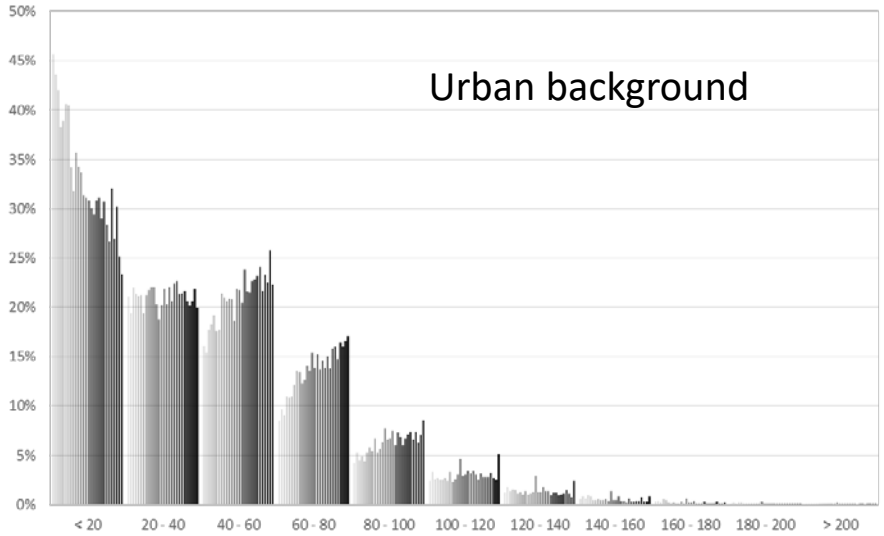


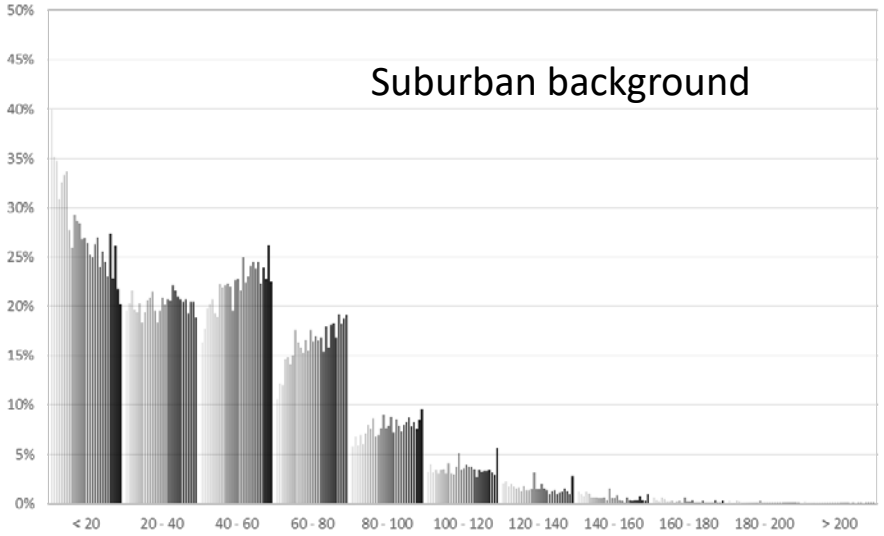
Mountanious regions

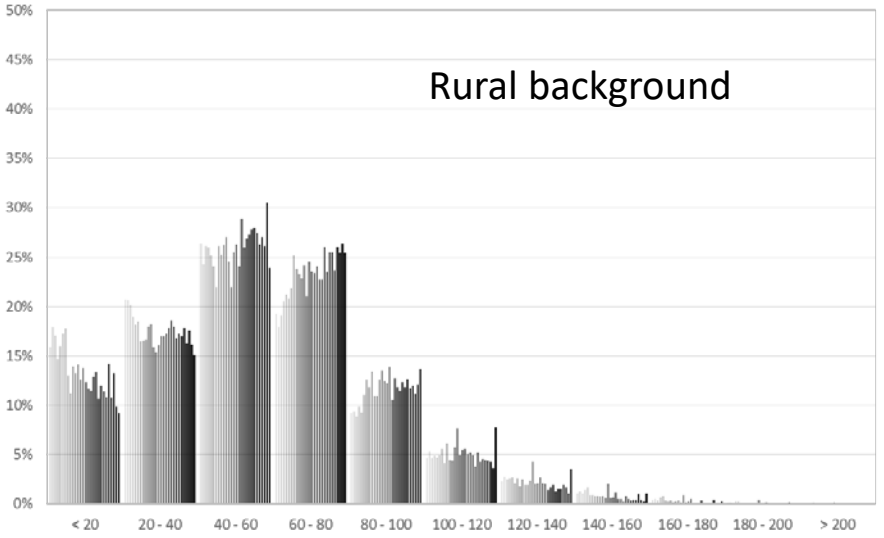


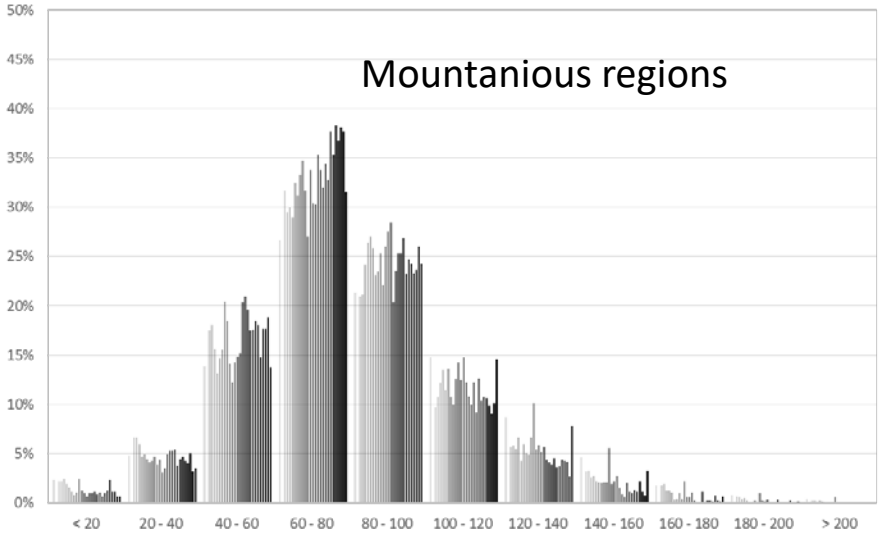
Frequency distribution of hourly mean ozone concentrations - trend analysis

1991 ... 2018

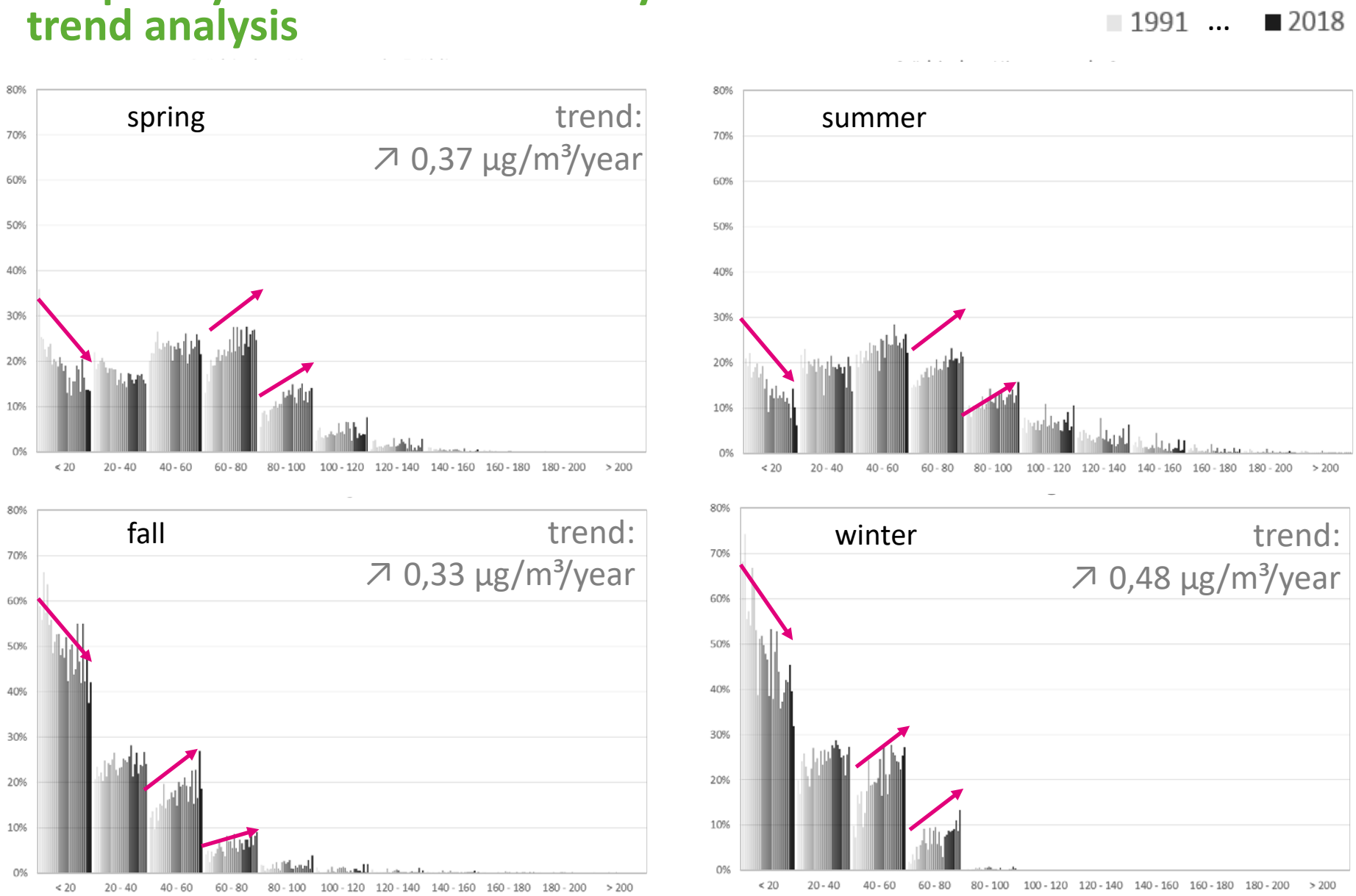




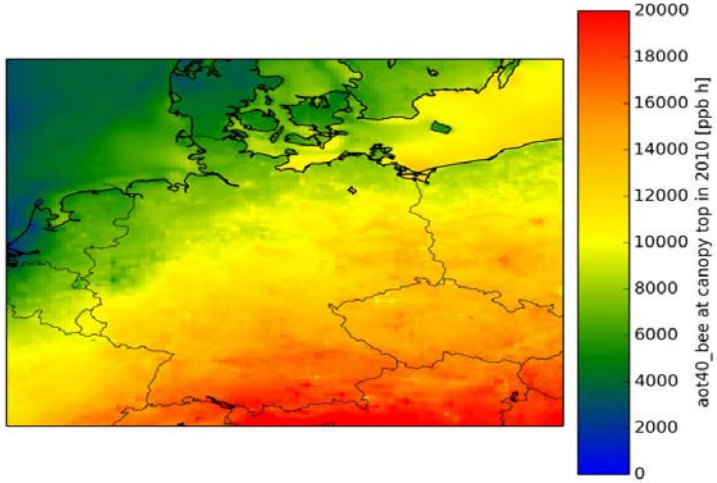


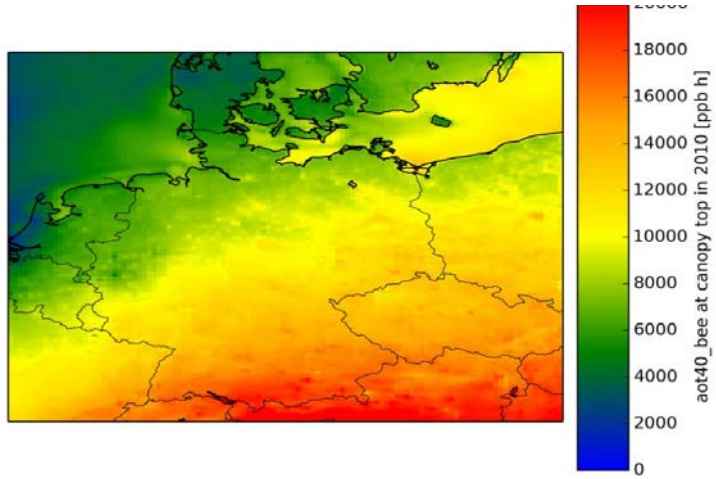


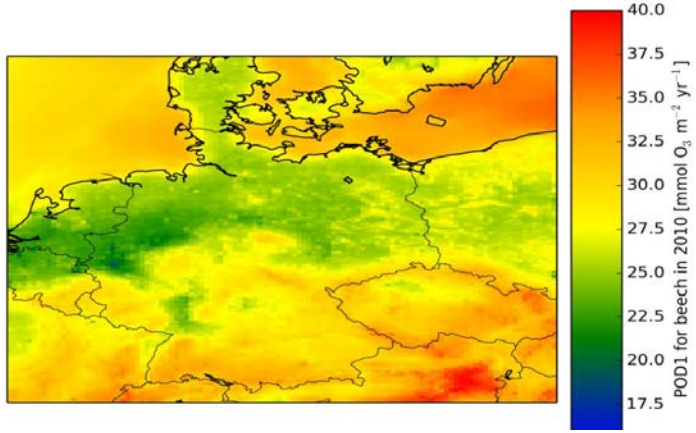
Frequency distribution of hourly mean ozone concentrations - trend analysis

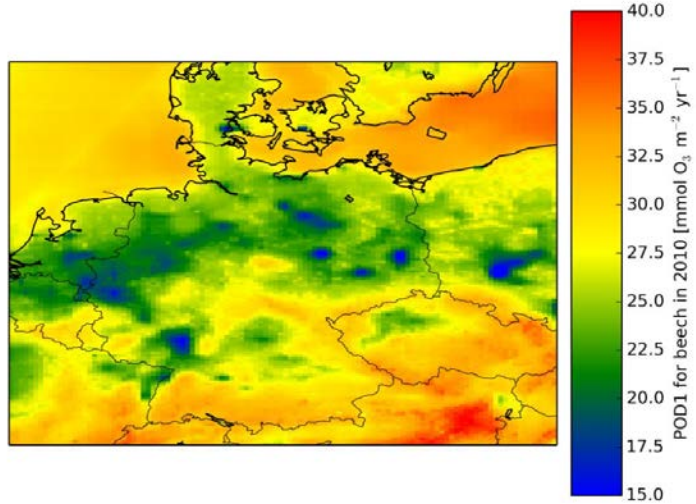


Vegetation: loss of growth rate (birch)









AOT40 ($\sum \quad conc > 40 \ \frac{\mu g}{m^3}$)

POD_1 **P**hytotoxic **O**zone **D**ose

without consideration of soil humidity (above)

resp. considering soil humidity (below)

Consequences from an adjusted ozone cross section value

- impact on human health confirmed by WHO based on current monitoring data
  -> strictly an adjustment of current guidance value would be necessary
- Impact on vegetation damage
  -> systematic shift of AOT-data,
  -> POD-patterns might change,
  i.e. reevalution of vegetation data recommended
- regional ozone patterns and analysis of sources
  -> conceptual uncertainties much higher than implication from cross section adjustment
- trend analysis using freqeuncy distribution
  -> systematic shift from adjustment,
  i.e. adjustment of historical data necessary

Thank you for your attention !

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http://www.umweltbundesamt.de/themen/luft