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Source/Receptor Relationship for Persistent Toxic Substances for three observational sites over Central Europe

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Concentrations of persistent toxic substances, like PAHs, PCBs and OCPs have been measured weekly in air at a background site in the Czech Republic, Kosetice for the last 10 years. At the Institute for Troposheric Research in Leipzig and in Schwartenberg by the Saxonian Environmental Administration some POPs were measured within the last years, as well.
To get more information about the possible source areas or point sources in Europe backward trajectories were determined for the years with an hourly or 10 minute interval for the three stations. The trajectory scheme uses the isentropic coordinate with some diabatic components and a special boundary layer modelling. The trajectories are determined by a mixed scheme utilizing kinematic and dynamic equations and the assumption of energy balance.

For a $1km^2$ grid over Europe the contacts of the backward trajectories with a cuboid of $1km^2$ to 50m height or mixing height near the ground are integrated in time. In a second step these trajectory contacts are weighted by the observed concentrations of the observed substances and again was integrated over time for the cuboids. Deviding the integrated concentrations by the integrated contacts the mean concentrations present the areas connected with high concentrations at the observational sites implying that within the grid cells emissions of POPs were possible or took place.

For each substance and station an inividual areal contact matrix was determined.

Adding the matrices belonging to the three stations the long term possible source areas are shown for the stations. For some substances the Czech Republic and East Germany is presented and for other substances the connected areas are shown in Central Poland. In result, there are different pattern for each substance presenting the climatological influence from special regions in Europe.

Examples for the statistics are presented.