## Air quality analysis and emission optimization on regional scales

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Emission data as the main input to air quality forecast models introduce large uncertainties. These data originate from emission inventories that provide estimates of spatially distributed emissions. The impact of fixed temporal distribution functions in contrast to variable societal behavior and meteorological implications are rarely considered. To evaluate the annual emission totals of European and German inventories, we perform a reanalysis of air quality applying chemistry four-dimensional variational data assimilation with the European Air pollution Dispersion –Inverse Model (EURAD-IM). Assimilating ground-based, airborne, as well as satellite observation data, we assess initial value optimizations and emission correction factors for anthropogenic emissions. The analysis is performed on different model grids. Analyzing the emission correction factors reveals that the total NOx emissions are underestimated in Germany, agreeing with missing emissions connected to the Dieselgate. NH3 emissions are found too high, leading to an overestimation of modelled NH3 concentrations using standard emission data.

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