

Air quality field studies at TROPOS ACD – An overview of the past 25 years

Dominik van Pinxteren, Laurent Poulain, Khandeh Wadinga Fomba, Gerald Spindler, Konrad Müller, Thomas Gnauk, Hartmut Herrmann

Air quality, and especially aerosol particle pollution, still lies among the Top 10 health risks in Germany. Studying its sources and impacts has always been a central scientific topic at TROPOS, since the institutes' foundation in the mid 1990s.

Correspondingly, the Atmospheric Chemistry Department (ACD) has been very active over the past 2.5 decades in addressing questions of air pollution on a local, regional and international scale.

These have comprised various topics, including particle composition and source apportionment, long-range transport vs. local influences, chemical processing during air mass transport, impacts of wood burning from residential heating, impacts of interventions such as low-emission zones or COVID lockdowns on urban air quality or trends and drivers of regional ozone and its precursors.

Methodologically, ACD has always put strong efforts into a comprehensive molecular characterization of aerosol particles and using the chemical information to understand processes and quantify source contributions.

With its research station Melpitz, the long-term evolution of air pollution has been studied and documented a strongly decreasing particulate pollution in the 1990s and current dominating sources in the regional background.

Dedicated campaigns have helped to inform policy on refining mitigation measures by contrasting quantitative source contributions at urban hotspots vs. background areas or by detailed assessments of emerging sources such as residential wood combustion.

This presentation will give an overview of selected field studies that have been performed, with a focus on regional air quality in the area of Leipzig, Germany. Highlight results from these studies will be summarized and an outlook to relevant future issues will be given.