Spatial and temporal variation of ultrafine particles in the Bavarian centres of the NAKO health study: Augsburg and Regensburg

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Epidemiological studies on ultrafine particles (UFP) are challenging due to their short lifetime in the atmosphere and their large spatial and temporal variability. To date, reliable data on chronic exposure to UFP is therefore scarce, which in turn means that air quality standards for UFP have not been developed yet.

The overall aim of the project “Ultrafine particles in Bavaria - UFP concentrations and health effects in the Bavarian centres of the NAKO health study” is to assess the long-term health effects of UFP at the Bavarian centres of the NAKO health study, Augsburg and Regensburg. In order to estimate the chronic exposure of the study participants, land use regression models will be developed for both cities. For Augsburg, the project makes use of existing UFP measurements obtained in two previous measurement campaigns in the Augsburg area in 2014/15 and 2017 and a LUR model developed for 2014/15 within the framework of the ULTRA3 project (Environmental Nanoparticles and Health: Exposure, Modelling and Epidemiology of Nanoparticles and their Composition within KORA).

This LUR model will be updated and transferred to Regensburg then. In order to validate the Regensburg LUR model we conducted UFP measurements at six sites in the Regensburg area between June 2021 and March 2022.

These unique and extensive data sets collected during the three measurement campaigns (two in Augsburg and one in Regensburg) allow us to assess the spatial and temporal variability of the UFP concentrations within Augsburg and Regensburg and compare them with each other. We analyze the contribution of local emitters regarding their diurnal, weekly and seasonal variability and the influence of meteorological conditions on the formation and dispersion of UFP in each city. Initial results show a pronounced spatial variability and a rather strong temporal correlation of UFP levels in each city.

Acknowledgement

This project makes use of data obtained in the ULTRA3 study (Environmental Nanoparticles and Health: Exposure, Modelling and Epidemiology of Nanoparticles and their Composition within KORA) and the project "Influence of local sources on the spatial and temporal distribution of ultrafine particles". ULTRA 3 was supported by intramural funding for Environmental Health projects of Helmholtz Zentrum München—German Research Center for Environmental Health. The project "Influence of local sources on the spatial and temporal distribution of ultrafine particles" was supported by the Bavarian Environment Agency on behalf of the Bavarian State Ministry for Environment and Consumer Protection.