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Variability of Airborne Ultrafine Particles in Number and Size at two Urban Monitoring Stations within Close Proximity to Munich Airport

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Airports and air traffic can be major sources of ultrafine particles (UFP), next to other anthropogenic and natural sources. UFP are in the size range of 100 nm or less and can be either liquid or solid. When airborne, UFP can have multiple effects on climate, weather and air quality i.e. when impacting cloud formation as condensation nuclei, altering chemical processes in the atmosphere, or being aspirated or taken up.

This project investigates to what extent a large airport and the respective near-ground air traffic contribute to the overall atmospheric UFP mixture. Furthermore, we aim to elucidate the conditions that favour the accumulation of these UFP due to atmospheric transport into adjacent urban areas.

Therefore, we designed and established two monitoring stations around Munich Airport on a North-South axis. Both stations are equipped for continuously measuring UFP by means of a mobility particle size spectrometer (MPSS, 8...800 nm) and a total condensation particle counter (CPC, 8...3000 nm). The setup is completed by meteorological measurements (wind speed and direction, precipitation, solar radiation, humidity, pressure and temperature) which are crucial parameters for exploring transport and mixing of detected UFP in the lowermost atmosphere in exchange with the Earth's surface and the multiple particle sources in the urban environment.

Officially launched in May 2021, we will present first results showing diurnal and weekly time series of UFP measurements and how they are connected to atmospheric conditions, wind speed and direction in particular as well as airport operation and other emission sectors in the surroundings.

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