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Dynamic interactions between city and atmospheric boundary layer – *urbisphere* Berlin campaign

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In order to better understand dynamic interactions between a city and the regional atmospheric boundary layer, the '*urbisphere* Berlin campaign' is being conducted during 2021-2022 in Germany within the ERC Synergy *urbisphere* grant. *urbisphere* aims to enhance understanding, forecasting, and projecting feedbacks between climate change and drivers of urban transformation. One foci is the development of the next generation of urban climate simulations with dynamic atmosphere-urban feedbacks.

A key aspect of *urbisphere* are comprehensive measurement campaigns in different cities. These involve undertaking high-quality research observations on urban effects for observation-based studies as well as for model development and evaluation. The Berlin campaign is investigating the dynamics of the atmospheric boundary layer within and beyond the city, and how the atmosphere dynamically responds to urban surface forcings, emissions, and human activity cycles from diurnal to an annual cycle. A dense network of ground-based remote sensing instruments (e.g. automatic lidars and ceilometers, doppler-wind lidars) for mixing-layer height detection within the city and along a rural-urban-rural transect, scintillometer paths for spatially averaged information on turbulent sensible heat flux, and radiation measurements for quantification of the influence of urban emissions, aerosols and clouds on downwelling radiative fluxes is deployed. Altogether, the additional observations supplement the existing Urban Climate Observatory (UCO) in Berlin to allow for a comprehensive and spatially detailed understanding of city-atmosphere interactions, and the effect of cities on downwind regions. This contribution provides an overview of the measurement campaign and gives first insights into collected data.