

EGU22-8889

<https://doi.org/10.5194/egusphere-egu22-8889>

EGU General Assembly 2022

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FESSTVaL: Field Experiment on sub-mesoscale spatio-temporal variability in Lindenberg – the campaign, first results and data availability

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The field campaign FESSTVaL (Field Experiment on sub-mesoscale spatio-temporal variability in Lindenberg) was carried out by 16 institutions from May to August 2021 in the surroundings of the Meteorological Observatory Lindenberg – Richard-Aßmann-Observatory of the German Meteorological Service (DWD). The project aims at an improved understanding of the initiation and interaction of cold pools and wind gusts in the summertime convective boundary layer. Such weather phenomena can cause great damage, but are, however, difficult to capture by conventional surface networks due to their small-scale nature. Unique to this campaign is the deployment of a high-density near-surface measurement network made of over 100 ground-level stations for measurements of temperature and pressure, complemented by 20 automatic weather stations as well as a dense network of soil moisture measurements. An X-band radar and several energy balance stations were also used. The surface network was augmented by a network of vertical profiling instruments including nine Doppler LiDAR systems for measurements of the wind profile and turbulence variables up to an altitude of several kilometers, four microwave radiometers, and measurement flights with unmanned and remotely-controlled aircraft. As a supplement to these measurements, the project investigates the gain of a citizen science measurement network.

This presentation will shed light on the 4D structure and evolution of cold pools associated with a strong convective event as viewed by the different sensors. The cold pool observations will be compared to forecasts and to large-eddy simulations conducted for that particular case. Overall, the results of the project will serve to improve the representation of such small-scale processes in

numerical weather prediction and to define new measurement strategies. The data products of the campaign are treated under the FAIR principle and are made available via a platform at the Integrated Climate Data Center of the University of Hamburg.