FESSTVaL: Field Experiment on sub-mesoscale spatio-temporal variability in Lindenberg – the campaign 2021 an its predecessors

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Measuring submesoscale variability is the core task of the field campaign FESSTVaL (Field Experiment on Sub-Mesoscale Spatio-Temporal Variability in Lindenberg). FESSTVaL focuses on three sources of submesoscale variability: cold pools, wind gusts and boundary layer pattern. It took place in the summer months of 2021 at the Meteorological Observatory Lindenberg – Richard-Aßmann-Observatory (MOL-RAO) of the German Weather Service (DWD) near Berlin and was initiated by the Hans-Ertel-Center for Weather Research (HErZ).

In order to capture phenomena at the submesoscale (500 m – 5 km), generally not captured by conventional measurement network, a hierarchical measurement strategy is adopted. This includes wind profiling stations with a coordinated scanning strategy of several Doppler Lidars, two mobile profilers to measure thermodynamic properties and precipitation, more than 100 stations with near-surface measurements of air temperature, pressure and soil moisture, more than 20 automatic weather stations, an X-Band radar, and a number of energy balance stations. This equipment is augmented by the extensive ground-based remote sensing array at the MOL-RAO, operated by DWD and by flights operated by Unmanned Aerial Systems. Complementing to this, the benefit of a citizen-science measurement network is investigated during the campaign with "Internet-of-things" based technology and low-cost sensors built and maintained by citizens. The measurements are supplemented by high-resolution large-eddy simulations (ICON-LES).

Originally planned for the summer 2020, FESSTVaL had to be postponed to 2021 and replaced by three local individual campaigns, conducted in Bayern, Lindenberg and Hamburg in 2020. Those three test campaigns demonstrated the ability of the envisionned measurement strategy and planned instruments to capture submesoscale variability and submesoscale weather phenomean. This talk will give a brief overview on the results of these three campaigns, as a foretaste to FESSTVaL, together with some of the very first measurements taken during FESSTVaL.