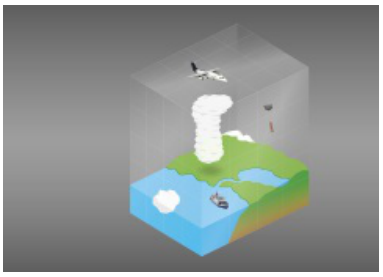

Contribution ID: **2** Type: **Oral presentation**

FESSTVaL: Field Experiment on sub-mesoscale spatio-temporal variability in Lindenberg

Tuesday, 11 June 2019 12:20 (20 minutes)

Numerical weather prediction (NWP) models applied on regional scales use a typical grid spacing of O(1 km). While such a grid spacing allows to start explicitly resolving convection - at least deep convection - several features of the flow remain of subgrid-scale nature, e.g. turbulence, shallow convection, or may be distorted by the coarse grid spacing. Large-eddy simulations (LES) with grid spacing of at least O(100 m) can be used to get more information on smaller-scale, generally under-resolved, phenomena. But such simulations also rely on parameterizations, most notably turbulence and microphysics. Getting information on the atmospheric flow on scales O(500 m) from observations remains challenging as the measurement network lacks the spatial resolution. For instance automatic measurement stations of the German Weather Service (DWD) have a typical horizontal distance of O(25 km). This makes the validation of NWP models and LES difficult.

We present the plan for the field campaign FESSTVaL, which deploys a high-density measurement network that will allow us to observe features of the atmospheric flow occurring on scales between 500 m and 5 km. The measurements will be used to (i) improve our process understanding, (ii) validate aspects of convection permitting NWP simulations and (iii) compare different measurement strategies and instrument types, including a citizen science approach and newly available satellite observations, in view of designing appropriate measurement networks of the future. Finally, in addition to the measurements, various simulations will be performed in support of the field campaign and for validation purposes.

With respect to the source of submesoscale variability, the measurement campaign focuses on three different topics: boundary layer patterns, cold pools, and wind gusts. The four topics are inter-connected via cold pools, which both generate boundary layer patterns and wind gusts. Furthermore, usability of citizen-science-based measurements will be investigated. Finally, FESSTVaL will provide a first opportunity to evaluate quality and representativeness of ESA Aeolus products.

The measurement campaign will take place in Lindenberg (east Germany) for an extended summer season in 2020 in the context of HErZ (Hans Ertel Centre for Weather Research). Lindenberg is chosen given the already existing instruments, the support by DWD available on site as well as the relatively flat topography. Moreover Lindenberg experiences more frequent convective activity than many other flat regions in Germany. One particular feature of the planned field experiment is the use of about 100 ground base stations, spread over a domain with a radius of 20km around the Lindenberg observtory.

Primary author: KLOCKE, Daniel (Hans Ertel Centre for Weather Research, DWD)

Co-authors: BEYRICH, Frank; KIRSCH, Bastian; AMENT, Felix; LÖHNERT, Ulrich; BASTAK-DURAN, Ivan; RUST, Henning; WEISSMANN, Martin; GOEBER, Martin; SCHMIDLI, Juerg; WAHL, Sabrina; ANNIKA, Schomburg; SCHLEMMER, Linda; HOHENEGGER, Cathy

Presenter: KLOCKE, Daniel (Hans Ertel Centre for Weather Research, DWD)

Session Classification: Clouds - Chair: Irina Sandu

Track Classification: Workshop: Observational campaigns for better weather forecasts