EGU2020-2918
https://doi.org/10.5194/egusphere-egu2020-2918
EGU General Assembly 2020

Spider webbing the land-atmosphere interface

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Worldwide 55-80% of the rainfall evaporates from the surface, making it a major water drain for the earth's water resources and a major supply of moisture to the atmosphere. Evaporation is relevant for crop growth and has a high impact on the severity of drought and floods. Nonetheless, this key process is still a highly uncertain, insufficiently quantified process. Also effecting weather forecasts as the available water is used as their boundary condition in atmospheric models. The persistent problem herein is our restricted understanding of the key processes of the land-atmosphere interface, as well as their interplay with hydrological and atmospheric processes. The major bottleneck is the difficulty to properly measure the land-atmosphere interface at the right spatial and temporal scale.

In this talk I will propose an experimental approach that enables data collection for the full surface energy balance at the land-atmosphere interface. This will be achieved by developing and exploiting a 'spider web' - like measurement approach with temperature measuring fibre optic cables (Distributed Temperature Sensing). This will enable simultaneously and continuously measurements of high-resolution temperature, humidity, wind, and soil moisture gradients. Which allows derivaiton of the sensible, latent, and ground heat flux and storage. The spider web offers a better representation of the land-atmosphere interface for the purpose to provide a knowledge base for improving flood and drought predictions and weather forecasts.