

Influence of changes in surface properties on the atmospheric parameters - measurements by a helicopter borne probe

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When performing meteorological measurements over heterogeneous terrain it is important to understand the processes in the atmospheric boundary layer over a heterogeneous land surface. Of special interest is the influence of large surface edges on the turbulent fluxes as this might contribute to the non-closure of the energy balance over heterogeneous terrain.

This study focuses on the following research questions:

- Are the meteorological parameters in the atmospheric boundary layer affected by changes in the surface properties such as surface roughness, surface temperature or surface humidity?
- At which height does the influence of the surface heterogeneities vanish? %%(so that the atmospheric boundary layer is well mixed?)
- Which meteorological quantities are affected by a change in the surface properties at large surface edges?

In order to answer these questions airborne measurements from the LITFASS-2003 field campaign taken by a helicopter borne turbulence probe were analysed. The turbulence probe measured the turbulent wind vector, air temperature and humidity with high precision. The heterogeneous experimental site was located in Lindenberg, south-east of Berlin, and consisted of grassland, forest, agriculture and lakes which is representative for Central Europe. Flights were performed at several heights from about 100 m agl up to 1000 m agl over different types of surface changes. The talk concentrates on flights over a lake and an area with different soil water availability which was the result of a local rain event only in the southern part of the experimental site. The analysis of the data shows that these changes in surface properties do not affect the meteorological parameters itself, but higher statistical moments of the parameters.