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Long-term operational flux measurements in the Lindenberg area

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Fluxes of energy, momentum and mass are essential transport processes in the climate system representing the interaction between the atmosphere and the underlying surface.
To predict near-surface atmospheric conditions, these fluxes must be adequately represented in numerical weather and climate prediction models. Measurements of fluxes over long time periods are needed
- to characterize their role at climate time scales,
- to provide model validation data over a wide variety of atmospheric and soil-vegetation conditions, and
- to improve our understanding of the relevant processes and their parameterisation in atmospheric models.
Over land, surface heterogeneity poses a special challenge to match observations and model output.

The area around the Meteorological Observatory Lindenberg – Richard-Aßmann-Observatory is characterised by a mixture of different land use classes with agricultural farmland and forest being dominant. A long-term operational measurement program has been initiated within the LITFASS (Lindenberg Inhomogeneous Terrain – Fluxes between the Atmosphere and the Surface: a long-term Study) project about a decade ago. Measurements of atmospheric state variables, radiative and turbulent fluxes, and of soil parameters have been running at a grassland and at a forest site continuously since January 2001 and 2003, respectively. A ten-year data set will be completed from these measurements after the end of the running year. Parallel long-term measurements with a large-aperture scintillometer provide area-representative estimates of the sensible heat flux. A supplementary 10-year data set of boundary-layer height estimates is derived from the four daily operational radiosoundings performed at Lindenberg observatory.

The presentation will give an overview on the measurements and data available. We will then discuss seasonal and interannual differences of the energy fluxes. Special emphasis will be put on the variability in the surface energy budget (non-)closure. A further topic is the inter-comparison of the grassland and forest site data.