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Exchange processes in mountainous regions during the EGER 2007 micrometeorological experiment

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Different physical, chemical and biological processes in the soil-vegetation-boundary-layer system were investigated in the frame of EGER (ExchanGE processes in mountainous Regions) project. Main aim of the project is to quantify soil, in-canopy and atmospheric phenomena, their interactive coupling and corresponding role for budgets by observing diurnal and annual cycles of energy, water, and trace gases. Field experiments were performed in North-Eastern Bavaria at the Waldstein site in the Fichtelgebirge mountains, which are challenging for their heterogeneity and orographically structured terrain. The EGER project combines micrometeorological, biogeochemical and chemical investigations, and this work presents the contribution of the micrometeorological subproject.

Turbulence structure, advection, flux gradients of meteorological and chemical quantities were observed within the first intensive observation period in September and October 2007. Observations of turbulence structure were obtained by a vertical profile of sonic anemometers covering all parts of the forest up to the lower part of the roughness sub layer. All heights were additionally equipped with fast CO2 and H2O analysers for assessing the carbon dioxide and water vapour budgets. The vertical profile is continued up to a height of several hundreds of meters above ground by using acoustic and radar remote sensing (SODAR-RASS). To monitor advective flow in the sub-canopy space five small masts were set up in the trunk space of the forest and

equipped with sonic anemometers, humidity and temperature sensors as well as CO2 analyzers. The relevant data for in- and above canopy profiles of wind, temperature and humidity as well as for radiation and soil temperature were provided by the long term observing programme at the Waldstein site. Field observations are complemented by simulations of ACASA model (Advanced Canopy-Atmosphere-Soil Algorithm).

The obtained results are essential for the advanced, scale interaction dependent description of landscape. Our contribution will present an overview of the experiment setup as well as first experimental and model results.