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Energy versus Water balance in a small agricultural catchment

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Evapotranspiration (ET) is an important process between vegetation, soil and the atmosphere and also the link between the surface energy balance and water balance. In the64 ha. HOAL experimental catchment at Petzenkirchen all the parameters of both the water and energy balance are measured. Discharge is measured along the small stream at all the incoming tributaries(springs, drainages and small tributaries) and at the catchment outlet. Throughout the catchment four precipitation scales are installed. Groundwater levels are measured in a transect perpendicular to the stream, which will give an indication of the storage change in the catchment. In the middle of the catchment a fully equipped Eddy-Flux station with radiation balance and soil heat flux measurement devices and a surface layer scintillometer are present in the catchment.
This unique measurement setup enables us to compare the measured ET from the Eddy-Flux station with the residual of the water balance for the summer of 2012. Because the catchment and therefore the footprint of the Eddy-Flux measurements is very heterogeneous, the influence of the wind direction on the energy balance closure will also be investigated. By comparing the measured ET with the calculated ET from the water balance an estimate can be made of how representative the footprint is for the entire catchment.
The surface layer scintillometer and the Eddy-Flux station both measure sensible heat flux and the latent heat flux can also be calculated from the scintillometer data. Therefore both sets of turbulent fluxes can be compared to give insight into the differences between both measurement devices. In addition more insight on the influence of the different shapes of both footprints(drop like from the Eddy-Flux station and oval for the scintillometer)in different wind directions can be gained.
This study focuses on integrating measured data from different measurement stations in our catchment and is the first step in a broader research on spatial analysis of evaporation on the catchment scale.