Geophysical Research Abstracts
Vol. 16, EGU2014-15719-1, 2014
EGU General Assembly 2014

Disassembling "evapotranspiration" in-situ with a complex measurement tool

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In this work we present a complex tool for measuring water fluxes in wetland ecosystems. The tool was designed to quantify processes related to interception storage on plants leafs. The measurements are conducted by combining readings from various instruments, including: eddy covariance tower (EC), field spectrometer, SapFlow system, rain gauges above and under canopy, soil moisture probes and other.
The idea of this set-up is to provide continuous measurement of overall water flux from the ecosystem (EC tower), intercepted water volume and timing (field spectrometers), through-fall (rain gauges above and under canopy), transpiration (SapFlow), evaporation and soil moisture (soil moisture probes). Disassembling the water flux to the above components allows giving more insight to the interception related processes and differentiates them from the total evapotranspiration.
The measurements are conducted in the Upper Biebrza Basin (NE Poland). The study area is part of the valley and is covered by peat soils (mainly peat moss with the exception of areas near the river) and receives no inundations waters of the Biebrza. The plant community of Agrostietum-Carici caninae has a dominant share here creating an up to 0.6 km wide belt along the river. The area is covered also by Caricion lasiocarpae as well as meadows and pastures Molinio-Arrhenatheretea, Phragmitetum communis. Sedges form a hummock pattern characteristic for the sedge communities in natural river valleys with wetland vegetation.
The main result of the measurement set-up will be the analyzed characteristics and dynamics of interception storage for sedge ecosystems and a developed methodology for interception monitoring by use spectral reflectance technique. This will give a new insight to processes of evapotranspiration in wetlands and its components transpiration, evaporation from interception and evaporation from soil. Moreover, other important results of this project will be the estimation of energy and water budgets, spatial and temporal distribution of evaporation (from interception and soil) and transpiration of the sedge ecosystem. The results of this research will therefore contribute to a better understanding of the hydrological balance of wetland ecosystems.
This contribution will highlight the first results of the set-up and the advantages and drawbacks of the proposed approach.