Geophysical Research Abstracts
Vol. 15, EGU2013-8437-2, 2013
EGU General Assembly 2013

Partitioning evapotranspiration fluxes using atmometer

Matej Orsag (1,2), Milan Fischer (1,2), Miroslav Trnka (1,2), Jiri Kucera (3), Zdenek Zalud (1,2)

(1) Institute of Agrosystems and Bioclimatology, Mendel University in Brno, Brno, Czech Republic, (2) CzechGlobe, Centre for Global Climate Change Impact Studies, AS CR, Brno, Czech Republic, (3) EMS Brno, Brno, Czech Republic

This effort is aimed to derive a simple tool for separating soil evaporation and transpiration from evapotranspiration, measured by Bowen ration energy balance method (BREB) in short rotation coppice (SRC). The main idea is to utilize daily data of actual evapotranspiration (ETa) measured above bare soil (spring 2010 – first year following harvest), reference evapotranspiration (ETo) measured by atmometer ETgage and precipitation data, in order to create an algorithm for estimation evaporation from bare soil. This approach is based on the following assumption: evaporation of wetted bare soil same as the ETo from atmometer is assumed to be identical in days with rain. In first and further days with no rain (and e.g. high evaporative demand) the easily evaporable soil water depletes and ETa so as crop coefficient of bare soil (Kcb) decreases in a way similar to decreasing power function. The algorithm represents a parameterized function of daily cumulated ETo (ETc) measured by atmometer in days elapsed from last rain event (Kcb = a*ETć b). After each rain event the accumulation of ETo starts again till next rain event (e. g. only days with no rain are cumulated). The function provides decreasing Kcb for each day without rain. The bare soil evaporation can be estimated when the atmometer-recorded value is multiplied by Kcb for particular day without rain. In days with rain Kcb is assumed to be back at 1. This method was successfully tested for estimating evaporation from bare soil under closed canopy of poplar-based SRC. When subtracting the estimated soil evaporation from total ETa flux, measured above the canopy using BREB method, it is possible to obtain transpiration flux of the canopy. There is also possibility to test this approach on the contrary - subtracting transpiration derived from sap-flow measurement from total ETa flux is possible to get soil evaporation as well.

Acknowledgements: The present experiment is made within the frame of project InterDrought (no. CZ.1.07/2.3.00/20.0248) and by project KONTAKT II LH12037 „Development of models for the assessment of abiotic stresses in selected energy woody plants".