Geophysical Research Abstracts
Vol. 16, EGU2014-6683-1, 2014
EGU General Assembly 2014

How can we get a better estimation for vegetation water uptake in groundwater discharge areas using high frequency soil moisture data

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Evapotranspiration induces diurnal signal of soil moisture, and also of water table in shallow water table environments. Shallow water table diurnal signal was widespreadly used for estimation of groundwater uptake by plants. The limitation of all groundwater signal based methods lies in the difficulty of specific yield estimation. In this paper a new technique is demonstrated by which more exact evapotranspiration values can be calculated from aggregated soil moisture profile dataset taking into account diurnally changing replenishment rate. The technique is of great benefit to provide sufficient accuracy without soil specific calibration. New technique was successfully tested on the soil moisture profile dataset of a riparian alder forest in Hidegvíz Valley experimental catchment in the summer of 2013. Comparing traditional evapotranspiration estimation from soil moisture data the new technique gives much higher water uptake taking into account soil moisture continuous replenishment from shallow groundwater. The water uptake seems to be acceptable if oasis effect is taken into account in a well watered valley situation in a period when hot and dry environment can add significant amount of heat enhancing transpiration. Soil moisture replenishment rates from groundwater can provide high portion (60-80This publication has been supported by funds from: OTKA (NN 79835) and TÁMOP-4.2.2.A-11/1/KONV-2012-0013 project. The research of Zoltán Gribovszki was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of TÁMOP 4.2.4. A/2-11-1-2012-0001 'National Excellence Program'.

Keywords: groundwater evapotranspiration, diurnal fluctuation, forest vegetation