



## **Evapotranspiration determination from observing diurnal cycles of groundwater level and streamflow in a headwater basin**

**Z. Gribovszki** (1), G. Gyimóthy (1), P. Kalicz (1), M. Kucsara (1), P. Vig (2)

(1) West-Hungarian University, Department of Forest Opening Up and Hydrology, H-9400, Sopron, Ady E. u.5. Hungary. (efelt@emk.nyme.hu), (2) West-Hungarian University, Institute of Botany and of Forest Site, H-9400, Sopron, Ady E. u.5. Hungary.

An important and interesting challenge in hydrological study today is establishing the relationship between hydrological and biological processes in ecosystems. Short periodical fluctuation of hydrological features like streamflow diurnal patterns in forested lands can be closely linked to water use by riparian vegetation. There are two characteristic types of stream baseflow diurnal cycles: a winter and a summer type. The summer type of this periodicity is mainly caused by transpiration of riparian vegetation. We would like to compare diurnal patterns of vegetation transpiration with stream baseflow and groundwater level patterns in a small headwater catchment.

The study site (Hidegvíz-völgy) is located in Sopron-hills at the eastern border of the Alps. Some representative rainless periods in the years of 2003-2004 have been chosen from hydro-meteorological data sets for analysis. We determine evapotranspiration of riparian vegetation (alder [*Alnus Glutinosa*] dominated) from Penman-Monteith equation and from diurnal cycles of groundwater levels, which are measured in near stream bore holes. After this we calculate the amount of streamflow that is missing during each diurnal cycle. The missing streamflow is the integration of whole catchment riparian vegetation evapotranspiration. We made a comparison between the two estimated evapotranspiration time series and missing streamflow time series. These comparisons were used to estimate the area of riparian vegetation that influences daily streamflow patterns. We determined the phase shift and the strength of correlation between calculated transpirations (the two mentioned above) and missing streamflow patterns during the summer season.