



Groundwater evapotranspiration estimation with the help of the linear storage model

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Discharge measuring is a common method in the hydrological research. While the continuous discharge time series is determined by the rainfall, the riparian vegetation have great effect on the falling limb of the hydrograph. The information enclosed in the falling limb can be subtracted with help of the linear storage model. The initial time point of the recession has not an influence on the parameters of the model and can be fit as an exponential curve with the method of linear regression.

The apparent residence time, which is calculated by the linear storage model, changes parallel with the transpiration intensity during the growing season. The evapotranspiration of the riparian zone can be estimated with the help of this strong relationship. In the first step of calculation it is necessary to determine a transpiration-free, mean residence time. This number is calculated from hydrographs during late-winter or early-spring floods, before the plants break the dormancy in temperated climate. The evapotranspiration can be expressed from the combination of the linear storage model and the water balance of the recession period.

The method was tested in the fully forest covered Hidegvíz Valley experimental catchment. The 6 km² catchment located in the Sopron Hills (Hungary) at the Austrian border region. The processed time series are measured in two neighboring sub-catchments (Farkas Valley and the Vadkan Valley). The method gives reasonable groundwater evapotranspiration values compared to other estimations.