Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08433, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08433
EGU General Assembly 2008

Evapotranspiration and percolation of a lysimeter

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Weighable lysimeters are an appropriate tool for observing and understanding several processes of the hydrological cycle, e.g. evapotranspiration and percolation. The water balance equation (evapotranspiration = precipitation - percolation ś change of weight) expresses the relation between these parameters. The lysimeter station Groß-Enzersdorf is located a few kilometres eastern from Vienna within an agricultural area named “Marchfeld”. Beside the neighbouring meteorological station it contains several types of lysimeters, including two weighable, backfilled gravitation lysimeters. One of them is operated according to a local crop rotation, the other one is planted with grass for determination of potential reference-evapotranspiration. Calculation of the potential reference-evapotranspiration requires sufficient water and nutrient supply in the root zone of the plant (grass). In dry regions like the Marchfeld, which is characterised by an annual precipitation less than 540 mm and a mean temperature of 9.9°C, a sufficient water supply can not be presumed in general. Therefore, the grass reference lysimeter in Groß-Enzersdorf has to be irrigated. Of course, irrigation intervals and the quantity of applied water have a deciding impact on evapotranspiration and percolation. Thus, a modified application (EPIC model) was used in order to get a better understanding about the interrelations between weather, crop development, irrigation, evapotranspiration, soil, percolation water etc. The characteristics of the lysimeter (size, depth, soil) and measured data from the years 2005 and 2006, including weather data, biomass production, percolation water and change of weight, served as basis for the model. The results of the simulations were compared to measured data. Running additional simulations with altered irrigation and weather parameters may show changes in percolation water. Further steps will be the use of the model for the lysimeter with crop rotation focussing not only on percolation but also on nitrate

concentration in the percolation water.