



Effect of the preferential flow on the soil water balance

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Comparative simulations were carried out to evaluate the impact of preferential flow on the soil water balance for a series of five different soil profiles. The course of soil water content changes and the flux rates through the bottom of 1.2m deep soil profile composed in all cases of two layers covered by grass and exposed to the rainfall and evapotranspiration during the vegetation season were calculated a) using the standard Richards' equation simulation model S_1D b) applying the dual permeability concept simulation model S_1D \check{n} _DUAL (Vogel et al., 2004). For selected soil materials the effect of the ratio of the preferential and the matrix domain, parameters of the transfer term and parameters of the preferential domain retention curve, respectively, were tested. The changes of the volume of water in the soil profile and the volume of the water reaching the bottom in particular soil profiles was quite small. The importance of the preferential flow thus could be seemingly negligible, however in all cases the breakthrough of the wetting front due to the preferential flow was very fast. This is important in respect to the transport of pollutants from the soil surface towards the groundwater level. The study was carried in the frame of the research project VZ 04 CEZ MSM 6840770005.