

Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11837, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11837
EGU General Assembly 2008
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Evaluation of the soil water regime of the Hungarian Bodrogek Region at profile and sub-regional scales

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The latest climate change scenarios, forecasting valuable increase in the occurrence of extreme weather events for the Tisza River watershed as well as changes in land use policy increased the demand on knowledge towards sustainable flood plain and water reservoir management. In the frame of the VTT project, our main objective is to work out the conditions of a sustainable, adapted to local natural conditions land management system in the Bodrogek Region that could be extended to other water reservoirs along the Tisza River. Soil and groundwater protection, nature and landscape rehabilitation is based on water availability and on optimal land use matched with the ecologically sound new conditions. Thus, the aim of the Bodrogek model is to achieve flood prevention through the rehabilitation of former river beds and through increase in water retention of the whole system. This requires knowledge on soil water regime of different flood plain areas. Our aim was to develop an appropriate methodology that could be used for describing the soil water regime of the Bodrogek Area at sub-regional scale and to derive the corresponding soil and hydrological database. A fine-scale spatial soil database, including soil hydrophysical data was constructed for the Hungarian territory of the Bodrogek Region. Four different floodplain levels (deep, shallow and high floodplains and flood free areas) were identified in accordance with the elevation. Reference soil profiles were chosen for each of the floodplain levels, based on fine-scale soil database and available soil maps. Monitoring stations were installed at each of the reference soil profiles for measuring the soil water content and soil temperature up to 160 cm depth in 10 cm resolution. The SWAP soil water bal-

ance simulation model was adapted to each of the reference profiles. The simulated data on soil water content dynamics was calibrated against the measured reference ones. Spatial extension of the modelling results was performed, based on the fine-scale soil database and the Kreybig maps. This paper describes the fine-scale spatial soil database, constructed in the GIS Laboratory of RISSAC for characterising the soil cover of the Hungarian territory of the Bodrogköz Region; the monitoring system, established in the study area, the modelling concept and the spatial extension of the simulation results. It was concluded, that based on the adaptation and spatial extension of a water balance simulation model and on the spatial soil physical database, the water regime of the dominant natural, semi-natural and agrarian ecosystems can be estimated. This would support studies on the evaluation of the effect of different extreme weather event, climate change and land use scenarios on the water regime of the area.

Acknowledgement:

Authors acknowledge the support of the Hungarian Science and Technology Foundation (CZ-10/2006), the material assistance of HNSF grants (OTKA T042996 and T048302) and the NKFP6-00079/2005 research project. The financial support of HUSKUA/05/01/139 and HU-SK-UA-/05/01/041 EU INTERREG grants is highly acknowledged. The authors are grateful to the collective of the Bokartisz Kht. for their help in choosing the study locations and in field measurements.