

Modeling of soil water content in Nitra river watershed (Slovakia) using two different models

Jan Horak¹, Dusan Igaz¹, Viliam Berek², Peter Halaj² and Jan Cimo¹

¹Department of Biometeorology and Hydrology, Slovak University of Agriculture in Nitra, Slovak Republic
²Department of Landscape Engineering, Slovak University of Agriculture in Nitra, Slovak Republic

Two simulation models Global and DNDC model were used for simulation of soil water content and compared with measured values. Global model is a simulation model of soil water movement in a soil with crop cover (developed at Institute of Hydrology, Slovak Academy of Sciences, Slovakia) which uses nonlinear partial differential equations of soil water movement based on the Richard's equation. On the other hand DNDC model (developed at Institute for the Study of Earth, Oceans and Space, University of New Hampshire, USA) uses a simple cascade approach. There was used VIRRIB device working on TDT (Time Domain Transmissometry) for measuring soil water content from Nitra river watershed (Kolíňany site, 48° 22' 0" latitude, 18° 12' 0" longitude, 200 m a.s.l.) during years 2002-2004. The soil type is classified as sandy-loam Haplic Luvisols with humus content in range of 2,0 – 2,99%. Results of the simulations showed that Global model performed better results compared to the results of the DNDC model. Results of this study suggest that before using DNDC model at large spatial scales, the parameter optimization should be done at site specific conditions first.

Biography

Jan Horak, has completed his Ph.D at the age of 29 years at the Slovak University of Agriculture in Nitra, Slovakia. He is an Assistant Professor at the Department of Biometeorology and Hydrology, Slovak University of Agriculture (SUA) in Nitra. He has published more the 15 papers in scientific journals and is co-author of monograph chapter published by reputable publisher (Springer). Professional stays: 06/2011–12/2011 PostDoc at the University of Bern, Switzerland as a member of the research team studying the effect of adding biochar to an intensively managed grassland system.

jan.horak@uniag.sk