



Evaluation of the role of the soil moisture on the lateral subsurface stormflow dynamics at the small catchment in the Jizera Mountains

M. Cislérova (1), T. Hess (2), **M. Hrnčíř** (1), M. Sanda (1)

(1) CTU in Prague, Faculty of Civil Engineering, Czech Republic (hrncirm@gmail.com / Phone: (+420) 224353725), (2) Cranfield University at Silsoe, United Kingdom (t.hess@cranfield.ac.uk / Phone: +44(0) 1525863292)

Focusing on the selected significant rainfall-outflow episodes, the aim of this hydrological research was the quantification of the rainfall-outflow relationship and the evaluation of the role of the soil moisture on the lateral subsurface stormflow dynamics at the small experimental catchment in the Jizera Mountains. The shallow highly heterogeneous soil profile at the catchment is formed by Cambisols developed on the granite bedrock.

In accordance with the conventional soil science approach, the rainfall-outflow relationship was studied at three different scales. The statistical multiple regression methods were employed for the study at the catchment and at the subcatchment scales, the graphical methods were used for the analysis at detailed temporal scale. The subcatchment is as an area drained by the collecting trench. For the study, a representative data set consisting of 27 rainfall-outflow episodes was selected. The criteria for the selection were based on the baseflow.

The results show that the initial soil moisture content is the statistically significant parameter that influences the runoff forming process at the catchment scale. Because of the large effects of the measurements errors and the large impacts of the heterogeneity of the soil profile, the statistical significance of the parameter at the subcatchment scale was not unambiguously proved or disproved. For the same reasons the selected tools were considered inappropriate for the study of the runoff formation at detailed temporal scale and consequently for the testing of the hypothesis of the dual character of flow. For the further research the deterministic simulations may be recommended.