

## Abstract

This paper deals with evaluating the impact of small reservoirs on flood events. The system of small reservoirs represents an effective part of integrated flood protection in the Czech Republic. Its realisation does not require a drastic impact on the environment. The small reservoirs could influence significantly the decrease of flood flows in the mountain catchments. Four small potential uncontrolled reservoirs were implemented to the headwater part of the Rolava river basin (126 km<sup>2</sup>) in the Ore Mountains. The relief of the Rolava river basin is heterogeneous with the upper headwater part characterised as flat plain and the middle part of the river flowing through a steep valley. The only option of the river to be flooded out during the extreme floods could appear in the lower part of the river basin. The Rainfall-runoff modeling was carried out in the model HEC-HMS (Hydrologic Engineering Center – Hydrologic Modeling System). The advantages of the model are its freeware availability, good arrangement and connection with GIS. The basin model of Rolava was calibrated using the known flood event in September 2007. The verification of the basin model ran on flood event in August 2006. The value of the efficiency criterion between the simulated and measured hydrograph was 0,86 and 0,89, which means successful agreement. Four designed scenarios (10, 20, 50 and 100-year return period of 1-day precipitation) were taken to show the impact of the system of small reservoirs on the hydrological regime. The positive assessment of the role of the system of small reservoirs was proved. The results of the simulations results showed the drop of the peak discharge during all scenarios.

**Key words:** Rainfall-runoff modeling, HEC-HMS, flood protection, Rolava river basin, uncontrolled small reservoirs