



Application of the stream Thermometry in small drainage basins

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There exist numerous tools for research into groundwater flow. Measuring water temperature is one of the oldest measurements used in hydrogeology. The underlying principle of thermometry is to determine the influence of relief and geological environment on groundwater flow. The basic assumption is that water temperature in streams is different from temperature of groundwater, which drains into the streams. This situation is most marked in winter. Water changes its temperature and electrical conductivity when in touch with rock bodies. Inflows of groundwater are best to trace when this happens. The goal of this work is to test the application of the thermometry method to drainage basins with the area smaller than 10 square kilometres. It is the Sloupečník stream (left tributary of Svitava river) and Bunčovský stream which belongs to Morava river basin. Both the small basins drain different types of rocks with different age and development. Usability of thermometry method in small drainage basins has been effectively verified and described in this paper. Using the non - parametric Kruskal – Wallis ANOVA test and other statistical procedures it was possible to demonstrate the influence of relief and rock types on groundwater flow. Majority of points of groundwater stream inflow have been identified in rugged relief and sandstone. Depending on factors mentioned above different types of groundwater flow cycles, characterized by unlike depth and velocity, have been detected. As it was documented through the measured values of the electrical conductivity and temperatures, a deeper and more rapid groundwater flow passes through the rugged relief. On the other hand, a slow and shallow groundwater flow has been identified in the flat relief. The crystalline rocks of the research area are drained by quite shallow and relatively fast groundwater flow in the subsurface weathering zone. By contrast, a slightly deeper and slower flow is recognized in the flysch rocks.

Key words: Thermometry, Rock type, Relief type, Water temperature, Electrical conductivity, Bunčovský stream, Sloupečník stream