ABSTRACT

Vysoké Mýto Syncline represents one of the most important hydrogeological region in the eastern part of the Bohemian Cretaceous Basin. Groundwater circulation of this unit is affected by facial changes in sedimentary rocks (sandstones and marlstones) and tectonics, which is responsible for degree of fracturing.

This work is focused on Vysoké Mýto springs and groundwater chemistry to explain how permeable zones influence groundwater quality and residence time. The study could be separated into two parts: (1) field work in three selected regions of Vysoké Mýto Syncline (Desná and Loučná rivers) and spring chemistry (2) evaluation of groundwater chemistry and spring data (Hydrofond and ČHMÚ databases).

By means of thermometry I located all springs in the study area and measure their discharge. These measurements demonstrated that prevailing groundwater discharge to Loučná river is in form of hidden inflows, which can not be directly observed. These hidden inflows have higher water discharge (>700 l/s) than visible springs in corresponding area. On the other hand, inflows at Desná Creek are mainly formed by observable springs and importance of hidden inflows is not so significant. Part of the upper Desná Creek segment can be classified as loosing stream (between villages Poříčí u Litomyšle and Víska). The only important spring in this area is the Panna Marie Spring with yield around 21 l/s. The majority of springs located at lower segment of Desná Creek are usually concentrated around one larger spring and yield of some of these spring groups is up to X0 l/s.

Nearly all springs show elevated concentration of nitrates and chlorides. These are higher than natural concentration in groundwater. In some cases, concentrations are higher than limits for drinkable water.

Relationship between depth of intake parts of boreholes and aquifer chemistry was studied based on chemical analyses of boreholes from Hydrofond database. The highest degree of pollution shows the shallow aquifer. However even deeper aquifers show considerable number of samples with elevated nitrate and chlorite content demonstrating presence of water admixture infiltrated in last several decades. Almost 40% of boreholes with mean open depth exceeding 200 m have chloride content over 10 mg/l. Also nearly 30% of boreholes with mean open depth exceeding 100 m have nitrate concentrations higher then 15 mg/l. Area distribution of groundwater chemistry points to higher concentration of chloride, hydrocarbonate, sulphate and potassium in northwestern part of Vysoké Mýto Syncline comparing to other parts. This is probably result of stagnant zones in this region.