Abstract

This bachelor thesis aims to study the selected parameters and nutrients of water quality in relation to the rainfall-runoff regime in the Sázavka River basin. The rainfall-runoff regime is influenced by many factors, including the climate change, which has received more and more attention in recent years. These changes may have a consequential impact on the quality of surface waters. In the first part of this paper selected parameters of water quality are presented. The aim was to try to understand their behaviour under the changing water flow dynamics. For this purpose, Czech and foreign literature was used. In this thesis there are also presented the most common statistical methods that are used in analysing geochemical parameters. The second part of this paper deals with the changes of climate-hydrological characteristics (air temperature, precipitation, snow cover and flow), the analysis of nutrients (forms of nitrogen and phosphorus) and physical parameters (water temperature and electrolytic conductivity). Lastly, metabolites of herbicides that ware above the detection limit in the watershed (acetochlor ESA, alachlor ESA, dimethachlor ESA and metolachlor ESA) were assessed. The analysis used some of the methods introduced in the research section. The regression analysis, correlation coefficients and the Mann-Kendall test can be encountered in this work. To better understand the outliners that occurred, boxplots and linear regression line were used to help detect the residuals.

As predicted, the Sázavka River basin has been experiencing long-term nitrogen loading. Total nitrogen (TN) and nitrate ($N\text{-}NO_3^-$) were the most problematic. On the other hand, surprisingly low concentrations were measure for ammoniacal nitrogen ($N\text{-}NH_4^-$) and nitrite ($N\text{-}NO_3^-$). Correlation coefficients showed dependence for nearly all monitored parameters. In some cases, there were positive correlations, in others inverse correlation. Phosphorus compounds did not show as high concentrations as nitrogen compounds, although the resulting concentrations cannot be said to indicate good water quality. Mann-Kendall test indicated the impact of climate change, which has caused an increase in the average annual air temperature, a decrease in snow cover days and a decrease in total runoff. On the contrary there was no trend in total precipitation. Regarding water quality parameters, a trend was found in the time series only for phosphorus compounds, nitrite, and conductivity. Therefore, it is a matter of time before the changing climate will have an impact on water quality parameters and when, if at all, the results will be observable in the Sázavka river basin.

Key words: nutrients, pesticides, rainfall-runoff regime, Sázavka River, rural areas