

## Abstract

The area of interest is located in Central Bohemia and covers the town of Kutná Hora and the area north of this town up to the river Labe. The main part of the area consists of farm land; the southern part includes sulphidic ore mines of Kutná Hora and Kaňk. Mining of Pb-Ag-Zn ore ended in 1991 with the closing of the Turkaňk mine. Nowadays, the Turkaňk mine is flooded. The water level in the mine is held under the level of the drainage galleries to avoid the acid mine drainage from the Turkaňk mine.

Water table levels were measured in 12 boreholes and 8 wells in the period from September 2003 to January 2006. Ground water flow was specified in the upper aquifer near Kaňk with respect to the measuring results.

Since resumption of mine water pumping, the concentrations of Zn, Mn, Cd, Fe and sulphates in samples of mine water decreased, while the concentration of As slowly increased. The pH value slowly increased (from pH < 2 to pH 4). The composition of water samples from the drainage galleries shows that old mine works above the level of drainage galleries are already washed.

The water balance was calculated. Ground water affected by mine working is mixed with non-affected ground water in the surrounding aquifers in the ratio of 1:22. Ground water flowing in floodplain of the river Labe is mixed with the ground water flow from the southern area in the ratio of 1:12.

Comparison with drinking water standards was carried out, especially for the pH value and Fe, As, Cd, Cr, Cu, Zn, Mn, Pb and the concentration of sulphates. At least one limit was exceeded in the samples taken from each borehole or well. The highest concentration of metal ions, As and sulphates were found in samples from the Turkaňk shaft. In the upper aquifer, the concentrations were higher than in the lower aquifer. The pH value was lower in the upper aquifer than in the lower aquifer.

According to the results of geochemical modelling, ferrihydrate precipitates after the mine water is mixed with ground water from the surrounding aquifers, whereby adsorption of metal ions and arsenic ions can occur on the ferrihydrate surface.