**SUMMARY**

This study deals with the association of trace elements with colloids and particles in surface waters and groundwaters of mining and smelting district of Příbram. Colloids were studied using combination of cascade filtration a tangential flow ultrafiltration method to separate individual colloid fractions. Colloids were separated by filtration membranes with nominal pore size 0,8 μm, 0,45 μm, 0,1 μm, 100 kDa, and 5 kDa. Water samples were analyzed using ICP-OES, ICP-MS and HPLC. The data were used for thermodynamic modeling using PHREEQC-2 programme.

The results show that major and trace elements can be divided into several groups, based on their abundance in individual size fractions. Most elements dominate in fraction of truly dissolved matter as dissociated ions (< 5 kDa), maximum concentration in colloid fraction is 5-20 % and almost exclusively in fraction 5 kDa – 100 kDa. Gradual decrease of concentration in all fractions at low ionic strength (1,2 mmol/l) was observed in case of elements such as As, Co, Cr, Si, Sb and U. Gradual decrease of concentration in several samples was observed for Cd, Fe, Pb, Mn and Zn. Dominant binding to colloids and particles in surface waters was observed for Fe and Pb, where these fractions accounted for over 90 %. The main factor influencing colloid concentration is ionic strength and the colloid concentration generally decrease with increasing ionic strength.