

Summary

The thesis is focused on the chemical composition of water from the unsaturated zone of sandstones on six localities in the Bohemian Cretaceous Basin and one site in the permocarbon basin. The subject of the study is mainly capillary water from several cm depth of sandstone exposure. Soil lysimeters, called rhizons, were tested to sample this water. Although rhizons are primarily designed for soil moisture sampling, under suitable conditions water abstraction has been successful. Vadose waters have low pH of 3.7-6.2, mainly caused by the infiltration of acid atmospheric precipitations, rich on sulphates and nitrates and other components, which are subsequently involved in the formation and crystallization of salts. Higher pH 5.7-6.2 show sites where rise in pH and different water chemistry are due to different geological conditions. Waters contain high concentrations of sulphates (4.9-763 mg/l), nitrates (2.2-109 mg/l), calcium (1.8-167 mg/l) and aluminium (0.1-4.7 mg/l) and compared to atmospheric precipitation are enriched for all dissolved ions. However, vadose waters sampled with rhizons do not differ from sandstone seeping waters. According to the results of geochemical modelling, waters are supersaturated with respect to quartz and chalcedony. The precipitation of main salts, such as gypsum and K-alum, which are the dominating components of surface efflorescence and vadose waters, occurs with progressive evaporation.