

Abstract

This thesis addresses determination of groundwater recharge based on analysis of groundwater levels recorded in wells in time. This technique, called water table fluctuation method, is widely used abroad, but it was never implemented in the Czech Republic. It is designed for use in unconfined aquifers. By multiplying height of groundwater level rise by specific yield of the aquifer, thickness of layer of recharged groundwater can be quantified. This method can be used either for individual rainfall events, or for entire time series of groundwater level records. Its main advantage is the availability of groundwater level records. The main limitation of this method is the need of precise estimate of specific yield, which is often difficult to measure. Other sources of uncertainty include groundwater level fluctuations caused by non-recharge influences, and conditions variable in time. The practical part of this thesis gives an example of use of water table fluctuation method, using data from two wells in quaternary fluvial deposits of Elbe. I determined minimal and maximal cumulative height of groundwater level rise for the period of groundwater level recording. For well VP0673, groundwater level rise is 5,1 to 17,7 m for 52 years. For well VP1851, it is 15,6 to 38,6 m for 26 years. The limitation of this approach is that specific yield of most aquifers in the Czech Republic is not known. I used an estimate of specific yield of 15 %, based on calibration of a hydraulic numerical model in the Káraný area. By comparing the results with mean groundwater recharge in the studied area, this estimate proved to be reasonable for VP0673, but overestimated for VP1851. Even without knowledge of specific yield, water table fluctuation method can be used for identifying wet and dry periods based on the amount of cumulative rise of groundwater level.