Abstract:

As a result of ground water pumping in the Střeleč quarry there has been developed a depression in ground water surface during recent 30 years impacting an area of approx. 10 km$^2$. Due to the existence of steep hydraulic gradient in the quarry surroundings subsurface erosion occurs resulting in a development of underground channels. The biggest one developed in the years 2000 – 2002. Its length was 300 m reaching in some place the height of 17 m. During field works in the quarry in the years 2009 – 2010 the only accessible channel was mapped. In the channel two main types of cracks were discovered. On the crossing of these cracks slumping of the sandstone occurs which causes difficulties for the mining company. A hydraulic gradient higher than 5% was determined to be critical for sand transport in the channels and widening the initial conduits into channels. The channel development and releasing of static ground water reserves also influenced chemical composition of ground water emerging in the quarry. In the period of the most intensive channel development in 2001 the ratio of ground water from static reserves on the total amount pumped was 56%. Also in this period the concentration of sulphates in the ground water of the streams in the quarry decreased significantly. In the year 2010 there were three main channel systems in the quarry, each of them having individual hydrogeological regime.