Geophysical Research Abstracts
Vol. 18, EGU2016-7500, 2016
EGU General Assembly 2016

Climate vulnerability of drinking water supplies

Pál Selmeczi, Emese Homolya, and Ágnes Rotárné Szalkai
Geological and Geophysical Institute of Hungary

Extreme weather conditions in Hungary led to difficulties in drinking water management on diverse occasions in the past. Due to reduced water resources and the coexisting high demand for drinking water in dry summer periods the availability of a number of water supplies became insufficient therefore causing limitations in water access. In some other cases, as a result of floods and flash floods over karstic areas evolving in consequence of excessive precipitation, several water supplies had to be excluded in order to avoid the risk of infections.
More frequent occurrence of extreme weather conditions and further possible changes in the future induce the necessity for an analysis of the vulnerability of drinking water resources to climate change. Since 95% of the total drinking water supply in Hungary originates from subsurface layers, significance of groundwater resources is outstanding.
The aim of our work carried out in the frames of the NAGiS (National Adaptation Geo-information System) project was to build up a methodology for the study and determination of the vulnerability of drinking water supplies to climate. The task covered analyses of climatic parameters influencing drinking water supplies principally and hydrogeological characteristics of the geological media that significantly determines vulnerability. Effects on drinking water resources and their reduction or exclusion may imply societal and economic consequences therefore we extended the analyses to the investigation of possibilities concerning the adaptation capacity to changed conditions.
We applied the CIVAS (Climate Impact and Vulnerability Assessment Scheme) model developed in the frames of the international climate research project CLAVIER (Climate Change and Variability: Impact on Central and Eastern Europe) to characterize climate vulnerability of drinking water supplies. The CIVAS model, being based on the combined evaluation of exposure, sensitivity and adaptability, provides a unified methodical scheme to quantitative climatic impact assessment. We investigate the effects of climate change in the integrated context of exposure, sensitivity, impact, adaptive capacity and vulnerability, thus apart from the expected environmental changes societal and economic processes are also taken into account. Climate vulnerability has been determined on the basis of the distribution and categorisation of the chosen indicators.
Further effects, independent of climate change and caused by anthropogenic activity, result in similar phenomena. It is often difficult to differentiate between natural and anthropogenic effects that occur simultaneously therefore in the analyses of vulnerability anthropogenic activity is needed to be taken into account.
We determined climate vulnerability using data of two different climate models and for two separate future time periods. Results on the basis of both climate model projections suggest that a considerable number of regions in the area under investigation appear to be vulnerable to climate change to a certain extent and vulnerability intensifies to the end of the 21th century.