Geophysical Research Abstracts
Vol. 14, EGU2012-11700, 2012
EGU General Assembly 2012

Groundwater vulnerability assessment in Jaworzynka's Valley catchment basin (Tatra Mountains, Poland)

M. Cypel

Faculty of Geology, Chair of Environmental Protection and Natural Resources, University of Warsaw, Warsaw, Poland (m.cypel@uw.edu.pl)

During the research an attempt was made to assess an intrinsic groundwater vulnerability to contamination in Tatra Mountains (Poland.
Assessment of the degree of hazard of permeating pollutions from land surface directly to the ground water table was the main target of the research.
The Jaworzynka's Valley in West Tatra Mountains was chosen as the exact research area. Jaworzynka's Valley is a typical karst catchment basin. Location of study area wasn't accidental, because in the north part of the valley there is a well which is being used as drinking water intake for the whole Zakopane City. This is the reason, why the quality of ground water is so important.
The method used in this research, entitled KARSTIC, wasn't applied in Poland before. This is a parametric method of groundwater vulnerability assessment. KARSTIC is a modification of much better known DRASTIC method, specialized for specific karst terrain. KARSTIC method created by A. Davis and others (1994), was used for the first time, during a research in the Black Hills Mountains, USA. Research in Jaworzynka's Valley was based on the Black Hills study. In order to apply this method in Tatra Mountains, it was necessary to make a few changes in relation to original area.
Applying KARSTIC method consists of successive stages. Schematization of hydrogeological conditions is an inseparable part of KARSTIC method. The first step bases on collecting all of available data such as maps, databases and documentations. Next stage consists of classifying all parameters employed in this method and then assigning a ratings and weights for this parameters. Subsequently it is necessary to use a mathematical formula, named Pollution Potential Index, which presents a ground water vulnerability in each point. The final step is visualization on the ground water vulnerability map.
The result of research displays the high vulnerability in close proximity of the drinking water intake. The most vulnerable areas in Jaworzynka's Valley are spring-beds, consequence of very intensive karst development. The rest of research terrain was classified as medium and low vulnerable. KARSTIC method didn't show caves in the valley as high vulnerable, which is certainly incorrect, proving the method to be insufficiently detailed in such cases.
During the research, it turned out that using this method in highmountains terrains is not simple. Even a definition of aquifer in highmountains karst areas is difficult (aquifer is not continuous layer and also depth to water is frequently changing). Therefore author decided to continue research about ground water vulnerability assessment in Tatra Mountains, but in a much more detailed form.