Groundwater flow system in igneous rock basin based on environmental isotope and groundwater potential distribution

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http://www.sci.kumamoto-u.ac.jp/~hydrolab/index.html

In Japan, many number of groundwater flow system study in alluvium and diluvium has been done, and has been almost established their general concept. However, the flow system for the groundwater in relatively low permeability igneous and sedimentary rocks is limited number and not yet understood well.

In this study, a large scale groundwater flow region including the mountainous part to the coastal part in one hydrologically closed basin which is composed by the volcano bedrock, was selected to clarify the groundwater flow system by using both the environmental isotope as a flow tracer and the groundwater potential. Furthermore the three-dimensional groundwater flow characteristics in the basin, has been studied by using seasonal changes.

As a result, the flow system in this basin that consists of the igneous rock is divided roughly into three (local flow system, the intermediate flow system and the regional deep flow system).Local flow system is appeared in mountainous head water area and independent from main groundwater body to exist as perched groundwater. The regional deep flow system has a longest residence time. For instance, the one that seeps out in the coastal area in the basin could be applicable to this system. The intermediate flow system has intermediate residence time between previous two flow systems, and springs in Furuyashiki area mid basin could be as this system.