

Regional groundwater flow in the western part of Tokachi plane, Hokkaido

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In and Around Obihiro city and Tokachi-gawa spa area, groundwater pumped up from the stratum of about 1,000 m deep is used as hot spring source. The number of wells increased rapidly due to the hot spring boom from 1980's. It causes remarkable drawdown of groundwater head and lowering water temperature. At some well, the groundwater head has come down almost 50 m for these 20 years. It is important to study causes of these phenomena out of consideration of regional groundwater flow over wide-area. In this study, the subsurface flow in this region was analyzed based on a geological structure by using the 3D finite-difference groundwater flow model (MODFLOW).

Tokachi plane is a sedimentary basin (50-100 km east-west wide, and 300 km north-south long) surrounded by both of Ishikari and Hidaka Mts. The western part of Tokachi plan is characterized by Tokachi-chuou fault and several aquifers of about 1,000 m deep. Regional groundwater flow along E-W cross section has been studied in the past, however, the flow of N-S direction has not been quite clear. As a result of this study, the N-S directional flow predominates than the E-W flow almost along Tokachi-chuou fault, especially in the Nukanai formation that is a main source for hot spring well. Therefore the hot spring water to Tokachi-gawa spa has to be considered that flowing from northern mountain area. And pumping from the southern part of Otofuke area may affect groundwater head regression of Tokachi-gawa spa. Farther analysis is necessary for the evaluation of water reduction in this region by using more detail subsurface structure and hydrogeological parameters.