

## Hydrogeological Structure Estimation Applying Forward Modeling Method to Shallow Sedimentary Rocks

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To develop a modeling methodology for geological environment considering heterogeneity of sedimentary rocks is very important issue for a safety assessment based on site investigations of high-level radioactive waste geological disposal. As a development of hydrogeological modeling methodology, this paper shows that we attempt to estimate hydrogeological model of shallow sedimentary rocks, which consists of late Pliocene Yuuchi Formation and Pleistocene Sarabetsu Formation, at Horonobe area, northern Hokkaido, Japan. The model is estimated by using of forward modeling software developed to evaluate heterogeneity of sedimentary rocks. Shallow sedimentary rocks play a significant role for groundwater flow system because recharge and discharge are induced here. Groundwater flow analysis is also carried out used by the estimated hydrogeological model.

Objective area is defined as 11km x 5km and 2km depth approximately. In modeling process it is used 50m grid data for expressing topography and 29 layers toward direction of depth. The estimated model shows remarkable distributions and geological structures such as anticline and syncline of north-south orientation. Moreover it describes large scale lithofacies change such as coarsening upward sequence attributed uplifting of hilly area and small scale cyclic sequence caused by glacial sea level change. Three dimensional groundwater flow analysis with estimated hydrogeological model is carried out under the boundary condition which meteoric water precipitates from ground surface and continued till steady state. This analytical result shows that groundwater flow reflects sedimentary structures. It also shows the consistency of this analytical and conceptual model concerning of groundwater flow in this area.

Methodology for estimation of geological model and geological information required for setting up input parameters of this method is compiled in this study. These results are considered to be effective for establish a methodology to evaluate geological environmental characteristics in sedimentary rock area.

**Keywords:** Sedimentary Rocks, Forward Modelling, Hydrogeological Model, Groundwater Flow Analysis