# Preliminary study on hydrogeological structure in accretionary complex in Ooshika Village, Nagano Prefecture, Japan - Relationship between deep-seated fluid outflow region and geological structure

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The hydrogeological structure is the basic information for considering the groundwater-mediated radionuclide migration in a geological disposal project. However, it is not well understood how groundwater can flow in the accretionary complex, which is considered to be widely distributed in the deep underground in Japan.
It has been reported that groundwater originating from deep underground gushes to the surface in many parts of Japan. Such groundwater is called deep-seated fluid and should be considered in site selection for geological disposal. The distribution of deep groundwater is considered to represent the outflow path of groundwater from deep underground to the surface. Therefore, this study aims to clarify the hydrogeological structure of the accretionary complex by investigating the relationship between the distribution of the deep fluid and the geology and geological structure.
In this study, we focused on Ooshika Village, Nagano Prefecture, where accretionary complex is distributed and deep-seated fluid outflow is known from previous studies. We investigated the geology and geological structure and the spatial distribution of surface water quality in the area, and discussed the relationship between the geological structure and the location of deep fluid inflow.
In the case study area, the Median Tectonic Line runs north-south, and schists of the Sambagawa Belt and greenrocks of the Mikabu Belt are distributed in a band along its east side. In the previous study, there were different opinions on the dip and strike of the boundary, and whether it is a fault or not regarding the two lithological boundaries between schists and greenrocks (the west side is called Boundary A and the east side Boundary B). Based on the outcrop data obtained from the surface survey, we concluded that Boundary A dips eastward by about 30 degrees, and Boundary B is nearly vertical and straight. In addition, both boundaries were assumed to be faults because the schistosity planes and the boundary surface were oblique near the boundaries.
We measured the Cl concentration in the river water of the Shiokawa River and the Koshibu River, flowing westward through the case study area. A sharp increase in the Cl concentration was observed in the Shiokawa River near the Median Tectonic Line and near the B boundary. The measurement of Cl concentration in the stream water in the case study area shows that small streams with high Cl concentration, which are considered to be mixed with deep-seated fluid, are mainly distributed between the Median Tectonic Line and the A boundary and east of the B boundary, and all of them seem to be connected north-south along the schist distribution area.
These results suggest that the outflow path of the deep-seated fluid is related to (1) the Median Tectonic Line and the B boundary, and/or (2) the distribution of schists. Considering the fact that minor faults with saline water were found near the B boundary and that schists themselves are very dense rocks, (1) is maybe the main factor.
In the future, we will conduct a more detailed surface survey and water quality survey of the area where the deep-seated fluid gushes out, and try to elucidate the correspondence between the gush path and the geology and geological structure.

 

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