

Geochemical characteristics and origin of groundwater in central to eastern Hokkaido

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Japanese island arc is located in the subduction system where the groundwater migration/circulation is significant. Groundwater has chemical history of dissolved components that come from deep part. There are many reports about chemical composition of groundwater in Hokkaido. However, there is little geochemical research about chemical constituents derived from deep in the groundwater in Hokkaido. The relationship between geological features and chemical characteristics of groundwater remains unknown. This study focused on the geochemistry of deep fluid collected from hot springs in central to eastern Hokkaido area to understand the origin and underground geochemical processes by analyzing main and trace elements, hydrocarbon gas, and oxygen-hydrogen isotopes.

The concentrations of dissolved major elements such as Cl, suggested that groundwater in Hokkaido is mainly of seawater origin. The $\delta^{18}\text{O}$ and δD values, however, indicate that the fluid also contains meteoric water. The redox condition of deep environment had changed the concentrations of Mn and SO_4 , and the weathering of sedimentary rocks had increased the amount of Si, respectively. Iodine was significantly enriched compared to seawater, resulting from the deposition of I-rich marine algae in the internal shallow water zone. Concentrations of trace elements such as Pb, Zn, and Li vary among sampling locations, which indicates elution of Pb and Zn by the weathering of minerals, and release of Li from clay minerals in high temperature environment.