

Investigation on evaluation method for diffusion field -a case study in the Horonobe area-

*Takuma HASEGAWA¹, Kotaro NAKATA¹

1. Central Research Institute of Electric Power Industry

Under stagnant groundwater condition, solutes are transported by diffusion. Diffusion is the slowest transport phenomena, and diffusion dominant condition is called as diffusion field, which is suitable condition for radioactive waste disposal. Diffusion field could be formed in low permeable formation where fossil seawater is remained.

Separation of solute and fractionation of isotopes will be promising to evaluate diffusion field. Fossil seawater has high Cl concentration and high δD compared to meteoric water. Cl and δD will be separated by diffusion because diffusion coefficients of Cl and δD are different. Cl mainly consists of ^{35}Cl and ^{37}Cl , and their diffusion coefficients are different due to mass weight. Thus, isotope fractionation between ^{35}Cl and ^{37}Cl is caused by diffusion.

In the Horonobe area, the separation of Cl and δD and isotope fractionation of Cl accompanied by change of $\delta ^{37}\text{Cl}$ were observed. Therefore, diffusion is seemed to be dominant in the Horonobe area. From theoretical approach, diffusion could occur after a part of fossil seawater was flushed with meteoric water. Thus, the historical change of geological condition should be considered to evaluate the distribution of δD , Cl and $\delta ^{37}\text{Cl}$.

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