

Geochemical investigations of groundwater in the western coastal area of the Miura peninsula, Japan

Y. TOMIOKA^{1*}, T. HASEGAWA¹, K. NAKATA¹,
H. KONDO¹ AND T. KUNIMARU²

¹Central Research Institute of Electric Power Industry (CRIEPI), Abiko, Chiba 270-1194, Japan
(*Correspondence: tomioka@criepi.denken.or.jp)

²Nuclear Waste Management Organization of Japan (NUMO), Tokyo 108-0014, Japan
(tkunimaru@numo.or.jp)

The Yokosuka demonstration project has been carried out under the collaboration between the Nuclear Waste Management Organization of Japan (NUMO) and the Central Research Institute of Electric Power Industry (CRIEPI) since FY2006 [1]. The geology of the Yokosuka site consists of early to middle Miocene basement of the Hayama Group (mainly mudstone) and the overlying late Miocene to Pliocene Miura Group (alternating sandstone and siltstone). Hydraulic conductivities of the Hayama G. and the Miura G. are $\sim 10^{-9}$ m/s and $\sim 10^{-7}$ m/s, respectively. Groundwater samples were collected from three boreholes by core squeezing, pumped up with a double-packer system and an in-situ sampling probe. For noble gas sampling, borehole core sampling method [2] was used.

Freshwater in the Miura G. has a general trend of increasing Cl concentration and decreasing $^{36}\text{Cl}/\text{Cl}$ ratio with depth. In addition, relationship between Na and Ca ions in the Miura G. show a cation exchange behavior of seawater mix to freshwater. In the deeper part of Hayama G., seawater exists with almost constant $^{36}\text{Cl}/\text{Cl}$ ratios, which are thought to be in the state of secular equilibrium. The $^{36}\text{Cl}/\text{Cl}$ ratios in the deeper Miura G. and shallower Hayama G. suggest the mixing of modern seawater and stagnant seawater. Concentrations of dissolved He in the Miura G. gradually increase with depth, and are high and almost constant in the Hayama G.

These results indicate that the mixing of young fresh water and relatively young seawater in the Miura G., while stagnant seawater exists for a long time period in the deeper Hayama G. The mixing of the young seawater and the stagnant seawater occurs across the boundary between the Hayama G. and the Miura G. [3].

[1] Kondo, *et al.* (2011) CRIEPI report, N15. [2] Nakata, *et al.* (2006) CRIEPI report, N05065. [3] Hasegawa, *et al.* (2013) Journal of Geography, (Chigaku Zasshi) **122**, 116-138.