

沿岸域における地下水の流動性の年代測定による評価

— 三浦半島西部沿岸域でのボーリング調査 —

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Evaluation of Groundwater Mobility in a Coastal Area Using Groundwater Dating: Borehole Investigation in the West Coastal Area of the Miura Peninsular

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Abstract

Groundwater dating was applied to characterize the groundwater flow in the West coastal area of the Miura Peninsular belonging to Neocene sedimentary rock. At the location of the borehole, the Miura Group is distributed from the surface to a depth of 210 m, and the Hayama Group is distributed at depths greater than 210 m. The hydraulic conductivities of the Miura Group and the Hayama Group are 1×10^{-7} m/s and 1×10^{-9} m/s, respectively.

There are significant differences between the Miura Group and the Hayama Group. ^{14}C concentration is high (40 to 60 pmC) in the Miura Group and is low (10 pmC) at upper part of the Hayama Group. $^{36}\text{Cl}/\text{Cl}$ is equivalent to modern sea water in the Miura Group and in-situ equilibrium in the Hayama Group. ^4He concentration is equivalent to atmospheric equilibrium at the upper part of the Miura Group. ^4He concentration increases with depth and is constant at 2×10^{-5} cc_{STP}/g_w in the Hayama Group. ^4He concentration of 2×10^{-5} cc_{STP}/g_w is equivalent to 7 Ma accumulation of in-situ production. $\delta^{37}\text{Cl}$ is equivalent to SMOC in the Miura Group and decrease with depth in the Hayama Group. This implies that advection is dominant in the Miura Group and diffusion is dominant in the Hayama Group.

These results are consistent with each other and indicate the difference in groundwater mobility between the Miura Group and the Hayama Group. The difference in groundwater mobility is also supported by: (1) the difference in hydraulic conductivities of the Miura Group and the Hayama Group, (2) fresh water is dominant in the Miura Group and seawater is dominant in the Hayama Group, and (3) the shift of $\delta^{18}\text{O}$ due to water-rock interaction in the Hayama Group. It is confirmed that groundwater dating provides useful information to evaluate the groundwater flow in a coastal area. This multiple approach could be useful to obtain reliable results.

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