

Evaluation of submarine groundwater discharge volume by hydrological data

Narimitsu Ito[1]; Atsunao Marui[2]

[1] NEWJEC Inc.; [2] GSJ, AIST

Submarine groundwater discharge (SGD) is the direct flow of water into the sea, representing an underground route for the water cycle through porous rocks and sediments (Church, 1996). Marui (1997) indicates that SGD contributes to prevent adverse effects as land subsidence and seawater intrusion, because it reduces the volumes of pumping from aquifers. Submarine groundwater discharge can be also recognized as a pathway of materials from the land to the ocean. In the case of high level nuclear-waste disposal, SGD may become the route for movement of radioactive species to the biosphere, and in the case of carbon dioxide storage into aquifer, although it is ideal to store into an anticlinal to reduce possibilities of leakage, other environments of disposal are often a more realistic option. Then, it is important to evaluate the flow conditions within the aquifer to decide the suitability of the area for storage.

By the end of this study, the distribution of SGD all over the Japanese Islands will be understood, and a SGD-map useful to assess the groundwater environment will be presented. If the survey can be expanded to Southeast Asia, the influence of local weather conditions will be discussed, and the results will be useful to solve some of those country's problems (securing drinking water, seawater intrusion, etc).

In this paper, a preliminary case study of SGD is developed at the Kino-River in Wakayama Prefecture. The SGD volume calculated by this method has demonstrated to be close enough to results obtained by a 3-D simulation.

Church (1996) : Nature, 380, 18 April 1996

Marui (1997) : Journal of JAHS, No.27, Vol.2, May, 1997 (Japanese)