

Carbon-14 concentrations of confined groundwater in the central Kanto plain, Japan

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In the central parts of the Kanto plain, the largest Quaternary groundwater basin in Japan, confined groundwater with high Cl^- concentrations of 100-216 mg/l is obtained from the productive bores of more than 200 m depth. The area with the Cl-rich groundwater, spreading from the northwest to southeast, corresponds with the so-called Motoarakawa tectonic zone (ca. 10 km wide by 35 km long) bounded by the faults on its longer sides, that is the Ayasegawa fault on the southwest side and the Kuki fault on the northeast side. It has also been found that the Cl-rich groundwater is characterized by low delta-D and low delta-18O values (Yasuhara *et al.*, 2008). With regard to the origin of this isotopically-depleted confined groundwater, a potential source is assumed to be precipitation in a cooler climate than the present. Admixture of residual sea water is likely to account for its elevated Cl^- concentration.

For the sake of helping understand the origin of groundwater and geochemical processes taking place in the tectonic zone with more accuracy, groundwater samples from some sixty bores out of 230 bores in the central parts of the Kanto plain were measured for their ^{14}C concentrations. The result shows a very low ^{14}C concentration of less than 5 pMC for groundwater in the tectonic zone. In contrast, groundwater outside of the tectonic zone generally has a higher ^{14}C concentration (20-90 pMC) indicative of a shorter residence time. Especially, the ^{14}C concentration of groundwater presents a striking contrast across the southern part of the Ayasegawa fault, indicating the fault acts as a geologic barrier to the northeasterly regional groundwater flow originated in the Musashino diluvial plateau. For the northwestern end of the tectonic zone near Gyoda and Konosu cities, the result suggests an existence of unknown geologic structure impeding groundwater interaction between the southeasterly regional groundwater flow and that in the tectonic zone.