

Geophysical Research of Tachikawa Fault Zone by Rn-222 and Cl- Concentration in Groundwater

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The 2011 off the Pacific coast of Tohoku Earthquake enhanced the probability of earthquake in Tachikawa Fault Zone. To evaluate the physical condition of Tachikawa fault zone, we researched Rn-222 concentration in groundwater, which is known as a precursory anomaly of earthquake. Additionally, we focused on the connection between the concentration of chloride ion in groundwater and fault damage zone and measured chloride ion in groundwater as well. Our purpose in this paper is to detect suitable groundwater for continuous measurement: (1) The depth of aquifer is deep enough to reach the bedrock. (2) Water contains much enough radon to monitor. (3) Water contains chloride ion whose concentration is controlled by the condition of fault damage zone.

Radon concentration in confined aquifer is supplied by alpha decay of radium in the surface of the grain. If the specific surface area of the grain changes according to physical condition of fault, radon concentration in the groundwater would change. The upper edge of bedrocks, main source of radon, has a depth of under 2,000 m around Tachikawa Fault Zone and it deepens in the west.

We focus on the distribution of chloride ion around Ayasegawa Fault is similar to one around Tachikawa Fault Zone. Low concentration of chloride ion in groundwater around Ayasegawa Fault is affected by fault damage zone, and we expect that groundwater around Tachikawa Fault Zone also shows low concentration of chloride ion due to fault damage zone. We use RTM1688(SARAD) for radon measurement, and ion chromatography for chloride ion measurement.

As a result, samples around the fault show high concentration of radon and low chloride ion. This suggests that the well around fault reach the bedrock and contain low concentration of chloride ion due to fault damage zone. These samples would show concentration change according to earthquake.

Keywords: radon, chloride ion, Tachikawa Fault Zone, spring water