

## Problems of the "Nationwide Map of Scientific Features for Geological Disposal" in Saitama prefecture and storage method of High-level Radioactive Waste (HLW)

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The "Nationwide Map of Scientific Features for Geological Disposal" was announced by the Agency for Natural Resources and Energy in 2017. Candidate sites for suitable places and inappropriate places for geological disposal are shown by each color. In Saitama prefecture, the linear yellow part extending from the northwest end to the southeast direction is the most prominent unsuitable place. Other areas are mostly suitable.

In the northern part of Saitama Prefecture, there is the Kanto Plain Northwest Rim Fault Zone. The main one is the fault zone represented by the Fukaya fault and the fault zone represented by the Ayasegawa fault. This fault zone is evaluated as follows. The dip is southwest inclination of 50 ° to 70 ° (depth less than 500 m), the width is about 20 to 25 km, the average slip speed is 20 to 40cm / 1,000 years, The latest activity period is after 6,200 years ago, before about 2,500 years ago. When this fault caused an earthquake, the predicted seismic intensity is the maximum magnitude 8.0 (The Headquarters for Earthquake Research Promotion Committee, 2005).

The length of the Fukaya fault system is about 80 km (Sugiyama, 2000). According to the criteria of the "Nationwide Map of Scientific Features for Geological Disposal", since the inappropriate place related to the active fault is one hundredth of the length of the fault, the width of the inappropriate area of the Fukaya fault system is about 800 m. Since there is a possibility that the dip of the fault plane is 50 °, considering the horizontal spread, there is no sufficient basis for the width of the inappropriate area.

The depth of the epicenter of the earthquake caused by the Fukaya fault and the Ayasegawa fault is estimated to be 17 to 19 km and the magnitude of the earthquake is to be the maximum magnitude of 8.0. The area with seismic intensity of 7 is distributed in Honjo City, Yoshimi Town, etc. Also the intensity 6 is expected to be distributed in wide area in the prefecture. These areas are much wider than the areas that are regarded as inappropriate in the "Nationwide Map of Scientific Features for Geological Disposal". Since the depth of the epicenter is expected to be 17 to 19 km, there is a high possibility that a wide area suffers a strong shake.

Since the geological disposal site could be kept for more than tens of thousands of years, there is a possibility that a new active fault will destroy the site. As a result, the radioactive material leaks out and it is possible that it can be carried to the ground by groundwater. It is pointed out that groundwater flow is the most important requirement for geological disposal of radioactive waste (IAEA, 1977), but the matter of groundwater flow is not reflected in the "Nationwide Map of Scientific Features for Geological Disposal". Since the behavior of groundwater is not well understood in deep underground, classification of suitable sites by the "Nationwide Map of Scientific Features for Geological Disposal" requires detailed study of groundwater.

As the "Nationwide Map of Scientific Features for Geological Disposal" has many problems, construction

of the geological disposal site is not carried out until sufficient safety and understanding of the people are obtained, and it is appropriate to temporarily keep the radioactive waste on the ground etc. (Science Council of Japan, 2012). It seems necessary to seriously consider options other than geological disposal.

Keywords: Nationwide Map of Scientific Features for Geological Disposal, Kanto Plain Northwest Rim Fault Zone, groundwater, storage method