

Disposal of high-level radioactive waste and crustal deformation of the Japan island

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The issue of high-level radioactive waste disposal is closely related to the problem of nuclear power plants. But this topic is not avoidable regardless of the opinion about nuclear power plants since such radioactive wastes already exist. The disposal method has been discussed to secure stability of the site over the timescale of 100,000 years. This condition inevitably brings a large uncertainty in scientific knowledge necessary for the discussion. In such a case, it is not enough to discuss based on “the knowns”. We have to summarize “the unknowns” and consider them in the arguments. The Japan islands are located in a tectonically active region. In a short-term, elastic crustal deformation occurs on the order of 0.1 ppm/year, mainly due to interplate coupling at subduction zones. Such elastic strain is released by large earthquakes. In a long-term, there remains crustal strain on the order of 0.01 ppm/year, which is still more than two order of magnitude larger than that in stable continental as well oceanic plates. Such a condition is a starting point in discussing how to deal with the radioactive waste in Japan. The 2011 Tohoku-oki earthquake substantially improved our understanding of crustal deformation in short- and long-terms, but there still exist a number of unsolved problems. I will introduce examples of such problems and discuss uncertainties of knowledge in earth sciences.

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