
 [JJ] Evening Poster | H (Human Geosciences) | H-CG Complex & General

[H-CG29]Disposal of high-level radioactive waste: Viewpoints of science and engineering

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We have organized sessions in the JpGU meeting on nuclear power plants in Japan mainly from a viewpoint of earthquake science since 2013. Topics in the sessions include risks of nuclear power plants by earthquakes, volcanic activities, tsunamis, and a communication gap between scientists and engineers on the risks of the nuclear power plants. In the 2018 JpGU meeting, we propose the session that focuses mainly the disposal of high-level radioactive waste in Japan. This is an unavoidable issue in discussing future of the nuclear power plants and requires mutual discussion and understanding between scientists and engineers. Recently the Japanese government has published "Nationwide map of scientific features for geological disposal" and has planned to proceed "geological disposal" as the best disposal method. However, geological and social stabilities in a time scale of 100,000 years, which is critical in the disposal issue, are difficult to be assessed in Japan where crustal activity is high. We still consider that feasibility of the geological disposal in Japan is to be discussed and subjects in implementing geological disposal is to be clarified. We would like to promote discussions on issues such as how earth scientists can contribute to the disposal issue and a social decision making on the issue. We would encourage discussions from a broad viewpoint across science and engineering. We are welcome to papers of other topics relevant to relationship of earthquake science and nuclear power plants.

[HCG29-P01]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.