Difficulty of HLW geological disposal in Japan, an earthquake country, and non-scientificity of the "Nationwide Map of Scientific Features"

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Related to the Japan's project of the geological disposal of high-level radioactive waste (HLW) from nuclear power plants, the Government published in July 2017 the "Nationwide Map of Scientific Features for Geological Disposal." It categorizes all areas of Japan into the following four categories; (1) area with unfavorable geological features that may damage long-term stability of geological environment, (2) area endowed with natural resources, (3) area with good chance to be confirmed as having favorable characteristics and (4) area within the former area where it is favorable from the viewpoint of waste transportation as well (Kondo, 2017). Though it was said that the publication of the Map did not decide a disposal site, it was regarded as the first step toward the decision of the site. However, the Map is far from science, because it overlooks important and serious effects of earthquakes. A large earthquake inevitably produces changes in stress and strain in a very wide area. If a considerable amount of change hits the underground disposal site, opening and closure of numerous cracks in and around the site take place, leading to changes in hydraulic gradient and permeability, i.e., changes in groundwater flow characteristics. Then, it may happen that underground water in and around the disposal site flows to some extent, transporting radionuclides which have been released from the artificial barrier. Many places in the above-mentioned area (4) will suffer from such severe effects of large and great interplate and intraplate earthquakes more than hundreds of times during about 100,000 years of geological disposal, and in some cases the appearance of radionuclides in the human environment of the ground surface can occur. Therefore, many places in the area (4) are completely inadequate for the construction of a geological disposal site, which proves the non-scientificity of the Map.

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