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The European ASAMPSA_E project : towards guidance to model the impact of high amplitude natural hazards in the probabilistic safety assessment of nuclear power plants. Information on the project progress and needs from the geosciences.

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The Fukushima nuclear accident in Japan resulted from the combination of two correlated extreme external events (earthquake and tsunami). The consequences, in particular flooding, went beyond what was considered in the initial engineering design design of nuclear power plants (NPPs).
Such situations can in theory be identified using probabilistic safety assessment (PSA) methodology. PSA results may then lead industry (system suppliers and utilities) or Safety Authorities to take appropriate decisions to reinforce the defence-in-depth of the NPP for low probability event but high amplitude consequences.
In reality, the development of such PSA remains a challenging task. Definitions of the design basis of NPPs, for example, require data on events with occurrence probabilities not higher than 10-4 per year. Today, even lower probabilities, down to 10-8, are expected and typically used for probabilistic safety analyses (PSA) of NPPs and the examination of so-called design extension conditions. Modelling the combinations of natural or man-made hazards that can affect a NPP and affecting some meaningful probability of occurrence seems to be difficult.
The European project ASAMPSA_E (www.asampsa.eu) gathers more than 30 organizations (industry, research, safety control) from Europe, US and Japan and aims at identifying some meaningful practices to extend the scope and the quality of the existing probabilistic safety analysis developed for nuclear power plants. It offers a framework to discuss, at a technical level, how “extended PSA” can be developed efficiently and be used to verify if the robustness of Nuclear Power Plants (NPPs) in their environment is sufficient.
The paper will present the objectives of this project, some first lessons and introduce which type of guidance is being developed. It will explain the need of expertise from geosciences to support the nuclear safety assessment in the different area (seismotectonic, hydrological, meteorological and biological hazards, . . .).