



Global Flood risk and Nuclear risk

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The Fukushima accident raised considerable concern around the globe on the overall safety of nuclear power plants against natural hazard induced risks. It appeared that natural hazards, and in particular flooding, are a large threat for the safety of global nuclear power plants. Flooding of coastal and fluvial systems are the most significant natural hazards that modern society and is affecting several million people globally each year. The total population and the economic value of material assets located in zones prone to flooding have increased dramatically over the past decades and are expected to increase further due to: (1) an overall growth in economic assets, infrastructure, population and wealth; and (2) increases in sea-level and flood frequency due to climate change.

The Fukushima accident has geared an immediate and coordinated response from IAEA and EU member states, who stated that the safety of all EU nuclear plants should be re-assessed on their vulnerability to natural hazards such as floods and earthquakes. This 'stress test' was developed in 2012 together with experts from e.g. the Western European Nuclear Regulators Association (WENRA). Guidelines for a stress test were developed according to how nuclear installations can withstand the consequences of various extreme external events and to analyze security threats due to e.g. terrorist acts.

Since nuclear power-plants are often located near- or in flood zones from rivers, this research assesses whether nuclear facilities will face increased risk from flooding in the future. The research will contribute to stress-testing nuclear facilities in flood zones and describes how global flood risk may increase in the future using a global hydrological model. This information is used to assess the vulnerability of existing and planned nuclear facilities as to whether they (1) are located in flood prone areas (2) are susceptible to an increase in potential flood inundation and (3) are vulnerable to other natural hazards such as earthquake and tsunamis. Based on this assessment, a priority ranking can be made showing the potentially most vulnerable nuclear power plants to natural hazards, and in particular flood risk.