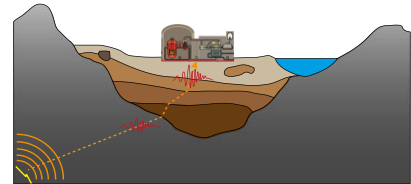


# METIS

## Methods and Tools Innovations for Seismic Risk Assessment

### OBJECTIVES

It is our aim to improve methods and tools seismic safety assessment of NPPs and to provide guidelines for practical implementation and rapid transfer to engineering practice. METIS addresses the 3 ingredients of seismic safety assessment in an overall approach: seismic hazard; structural and equipment fragility analyses; integration in the full PSA framework to determine plant failure probabilities and comparison to pertinent safety criteria. The overall framework for probabilistic safety assessment is well established but the partitioning into disciplines prevents from integration of common approaches, for example for uncertainty propagation. It is proposed to work in a multidisciplinary framework based on advanced methodologies that will be jointly applied to different parts of safety assessment.



### EXPECTED IMPACTS

#### Translate research to practice

- Benefit from recent advances in seismic hazard assessment and performance based engineering for industrial applications
- Address particular issues for nuclear safety: very low probabilities, robust equipment & extensive housekeeping

Contribute to **European consensus on best practices** to assess seismic safety of NPP

- Improve the state of the art in seismic risk and beyond design assessments
- Develop coherent approach between deterministic (margins) and probabilistic approaches (PSA) for seismic assessment

Disseminate best practice to engineering and **train new generation young of engineers**



### HIGHLIGHTS

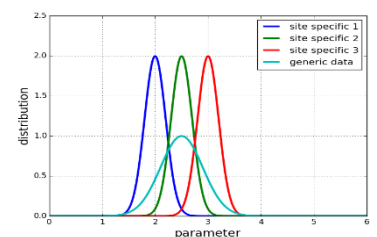
#### Uncertainty quantification and communication

- Propagate uncertainty from hazard to fragility and risk
- Reduce epistemic uncertainty by best estimate and site specific models

**Testing model performance** by comparison to data and **model updating**

Develop, improve, and disseminate **open source tools** for seismic hazard, fragility and risk assessment

- Make new approaches available to community through opensource tools
- Facilitate exchange and comparison of advanced methods in earthquake engineering and risk assessment



### PARTNERS

EDF / EDF Energy / ENERGORISK / GEM / GFZ Potsdam / IRSN / IUSS / LGI / National Technical University of Athens / Géodynamique et Structures / SSTC-NRS / Technical University Kaiserslautern / University of Ljubljana / GRI / North Carolina State University / PEER

### DURATION & BUDGET

09/2020 – 09/2024 - 4 years  
5 Million Euros

### CONTACTS

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### EVENTS

Kick-off meeting 29-30/09/2020.

