

GEM (Global Earthquake Model)

OPENING THE WORLD OF CATASTROPHE MODELS PUBLIC EVENT

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EUROPEAN INSURANCE AND OCCUPATIONAL PENSIONS AUTHORITY
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working together
to assess risk

GEM
GLOBAL EARTHQUAKE MODEL

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OPENQUAKE

About GEM Foundation

- Non-profit NGO, founded in 2009
- Global, public-private partnership
- Develop software, tools and data for use in earthquake and multi-hazard risk assessment worldwide
- Develop trust in the assessment process and ownership of results
- Promote and foster applications to DRR



About GEM Foundation



OUR VISION

A world that is resilient to earthquakes and other natural hazards.



Our Supporters

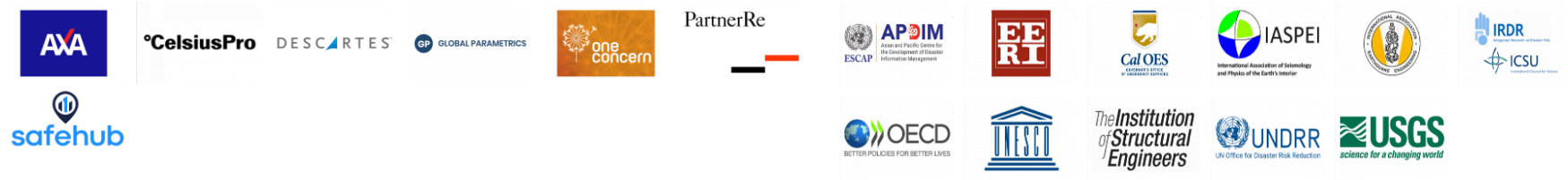
Public Governors

Private Governors



Advisor Sponsors

Associate Partners

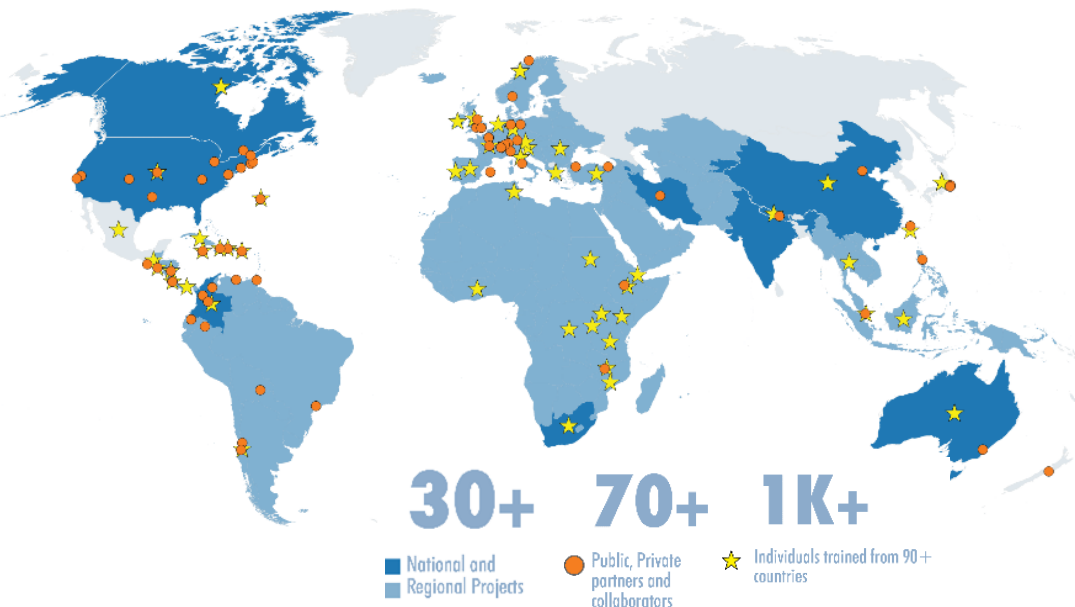
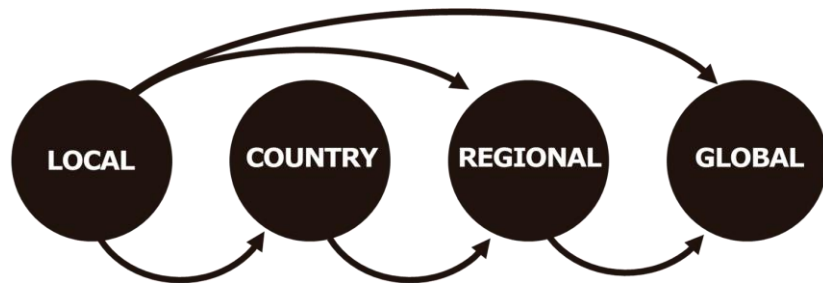


Product Distribution Partners



Collaboration Framework

- Built upon collaborations and partnerships
- Multi-level approach, linking local through global actors and initiatives
- Guiding GEM Principles:
 - Collaboration
 - Credibility
 - Openness
 - Public-good



General Modelling Framework

Divided into the 3 main components of risk:

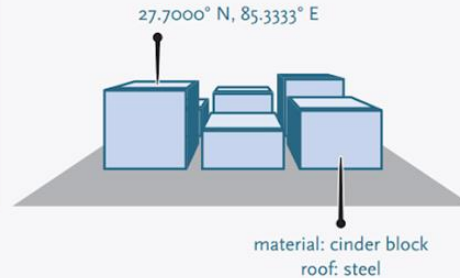
HAZARD

The likelihood, probability, or chance of a potentially destructive phenomenon.



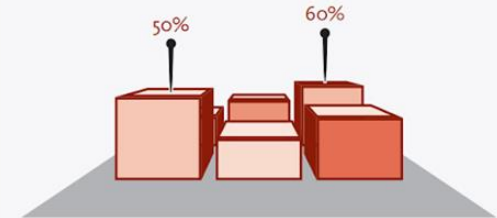
EXPOSURE

The location, attributes, and values of assets that are important to communities.



VULNERABILITY

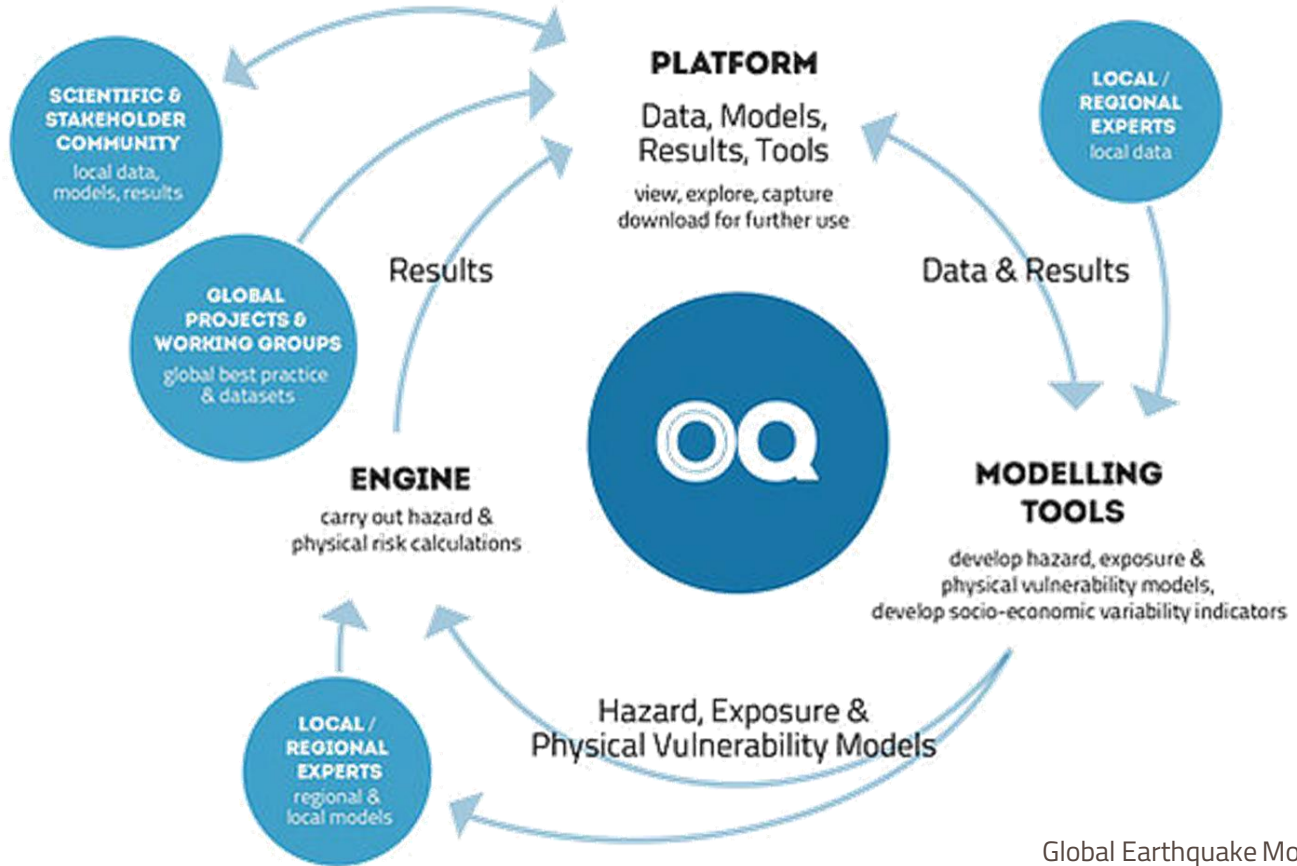
The likelihood that assets will be damaged or destroyed when exposed to a hazard event.



Seismic Risk Metrics



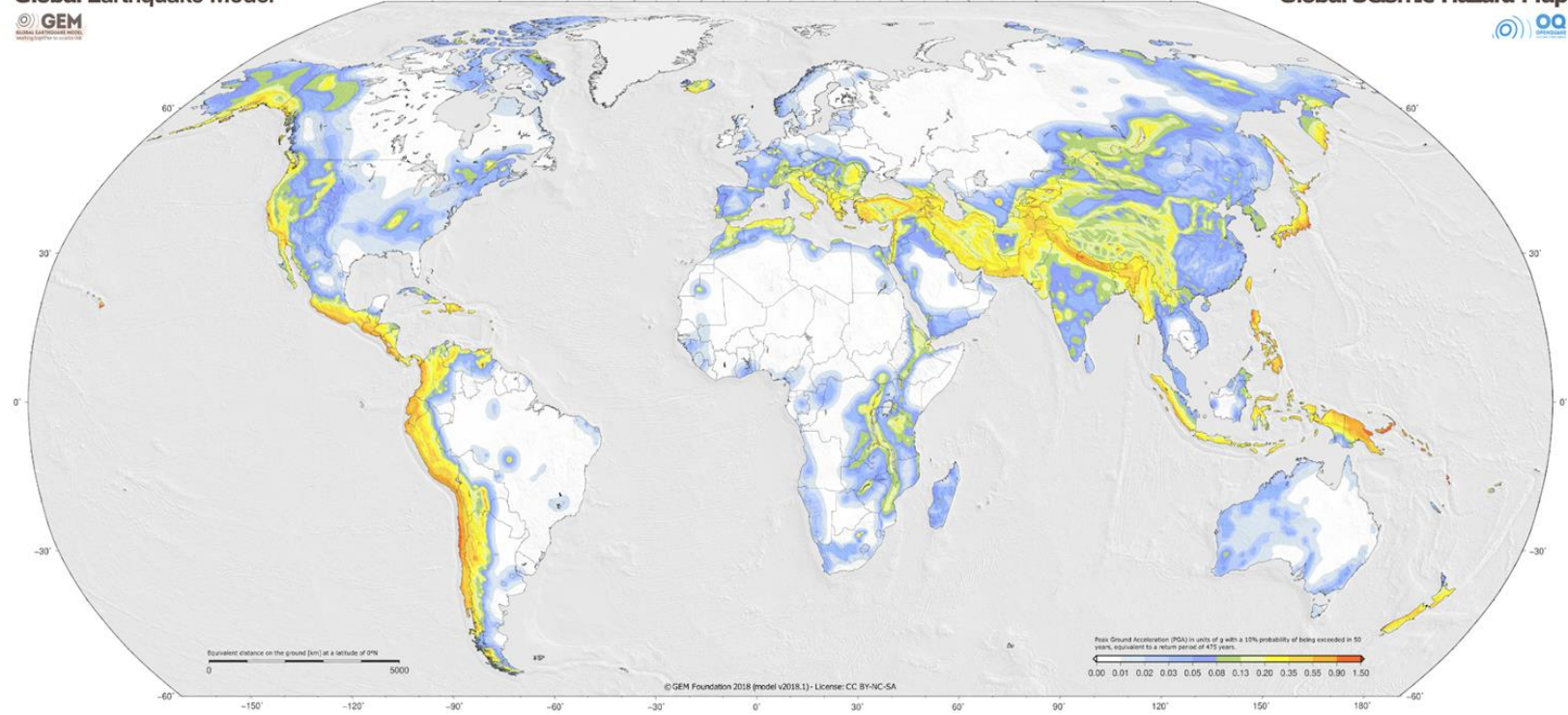
Open Source Software: OpenQuake Engine



General Modelling Framework – Seismic Hazard



Global Earthquake Model

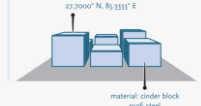


Global Seismic Hazard Map

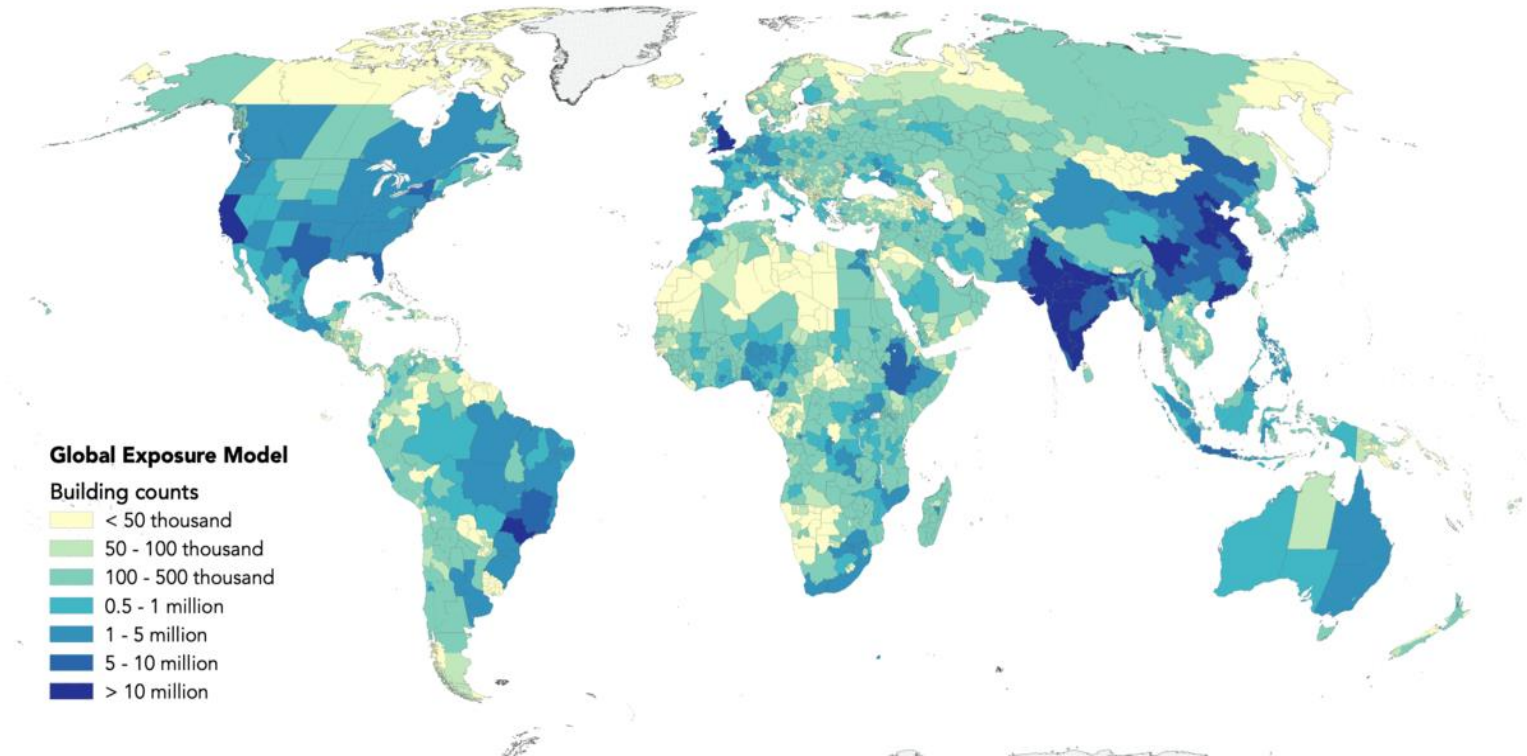


General Modelling Framework - Exposure

EXPOSURE
The location, attributes, and values of assets that are important to communities.



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Global Earthquake Model

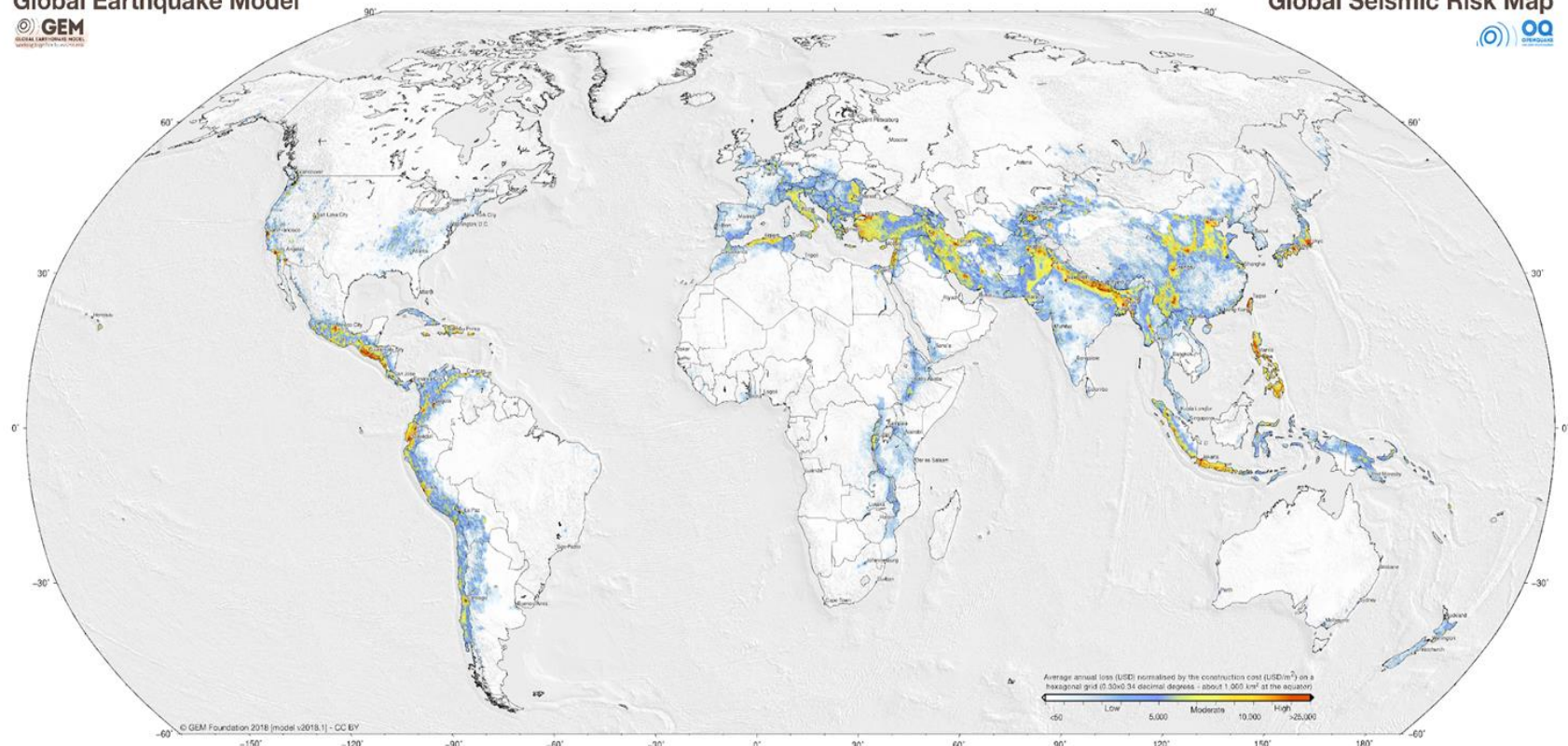


General Modelling Framework – Seismic Risk

Global Earthquake Model



Global Seismic Risk Map

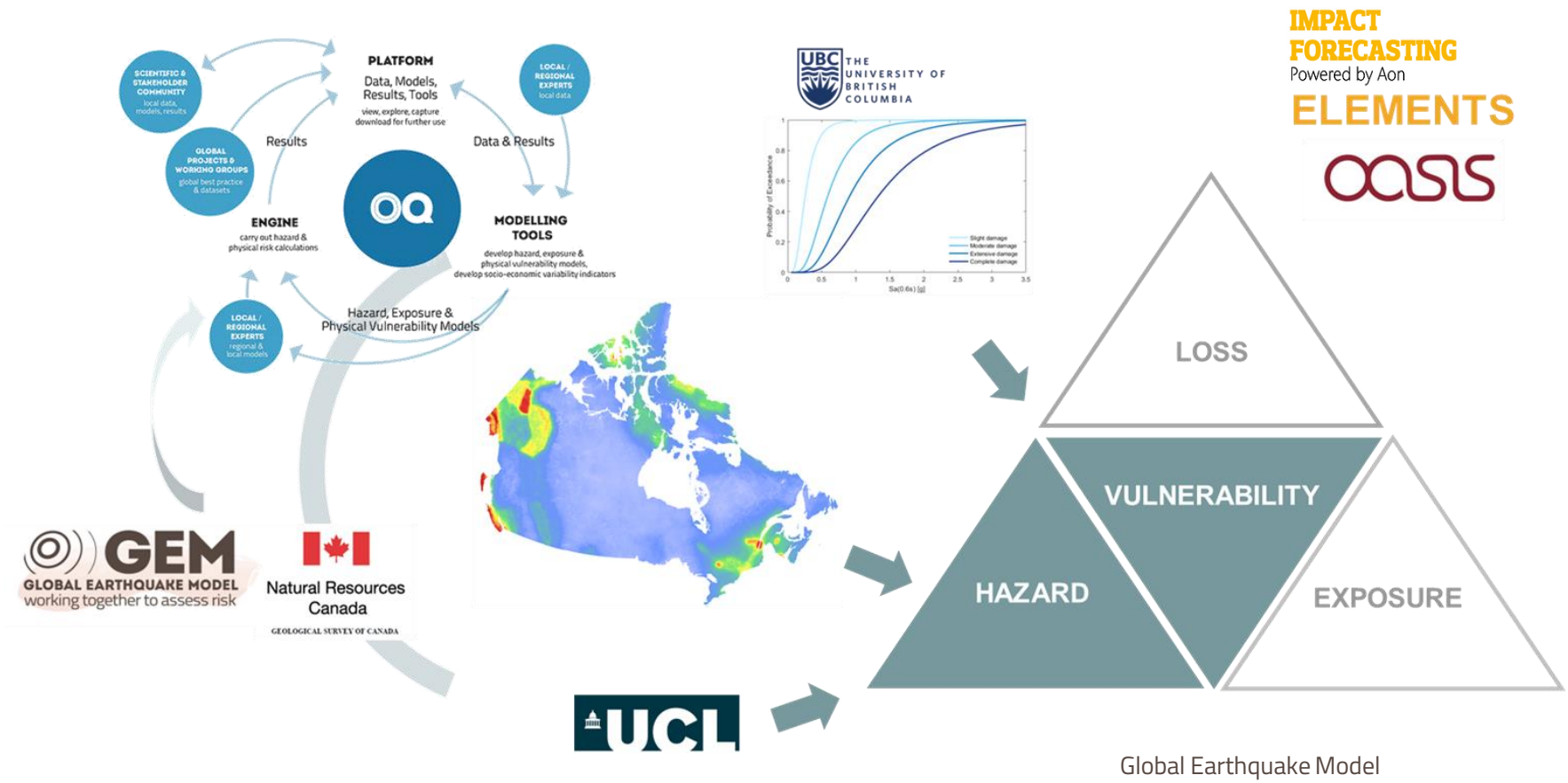


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Global Earthquake Model



Use Case: Canada Risk Model for DRR Policy and Insurance

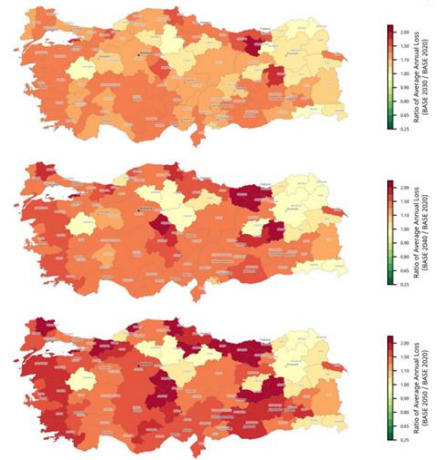


Use Case: Turkey National Risk Assessment

Risk to critical infrastructure for World Bank



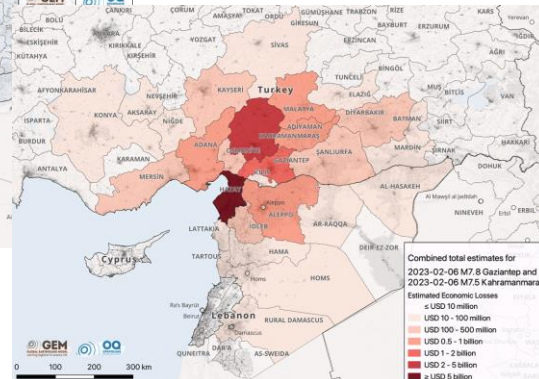
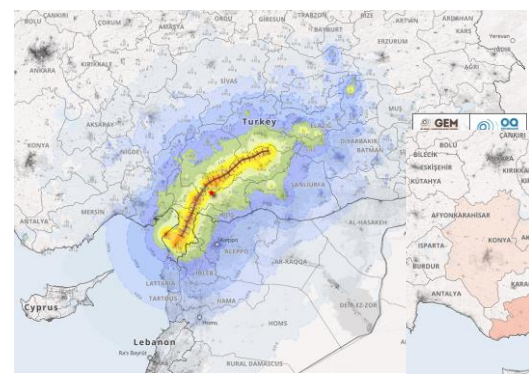
2020 - 2050



- Considers evolution of risk to 2050
- Used to appraise a WB loan of \$265M

Early Response Assessment for Recent Earthquakes

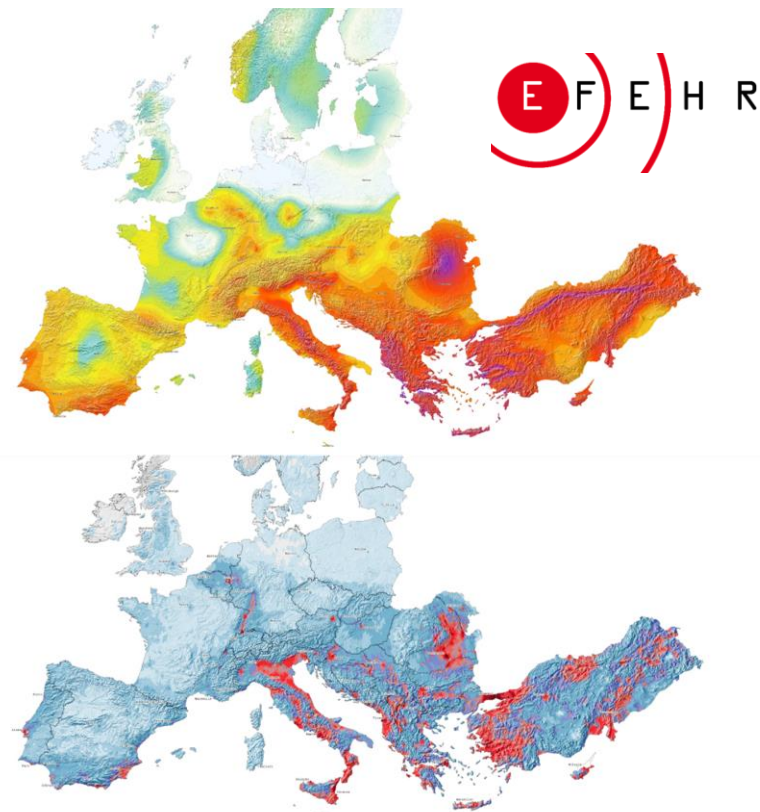
- Within 48 hours for Search & Rescue operations
- Damage and economic cost



Use Case: Open Seismic Hazard & Risk Model for Europe

European Seismic Hazard and Risk Model

- Provides the basis for engineering regulations in the area (CEN/TC 250/SC 8)
- Contributes to the development of Eurocode 8 within the European Committee for Standardization (CEN)
- Used by insurance and reinsurance companies

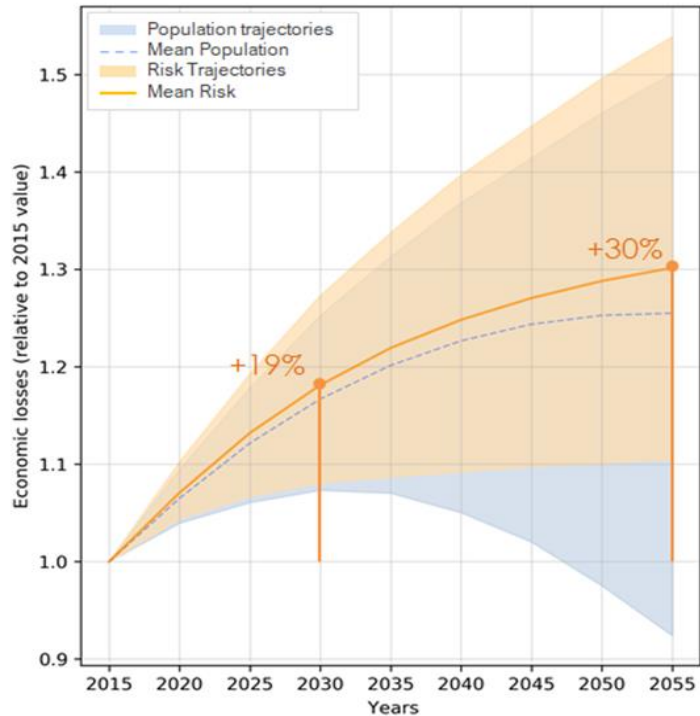


Global Earthquake Model

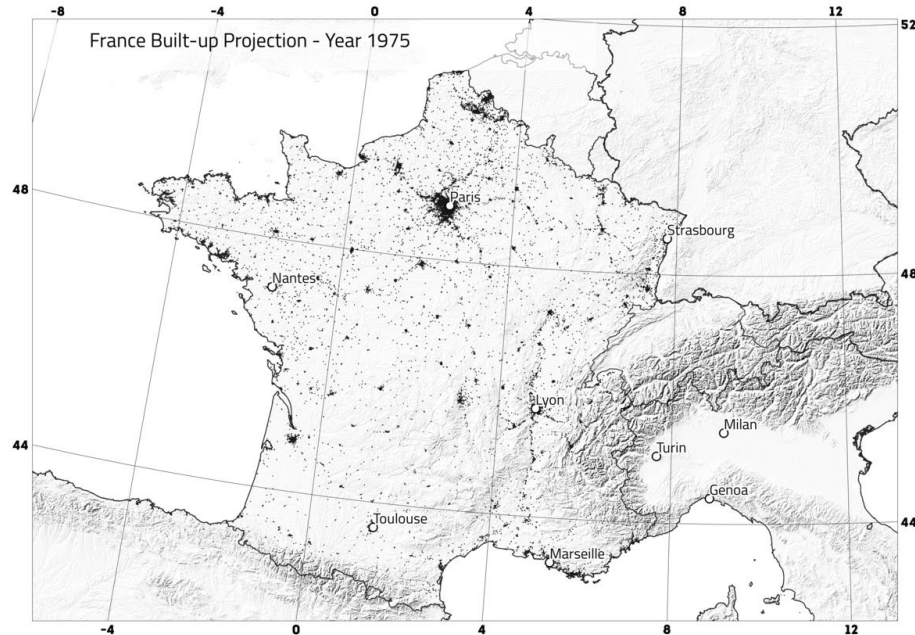


Future Exposure – for Multi-hazard Risk Assessment

- Multiple climate scenarios



- Projections based on population, road density, slope, elevation, ...





Global Earthquake Model



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