Transparent Global Seismic Hazard and Risk Assessment

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Vulnerability to earthquakes is increasing, yet advanced reliable risk assessment tools and data are inaccessible to most, despite being a critical basis for managing risk. Also, there are few, if any, global standards that allow us to compare risk between various locations. The Global Earthquake Model (GEM) is a unique collaborative effort that aims to provide organizations and individuals with tools and resources for transparent assessment of earthquake risk anywhere in the world. By pooling data, knowledge and people, GEM acts as an international forum for collaboration and exchange, and leverages the knowledge of leading experts for the benefit of society.

Sharing of data and risk information, best practices, and approaches across the globe is key to assessing risk more effectively. Through global projects, open-source IT development and collaborations with more than 10 regions, leading experts are collaboratively developing unique global datasets, best practice, open tools and models for seismic hazard and risk assessment. Guided by the needs and experiences of governments, companies and citizens at large, they work in continuous interaction with the wider community. A continuously expanding public-private partnership constitutes the GEM Foundation, which drives the collaborative GEM effort.

An integrated and holistic approach to risk is key to GEM's risk assessment platform, OpenQuake, that integrates all above-mentioned contributions and will become available towards the end of 2014. Stakeholders worldwide will be able to calculate, visualise and investigate earthquake risk, capture new data and to share their findings for joint learning. Homogenized information on hazard can be combined with data on exposure (buildings, population) and data on their vulnerability, for loss assessment around the globe. Furthermore, for a true integrated view of seismic risk, users can add social vulnerability and resilience indices to maps and estimate the costs and benefits of different risk management measures.

The following global data, models and methodologies will be available in the platform. Some of these will be released to the public already before, such as the ISC-GEM global instrumental catalogue (released January 2013).
Datasets:
• Global Earthquake History Catalogue [1000-1903]
• Global Instrumental Catalogue [1900-2009]
• Global Geodetic Strain Rate Model
• Global Active Fault Database
• Tectonic Regionalisation
• Buildings and Population Database
• Earthquake Consequences Database
• Physical Vulnerability Database
• Socio-Economic Vulnerability and Resilience Indicators
Models:
• Seismic Source Models
• Ground Motion (Attenuation) Models
• Physical Exposure Models
• Physical Vulnerability Models
• Composite Index Models (social vulnerability, resilience, indirect loss)

The aforementioned models developed under the GEM framework will be combined to produce estimates of hazard and risk at a global scale. Furthermore, building on many ongoing efforts and knowledge of scientists worldwide, GEM will integrate state-of-the-art data, models, results and open-source tools into a single platform that is to serve as a "clearinghouse" on seismic risk. The platform will continue to increase in value, in particular for use in local contexts, through contributions and collaborations with scientists and organisations worldwide.