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OpenQuake, a platform for collaborative seismic hazard and risk assessment

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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, tools and models for global seismic hazard and risk assessment, within the context of the Global Earthquake Model (GEM). Guided by the needs and experiences of governments, companies and international organisations, all contributions are being integrated into OpenQuake: a web-based platform that – together with other resources – will become accessible in 2014.

With OpenQuake, stakeholders worldwide will be able to calculate, visualize and investigate earthquake hazard and risk, capture new data and share findings for joint learning. The platform is envisaged as a collaborative hub for earthquake risk assessment, used at global and local scales, around which an active network of users has formed. OpenQuake will comprise both online and offline tools, many of which can also be used independently.

One of the first steps in OpenQuake development was the creation of open-source software for advanced seismic hazard and risk calculations at any scale, the OpenQuake Engine. Although in continuous development, a command-line version of the software is already being test-driven and used by hundreds worldwide; from non-profits in Central Asia, seismologists in sub-Saharan Africa and companies in South Asia to the European seismic hazard harmonization programme (SHARE). In addition, several technical trainings were organized with scientists from different regions of the world (sub-Saharan Africa, Central Asia, Asia-Pacific) to introduce the engine and other OpenQuake tools to the community, something that will continue to happen over the coming years.

Other tools that are being developed of direct interest to the hazard community are:
• OpenQuake Modeller; fundamental instruments for the creation of seismogenic input models for seismic hazard assessment, a critical input to the OpenQuake Engine. OpenQuake Modeller will consist of a suite of tools (Hazard Modellers Toolkit) for characterizing the seismogenic sources of earthquakes and their models of earthquakes recurrence. An earthquake catalogue homogenization tool, for integration, statistical comparison and user-defined harmonization of multiple catalogues of earthquakes is also included in the OpenQuake modeling tools.
• A data capture tool for active faults; a tool that allows geologists to draw (new) fault discoveries on a map in an intuitive GIS-environment and add details on the fault through the tool. This data, once quality checked, can then be integrated with the global active faults database, which will increase in value with every new fault insertion.

Building on many ongoing efforts and the knowledge of scientists worldwide, GEM will for the first time integrate state-of-the-art data, models, results and open-source tools into a single platform. The platform will continue to increase in value, in particular for use in local contexts, through contributions from and collaborations with scientists and organisations worldwide.

This presentation will showcase the OpenQuake Platform, focusing on the IT solutions that have been adopted as well as the added value that the platform will bring to scientists worldwide.