

Background to GEM's Risk Request for Proposals

Following the online peer review of the draft risk Request for Proposals (RfPs), it became clear that an additional document was needed to summarise the mechanisms and requirements of GEM and the rationale behind the 5 RfPs and how they are expected to fit together. Consortia that are intending to bid for any of the 5 RfPs are advised to read this document carefully and follow any of the recommendations made herein. For any more information on the Global Earthquake Model, please visit the GEM website (www.globalquakemodel.org).

Building GEM

GEM will provide state-of-the-art open-source software and databases as a necessary basis for reliably mapping, monitoring and communicating earthquake risk. The GEM scientific framework serves as the underlying basis for constructing the model, and is organised in three principal integrated modules:

- Seismic Hazard
- Seismic Risk
- Socio-Economic Impact

The Seismic Risk module provides the basis for calculations of damage and direct losses resulting from this damage such as fatalities, injuries and cost of repair. Damage due to strong ground shaking is calculated by combining building vulnerability, population vulnerability and exposure. GEM will furthermore develop remote sensing and crowd data collection techniques to classify, monitor and regularly update building inventory data and thus regional vulnerability.

Global Components are part of the scientific modules of GEM that are developed at a global scale. These components will be addressed by international consortia that respond to Requests for Proposals (RfPs) released periodically by the Scientific Board of GEM. The output of the Global Components, that includes standards, models, tools and data, will be reviewed by a Technical Advisory Panel (TAP) to ensure uniformity and conformance with the highest scientific standards and the needs of the Global Earthquake Model.

The output of the Global Components will be assembled and maintained at GEM's Model Facility (GMF), which provides the IT infrastructure and thus the capability to compute, analyse and communicate global harmonised hazard, risk and socio-economic impact products.

The GEM Executive Committee will coordinate the interaction between the different Global Components and the Regional Programmes, which are independent projects that will trial and test the standards and software, providing necessary feedback and data.

Risk Requests for Proposals

The following 5 Risk Global Components have been defined and Requests for Proposals have been drafted and subsequently modified, based on the feedback from the Risk community through the online commenting system on the GEM website¹:

- GEM Ontology and Taxonomy
- Global Exposure Database
- Global Earthquake Consequences Database
- Inventory Data Capture Tools
- Global Vulnerability Estimation Methods

¹ It is noted that the responses to the published comments are available on the GEM website.

The text for each of these RfPs can be downloaded here: www.globalquakemodel.org/node/373.

A key Global Component is the GEM Ontology and Taxonomy which will be required to collaborate intensively with the 4 other risk global components (in addition to the global components in Hazard and Socio-Economic Impact) in order to define the framework that will guide GEM's development and the classification and order of the parameters involved in risk assessment. The RfP for this component is being released with the other Risk RfPs, but it is noted that the aim will be to define an ontology and taxonomy for the whole scientific framework of GEM. It is noted that during this first 5-year phase of GEM, the emphasis will be placed on buildings (residential and commercial) due to budget and time constraints, whilst future extensions are expected to consider infrastructure/lifelines.

The consortia working on Global Exposure Database, Global Vulnerability Estimation Methods and Global Earthquake Consequences Database will all have to follow the same taxonomy of building typologies, which will be defined together with the GEM Ontology and Taxonomy consortium. The Global Exposure Database (GED) is expected to collect inventory data using conventional methods and existing data, whilst for the future updating of the Global Earthquake Model the Inventory Data Capture Tools consortium will produce tools of use for extracting building inventory information from satellite images, street surveys, crowd data collection etc. The GED will be expected thus to ensure that the database can be updated using data from the aforementioned tools. Furthermore, the other two global components will all be served by the Inventory Data Capture Tools module which will provide tools for collection data for defining building inventories and information of use for calculating vulnerability, including post-earthquake damage data. The Global Vulnerability Estimation Methods consortium will be expected to use the damage data collected in the Global Earthquake Consequences Database to compare and calibrate the vulnerability methods and functions, and thus both modules will need to use the same damage and loss scales, which will again be defined together with the GEM Ontology and Taxonomy group. An illustration of how GEM thus envisages that these Risk Global Components will fit together is shown in the figure below, though it is noted that there will obviously be many more interactions and collaborations between the consortia.

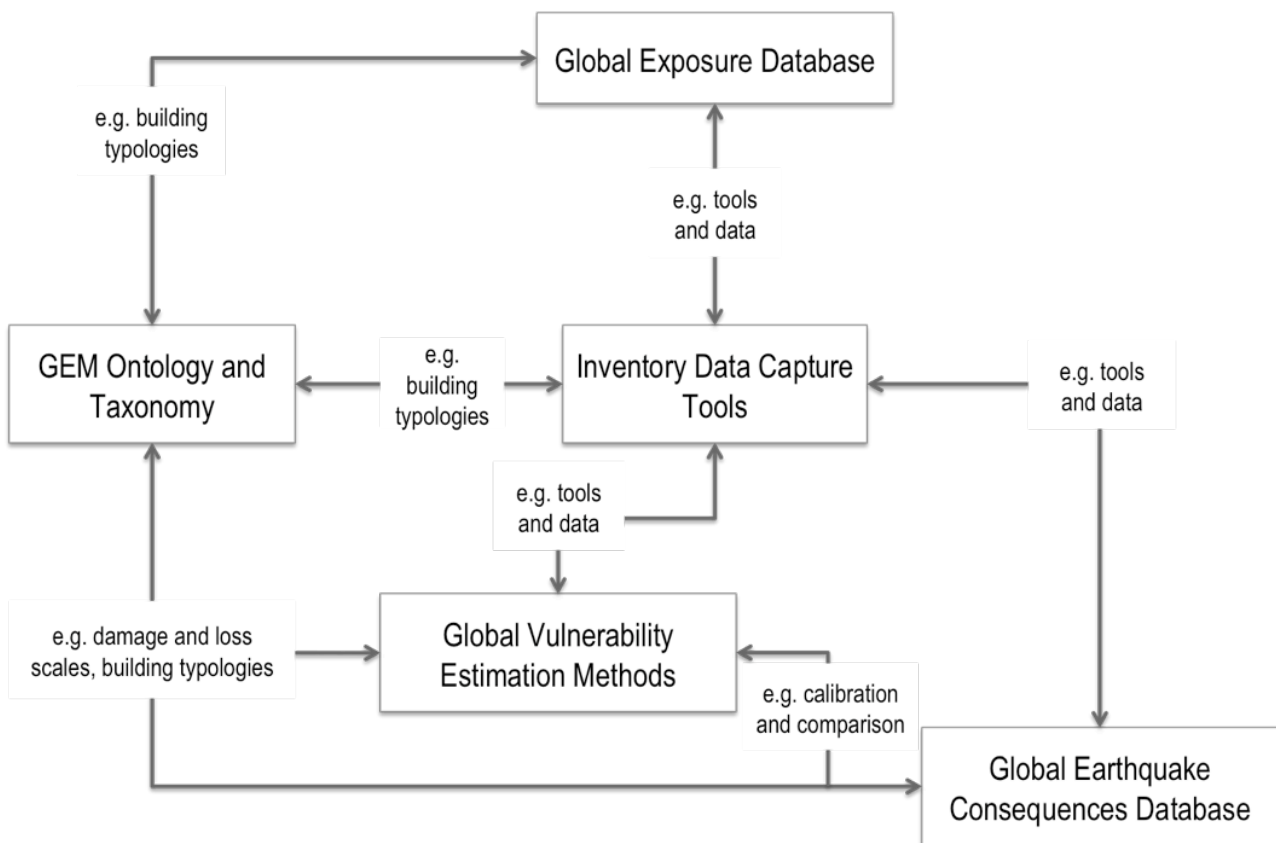


Figure 1. Illustrative diagram of the interaction between the 5 Risk RfPs

Risk RfPs Timeline

All of the 5 RfPs are expected to last between 30 and 36 months. However, GEM will expect a number of intermediate results and products to be delivered during this period and the bidding consortium should identify within their proposals the intermediate deliverables that they intend to provide.

While the GEM Ontology and Taxonomy global component is expected to be of 36 months duration, it is clear from the previous description that a significant portion of its effort should occur during the first 6 months of the project, and thus the consortium bidding for this RfP should explain how they will utilise the resources to reach this goal. Therefore, while the taxonomy and terminology etc. will need to be dynamic and updatable throughout the project, it is anticipated that there will be a significant reduction in effort past the first 6 months. Each of the other global components will also need to plan for emphasis to be placed on defining ontology and taxonomy during their first 6 months so that they can provide their input to its initial development.

The Global Exposure Database (GED) consortium will be expected to provide intermediate versions of the database after each 12 months as there is a wealth of existing data that can be utilised in the initial phases of the project. Likewise, the Global Vulnerability Estimation Methods consortium should aim to provide vulnerability methods and functions for the most predominant building typologies (identified together with the GED consortium) within 18 months.

Support from GEM

In addition to funding the Global Components for the budgets identified in the RfPs, GEM will also strive to provide additional in-kind support to the consortia in obtaining data, where possible; for example, census data will be requested from the countries that adhere to GEM for the Global Exposure Database, agreements with providers of satellite images will be sought to aid the Inventory Data Capture Tools group, requests will be made for the 3D models produced by telecommunications companies and so on.

GEM's Copyright, Open Source and Open Access Policy

The prospective consortia should be aware when preparing their proposal of GEM's policy on copyrights, open source software and open access data. The following bullet points summarise the main characteristics of this policy:

- A GNU GPL (General Public License) will be used to regulate the software;
- An AGPL (Affero General Public License) will be used for web applications;
- A Creative Commons Share-Alike license (CCby-sa) will be used for creative content;
- An Open Database License (ODbL) and Database Contents License (DbCL) will be employed for databases and contents, respectively, if GEM controls the rights of both; otherwise, an ODbL will be used for data outputs generated by GEM whilst another license will need to be agreed upon on a case-by-case basis with those that control the rights of the database contents;
- Software should be patent free;
- Contributor license or copyright transfer agreements will have to be signed.

A more detailed report on this policy is available and further details will be discussed with the winning consortia during the contract negotiation phase.