

# The GEM Database of Seismic Hazard Models

Here you can find information about the OpenQuake-engine implementation of different seismic hazard models around the world.

The models provided herein represent GEM's interpretation of the original models proposed by National Agencies and International Projects. These models were created by GEM, in the attempt of reproducing in the most faithful way possible the original models but they ARE NOT intended to be an alternative nor a replacement implementation of the original models.

GEM provides them recognising importance, authoritativeness and, transparency of the original models, for the purpose of open collaboration and in the hope that it will be useful to the scientific, engineering, disaster risk and software design communities.

Scroll down to find the links where you can learn more about each hazard model. Example results computed for each of these models can be accessed through the hazard models explorer available in the [OpenQuake-platform](#).

Total occurrence rate  
(number of events / year)

- < 1e-6
- 1e-6 - 1e-5
- 1e-5 - 1e-4
- 1e-4 - 1e-3
- 1e-3 - 1e-2
- 1e-2 - 1e-1
- 1e-1 - 1
- 1 - 10
- > 10

```
.my-legend .legend-title { text-align: left; margin-bottom: 5px; font-weight: bold; font-size: 80%; }  
.my-legend .legend-scale ul { margin: 0; margin-bottom: 5px; padding: 0; float: left; list-style: none; }  
.my-legend .legend-scale ul li { font-size: 80%; list-style: none; margin-left: 0; line-height: 18px; margin-bottom: 2px; }  
.my-legend ul.legend-labels li span { display: block; float: left; height: 16px; width: 30px; margin-right: 5px; margin-left: 0; border: 1px solid #999; }  
.my-legend .legend-source { font-size: 70%; color: #999; clear: both; }  
.my-legend a { color: #777; }
```

## GEM Regional Programmes

1. EMCA (Earthquake Model for Central Asia) - For more information see the [EMCA website](#)
2. EMME (Earthquake Model of the Middle-East) - For more information see the [EMME website](#) on the EFEHR portal
3. [SARA \(South America Risk Assessment\) - 2016](#)
4. [SHARE \(Seismic Hazard Harmonisation in Europe\) - 2013](#)
5. [SSAHARA \(Sub-Saharan Africa Hazard and Risk Assessment\) - 2016](#)
6. [CCARA \(Caribbean and Central America Risk Assessment\) - 2018](#)

## Regional/National Models

1. [Alaska - USGS \(United States Geological Survey\) - 2007](#)
2. [Australia - GA \(Geoscience Australia\) - 2012](#)
3. [Canada - GSC \(Geological Survey of Canada\) - 2010](#)
4. [Caribbean - Lesser Antilles - GEOTER - 2002](#)
5. [Central America - RESIS II - 2010](#)
6. [Cuba and surrounding areas - Garcia et al. 2003](#)
7. [Italy - INGV - 2016](#)
8. [Japan - NIED \(National Research Institute for Earth Science and Disaster Prevention\) - 2012](#)
9. [New Zealand - GNS Science - 2012](#)
10. [Papua New Guinea - 2016](#)
11. [South America - USGS \(United States Geological Survey\) - 2010](#)
12. [South East Asia - USGS \(United States Geological Survey\) - 2007](#)
13. [Switzerland - SED-ETH - 2015](#)
14. [Taiwan - TEM \(Taiwan Earthquake Model\) - 2015](#)
15. [Turkey - KOERI - 2016](#)
16. [United States - USGS \(United States Geological Survey\) - 2008](#)

## Acknowledgements

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- The [Geological Survey of Canada](#) for providing us with access to the 2005 and 2010 models
- [Geoscience Australia](#) for making their 2012 model publicly available.
- Geoter, BRGM and the French Ministère en charge du Développement Durable for making information about the Lesser Antilles (2002) model publicly accessible - [Le site internet de la prévention du risque sismique](#)
- The authors of the Cuba (2003) model for providing access to it
- [GNS Science](#) for sharing their 2012 hazard model for New Zealand
- The [National Research Institute for Earth Science and Disaster Prevention](#) for making their 2012 model openly available and for the valuable collaboration offered
- The RESIS II working group for giving us access to the RESIS II (2012) model
- The large team of scientists which worked at the development of the [SHARE](#) (2013) model for Europe. Their contribution to the development of the OpenQuake-engine is also kindly acknowledged.

- The [Taiwan Earthquake Model](#) for sharing with GEM their new model for Taiwan and for actively supporting and collaborating with GEM
- The [USGS National Seismic Hazard Mapping Project](#) for making the following models publicly available: Alaska (2007), South East Asia (2007), United States (2008), South America (2010) and - more in general - for the openly sharing models and software
- The members of the [OpenSHA](#) team (N. Field, P. Powers, K. Milner) for the valuable collaboration during the GEM1 project.

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