

SHARE: Seismic Hazard Harmonization in Europe

SHARE successfully delivered a Euro-Mediterranean wide probabilistic seismic hazard assessment across multiple disciplines spanning from geology to seismology and earthquake engineering. The project built a framework for integration across national borders, compiled relevant earthquake and fault data, and developed a sustainable, high-impact authoritative community-based hazard model assembled by seeking extensive expert elicitation and participation through multiple community feedback procedures.

SHARE has established a quality-controlled computational infrastructure that enabled to deliver all products that are of key interest to the seismological and engineering community as well as for the public and policy makers. SHARE spearheads regional scale hazard assessment programs releasing an unprecedented range of products: large data resources are freely available to stimulate research and a large range of hazard results is ready to be used in multiple engineering applications and decision making processes.

As input to the new hazard mapping, SHARE introduced new standards and databases, including a new European historical and instrumental catalogue (SHEEC), a new database of active faults with over 64'000 km of mapped faults, a full-logic tree of Ground-Motion Prediction Equations covering the main tectonic regions, a new model of maximum magnitude for the whole region, a new regional reference geodetic mapping, three independent models expressing the expected recurrence of earthquakes in the future (based on different combinations of area sources, distributed seismicity and larger events concentrated on faults), new procedures for expert elicitation and the description of aleatory uncertainty.

SHARE produces a legacy of more than sixty time-independent European Seismic Hazard Maps (ESHMs) spanning spectral ordinates from PGA to 10 seconds and exceedance probabilities ranging from 10^{-1} to 10^{-4} yearly probability. The hazard values are referenced to a rock velocity of $v_{s30}=800\text{m/s}$ at 30m depth. SHARE models earthquakes as finite ruptures and includes all events with magnitudes $M_w \geq 4.5$ in the computation of hazard values. SHARE introduces an innovative weighting scheme that reflects the importance of the input data sets considering their time horizon, thus emphasizing the geologic knowledge for products with longer time horizons and seismological data for shorter ones.

Single-site hazard products such as uniform hazard spectra and disaggregation are available for locations on-land at a spacing of about 10km summing up to more than 120,000 sites. The products reflect essential information including all uncertainties that contribute when assessing seismic hazard and are suitable to serve as reference for engineering applications as well as for insurance purposes. The wealth of output products is available through a web portal that provides access to mapped and single site hazard information. All products as well as the input data are accessible and documented on the SHARE website (www.share-eu.org) and via the SHARE portal. The SHARE portal will be integrated in the European Facility for Earthquake Hazard and Risk (EFEHR), the European access point for hazard and risk information of the European earthquake data and products portal (www.seismicportal.eu).

The SHARE products will impact the assessment of seismic hazard by setting a European and worldwide standard. SHARE proposes new pathways to develop the next European seismic zonation map and also proposes parameters essential for new seismic design practices. On the European Community level, long lasting impact is expected by serving as reference model for the Eurocode 8 revisions, owing to the participation of the CEN/TC250/SC8 committee members in the project. At global level, the procedural implementation already is serving as guideline for other regional projects within the Global Earthquake Model (GEM) initiative.

Contact details:

Prof. D. Giardini, Coordinator
Chair of Seismology and Geodynamics
ETH Zurich, NO H69.1
Sonneggstrasse 5
CH-8092 Zürich
Switzerland
tel: +41-44-6332610

Dr. J. Wössner, Project Manager
ETH Zürich, Swiss Seismological Service
NO H67
Sonneggstrasse 5
CH-8092 Zürich
Switzerland
tel: +41-44-6337591

Grant Agreement no.: 226967
Project acronym: SHARE
Project title: Seismic Hazard Harmonization in Europe
Funding Scheme: FP7-CP-FP
Period covered: from 01/06/2009 to 30/11/2012