SERA
Seismology and Earthquake Engineering
Research Infrastructure Alliance for Europe

WP 26: European Exposure data for seismic risk modelling

H. Crowley, V. Despotaki, D. Rodrigues, V. Silva, D. Toma-Danila, E. Riga, A. Karatzetzou, S. Fotopoulou, L. Sousa, S. Ozcebe, P. Gamba, & Contributors)

Keywords

Seismic risk, European exposure, buildings, population

Figure

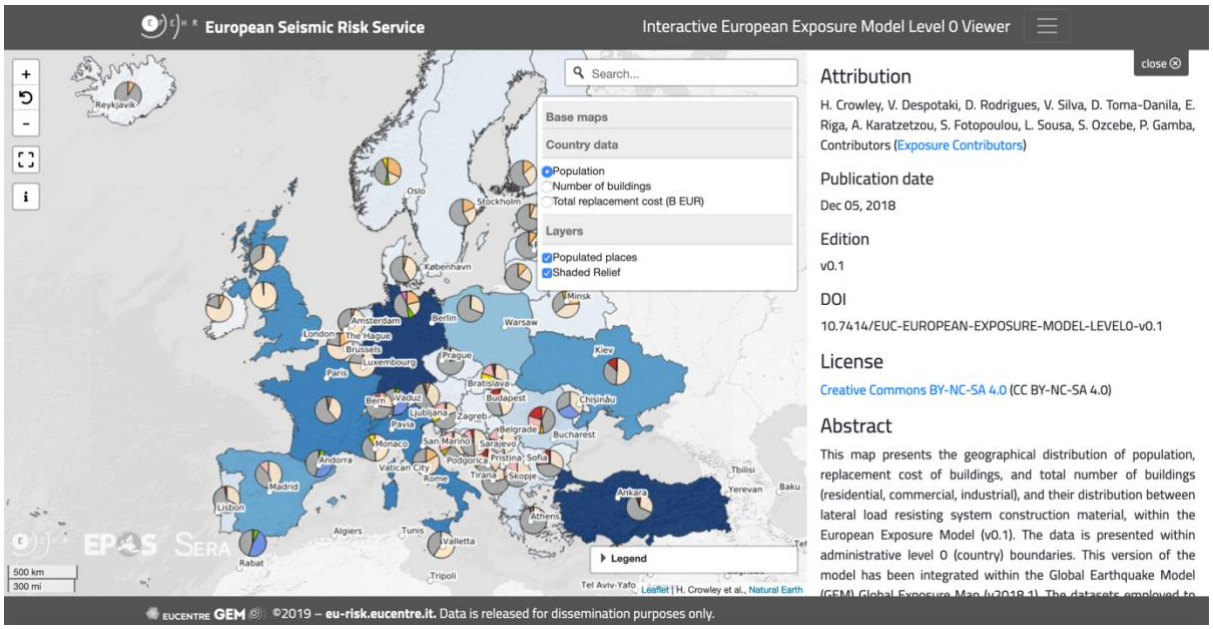

Figure 1. Interactive European Exposure Model

Main Results

One of the main results of JRA4 that has been achieved relates to the development of the European Exposure Model, which provides the geographical distribution of population, replacement cost of buildings, and total number of buildings (residential, commercial, industrial), and their distribution between different construction materials. The data presented in the figure above is within administrative level 0 (country) boundaries, but it has also been developed at a higher resolution that will be released at the end of the SERA project. This version of the model shown above has been integrated within the Global Earthquake Model (GEM) Global Exposure Map (v2018.1) that was used in the Global Seismic Risk Map (v2018.1). The datasets employed to develop this exposure model were publicly provided through national institutions and local experts. The European Exposure Model is intended to be a dynamic product, such that it may be updated when new datasets and models become available.

This European Exposure Model has been released through the new European Seismic Risk Service (https://eu-risk.eucentre.it) which is part of the European Facilities for Earthquake Hazard and Risk

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730900.

(EFEHR), a non-profit network of organisations and community resources aimed at advancing earthquake hazard and risk assessment in the European-Mediterranean area. The new risk service of EFEHR has been set up with the main objective of providing interactive access to the seismic risk products that will be developed by the end of the SERA project, which in addition to exposure data and models will include the following:

- European capacity curves, fragility, consequence and vulnerability models.
- European seismic risk results in terms of average annual loss (AAL), probable maximum loss (PML), and risk maps in terms of economic loss and fatalities for specific return periods and indicators of the Sendai Framework for Disaster Risk Reduction.
- Methods and data to test and evaluate the components of seismic risk models.
- Documentation on all of the datasets and models.
- Scientific support on the development of the models and seismic risk computations.

List of Publications

Crowley, H., Rodrigues, D., Silva, V., Despotaki, V., Marins, L., Romão, X., Castro, J.M., Pereira, N., Pomonis, A., Lemoine, A., Roullé, A., Tourlière, B., Weatherill, G., Pitilakis, K., Danciu, L., Correira, A.A., Akkar, S., Hancilar, U., Covi, P. (2019). "The European Seismic Risk model 2020 (ESRM20)," *Proceedings of 2nd International Conference on Natural Hazards and Infrastructure*, ICONHIC 2019

Crowley, H., Despotaki, V., Rodrigues, D., Silva, V., Toma-Danila, D., Riga, E., Karatzetsou, A., Sousa, L., Ozcebe, S., Zugic, Z. & Gamba, P. (2019). "Exposure model for European Seismic Risk Assessment," *Earthquake Spectra*, *accepted for publication*.

Access to Data and Services

You can access the European exposure data through interactive viewers (https://maps.eu-risk.eucentre.it/) or through web services. For example, you can bring the exposure layers shown in the figure above into QGIS by first copying the WMS or WMTS links you find on this page: https://eu-risk.eucentre.it/web-services/. Then, in the Browser of QGIS you should right click the WMS/WMTS option and choose 'New Connection' and copy the URL in the box that pops up (giving it an appropriate name).