



Status, Milestones and Next Activities on the Development of the 2020 European Seismic Hazard Model (ESHM20)

Laurentiu Danciu (1), Stefan Hiemer (1), Shyam Nandan (1), Graeme Weatherill (2), Steffi Lammers (2), Andrea Rovida (3), Andrea Antonucci (3), Roberto Basili (4), Michele M.C. Carafa (4), Vanja Kastelic (4), Francesco E. Maesano (4), Mara M. Tiberti (4), Karin Sesetyan (5), Susana Vilanova (6), Céline Beauval (7), Pierre-Yves Bard (7), Fabrice Cotton (2), Stefan Wiemer (1), and Domenico Giardini (8)

(1) Swiss Seismological Service, ETH Zurich, Sonneggstrasse 5, 8092 Zurich, Switzerland, (2) German Research Centre for Geosciences (GFZ), Section 2.6 Seismic Hazard & Risk Dynamics, 14473 Potsdam, Germany, (3) Istituto Nazionale di Geofisica e Vulcanologia (INGV), 20133 Milan, Italy, (4) Istituto Nazionale di Geofisica e Vulcanologia (INGV), 00143 Rome, Italy, (5) Bogazici University, Kandilli Observatory and Earthquake Research Institute, Department of Earthquake Engineering, 34684, Cengelkoy, Istanbul, Turkey, (6) Instituto Superior Tecnico (IST), 1049-001 Lisboa, Portugal, (7) Institut des Sciences de la Terre (ISTerre), IRD, 38058 Grenoble, France, (8) Institute of Geophysics, ETH Zurich, Sonneggstrasse 5, 8092 Zurich, Switzerland

Knowledge of seismic hazard provides a key input to evaluate and further mitigate the seismic risk in earthquake prone regions. In Europe, within the Joint Research Activities (JRA3) in Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe (SERA) Project (www.sera-eu.org) there are ongoing activities to update the 2013 European Seismic Hazard Model (ESHM13, Woessner et al 2015). Starting with the SERA kick-off meeting in April, 2017, significant progress has been achieved in the compilation of national seismic hazard models, updates to the instrumental and historical earthquake catalogues, compilation of crustal and subduction fault sources, development of new ground motion models, improvement of methods for data analysis, as well as development of the seismogenic source models to capture the intrinsic uncertainties.

In this contribution, we present the results of the SERA JRA3 working group, with a focus upon the compilation and analysis of the European Earthquake Catalogue (SHEEC v.4.0), insights into the methods used to assess the spatial and temporal completeness of the earthquake catalogues, the results of a sensitivity analysis of the declustering technique, as well as their impact on estimation of the seismic activity rates.

The newly developed seismogenic source model encompasses a fully harmonized, cross-border seismogenic source model following the recent national hazard models developed after the completion of the ESHM13. The inherent uncertainties in characterizing the earthquake rupture forecast are handled by a complex logic tree, consisting of two main models (branches): an area source-based model and a hybrid fault-smoothed seismicity model. The master logic tree will combine the earthquake rate forecast with the ground motion characteristic models into a computational model for assessing the earthquake ground shaking at the pan-European scale.

Finally, we conclude with an overview of the next steps and the milestones towards the 2020 European Seismic Hazard Model (ESHM20).