

## Preparation of the unified earthquake catalogue for the Western Balkan Region

Snjezana Markušić (1), Zeynep Gülerce (2), Neki Kuka (3), Llambro Duni (3), Ines Ivančić (1), Jadranka Mihaljević (4), Svetlana Kovačević (5), Radmila Šalić (6), Zoran Milutinović (6), Slavica Radovanović (5), and Branislav Glavatović (4)

(1) Department of Geophysics, Faculty of Science, University of Zagreb, Zagreb, Croatia, (2) Civil Engineering Department, Middle East Technical University, Ankara, Turkey, (3) Institute of Geosciences, Energy, Water and Environment, Polytechnic University, Tirana, Albania, (4) Institute of Hydrometeorology and Seismology of Montenegro, Podgorica, Montenegro, (5) Seismological Survey of Serbia, Belgrade, Serbia, (6) Institute of Earthquake Engineering and Engineering Seismology (IZIIS), Ss. Cyril and Methodius University, Skopje, Macedonia

The project „Harmonization of Seismic Hazard Maps for the Western Balkan Countries Project“ (BSHAP) was funded for 7 years by NATO SfP Program as a collaboration between Albania, Bosnia and Herzegovina, Croatia, Montenegro, Macedonia, Serbia, Slovenia and Turkey. One of the most important outputs of this project is an unified earthquake catalogue (BSHAP earthquake catalogue) that covers the geographic area 38.0° - 47.5°N, 12.5° - 24.5°E (BSHAP area).

The first version of the BSHAP catalogue was compiled directly from provided regional earthquake datasets. After merging the national catalogues the search for duplicate events was done by an iterative and automated procedure based on several search criteria. To control the automated procedure, manual and automated quality checks were performed. The compiled catalogue was also enriched with data from global catalogues.

The moment magnitude was chosen as the uniform magnitude scale for the BSHAP catalogue, since it characterizes the earthquake size accurately. Considering that a variety of magnitude scales were assigned to the events, new separate empirical relations between various magnitude scales and  $M_w$  were developed for Albania, Croatia, Macedonia, Montenegro and Serbia, using errors-in-variables regression (EIVREG), a least squares data modeling technique in which observational errors on both dependent and independent variables are taken into account.

The final version of the BSHAP catalogue contains 26,118 earthquakes that occurred in the BSHAP area between 510 BC and 2012, of which 5,914 earthquakes were with magnitudes  $M_w \geq 3.5$  in the period 510BC-1969 and 19,230 earthquakes with magnitudes  $M_w \geq 3.0$  in the period 1970-2012. The average depth of events recorded in the whole BSHAP area after 1900 was found as 8.4 km.

The catalogue completeness thresholds were analyzed and completeness time intervals were estimated for different magnitude intervals.

The unified BSHAP catalogue is found to be compatible with the current well-established European and world-wide catalogues (e.g. ISC-GEM Global Instrumental Earthquake Catalogue, SHARE European Earthquake Catalogue – SHEEC ver 3.3) and represents a sound basis for analysis of the Western Balkan Region seismicity.