



## ShakeMapEU: Towards an Integrated European ShakeMap System

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The last few years have witnessed impressive improvements in strong-motion data curation and dissemination in the Euro-Mediterranean region. Two new modern strong-motion portals were developed within the EC-funded project NERA, mainly based on the European Integrated Waveform Data Archive (EIDA; <https://www.orfeus-eu.org/data/eida/>), namely: (a) an automatic peak-motion database (RRSM; <http://www.orfeus-eu.org/opencms/rrsm/>) that delivers earthquake and peak-motion information within minutes of any event with  $M \geq 3.5$  and; (b) a manually revised strong-motion ( $M \geq 4.0$ ) database tailored to engineering applications (ESM; <http://esm.mi.ingv.it/>). Within ongoing projects EPOS-IP and SERA, the content of the two databases has been made accessible via event, station, peak-motion and waveform webservices, thus considerably improving users' access to strong-motion data and automation of downstream products, like ShakeMap. We present in this contribution the key elements of a novel European ShakeMap system, ShakeMapEU, which uses the USGS ShakeMap codes and input from the RRSM and ESM to deliver maps of expected and recorded ground shaking within minutes of any event with  $M \geq 4.0$  in the Euro-Mediterranean region. The predicted maps are initially constrained by the earthquake locations and magnitudes provided by Euro-Mediterranean Seismological Centre (EMSC) together with the recordings of the RRSM and subsequently updated as soon as manually revised ESM ground-motion estimates are available. The system uses ground-motion prediction tools suitable for the European context and adopts the seismo-tectonic regionalisation of project SHARE (<http://www.share-eu.org/>) to identify subduction, volcanic, shallow active crustal and stable continental seismicity. The system uses the authoritative configuration for Switzerland and Italy and will in the future include any other regional configuration as adopted by other European Institutions running USGS ShakeMap. The system, presently accessible at <http://shakemap-eu.ethz.ch/>, is based on ShakeMap 3.5. A transition to ShakeMap 4.0, including new developments concerning map and web rendering, is planned in the future. The main goals of ShakeMapEU are: (i) to provide a single source for ShakeMaps at the European scale that builds on EIDA and modern future-proof community software and tools; (ii) to serve as a backup to local authoritative ShakeMap implementations and; (iii) to deliver ShakeMaps for regions where no local capability is yet available. Finally, the ShakeMapEU can act as a platform for testing novel methodologies aimed at improving the temporal and spatial prediction and mapping of the experienced ground shaking.