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EMME-HAZ-2014: SEISMIC HAZARD ASSESSMENT RESULTS FOR THE MIDDLE EAST REGION

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The Earthquake Model of the Middle East Region (EMME) project was a cooperative initiative, coordinated by ETH-Zurich and Boğaziçi University, Kandilli Observatory and Earthquake Res. Institute, with the participation of several regional institutes. The institutions that have contributed to the EMME hazard model were IIEES from Iran, Middle East Technical and Sakarya Universities from Turkey, American University of Beirut from Lebanon, Yarmouk University from Jordan, University of Peshawar from Pakistan, Tbilisi State University from Georgia, National Academy of Sciences from Armenia and National Academy of Sciences from Pakistan. EMME was designed to address the potential risk posed by earthquakes to the region of Middle East. EMME-HAZ-2014 is the first published version of the probabilistic hazard assessment results of this ambitious project, which also forms the basis of the subsequent risk assessment activities.

The probabilistic seismic hazard model involved two fully independent source models, which were the area source model and the fault source combined with smoothed seismicity in the background. Full description of these source models together with main modeling assumptions and the treatment of uncertainties in both models is presented by Danciu et al. (2014, this conference).

The epistemic uncertainties in the ground motion estimation are addressed with the help of the ground motion prediction logic tree, the applicable ground motion models as well as the weights assigned to each branch of the GMPE logic tree branch were the outputs of the specific work package of the project. The tectonic regionalization assigned to the source models (active shallow, stable continental, subduction interface and in-slab) was the link to the associated GMPE logic tree structures. OpenQuake (Pagani et al 2014), which is the software adopted for seismic hazard computation allows for a full description of the logic tree structure comprising both the GMPE and source modeling levels of branching. Hazard computations are done for a grid of sites with 10 km spacing covering the territories of the partner countries, namely Turkey, Cyprus, Jordan, Lebanon, Iran, Georgia, Armenia, Azerbaijan and Pakistan. For the sake of regional completeness, the hazard computation also covers the territories of Afghanistan, Syria and Iraq either fully or partially. Consistency in modeling with similar regional projects (SHARE in the west and EMCA in the northeast) is carefully considered. The complete set of outputs includes mean and quantile hazard curves for the PGA and 5% damped SAs at various periods for the grid of sites as well as mean hazard maps for several return periods and uniform hazard spectra for the computation sites corresponding to these return periods and deaggregation results for selected locations.

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