INVESTIGATION OF REGIONAL DIFFERENCES BETWEEN TURKEY AND IRAN ON THE USE OF STRONG-MOTION DATA TRENDS

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One way of quantifying seismic hazard for a seismic prone region (or a specific site) is to use probabilistic seismic hazard assessment (PSHA). One of the challenges in conducting PSHA is selecting the appropriate ground-motion prediction equations (GMPEs) to consider the epistemic uncertainty and aleatory variability for properly reflecting the ground shaking at the site of interest. GMPEs are developed separately for shallow active crustal regions, for subduction zones and for stable continental regions as the earthquake mechanisms show differences in these seismotectonic regimes. The GMPEs developed from the same tectonic regions can also show different behaviours (Douglas, 2007). The most important sources of these differences are reported as style-of-faulting and depth distributions of the events (Douglas, 2007; Akkar and Çağnan, 2010). An effective way of highlighting these variations could be the analyses of data trends that are observed in the seismic prone regions of similar tectonic settings.

Within the scope of this study, two neighbour countries, Turkey and Iran, are selected to investigate the regional differences in shallow active crustal regions. The regional variations between Turkey and Iran are addressed by observing the empirical trends in the Turkish and Iranian ground motions from the recently compiled strong-motion database of the Earthquake Model of the Middle East region project (EMME; http://www.emme-gem.org/). The accelerograms recorded from events with depths approximately less than 30km are selected from the EMME database. The Turkish database used in the analyses contains 671 recordings from 175 earthquakes whereas Iranian database consists of 528 recordings from 137 events. The strong-motion data varies in R_{JB} and M_w ranges of 0-200km and 4.0-7.6, respectively. Strike-slip and normal fault mechanism events dominate the Turkish database whereas most of the events in the Iranian database come from strike-slip and reverse events. The observations from the empirical data trends indicate that the ground-motion variations in these countries differ significantly in terms of magnitude and distance scaling. The differences also show up in terms of ground-motion amplitudes of different faulting mechanisms.

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