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Analysis of Iranian Strong Motion Data and Comparison with Pan-European and Global Ground Motion Models

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The compilation of large and homogeneous ground motion datasets is the most important step in the process of developing GMPEs. Despite its importance from a seismic point of view, the contribution of Iranian data in existing global or Euro-Mediterranean databases is still limited. Hence we have compiled a reference and reliable database based on most recent data from Iran with the goal to develop a new set of GMPEs in Iran and compare it with pan-European and global models.

The source of the strong motion recordings in this database is the building and housing research center (BHRC) which is responsible for deployment of Iran strong motion network (ISMN). Metadata are sought to be gathered from reliable seismological agencies or case studies. The current dataset consists of 994 accelerograms from 58 earthquakes recorded by 642 strong motion stations. As a result of the recent seismic refraction site characterization studies derived by BHRC, information about the shear wave velocity profiles are provided and for almost half of the records, the average shear wave velocity up to 30 meters depth has been measured. The dataset consists of a considerable number of records from rock sites which makes it possible to further study rock motions. The database also includes a considerable number of records at short source to site distances (less than 30 km).

We have analyzed Iranian ground motions and compared them with recent models derived from pan-European (RESORCE) and global NGA-West 2 databases. This database has been also used to investigate the ground motion variability of strong motions with the purpose of deriving partially non-ergodic ground motion models.

Keywords: Iran Strong Motion Network, GMPE, regional variations, RESORCE, NGA-West 2, ground motion variability