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Geodetic Earthquake Recurrence for Seismic Hazard Analysis

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Current practice of seismic hazard relies on the seismic catalogues which suffer from incompleteness both spatially and temporally, which makes it difficult to determine possibly long recurrence intervals of large earthquakes. Furthermore, the seismic zonation necessary for seismicity based hazard studies are highly variable and often leads to different hazard predictions. On the other hand, geodetic deformation parameters often remain at research level without practical usage such as the input for design codes or quantitative risk assessment.

In this study, it is demonstrated to produce an earthquake potential map by computing the mean recurrence intervals of the earthquakes based on the geodetic strain rates is produced for Turkey with a method which could partially complement the current practice of analysis with seismic catalogues. In this respect, it is the first study in Turkey in which the earthquake recurrence maps are based only on the geodetic measurements. It is expected that the seismic hazard maps which are routinely produced with seismic catalogues in bylaws in Turkey will be complemented by incorporating the geodetic methods. It is also shown that the collaborative efforts of researchers within WEGENER initiative made it possible to obtain sufficient spatial density of GNSS velocities in Turkey which in turn provides input to further studies such as Seismic Hazard Analysis.