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Earthquakes, vulnerability and disaster risk: Georgia case

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The Republic of Georgia, located on the East coast of the Black Sea, is prone to multiple natural hazards, the most dangerous and devastating of which are strong earthquakes. This work issues a call for advance planning and action to reduce natural disaster risks, notably seismic risk through the investigation of vulnerability and seismic hazard for Georgia. Ground motion prediction equations are essential for several purposes ranging from seismic design and analysis to probabilistic seismic hazard assessment. Seismic hazard maps were calculated based on modern approach of selecting and ranking global and regional ground motion prediction equation for region. We have also applied the host-to-target method in two regions in Georgia with different source mechanisms. According to the tectonic regime of the target areas, two different regions are chosen as host regions. One of them is the North Anatolian Fault zone in Turkey with the dominant strike-slip source mechanism while the other is Tabas in Iran with mostly events of reverse mechanism. We performed stochastic finite-fault simulations in both host and target areas and employed the hybrid-empirical method as introduced and outlined in Campbell (2003). An initial hybrid empirical ground motion model is developed for PGA and SA at selected periods for Georgia. An application of these coefficients for ground motion models have been used in probabilistic seismic hazard assessment. Intensity based vulnerability study were completed for Georgian buildings. Finally, Probabilistic seismic risk assessment in terms of structural damage and casualties were calculated. This methodology gave prediction of damage and casualty for a given probability of recurrence, based on a probabilistic seismic hazard model, population distribution, inventory, and vulnerability of buildings