



A test of hazard source model against historical observations in Shanxi Rift System, China

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The Shanxi Rift System, situated at the east margin of the Ordos Block, is a seismically highly active area in North China. According to historical records, at least 7 $M_S \geq 7.0$ earthquakes have occurred in this region since the first earthquake was documented in 231 B.C. in Shanxi and caused serious casualties and damage. In this study, we designed several calculation methods to test hazard model generally against historical observed magnitude ≥ 5 earthquakes in Shan Rift System dating back to 1458 B.C.. Most specifically we test the hazard source model against the historical source information by looking on the ground motion parameter. The consistency of the source model with historical observations and the relationship between ground motion return periods and observed historical catalog time are discussed in details. Model predicted ground motions and observed ground motions (calculated using historical earthquakes with a specific GMPE function) are compared based on an aggregated approach, such that the observations and the forecast in the research area were combined and compared using the so called holistic method. The difference among different hazard calculation methods changes with the length of ground motion return periods.