

Is modern PSHA too precise?

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For the last 20 years, the New Zealand National Seismic Hazard Model (NSHM) has been constructed using standard probabilistic seismic hazard assessment techniques. In this algorithmic approach the model is constructed by first combining models developed from earthquake catalogue data and active fault data; these models are assumed to be Poissonian in nature. The combined source model is then coupled with ground-motion prediction equations (GMPEs) to estimate the potential shaking at desired locations. In recent years, there has been considerable progress and improvement in understanding of the uncertainties inherent to GMPEs. In our current work, we are exploring some of the fundamental assumptions of the NSHM and investigating how uncertainties in the earthquake source and ground motion modelling propagate through to the end uses of the model. In New Zealand, a major end-use is the development of the national building design standards. Some uncertainties are not quantified in the present model. These include uncertainties resulting from a paucity of earthquake occurrence data and from different methods that can be used to model the seismic sources. Additionally, seismic sources are generally assumed to be a stationary Poisson process and earthquake clustering is ignored. Here we will explore the impact of including these uncertainties in the NSHM on downstream risk-based applications of the model. Including these uncertainties will likely lead to more robust estimates of risk for use by industry and in the development of design standards.

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