

2022 New Zealand National Seismic Hazard Model Revision

*Matt Gerstenberger¹

1. GNS Science

The New Zealand National Seismic Hazard (NSHM) model underpins numerous decisions in New Zealand including the New Zealand Building Code and informing the risk modelling of the Earthquake Commission, which provides national earthquake insurance. We are now beginning the first revision of the NSHM in more than a decade. The revision is inspired by our increased understanding of earthquake hazard and risk due to the significant number of large or damaging earthquakes that have occurred in New Zealand since around 2009. The last decade has provided important lessons on the needs of end-users of the NSHM, and a focus of this revision will be to better target those needs in the baseline model development; importantly, this revision is being done in parallel with a process to reconsider how earthquake hazard is brought into government policy. To meet these needs a primary focus of the revision is a focus on better understanding and modeling of epistemic uncertainty both in the Seismicity Rate Model (SRM) and the Ground Motion Characterization Model (GMCM). Key priorities for the SRM include incorporation of geodetic data and understanding if increased modeling of fault connectivity and segmentation is necessary and useful for characterising hazard. For both SRM and GMCM, modeling of the Hikurangi Subduction is one of the largest challenges with limited data on past earthquake occurrence and shaking. Finally, for GMCM, we are exploring the use of statistical techniques for combining multiple Ground Motion Models and for understanding the value of region-specific and non-ergodic models for national scale hazard modeling.

Keywords: New Zealand, Seismic Hazard , Engineering seismology