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## Statistical properties of peak ground acceleration and their effect on results of probabilistic seismic hazard analysis

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The problem is considered of unrealistic ground motion estimates, which arise when the Cornell–McGuire method is used to estimate the seismic hazard for extremely low annual probabilities of exceedance. This problem stems from using the normal distribution in the modelling of the variability of the logarithm of ground motion parameters. In this study, the statistical properties of the logarithm of peak ground acceleration (PGA) are analysed by using the database of the strong-motion seismograph networks of Japan. The normal distribution and the generalised extreme value distribution (GEVD) models were considered in the analysis, with the preferred model being selected based on statistical criteria. The results indicate that the GEVD was a more appropriate model in eleven out of twelve instances. The estimates of the shape parameter of the GEVD were negative in every instance, indicating the presence of a finite upper bound of PGA. Therefore, the GEVD provides a model that is more realistic for the scatter of the logarithm of PGA, and the application of this model leads to a bounded seismic hazard curve.