Modelling episodically slipping faults in slowly deforming regions for PSHA

Abstract:

We present two case studies from eastern Australia, the Cadell and Lake George faults, where late Neogene to Quaternary slip histories are deduced with variable completeness. Distinctly non-Poisson, or clustered, slip histories are revealed. When assessed together with data from other slowly deforming regions, including the Otago district of New Zealand, a linear relationship emerges between the long-term average slip rate (assessed over several seismic cycles) and the rate at which activity clusters occur. Furthermore, the rate of earthquakes within a cluster also appears to scale with long term average slip rate. Less well correlated is the rate at which a cluster decays to the background rate. That these relationships exist suggests that episodically slipping faults may be characterised and incorporated into probabilistic seismic hazard analysis (PSHA) by modelling clustered rupture behaviour as a non-homogenous Poisson process.