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TOWARD BETTER ESTIMATIONS OF GROUND-MOTION VARIABILITY
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Fabrice Cotton[1*], Rodriguez-Marek Adrian[2], Archuleta Ralph[3], Causse Mathieu[4]
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[1]Disaster Prevention Research Institute (Kyoto Univ.) and ISTerre (Grenoble Univ.), [2]Civil and Environmental Engineering Department, Virginia Tech, Pullman, USA, [3]Department of Earth Science, University of California, Santa Barbara, California, [4]Institut des Sciences de la Terre, University Joseph Fourier, Grenoble, France
[1]Disaster Prevention Research Institute (Kyoto Univ.) and ISTerre (Grenoble Univ.), [2]Civil and Environmental Engineering Department, Virginia Tech, Pullman, USA, [3]Department of Earth Science, University of California, Santa Barbara, California, [4]Institut des Sciences de la Terre, University Joseph Fourier, Grenoble, France

The random ground-motion-prediction variability strongly influences the seismic hazard curve computation, in particular for long return periods. One of the key challenges of seismology is to be able to calibrate and analyze the physical factors that control the ground-motion variability. The exponential growth of seismological near-field records provides the opportunity to separate the source, propagation, and site factors controlling the ground-motion variability (Al-Atik et al., 2010; Rodriguez et al., 2011). Ground-motion variability is usually divided into between-events variability and within-event variability. We describe and discuss some recent results and analysis performed on these two variability components. In a recent study (Rodriguez-Marek et al., 2013) we estimate the within-event variability for five databases from different regions worldwide (California, Switzerland, Taiwan, Turkey, and Japan). We investigate the potential dependency of the within-event variability on region, Vs30, distance and magnitude. The results show that the variability of the within-event variability across the different regions is small when compared with the within-event standard deviation. In other words, the event-corrected single-station standard deviation is remarkably stable across tectonic regions. Our results also suggest that moderate earthquakes are more variable for a given magnitude than large ones and that some stations are also showing larger variability of ground motions than others. Our analysis of the between-event variability shows (Cotton et al., 2013) that the between-event ground-motion variability gives an upper boundary to the earthquake stress-drop variability. This quantification of stress-drop variability offers a new way to calibrate future earthquakes ground-motion simulations.

キーワード: strong-ground motion, seismic hazard, stress drop, variability
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