BROADBAND STRONG GROUND MOTIONS ASSOCIATED WITH LARGE SUBDUCTION EARTHQUAKES IN THE GUERRERO SEISMIC GAP, MEXICO

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We present recent results of the simulation of broadband strong ground motions associated with large subduction scenario earthquakes in three dimensions (3D) along the Guerrero subduction zone applying a hybrid approach. This procedure combines a deterministic viscoelastic simulation of ground motions at low frequencies (0.01– 1 Hz) by means of an hp-adaptive discontinuous Galerkin finite-element method (Tago et al., 2012; Cruz-Atienza et al., 2016) with a semistochastic simulation at high frequencies (1-10 Hz) (Pulido and Kubo, 2004). The domain is discretized with a tetrahedral non-structured mesh considering a 3D tomographic model of the Guerrero subduction zone that incorporates the real topography and bathymetry, as well as the geometry of the plate interface. We build broadband wavenumber rupture scenarios based on the estimated inter-seismic coupling that integrates small-scale stochastically-generated source heterogeneities to enhance the radiation of high frequencies following the methodology of Pulido et al. (2015). We set the kinematic source parameters (i.e., slip, rise time, peak time and rupture velocity) by means of a pseudo-dynamic rupture generator that considers the 1-point and 2-point statistics of each source parameter as well as their spatial interdependency extracted from dynamic rupture simulations. We validate our rupture model generator comparing different ground-motion metrics from two moderate-size earthquakes in the region with the median of the corresponding synthetics obtained from several rupture scenarios for each event. To assess the seismic hazard in the region we compute the strong motions for a set of scenario earthquakes and estimate the average durations, peak ground accelerations, peak ground velocities and response spectra maps.