RUPTURE MODELS AND IMPLICATION OF RUPTURE DYNAMICS IN SIMULATED GROUND MOTION FOR THE 2016 M7 KUMAMOTO, JAPAN EARTHQUAKE

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We performed simulations of rupture dynamics for a shallow M6.5 crustal earthquake to investigate the implication of multi-scale stress drop spatial variations on rupture dynamics and generation of Strong Motion Generation Areas (SMGA) and Long Period Ground Motion Generation Areas (LMGA) for crustal earthquakes on strike slip faults. Guided by the analysis of the dynamic rupture modeling we propose a kinematic earthquake rupture generator that combines the randomized spatial field approach of Graves and Pitarka (GP) with the multiple asperity characterization approach of Irikura and Miyake (IM) (also known as Irikura recipe). The resulting rupture model incorporates distinct features of both original models. Using several kinematic rupture realizations, we investigated the performance of the proposed, and GP and IM rupture models in simulations of broadband ground motions from the 2016 Kumamoto, Japan earthquake. Finally, comparisons with ground motion prediction equations (GMPEs) were used in sensitivity tests of simulated near-fault ground motion to variations in the prescribed kinematic rupture parameters for the Kumamoto earthquake.