Geophysical Research Abstracts
Vol. 19, EGU2017-12178, 2017
EGU General Assembly 2017

An insight on correlations between kinematic rupture parameters from dynamic ruptures on rough faults

Kiran Kumar Thingbijam, Martin Galis, Jagdish Vyas, and P. Martin Mai
KAUST - King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

We examine the spatial interdependence between kinematic parameters of earthquake rupture, which include slip, rise-time (total duration of slip), acceleration time (time-to-peak slip velocity), peak slip velocity, and rupture velocity. These parameters were inferred from dynamic rupture models obtained by simulating spontaneous rupture on faults with varying degree of surface-roughness.

We observe that the correlations between these parameters are better described by non-linear correlations (that is, on logarithm-logarithm scale) than by linear correlations. Slip and rise-time are positively correlated while these two parameters do not correlate with acceleration time, peak slip velocity, and rupture velocity. On the other hand, peak slip velocity correlates positively with rupture velocity but negatively with acceleration time. Acceleration time correlates negatively with rupture velocity.

However, the observed correlations could be due to weak heterogeneity of the slip distributions given by the dynamic models. Therefore, the observed correlations may apply only to those parts of rupture plane with weak slip heterogeneity if earthquake-rupture associate highly heterogeneous slip distributions. Our findings will help to improve pseudo-dynamic rupture generators for efficient broadband ground-motion simulations for seismic hazard studies.