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Probability distribution and scaling of slip in finite-fault rupture models

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We develop generic relations describing the distribution of final slip in finite-fault rupture models with respect to seismic moment. These relations are obtained by scaling the "seismic moment" with the "combined areas of the fault-rupture" (referred to slip-area, hereinafter), which correspond to slip bins. The slip values in each rupture model are binned according to a fraction (or percentage) of the maximum slip. The regression analyses uses standard linear relation of the form: log (A) = α + β log (Mo), where A and Mo refer to the slip-area and seismic moment, respectively. We find that the relations for reverse dip-slip events is consistent with self-similarity scaling, with an average slope of $\sim$2/3. On the other hand, the relations for strike-slip events reveals an average slope $\sim$1/2, suggesting slower growth of slip-asperity area with increasing seismic moment. In addition, we find that the mean probability distribution of the final slip values can be well described by stretched-exponential distribution function. These overall observations pertain to the spatial complexity of slip distribution, and will be useful in development of scenario earthquake ruptures.