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Damage Mechanics Model for Fracture Nucleation and Propagation JOHN RUNDLE, GLEB YAKOVLEV, JOSEPH GRAN, DONALD TURCOTTE, University of California, Davis, WILLIAM KLEIN, Boston University — We consider a slider-block model for rupture nucleation and propagation of shear fractures. Time to failure for each sliding block is specified from a Poisson distribution, a model that has been used elsewhere. A new feature is that the hazard rate is assumed to have a power-law dependence on stress. When a block fails, it is removed, and the stress on the block is redistributed uniformly to a specified number of neighboring blocks in a given range of interaction. We solve this problem for a constant applied stress at t = 0. Damage is the fraction of blocks that have failed. Time to failure and modes of rupture propagation are determined a s function of the hazard-rate exponent and the range of interaction. Results are compared with observations.

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