**Self-organizing fault systems and self-organizing elastodynamic events on them: Geometry and the distribution of sizes of events**

**B. E. Shaw [1].**

We introduce a new model which both generates a self-organizing complex segmented fault system which then accommodates finite strain, and generates sequences of elastodynamic events on that complex fault system. This opens up a new realm of study of populations of cascading elastodynamic ruptures on complex fault systems. We examine the distribution of sizes of events in the model, and its dependence on fault geometry. We see an evolution from a more Gutenberg-Richter like distribution of events at smaller strains to a more characteristic like distribution at larger strains. The distribution of lengths of events is not a simple scaling of the distribution of lengths of segments. We see relative insensitivity of the distribution of sizes of events to the friction used. Examining the distributions of sizes of events on fault segments of different lengths, we find support for a modified segmentation hypothesis whereby segments both break in power law small events and occasionally participate in cascading multisegment larger ruptures, but also predominantly break as a unit.

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