Abstract Submitted
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A simple model fault system[1] CHRISTOPHER SERINO, WILLIAM KLEIN, Boston University — The Gutenberg-Richter distribution, which characterizes the frequency-magnitude statistics collected over earthquake fault systems, has lead seismologists as well as physicists and geophysicists to propose various simple models to explain this empirical scaling relation. To date, these models have been limited to the description of a single fault. We discuss a model of an earthquake fault system made up of non-interacting faults that are represented as damaged, Olami-Feder-Christensen models. The frequency-magnitude statistics do not, in general, scale on a single fault with some realization of damage; however, these statistics follow a simple distribution that can also be used to describe the data collected from actual earthquake faults. What is more, by varying the amount of damage on each fault in the system, as well as the relative frequency with which a fault with a given amount of damage occurs within the system, we obtain a one-parameter family of models, all of which produce Gutenberg-Richter-like statistics. This parameter is a measure of the stress dissipation within the fault system, a quantity known to vary with various geological properties, and offers an explanation for the range of b-values observed by seismologists.

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