

# A Physicists View of Earthquakes: What Can We Learn from Simple Models?

W. Klein

## Abstract

Earthquakes pose a threat to both life and property but they are presently impossible to predict. In fact we do not know whether the events are predictable at all or whether they are completely random. The reason for this uncertainty is that we do not have a good understanding of the physics of earthquakes and how they are correlated with each other or if they are correlated at all. An interesting clue to the underlying physics comes in the form of Gutenberg-Richter (GR) scaling. In GR scaling the number of earthquakes with moment (area times slip)  $M$   $N_M$  obeys a power law

$$N_M \sim \frac{1}{M^\tau}$$

This law is true for the entire earth as well as for systems of faults that occur in a geographic area such as southern California. This has led physicists to speculate that earthquakes are fluctuations about phase transitions where the same kind of scaling may occur. In my talk I will explore this idea and how physicists build simple models that both test and modify the association of earthquakes with phase transitions.