

## A basic theory for earthquake prediction

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Earthquakes are generated by the anisotropic principal stress regime in the rock medium. In the preparing process of a large earthquake, the medium would be deformed generating regions of contraction and dilatation around the nucleus of the shearing stresses. A theory for earthquake prediction should be based on an elastic medium model with contraction and dilatation adjacently occurring within and around the seismogenic domain of the medium. The evolution of the medium changes should be monitored in a long time interval: long-, intermediate-, and short-term. The short-term and intermediate-term precursors will be detected when the shearing stress grows as high as the strength of the medium, of which condition we call it a critical state in the preparing process of a large earthquake.

Contraction of the medium should cause high pressures, and dilatation result in low pressures. Such changes in stresses may induce various precursors for an impending large earthquake. The primary precursors are changes of the strain field and micro-seismic activity changes, which are directly related to the elastic changes of the medium. Secondly, migration of fluid within the crust in response to changes of stress level would bring about various precursors. The fluids would transport heat energy, electric charges, and radioactive materials and so on, and, through a preexisting crack network, would incidentally emerge at the ground surface and bring about a variety of precursory phenomena on the ground surface and in the air.

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