



Earthquake Forecasts (Warnings, Predictions) based on Rock Mechanics (Stresses).

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A large number of earthquake forecast models mostly based on statistical pattern detection algorithms have been published. None of these methods seems to work well in all cases. The uncertainty of these methods has caused a lot of work to statistically verify the methods. This is quite different from the best methods in meteorological storm forecasts. They are mostly based on basic physical knowledge and in principal one tested case may be enough to see if they work well or not. In earthquake forecasts rock mechanical methods putting the crustal stress tensor field and water pressure field in the centre can be expected to behave as the meteorological models. Not only will the testing be much simpler, the prognostic value will also be much larger and one can expect that any mechanical model will work anywhere after adjusting of the local rockmechanical properties. In Iceland rock mechanical stress methods have been tested on the about 100,000 microearthquakes 1991-2000 before the two Ms 6.6 earthquakes in June 2000. The results are most promising and will be presented. Now, microearthquake data is available at most highly active areas and in many cases around the world also at places where recent larger EQs have occurred. It is thus possible to very quickly get any stress based method tested if the microearthquake data is made available. What is needed is just all wave form data and instrument responses for say 1,000 to 10,000 microearthquakes before the large EQs. The results from Iceland indicates that not only the exact positions (km accuracy) of the large EQs can be forecasted, but also the quality of the short term warnings (days to weeks) is dramatically improved.