Earthquake probability based on empirical relations

\# Masajiro Imoto[1]

[1] NIED

In his early study, Aki stated that the concept of probability gain associated with a precursor may be useful for unifying various areas of earthquake prediction research. Assuming that different precursory phenomena occur independently of one another, the probability expected from detecting multiple precursory phenomena is given by the product of probability gains for respective observations and probability estimated from secular seismicity. This formula has been practically applied for estimating probabilities of characteristic earthquakes in California, where a renewal process model and a model of foreshocks are assumed as two different and independent precursory phenomena. Except for a few cases, no other examples have been reported since it is widely considered that no reliable precursors have been observed except for only a few phenomena such as foreshocks. Another issue concerns the assumption of mutual independency of the phenomena. These two points are discussed from the aspect of point process modeling.