

Decreases in the b- value of magnitude-frequency relation prior to major earthquakes in Japan

Masajiro Imoto[1], Akio Yoshida[2]

[1] NIED, [2] MRI

The hypothesis of accelerating moment release as a function of time toward main shock suggests that the evolution of seismicity in a particular case could be ascribed to changes in the frequency - magnitude distribution with time. Given a small number of cases of drastic increases in the number of events preceding main shocks, more frequent occurrences of larger events are expected with time in approach of a main shock. Decreases in b- value of the frequency- magnitude relation in certain time -space domain could be observed for this hypothesis. From this viewpoint, changes in b-value are studied using earthquakes of magnitudes of 4.5 and larger after recalculating magnitude parameter based on the JMA catalogue in Japan. A parameter describing changes in b-value is defined using a simple filtering procedure. The targets of the study are major earthquakes with magnitudes 6.5 and larger for the period from 1975 to 2001. As the result, it is obtained that cases of decrease in b-value are more frequently observed than those of increase. This result is consistent with the hypothesis of accelerating moment release.