Decrease of the b-value observed in seismic activity around focal regions of moderate earthquakes

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Changes in seismic activity that have been appearing in the estimated focal region of the Tokai earthquake in recent years have attracted attention of many researchers. Although the decrease of occurrence rate of micro earthquakes that had begun in summer of 1999 turned the trend to increase in October 2000, it seems that the seismic activity on the western coastal region of Suruga Bay dropped again since the latter half year of 2001. In the meanwhile a remarkable activity occurred in the middle of Shizuoka Prefecture in April to June in 2001 including an M5.1 earthquake on 3 April and several M4 class earthquakes. Occurrence of an earthquake with a magnitude exceeding 5 is the first since an M6.1 earthquake in 1965 in this region.

We investigated change in the b value for the micro seismicity in the Philippine Sea slab around the estimated locked region and found that the b value had been significantly small during one year before the activity in April-June in 2001. It has been reported that quiescence was observed in micro seismicity around focal regions of moderate inland earthquakes during several months before their occurrences. We think it shows that preparatory process for those earthquakes proceeds in a rather wide area around their foci and the change in the b value will give another support to the supposition. Under these thoughts we performed investigation on the change in the b value for other moderate earthquakes in Japan. At present we have got a result that the b value in the activity around the M5.1 earthquake on August 25,2001 in the middle of Kyoto Prefecture had been small during about one year before its occurrence.

We shortly discuss meaning of the decrease of the b value and appearance of seismic quiescence before moderate earthquakes.