Spatial and temporal variation of b-value around asperities on the plate boundary east off NE Japan

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Spatial and temporal variations of b-value in the frequency-magnitude relation are investigated for earthquakes in the northeastern (NE) Japan subduction zone. We used the Tohoku-University earthquake catalogue in the period from January 1, 1981 to October 3, 2001 after correcting artificial magnitude shift and removing artificial events. Spatial distribution of b-value is compared with the locations of asperities estimated on the plate boundary east off NE Japan. Estimated b-value decreases with increasing depth. Anomalously high b-values are observed in two areas off-Iwate and off-Fukushima regions, and asperities do not intrude into them. Temporal variation of b-value for presently analysed six asperities shows a remarkable increase in b-value after the rupture of each asperity. Then the b-value decreases gradually. These observations suggest that b-value reflects the stress change occurring in the vicinity of the asperities.