

Plate slip distribution on Philippine sea plate in Kanto district estimated from similar earthquakes

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Around Kanto district, both Philippine Sea plate and Pacific plate subduct simultaneously and are thought to interact each other causing active and complicated seismic activity. Various types of large earthquakes could occur in this region, too. To understand the spatio-temporal pattern of seismicity in more detail, information about spatio-temporal distribution of plate slip could be contributable.

Slip deficit distribution on Philippine sea plate is detected using onland GPS data, by Sagiya(2003). Off Boso peninsula, slow slip event(SSE) is detected by GPS data on Mar. 1996 and Oct. 2002(Ozawa et al., 2003). We investigated similar earthquakes whose waveforms are extremely similar, and most of these similar earthquakes are thought to be caused by repeating slips on the small asperity surrounded by stable sliding area(Kimura et al., 2003). In this study, we estimated spatio-temporal distribution of plate slip on the Philippine sea plate from similar earthquake activity.

To estimate spatio-temporal distribution of plate slip, we calculated slip amount for each similar earthquakes using scaling law of Nadeau and Johnson (1998). In this procedure, because of limit of observation network, systematic biases which would change temporally may be included in the hypocenter and magnitude determination. To avoid this effect, we re-calculate magnitude using relative ratio of maximum amplitude for each similar earthquake clusters, because hypocenters are thought to be identical and the difference of size depends only on difference of amplitude.

Similar earthquakes which have been occurring with almost constant time spacing were detected in inland area of Boso peninsula, border of Chiba-Ibaraki prefectures and southwestern area of Ibaraki prefecture. Calculated plate slip rate on these areas is about same degree as that estimated from global model of plate motion. In offshore region of Boso peninsula, similar earthquakes have been occurring synchronizing with SSEs and no similar earthquakes have occurred during interevent period in spite of adequate time interval for typical similar earthquakes on the Philippine sea plate. From these observation, it is indicated that stable sliding is occurring in inland region but plate slip is not continuous and rather continual in offshore region.