

Change in dilatation obtained by means of GPS and presumption of asperities for the Tokai Earthquake

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Tokai Earthquake has been pointed out to occur in the near future in the central Japan due to the subduction of the Philippine Sea Plate beneath Amurian Plate. An anomalous tectonic movement was detected between the fall of 2000 and the summer of 2005 from GPS observation data. This fact indicates that a slow slip event progressed on the plate boundary beneath Lake Hamana. Matsumura (2007) specified asperities in the presumed fault of the Tokai earthquake based on the seismic activity change due to the slow slip event.

On the other hand, the Japanese University Consortium developed a dense GPS network there in order to know the crustal deformation in detail. Matsumura et al. (2008) processed their GPS data with those from GEONET (GPS Earth Observation Network System) during two years since 2004, and got the detailed distribution of dilatation. The asperities position was verified through the result of the dilatation distribution. However, the distribution included both slow slip occurrence duration and after-slip in this study (Matsumura et al., 2008).

In the present study, we divided the processed duration between 2004 and 2006 to two periods; one is the slow slip occurrence period before July 2005 and the other is after-slip one after August 2005. We estimated the detailed distribution of dilatation velocity of the both period. The result shows that the velocity changed between slow slip occurrence period and after-slip one. In addition, dilatation velocity scattered between -0.4 and 0.4 micro-strain/yr area by area when the slow slip occurred, and its scatter decreased to between -0.3 and 0.1 micro-strain/yr after it ended. Therefore, we think that the slow slip influenced to the surface dilatation velocity due to an increase in the stress at asperities.

The asperities positions were reviewed from surface distinction of dilatation. The results showed that there are three asperities in mid-west Shizuoka Prefecture.

Keywords: GPS, dilatation, Tokai earthquake, asperities