

Repeated Slow Slip Events and the Occurrence Process of the Large Earthquakes in the Tokai Region, Central Japan

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The slow slip event is detected by the national wide GPS network (Ozawa et al., 2001) in the Tokai region in 2001. This slow slip is characterized by the horizontal displacements toward southeast and the vertical deformation of uplift amounting to more than 2 cm in Hamanako area. Kimata et al.,(2002) estimated the fault model of the 2001 Tokai slow slip event, and the south-eastward slip fault is located in the inland of the tight interplate coupling between the Philippine sea plate and continental plate, where is the focal region of the of the anticipated Tokai Earthquake (M=8).

Kimata et al.,(2001) discuss ground deformation detected from the repeated leveling every year and EDM ranging every season since late 1970s, and they make clear the episodic interplate coupling in the plate boundary and the repeated slow slip events in the western Tokai region. Especially, the late slow slip event is estimated in the period of 1987-1991. However ground deformation data before 1987 is not enough, it suggests that the slow slip events are repeated in the same area, western Tokai. The estimated location of the slow slip fault is almost the same of the 2001 Tokai slow slip event. The plate subduction in the slow slip fault shows the low angle or almost flat from the epicenter distribution (Aoki, 2002).

Additionally, the pre-slip of the 1944 Tonankai earthquake is discussed from the leveling at Kakegawa, central Tokai, just done in the day of the earthquake (Takano et al., 2003). Ground tilting 10 micro radian detected from the leveling just before the earthquake means the slow slip events occurred in the same area of the 2001 Tokai slow slip event just ten or twenty minutes before the earthquake. The uplift of the ground with 20 cm is detected from the leveling after the earthquake would be mainly caused by pre-slip.

We conclude that slow slip events have been occurred in the western Tokai region, because of the low subduction angle of the Philippine Sea plate, and it is the key word of the occurrence process of the large earthquake along the Suruga-Nankai Trough.