

The meaning of the short term slow slip events detected by the JMA strain-meter network of Tokai area

Mitsuyuki Hoshiba[1]; Shin'ya Tsukada[2]; Sumio Yoshikawa[2]

[1] Matsushiro Seis. Obs.; [2] JMA

EPOS (Earthquake Phenomena Observation System) detected unusual strain changes of Gamagori, Sakuma, Hamakita and the other stations of JMA on July 20th of 2005. The strain rates were as small as about 0.01ppm in a day, which have never been found in regular observation. Similar types of changes were observed at the same time in the tilt-meters and strain-meters of NIED and AIST. Simultaneously the low frequency earthquakes (e.g. Katsumata and Kamaya, 2003) activated in the plate boundary beneath the eastern Aichi Prefecture. Anticipating the relationship with the expected Tokai earthquake, we tried to find sources of the strain changes and finally identified them as the slips occurred in the plate boundary far from the estimated focal region of the Tokai earthquake. And we found that the location of the sources of the estimated slip and those of the low frequency earthquakes were almost coincident. The phenomena continued until about the 22nd. This is the process that JMA strain-meter networks first detected the slow event of strain changes, which is to say the short term slow slip event. 'The short term slow slip event' is an expression compared with the long term one observed in the western Tokai area since around 2001. The crustal deformation associating with the low frequency micro-tremors or micro-earthquakes has been reported in a broad area from the south-western Japan to Tokai area by Obara et al.(2004) and the similar activity beneath the Aichi prefecture was also reported two years ago by Obara(2004). There were at least 21 events for these six years, estimated from the records of strain and low frequency earthquakes of JMA. The above phenomenon was an unexpected one for the strain-meter network of Tokai area, the main object of which is to detect the pre-slip of the expected Tokai earthquake. However, this event was the first experience of the phenomenon occurred in the boundary between the Eurasia and Philippine Sea plates. The necessary conditions of the earthquake prediction are 1) existence of precursor, 2) observation network covering a focal region, and 3) physical model, that is, a precursory slip in the plate boundary. This incident suggests the possibility of the prediction of the Tokai earthquake.