

Recent state of abnormal crustal deformation in the Tokai region and a possible change in coupling state on the Pacific Plate.

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Transient crustal deformation in the Tokai region, central Japan, is still continuing in February 2003. For the same period, the Kanto region showed eastward abnormal motion which amounts to 1 cm in February 2003 beyond detection accuracy. In this research, we estimate time evolution of the Tokai aseismic slip and the coupling state between the Pacific plate and the Philippine Sea plate in the Kanto region based on the detrended crustal deformation data.

We use east-west, north-south, and up-down displacement data at 98 selected GPS sites in the Tokai, Kanto and the Izu island chain. Since the raw data include annual and linear trend components, we estimate them for the period between 1997 and 2000. By extrapolating the estimated annual and linear trend components for the entire period, we detrended the GPS time series. On the assumption that silent earthquake is causing abnormal crustal deformation in the Tokai and Kanto regions, we estimate the slip history on the assumed plate boundary by Kalman filter based analytical method analogous to the time dependent inversion [Segall and Matthews, 1997]. As model geometry, we adopted the plate configuration model in the Tokai region estimated by Ishida [1992]. We also used plate configuration between the Philippine Sea plate and the Pacific plate in the Kanto region estimated by Ishida [1992].

Our analysis for the Tokai silent event shows aseismic slip area around the Lake Hamana, western Tokai region, close to the estimated Tokai source area from around October 2000 to November 2001. For the period between November 2001 and 2003, aseismic slip areas shifted its center northeastward by about 20 km, reflecting on a change in crustal deformation pattern over time. Estimated moment is now equivalent of Mw 6.8 earthquake. With regard to the abnormal eastward motion in the Kanto region, our analysis shows eastward aseismic slip of about 10 cm off the coast of the Boso peninsula, suggesting simultaneous occurrence of coupling change both along the Suruga and Sagami troughs from sometime before or after the 2000 Izu Islands event.