

The Izu detachment hypothesis: A proposal of a unified cause for the Miyake-Kozu event and the Tokai slow event

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The interseismic deformation of the collision zone is described by the detachment model, as presented by Seno (this meeting). If so, the deformation of the Izu collision zone is also expected to be described by the detachment model. Recently, Ishibashi and Itani (2003) noticed that the GPS velocities of the Izu Peninsula (western 2/3 part, Nov. 1998 - June 2000) with respect to the Eurasian plate are deviated from the Philippine Sea - Eurasian relative plate motions (Seno et al., 1993) systematically. These deviations directed in S20E can be fitted by the slip on the detachment beneath Izu Peninsula at the depth of 15-20 km with a rate of 3 cm/yr. The southern edge of the detachment is located about 20 km south from the southern tip of the Izu Peninsula. On June 26, 2000, seismic activity related with dike intrusion occurred near the Miyake Island and expanded to the northwest close to the Kozu Island. The activity continued during about three months. I call this activity MK hereinafter. The step-like horizontal movements of the GPS stations operated by the Geographical Survey Institute, however, extended far beyond the islands, from Izu Peninsula to central Honshu. The simple dike intrusion model (Yamaoka, 2000) cannot explain the movements. To explain the southeastward movements of the stations in Izu Peninsula and in Tokai-central Honshu, I hypothesize that a sudden larger slip occurred at the detachment beneath Izu Peninsula during the three months of MK. A slip of 20 cm during 0.26 yr is assigned over the horizontal rectangular plane at the depth of 20 km. I rather regard the dike intrusion southeast of the Kozu Island during MK as a byproduct of this extrusion, because the movement at the detachment would have brought a shear stress needed for the dike intrusion. The so-called abnormal crustal deformation in the Tokai region started about a half year after MK (GSI, 2003). The abnormal deformation has been interpreted by the slow slip at the plate boundary beneath Lake Hamana (Ozawa et al., 2002). However, apparently, the crustal deformation extends over much wider areas, into Kanto and central Honshu. I then regard the retarded diffusive transfer of the slip at the detachment beneath Izu Peninsula, through the low viscosity guides of the Tokai and Kanto rupture zones whose barriers are invaded (Seno, 2003) and the serpentized mantle beneath Lake Hamana (Kamiya and Kobayashi, 2001, 2003).