

Crustal deformation near the Hyuga-nada Sea, Japan

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Abstract

Time evolution of the interplate coupling near the Hyuga-nada Sea after two earthquakes in 1996 was reported by Yagi et al. [2001] in detail. Their results show that forward slip started immediately after these two earthquakes in the area including asperity of these earthquakes and gradually subsided until 1999. Since it is 12 years after the earthquakes, it is important to study the time evolution of interplate coupling in this area, considering the recurrence time of between 20 and 30 years in this area. In this study, we analyze continuous GPS time series near the Hyuga-nada Sea area and report spatiotemporal evolution of the estimated interplate coupling.

2. Data and analytical procedure

We use east-west, north-south, and up-down time series for a period between 2000 and 2008 at 65 continuous GPS sites in the Shikoku and Kyushu regions relative to Misumi site in the Chugoku region. Annual changes of the time series are estimated for a period between 2000 and 2002 and extracted from the original time series. By applying time dependent inversion to the data without annual changes, we estimated spatiotemporal evolution of the interplate coupling after 2000. We weight east-west, north-south, and up-down motions by a ratio of 3:3:1. The underground structure of the Hyuga-nada area is based on the model used in Ozawa et al. [2001].

3. Results and Discussion

Our analysis showed 3-4 cm/year slip deficit rate near the Hyuga-nada area for a period between 2000 and 2001. This result is consistent with the past studies. This slip deficit rate little changed over time until 2008. From this result, the energy of the next large earthquake in the Hyuga-nada area has been accumulated steadily.

Reference

Ozawa S., M. Murakami, T. Tada, Time-dependent inversion study of the slow thrust event in the Nankai trough subduction zone, southwestern Japan, *J. Geophys. Res.*, 106, 787-802, 2001

Yagi et al. (2001), Complementary relationship between co-seismic slip and a-seismic slip in Hyuga-nada and Sanriku-oki Japan, Doctoral thesis.