

Interplate coupling in the Tokai region estimated from the vertical movements since the 1944 Tonankai Earthquake

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We discuss the interplate coupling estimated from the vertical movements by leveling sea level measurements at the Tokai region after the 1944 Tonankai large earthquake, and we also discuss the preparing the process of the plate boundary earthquakes.

1. Interplate coupling estimated from the vertical movements in 1980-2000

Sagiya already discussed the interplate coupling from the horizontal displacements by the GPS measurements at the present time. However by his model we can not explain the subsidence of 8 mm/yr observed by tide gage measurement at Omaezaki and uplift at the southeast area of Nagoya. On the other hand, Heki and Miyazaki (2001) show the plate convergence rate of 2cm/yr estimated from the GPS measurements around the Suruga Bay area. They suggest the Izu Micro Plate between the Eurasian and Philippine Sea plates deduces that convergent rate.

To explain the 8mm/yr subsidence at Omaezaki and uplift at the southeast area of Nagoya, we estimated the full coupling is undergoing from the east off Omaezaki not at the Suruga trough and it spreads to the north coast of Mikawa bay. There are some differences in the area of full coupling estimated by Sagiya (1999), but it consistent with the coupling area estimated from the seismic mechanism (Matsumura, 1997).

2. Interplate coupling in the period of 1970-1980

It is characterized that the vertical movements are observed the uplift between Kakegawa and Hamamatsu, and subsidence at Nagoya in the period. The subsidence of 8 mm/yr is observed at Omaezaki, so the rate of the uplift is 5mm/yr referred to Omaezaki. It is suggested that the full coupling is limited the area between Omaezaki and Kakegawa and to calculate the subsidence at Nagoya and uplift at Hamamatsu forward slip of 2cm/yr is undergoing in this area.

3. Interplate coupling in the period 1958-1970

In the period it is very difficult to discuss the vertical movements from the leveling because of the survey accuracy. So discuss the vertical movements based only tide gage data. It shows the subsidence of 5 mm/yr at Omaezaki and the uplift of 3mm/yr at Maisaka (Hamamatsu) and the subsidence of 5mm/yr at Nagoya.

We estimate the interplate-coupling model of the half or two third coupling between Omaezaki and Kakegawa and forward slip of 3 cm/yr between Hamamatsu and Nagoya in the period.

4. Conclusion

1) The full interplate coupling model with the rate of 2cm/yr between the 5km east off at Omaezaki and the north coast of Mikawa bay can explain the subsidence of 8 mm/yr at Omaezaki, the uplift at Nagoya.

2) Since 1950, the coupling area is extending and the rates of the coupling are increasing in the Tokai region. The coupling rate beneath Omaezaki was 70% until 1970, after then it reaches the full in 1980.

3) In the area between Hamamatsu and north coast of Mikawa bay, the forward slip of 2-3cm/yr is estimated until 1980, and after then, interplate coupling is basically observed and the forward slip is occasionally detected.