

## Inversion analysis for slip deficit rate along the Nankai Trough using on- and offshore crustal velocities

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Along the Nankai Trough, megathrust earthquakes occur every 100-150 years. A nationwide continuous GPS observation network in Japan has measured precise crustal deformation in this area for the past decade. However, the sources of these earthquakes are located offshore where slip resolution is generally poor. Since the early 2000s, seafloor geodetic observations using GPS/Acoustic techniques have been conducted against such a background in Japan. Today, seafloor geodetic observations are recognized as an effective and essential procedure for understanding the source process of earthquakes that occur in offshore areas. In this study, we show the result of seafloor geodetic observations using GPS/Acoustic techniques from 2004 to 2012 and estimate slip deficit rates along the Nankai Trough using both onshore GPS velocities and offshore crustal velocities derived from seafloor geodetic observations. We conducted inversion analysis with a priori information, and then, a high slip deficit rate of more than 50 mm/yr was detected off the Shikoku district. This decreases to approximately 30-50 mm/yr off the Kii Peninsula, and then it falls to approximately 10-30 mm/yr around the Suruga Trough relative to the Amurian plate, except for slip deficit rate of nearly 40 mm/yr which was detected at a fault segment beside the seafloor benchmark at the Suruga Bay. In addition, we investigated slip resolution by adding new established seafloor benchmarks off Shikoku district. As a result, we found that slip resolution was still poorer in offshore areas such as off the Ashizuri Cape, the Muroto Cape, and the Kii Peninsula near the trench axis than in onshore areas. Thus, it is important to conduct seafloor geodetic observations in areas with poor slip resolution.

Keywords: GPS/Acoustic, Nankai Trough, crustal deformation, slip deficit rate, slip resolution