

SCG059-P27

Room:Convention Hall

Time:May 27 10:30-13:00

Driving force and internal deformation of the Pacific plate deduced from two-dimensional GPS analysis

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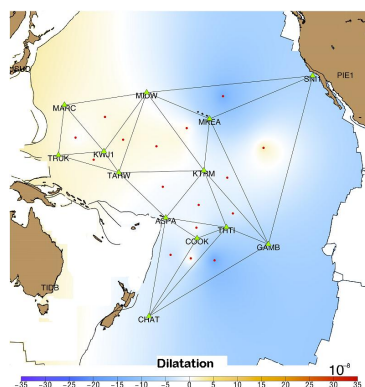
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The motion of the Pacific plate using GPS data has been estimated previously, e.g., Larson et al., 1997 and Beavan et al., 2002. Beavan et al. analyzed up to 11 years of data from 1990 to 2001 for twelve stations on the Pacific plate. Their analysis showed that the GPS sites offshore of southern California are presently moving 4-5 mm/yr relative to the predicted Pacific plate velocity whereas the easternmost sites in South Island, New Zealand, are moving about 3 mm/yr relative to the Pacific plate. However, the two-dimensional distribution and the cause of the deformation of the plate were not clear.

Therefore, this study aimed to determine the Pacific plate motion and intra-plate deformation by adding new GPS data, and to infer the cause of the internal plate deformation from the estimated two-dimensional pattern of the dilatation of the Pacific plate.

GPS data from 1998 to 2006 of fourteen stations on the Pacific plate are used for this analysis, including seven IGS stations, five GSI stations, and two stations of Western Pacific Integrated Network of GPS (WING). We applied a linear approximation to the nine years of data of each set of daily coordinates.

The result shows that the Pacific plate is dilated in the western part and is contracted in the east. This can be explained by expansion near the subduction zones and by contraction near diverging ridges. This mechanism is in harmony with the theory that the plates are driven mainly by slab pull and ridge push forces, introduced first by Forsyth and Uyeda, 1975.



Keywords: Pacific plate, internal deformation, driving force of plate motion, GPS, dilatation