GPS Traverse Across the Yamasaki Fault and the Hinge Line in the Kii Peninsula

Manabu Hashimoto[1], Fumio Ohya[2], Kensuke Onoue[3], Yoshinobu Hoso[4]

[1] RCEP., DPRI., Kyoto Univ, [2] RCEP,DPRI,Kyoto Univ, [3] Research Center for Earthquake Prediction,Kyoto Univ, [4] RCEP, DPRI, Kyoto Univ.

http://www.rcep.dpri.kyoto-u.ac.jp/~hasimoto/Manabu/Index.html

Introduction

We have been conducting GPS campaign surveys along traverse across active faults or other tectonic zones. These surveys are useful, if scale along the strike of tectonic zones is much larger than their width. We would like to report our recent works targeting on the Yamasaki fault and the Hinge Line in the Kii peninsula.

The Yamasaki Fault GPS Traverse Survey

We established a traverse line crossing the Yamasaki fault in October 1995. It spans about 30km in the N-S direction and consists of 6 sites. In August 1996 one more site was established. Since that we have made campaign surveys for a week once or twice per year. We reported the results in which a GEONET site (Mitsu) is fixed, but we recalculate coordinates in the ITRF for all campaigns using data from several IGS sites. For each campaign we first calculate the coordinate of Mitsu with IGS sites fixed. Then coordinates of our sites and 4 GEONET sites are determined referring to Mitsu of each campaign. In the ITRF all sites moves southeastward with about 2cm/yr. In order to observe local velocity field, we extract velocity of Mitsu from those of other sites. Figure shows the average velocity field (a preliminary result) relative to Mitsu derived from October 1995, August 1996, August 1999, August 2000 and August 2001 campaigns. Several sites near the Yamasaki fault moves northwest to westward with velocity by 3mm/yr. KASI and GEONET sites with the number 95 started observation in 1996. Himeji (960762) started in 1997. Coordinates for the 1995 campaign are calculated with ITRF 93 and transformed to ITRF97. Therefore there may be a systematic bias between the 1995 coordinates and others. Two sites near Mitsu have little velocities. Therefore the whole network is under the left lateral deformation. There are no clear offsets near the surface trace of the Yamasaki fault, which suggests that the shallow part of the fault is locked. Furthermore there is a northward gradient of velocity that covers the entire network. We suspect that the width of the locked zone might be large.

The Hinge Line in the Kii Peninsula

We established GPS arrays with 9 sites in the Kii peninsula for the purpose of the research on the next Nankai earthquake. This array consists of two traverse along the west coast and the Kumano river crossing the Hinge Line aiming to the detection of the variation in the depth of lower margin of the locked zone. We made a campaign survey for a week in March 2001 and determined the coordinate of each site and surrounding GEONET sites referring to IGS sites. Another site were established in December 2001. We plan to make a campaign survey in March 2002 and will report the result.

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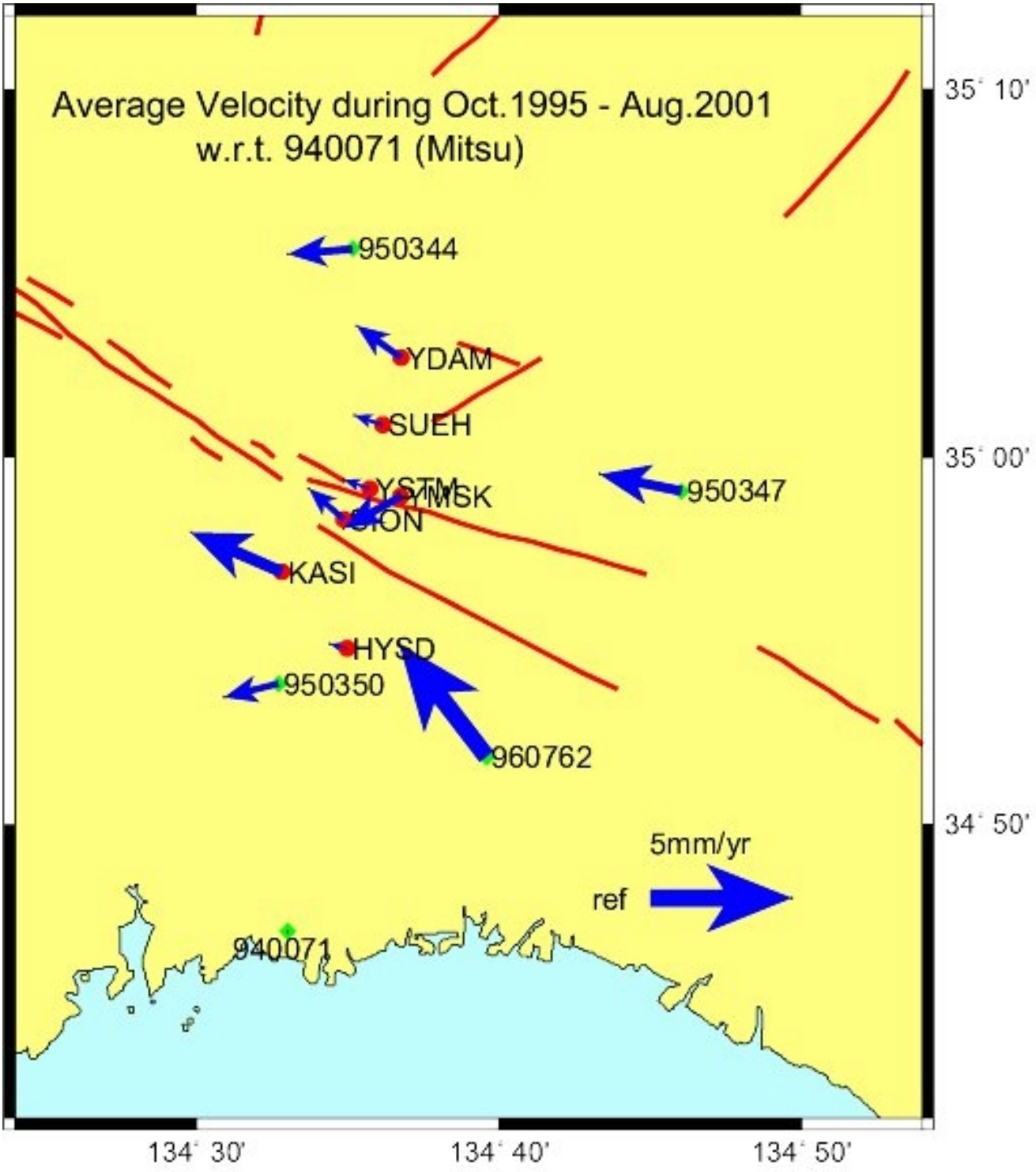
Average Velocity during Oct.1995 - Aug.2001
w.r.t. 940071 (Mitsu)
950344
YDAM
SUEH
YSTM
YMSK
SION
950347
KASI
HYSD
950350
960762
5mm/yr
ref
940071
35° 10'
35° 00'
34° 50'
134° 30'
134° 40'
134° 50'