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Quasi-static slips before and after the 2003 Tokachi-oki and November 29, 2004 off-Kushiro earthquakes at SE off Hokkaido, Japan estimated from repeating earthquakes

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The 2003 Tokachi-oki earthquake (M8.0) and an earthquake off Kushiro on November 29, 2004 (M7.1) occurred off the southeast coast of Hokkaido, Japan with a spatial separation of about 100km. We have estimated interplate quasi-static slip distributions around the source areas of these earthquakes by using small repeating earthquakes. Obtained results show slip rates of nearly 0cm/year in the source areas of the Tokachi-oki and the M7.1 events and low slip rates of less than 5 cm/year in the deeper extension of those source areas for the period of about 10 years prior to the Tokachi-oki earthquake (Fig. 1a). After the earthquake, significant quasi-static slip accelerations (afterslips) were detected in the regions to the south and east of the Tokachi-oki earthquake's asperity estimated by Yamanaka and Kikuchi (2003) (Fig. 1b). The M7.1 event occurred at the northeastern edge of the afterslip area of the Tokachi-oki earthquake. After the M7.1 event, quasi-static slips were again accelerated in the regions surrounding the asperity of the M7.1 event (Fig. 1c). The earthquake sequence and quasi-static slip accelerations mentioned above can be explained by the 'chain reaction model' (Matsuzawa et al., 2004) which was originally proposed to explain the seismic activity off Sanriku.

Keywords: Repeating earthquake; Tokachi-oki earthquake; Quasi-static slip.

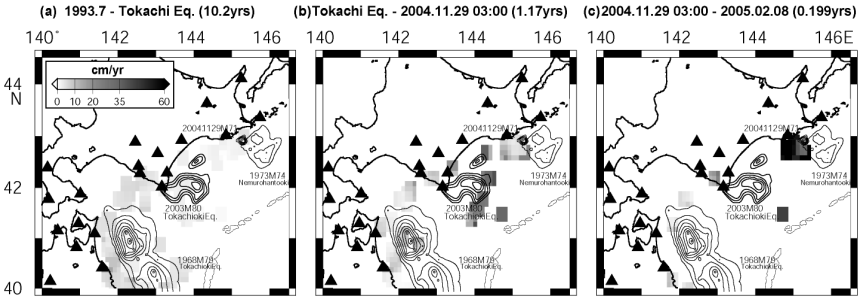

Figure 1. Quasi-static slip rates estimated from small repeating earthquakes. The analyzed period is shown at the top of each figure. The contours denote the slip distributions of large earthquakes (Yamanaka, Kikuchi, 2002. 2003,2004, Yamanaka, 2005)