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Spatio-temporal Evolution of Postseimic Slip Following the 2003 Tokachi-oki Earthquake (M8.0) Estimated by GPS and Repeating Earthquakes

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A giant interplate thrust earthquake (hereafter referred to as TE) with M8.0 occurred off Tokachi , Hokkaido, Northern Japan on September 26, 2003. GPS measurements revealed significant co- and post-seismic crustal deformations. This type of earthquake releases stress built up due to interplate coupling, and thus it is important to evaluate the variation of postseiemic slip in space and time. There occurred another interplate thrust event with M7.1 off Kushiro (hereafter referred to as KE), about 100 km northeast of the coseimic rupture area of the TE on November 29, 2004. This drives us to the question whether the co- and post-seismic slip of the TE might affect the occurrence of the KE.

We utilized a geodetic inversion technique devised by Yagi and Kikuchi (GRL, 30(2), 2003) to reproduce spatio-temporal distribution of the postseismic slip after the TE. The area of the dominant postseismic slip grew at the south of the coseismic rupture area, extending to the northeast, say, toward the forthcoming earthquake, KE. The cumulative seismic moment due to the after-slip is equivalent to M*w*7.9. The after-slip distribution is complementary to the coseismic rupture area estimated by waveform inversion. This characteristic has already been pointed out for some other interplate events by Yagi and Kikuchi (GRL, 30(2), 2003) and Yagi *et al.* (GRL, 30(22), 2003). The quasistatic slip distribution estimated by using repeating earthquakes (Uchida *et al.*, presented at SE13 of this meeting) coincides with the area of 60 cm slip or more estimated by this study. Comparing the time evolution of slip obtained by the two different methods, the slip amount estimated by GPS exceeds that by repeating earthquakes in general. In the best case, however, the quasi-static slip by repeating earthquakes amounts to about 70 to 80 % of geodetic estimation at regions demonstrating the major postseismic slip.

Keywords: GPS; Repeating earthquakes; Postseismic slip.