Afterslip distribution of large earthquake using viscoelastic media

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One of important parameters in simulations of earthquake generation is frictional properties of faults. To investigate the frictional properties, many authors studied coseismic slip and afterslip distribution of large interplate earthquakes using coseismic and post seismic surface deformation by GPS data.

Most of these studies used elastic media to get afterslip distribution. However, the effect of viscoelastic relaxation at the asthenosphere is important on post seismic surface deformation (Sato and Matsu'ura, 1992). Therefore, the studies using elastic media did not estimate correct afterslip distribution because they forced the cause of surface deformation on only afterslip at plate interface.

We develop a method to estimate afterslip distribution of large interplate earthquakes using viscoelastic media. We consider not only viscoelastic responses of coseismic slip but also viscoelastic responses of afterslip.

We estimate afterslip distribution for the 2003 Tokachi-oki earthquake. The viscoelastic results show clearer that afterslip distributes the area where coseismic slip does not occur. The afterslip with viscoelastic media concentrates deeper parts of plate interface at the eastern adjoining area of 2003 Tokachi-oki earthquake.