

Afterslip distribution of the 2003 Tokachi Earthquake and the 2004 Kushiro Earthquakes using poroelastic and viscoelastic media

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1. Introduction

It is important for obtaining frictional properties of plate boundaries to estimate coseismic and afterslip distributions of large interplate earthquakes. Afterslip may trigger another earthquakes, such as the 2004 Kushiro Earthquakes after the 2003 Tokachi Earthquake, and 3/11 main shock of the 2011 Tohoku Earthquake after 3/9 pre-shock. Surface deformation after large earthquakes includes displacements due to afterslip, viscoelastic relaxation, and poroelastic rebound. To determine afterslip distribution correctly, we need to estimate effects of viscoelastic and poroelastic responses. This presentation will show afterslip distribution of the 2003 Tokachi and 2004 Kushiro Earthquakes estimated from GNSS data using viscoelastic and poroelastic media, and discuss relationship between afterslip of the 2003 event and the 2004 events.

2. Data and method

We used daily F3 coordinate values of GNSS control stations from the GSI. We calculated the poroelastic deformation from the surface deformation under two conditions, drained and undrained, in terms of the elastic properties. We consider not only viscoelastic responses of coseismic slip but also viscoelastic responses of afterslip (for detailed method, see Lubis et al. GJI, 2013).

3. Results

The afterslip with poroelastic and viscoelastic media concentrates deep and shallow parts of plate interface at the eastern adjoining area of 2003 Tokachi Earthquake. This distribution of the afterslip spreads eastern side of the coseismic slip area of the 2004 Kushiro Earthquakes, and avoids the 2004 coseismic slip area. No slip area exists at the western side of the 2004 coseismic area. This area has no slip even after the 2004 events.

Acknowledgements

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Keywords: Afterslip, poroelasticity, viscoelasticity, 2003 Tokachi Earthquake, 2004 Kushiro Earthquakes