

Static deformation from fault slip in heterogeneous crust

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Introduction

Tone and Miyatake(2009) and Tone et al(2009) studied an effect of lateral heterogeneity of crustal structure on stress field, especially σ_{CF} . In the paper, we focus on an effect on crustal deformation. Static crustal deformation has often an important role in source inversion. Synthetic crustal deformations are calculated using uniform half space model(Okada,1992) or horizontally layered structure (Zhu and Rivera, 2002), and lateral heterogeneity is ignored. We calculate the deformation in heterogeneous structure and compare with those in homogeneous or horizontally layered structure. For simplicity, we use 2D model.

Method

We use FDM (see details in Tone and Miyatake, 2008, SSJ; 2009, this meeting).

We simulated a crustal deformation from the 1997 Northridge earthquake using simplified model. The fault assumed to be reverse fault and set the dip angle set to be 45degree and length to be 10km. We also assumed uniform stress drop. We made a crustal structure model as simple as possible. It has a square shaped basin of 5GPa rigidity, 15km width and 4km thickness.

Results

Deformation for heterogeneous structure is different from that for homogeneous structure or layered structure. Much difference appears on the central part of the basin.