

# Coseismic crustal deformation of the 2003 Tokachi-Oki Earthquake considering 1-D structures

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Static displacement is observed at many stations in 2003 Tokachi-Oki Earthquake, even though the epicenter is far from Hokkaido Island. This fact means that rupture propagated near Hokkaido Island. The large slip is estimated at east of Cape Erimo by a waveform inversion using strong motion records obtained from K-NET and KiK-net (Honda et al 2004). Similar results obtained by inversion analysis with geodetic data have been reported. However, such studies using static displacement generally depend heavily on the interpretation of source modeling in a half-space. In this study, we calculate static displacement and dynamic one simultaneously, considering stratified media with discrete wavenumber method.

As first, we assume a simple fault model and velocity structure. The fault is divided into two planes which correspond to around epicenter and the region with the maximum slip. A velocity structure with two layers on a half-space is introduced as the layered model. Comparing static displacements calculated with a half space and layered model, the existence of surface layer affects both the amplitude and the special distribution of static displacement. Maximum amplification of static displacement calculated at K-net and KiK-net stations is over 20 % and the vector of horizontal movement is slightly changed. This is because the amplification for strike slip component and the dip slip component is different. Our results suggest that a strong bias may be introduced to the conventional estimation of fault parameters assuming a medium to be a half-space, from static displacement or geodetic data by the existence of a low-velocity or low-rigidity surface layer.