

Investigation of regional-distance coseismic surface dislocations after a megathrust earthquake using broadband seismic records

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Abstract

Megathrust earthquake accompany large permanent coseismic displacements, perturbing stress field and seismicity in regional distances. The 11 March 2011 Mw9.0 Tohoku-Oki megathrust earthquake produced coseismic displacements of 2-5 cm in the Korean Peninsula in one day, which was observed in geodetic measurement. We use broadband seismic records for the megathrust earthquake to assess the dynamic evolution of permanent displacements in the Korean Peninsula. The seismic records presents the dynamic motions for transient seismic waves and permanent displacements. The seismic data is distorted by limited performance of instrument and unexpected local effects including local ground tilting. Seismometers transform ground motions into digital counts, which may lose information in low and high frequency components of the motions. In particular, the low ground motions are often contaminated by ambient noises. We reduce the noises from the seismic data, and retrieve the transient and permanent displacements. The coseismic displacements may imply the anelastic Earth response to a megathrust earthquake.