Mechanism of large ground motion at HKD020 during the 2004 Rumoi earthquake (Mj6.1), Hokkaido, Japan

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We developed an characterized source model of the 2004 Rumoi earthquake (Mj6.1), Hokkaido, Japan, that have a large ground acceleration of over 1000 cm/s/s at HKD020(K-NET). Referring to the source model estimated by empirical Green's function method (Maeda and Sasatani, 2009), we make the validation analysis of source model using hybrid method, which are combined by theoretical and stochastic Green's function method. The discrete wavenumber method (Bouchon, 1981) associated with the reflection transmission propagator matrix method (Kennett and Kerry, 1979) was used to calculate theoretical Green's functions for long period part. We also calculated stochastic Green's functions (Boore,1983) for short period part. We used 1-D velocity structure model at the strong motion observation site (HKD020), which were estimated by microtremors array measurement, and borehole data (Maeda et al., 2008). The hybrid waveforms, which were calculated from tuned source model, agree well with the observed waveforms at HKD020. It is suggested that the reason why the strong ground motions had hit HKD020 is due to the directivity effect from a source and shallow asperity.

Keywords: the 2004 Rumoi earthquake, large ground motion, mechanism of strong ground motion, hybrid method