[JJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS14]Strong Ground Motion and Earthquake Disaster

convener:Masayuki Kuriyama(Central Research Institute of Electric Power Industry)
Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
Strong ground motion has social impacts as it induces earthquake disasters. We solicit contribution on any seismological topics related to strong ground motion that includes, but are not limited to, source processes, wave propagation, and site effects. We also welcome contribution on earthquake related disaster mitigation.

[SSS14-P24]Rupture Process of the M5.5 Orkney Earthquake Using Strainmeters at Very Close Distance

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Gold mining is a major industry of South Africa, however, there is a risk of induced earthquakes associated with the deep escavations, so seismic monitoring is maintained around and in the mines. The Orkney earthquake (M5.5) occurred on 5 August 2014 directly beneath the Orkney Gold mine. The event was the largest earthquake since the dense instrumentation was installed, and includes 3 Ishii borehole strainmeters at a depth of 2.9 km depth and 17 surface strong motion meters at close distances. The aftershock distribution was well located by these instruments. The planar distribution of aftershock activity dips almost vertically and the upper edge is located several hundred meters from the strainmeter site. The strainmeters and surface strong motion meters recorded clear nearfield waveforms.

We try to model rupture process of the M5.5 mainshock using the nearfield strainmeters and surface strong motion meters data using a multi-time window method (Yoshida et al. (1996)). For the analysis, we used a horizontal stratified structures obtained by H. Ogasawara (2018 Msc) and A. Mangongolo (2014). The strain Green functions that include near-field terms and static off-sets were calculated using a finite difference method. Since the absolute timing of the strainmeters is not accurate, we decided set the starting point of rupture using a hypocenter determined by data from the 17 surface strong motion meters.

As a result of the analysis, large slip on the fault occurred in the northern region and the rupture propagated bilaterally upwards to the north and downwards to the south. This result is consistent with the absence of observed faulting in the mine tunnels and the inclination of aftershock distribution from north to south.