ID: Type: **Oral**

Estimation of NK09 and NK13 Source Time Functions and Yields Directly from Seismograms

I estimate the source time functions and yields of the North Korean 2009 and 2013 events (NK09 and NK13) directly from seismograms recorded at Mudanjiang (MDJ) seismological observatory. The path effect between source and receiver is eliminated by finding a ratio filter that shapes the NK09 seismogram to the NK13 seismogram. Neglecting noise, convolution of this filter with the source time function of NK09 yields the source time function of NK13. The two source time functions are also related by the well-known scaling law in which the injected volume is proportional to the yield and the time constant is proportional to the cube-root of the yield. These two independent equations are solved for the two source time functions, which are characteristic of explosions, not earthquakes, by a method that gives the yield ratio: NK13/NK09 = 2.35. Using measurements from underground nuclear tests at Nevada Test Site (NTS) for calibration, NK09 and NK13 are estimated to have yields of about 5 kt, and 12 kt. This method has applications in seismic exploration on land with explosives and may also be used to find earthquake source time functions using pairs of events from the same location with the same source mechanism.

Primary author: ZIOLKOWSKI, Antoni (University of Edinburgh)

Presenter: ZIOLKOWSKI, Antoni (University of Edinburgh)

Track Classification: 2. Events and Nuclear Test Sites