ID: Type: **Oral**

Accurate Depth Determination and Source Characteristics of the DPRK Nuclear Tests (2006, 2009, 2013, 2016J (01/06/2016) and 2016S (09/09/2016)) Using Regional and Teleseismic Arrays

North Korea conducted underground nuclear explosions on October 9, 2006 (M 4.3), May 25, 2009 (M 4.7), February 12, 2013 (M 5.1), January 6, 2016 (M 5.1) and September 9, 2016 (M5.3). We used spectral nulls of body waves and Rayleigh waves from regional and teleseismic arrays. We minimized noise signals and nonlinear tectonic effects using well-azimuthal coverage arrays and common depth point stacks enhancing a S/N ratio. The burial depths of the 2006, 2009 and 2013 nuclear tests were estimated at 2.16, 2.08, 2.08, 2.10 and 2.15 km for the 2006, 2009, 2013, 2016J and 2016S tests respectively. It should be noted that these depths are significantly greater than expected from the standard experiment practice and the source characterization of the 2006 test is quite different from rest of other nuclear tests. We infer that the 2006 test might have been conducted as a vertically distributed source in a vertically contained shaft whereas the rest of other nuclear tests as horizontally distributed sources in mutually connected drifts from source mechanisms as well as absence of radioisotopes after those nuclear explosions. The possibility that these events were over-buried would affect the interpretation of MS-mb discriminants and estimation of the yield.

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