ID: Type: **Poster**

Corrections to Improve Detection, Location and Measurement of Seismic Discriminants at IMS Arrays

The analysis of seismic data for test-ban verification relies on the detection of and discrimination between underground nuclear explosions and natural earthquakes. Data with high signal-to-noise ratio (SNR) is needed to make measurements of such seismic discriminants as source depth and mb/Ms. Seismic arrays can be used to improve the SNR of waveform data for a suspicious event using various stacking methods. The linear delay-and-sum stack is computationally simple and preserves the waveforms such that accurate magnitude ratios can be calculated. However, optimal SNR improvement requires that delay times be accurately estimated at each station within the array. We therefore seek static corrections to the arrival times and amplitudes of seismic phases to account for local velocity structure beneath IMS arrays. We have developed a semi-automated procedure that uses vespagrams to make slowness-azimuth station corrections as a function of slowness and backazimuth. The corrected slownesses are then used to calculate static corrections. The improvement in detection, location and SNR achieved using these corrections is demonstrated for example IMS arrays using the F-statistic. The enhanced data is then used to measure seismic discriminants for the nuclear tests conducted in the DPRK from 2006-2016, and compared with previously reported values.

Primary author: WILKINS, Neil (University of Bristol)

Presenter: WILKINS, Neil (University of Bristol)

Track Classification: 3. Advances in sensors, networks and processing