ID: Type: **Oral**

calibration of CTBTO hydrophone arrays using long-term ambient noise records

When using a hydroacoustic array to determine the bearing of a source, errors in the sensor positions severely reduce the accuracy of any bearing measurements. This issue is particularly problematic for three sensor arrays, designed to work in two dimensions, because of the lack of redundancy built into the array. This paper presents a method for correcting errors in sensor positions. It is mathematically straightforward to determine the bearing of a far-field impulsive signal by determining the time difference of arrival between sensors by cross-correlation. These time delays can also be used to estimate the sound speed in the vicinity of the array. In an isotropic acoustic medium, the local sound speed is expected to be independent of the source bearing. If the sensor positions used to determine the sound speed and bearing are incorrect, the resulting sound speed measurements will be bearing-dependent. Using an analytically derived function, the correct array shape (with only translational and rotational ambiguity) can be backed out from the directional sound speed distribution. This method will be demonstrated using long-term ambient noise records from the CTBTO's hydrophone arrays.

Primary author: NICHOLS, Stephen (ARL Penn State)

Presenter: NICHOLS, Stephen (ARL Penn State)

Track Classification: 2 - Signal processing techniques for hydroacoustic event detection and evaluation via different types of sensors