

# Detecting Seismic Events in Continuous Waveform close to a Proposed Carbon Capture and Sequestration Site in Coastal Texas

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## 1. Introduction

We worked with an industry dataset of 1800 nodes that were deployed for 30 days to detect potential seismic activity in an area that may be suitable for CO<sub>2</sub> sequestration.

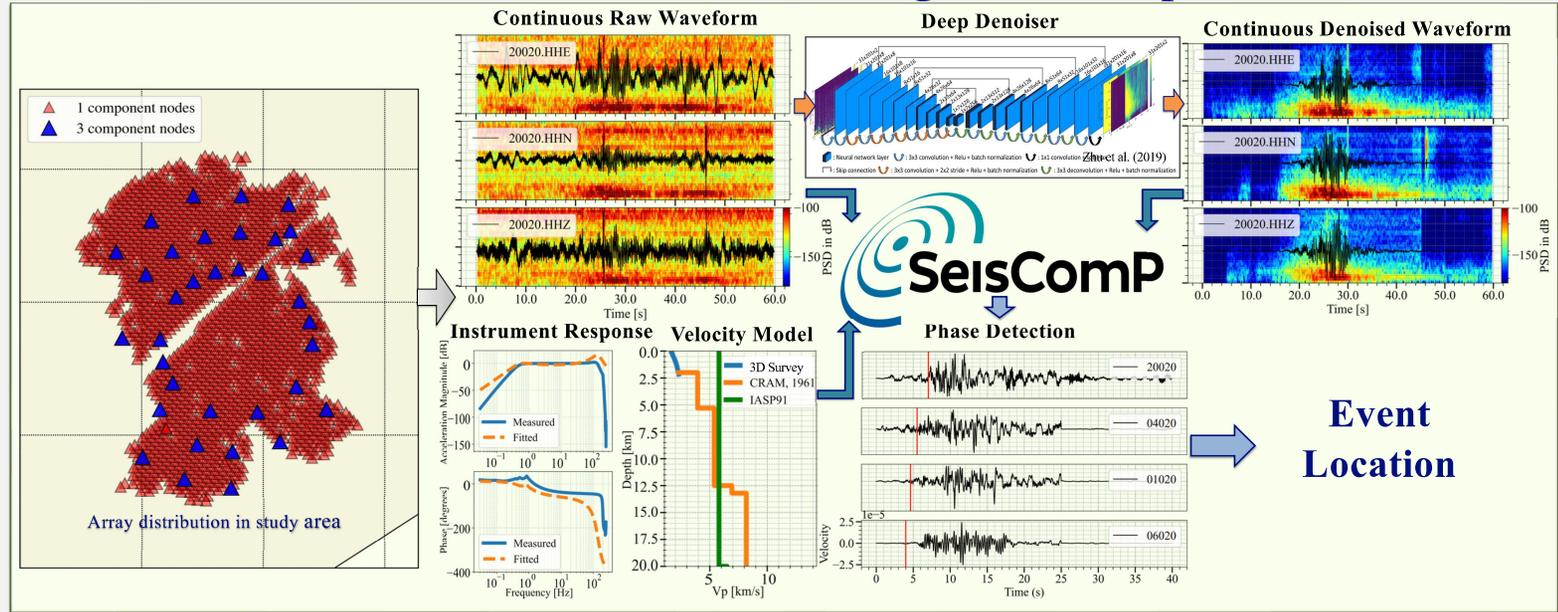
### Challenges:

1. Short seismic records complicate background rate estimates in stable, continental regimes.
2. SNR was expected to be low due to the instrument characteristics and high industrial noise.
3. Small array aperture only facilitates locating events if they are beneath the array.

### Opportunities:

1. Deep learning denoisers could help improve SNR.
2. Large-N records allows stacking to amplify coherent energy.

## 2. Continuous Waveform Processing in SeisComp



## 3. Detected Events

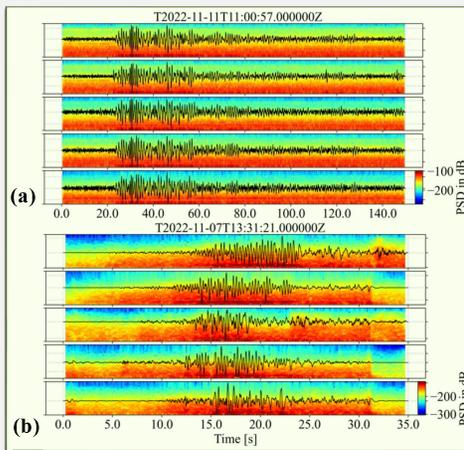


Figure. a) Telesismic 7.3Mw Tonga earthquake  
b) Suspected Local event

## 4. Validation with Beamforming

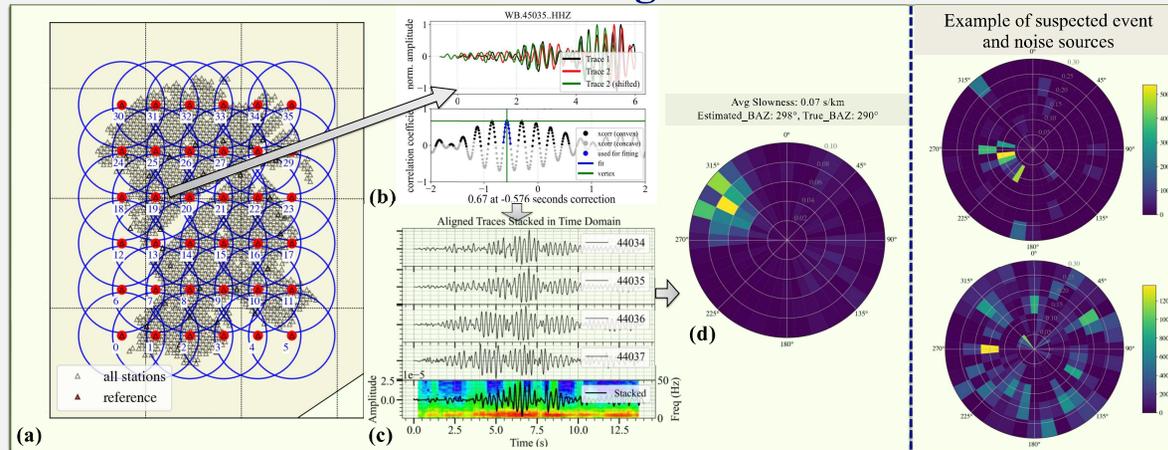


Figure. a) Station Grids for Cross-Correlation b) Cross-Correlation between two station  
c) Aligned station traces for stacking d) Beamforming using stacked traces

## 5. Conclusion

We detect few local coherent energy suspected to be small seismic event. Due to array geometry locating these events are challenging, unless the events are very close to the array. Beamforming of large array can be helpful to understand the azimuths of energy sources. To validate methodological approach, we process recordings from large teleseismic and regional earthquakes, happened during the time being of array deployment.