Constraining Microseismic Event Location in the Eagle Ford with Guided Waves

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RCP
RESERVOIR CHARACTERIZATION PROJECT
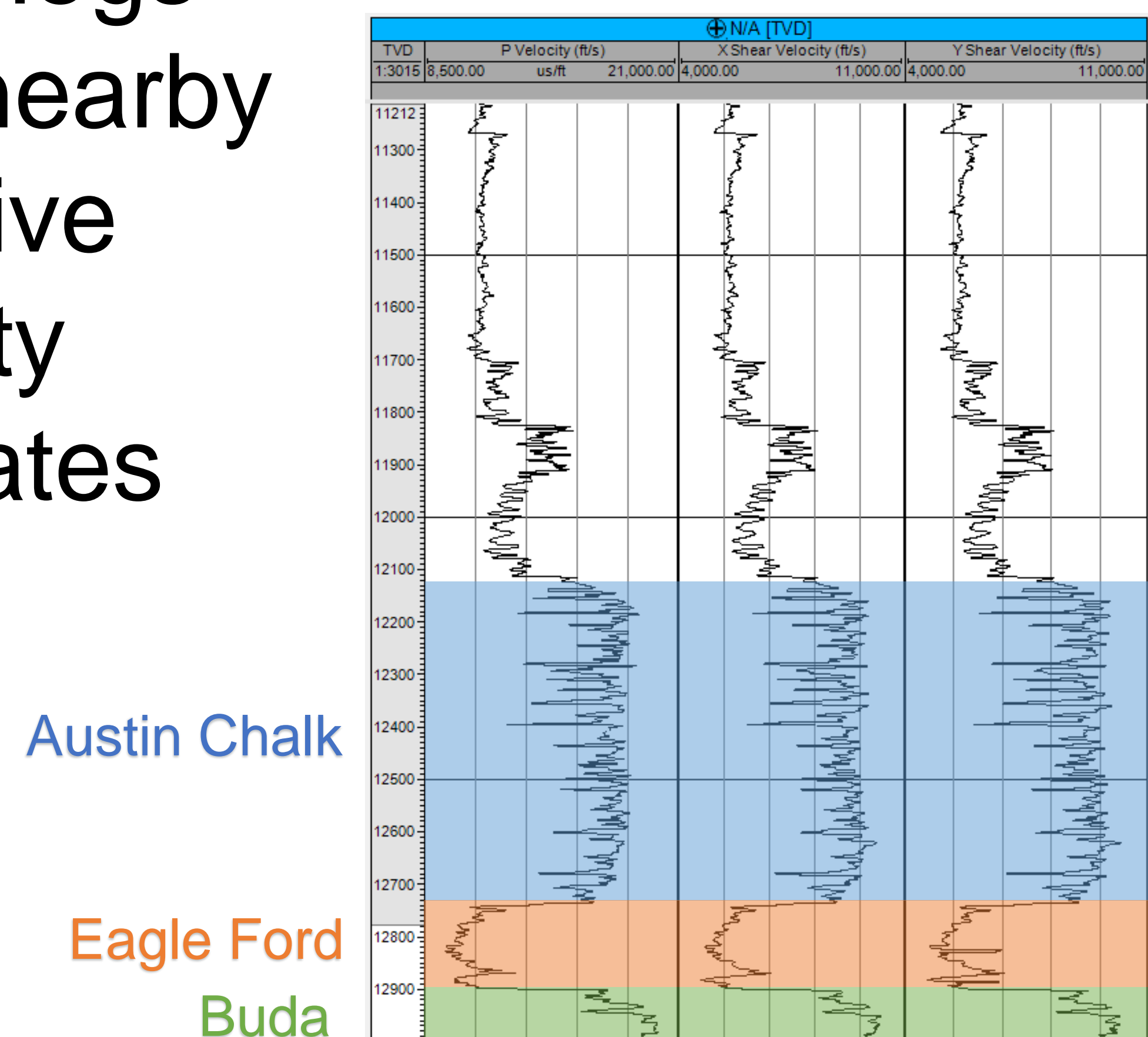COLORADO SCHOOL OF MINES

Objectives

- Assess quality of microseismic event location in the Eagle Ford
- Use guided waves to better constrain event location

Background

- Depths from microseismic surface catalog are inaccurate
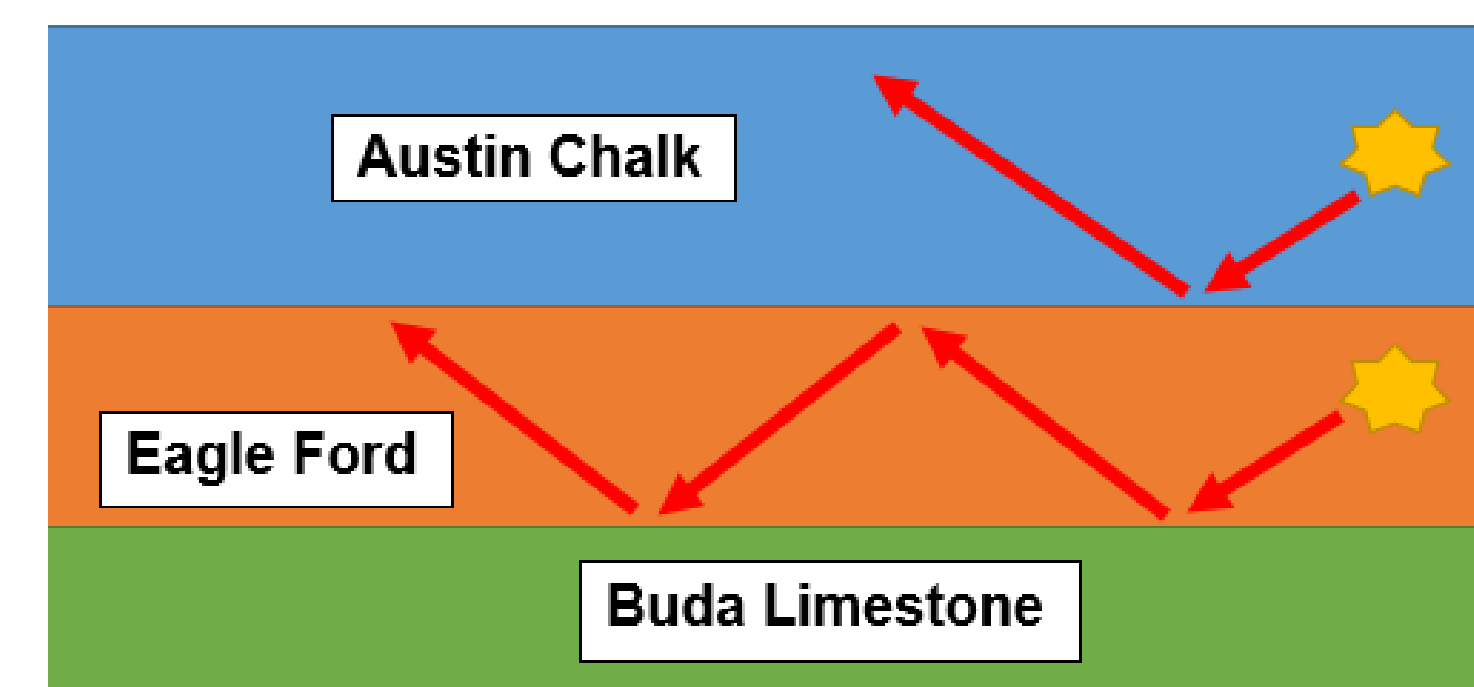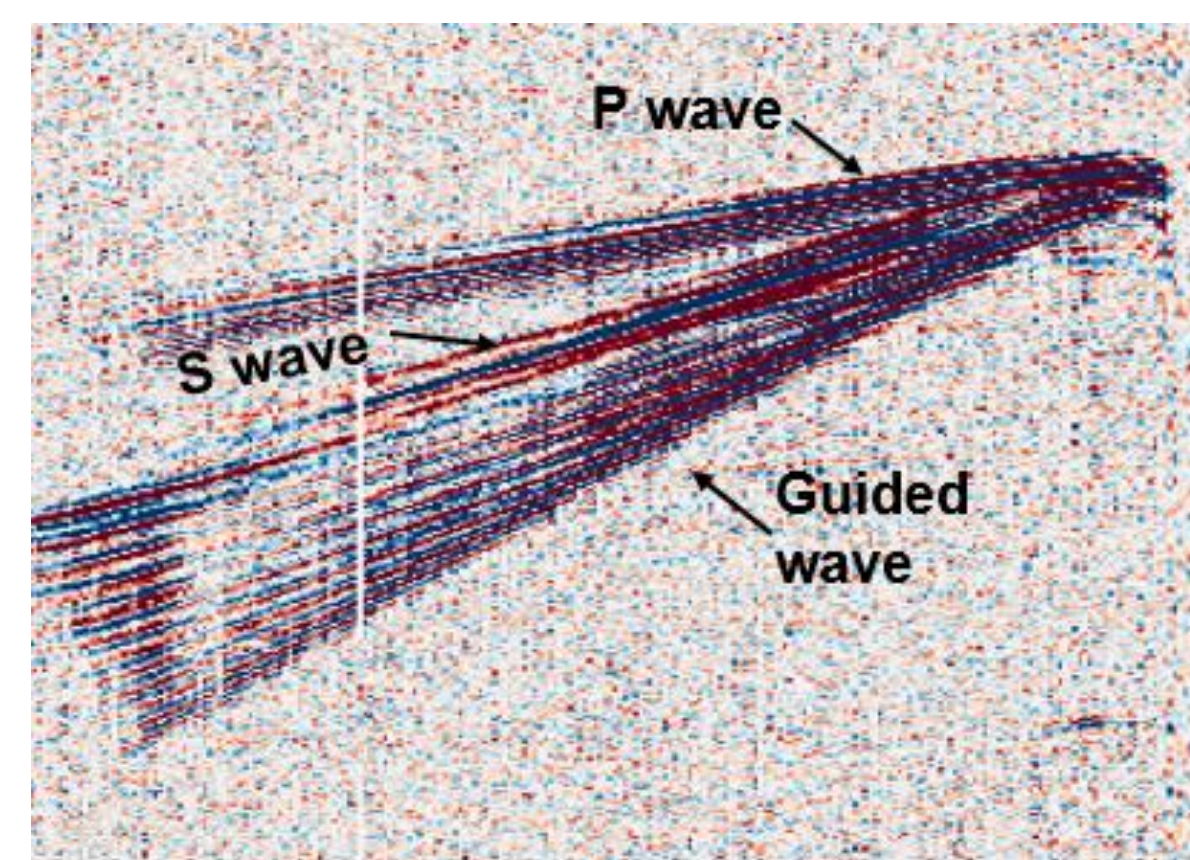- Events are detected by DAS in a well in lower Austin Chalk
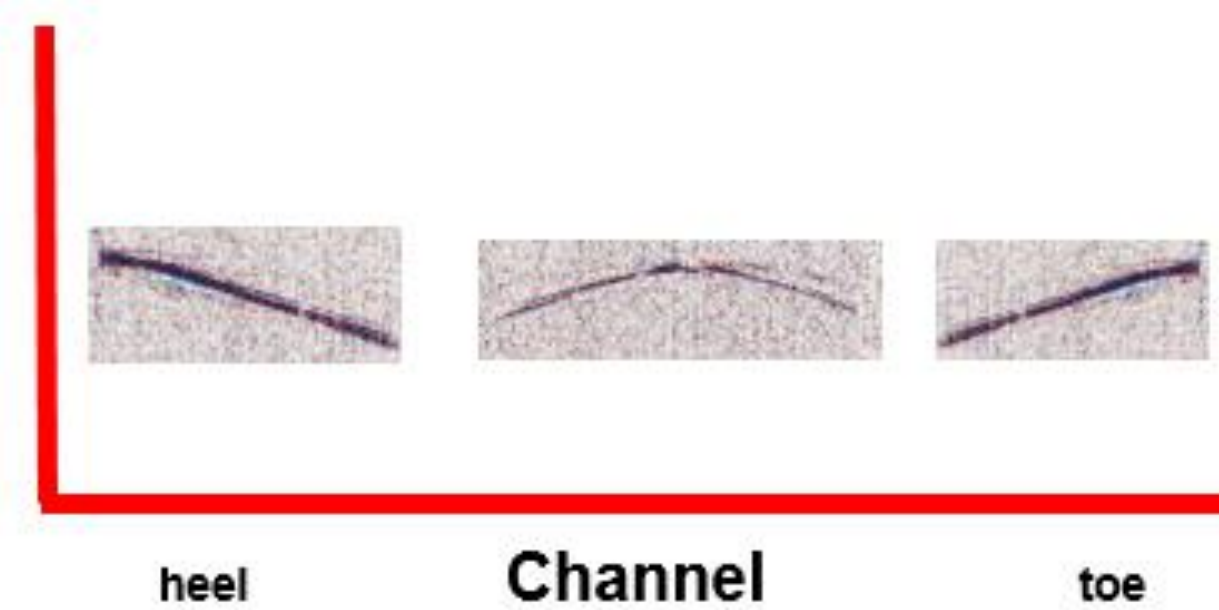
- Sonic logs from nearby well give velocity estimates

Background (cont.)

- Guided waves are generated by total internal reflection in a low velocity layer (like Eagle Ford)
- Events have different guided wave strengths
- Events with strong guided waves are likely in the Eagle Ford
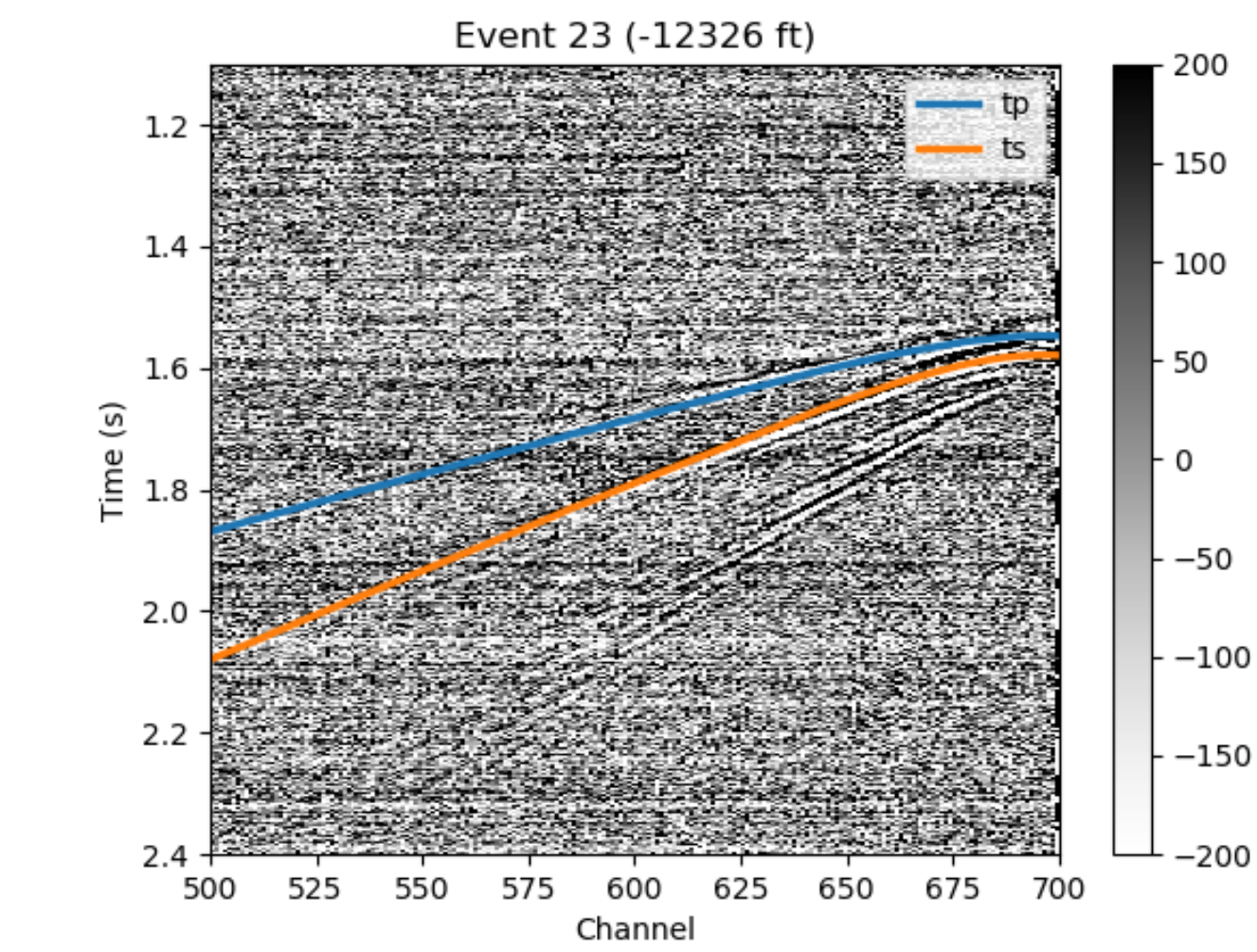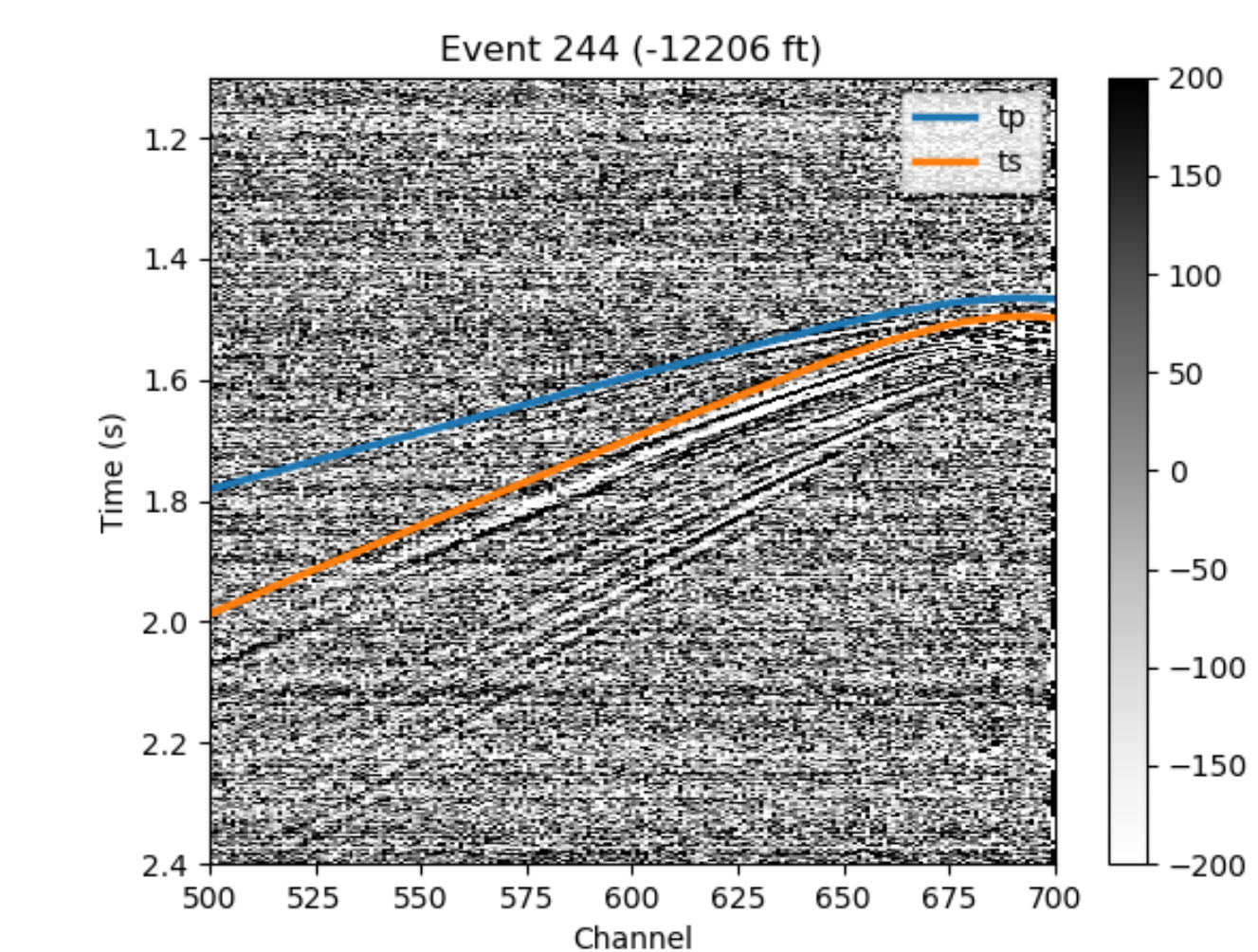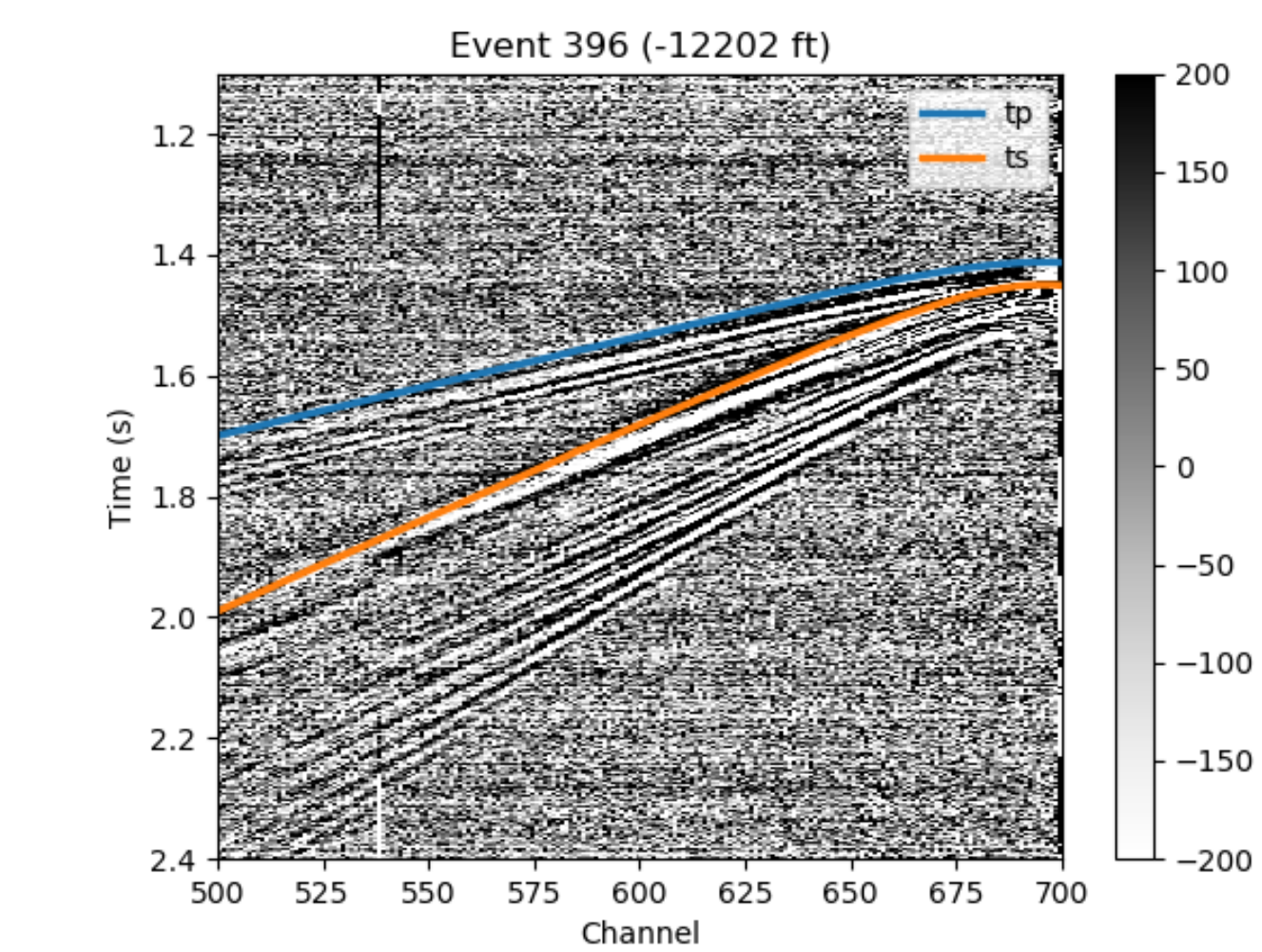 - Constrains event depth

Method

- Use distance between surface catalog and DAS channels to calculate traveltimes (with velocity estimates from sonic log)
- Manually adjust event time to get better traveltime curve matching
- Calculate amplitude ratio between guided wave and P or S waves for events (plot this vs depth)

Preliminary Results

Guided Wave Events

Weak/non-GW Events
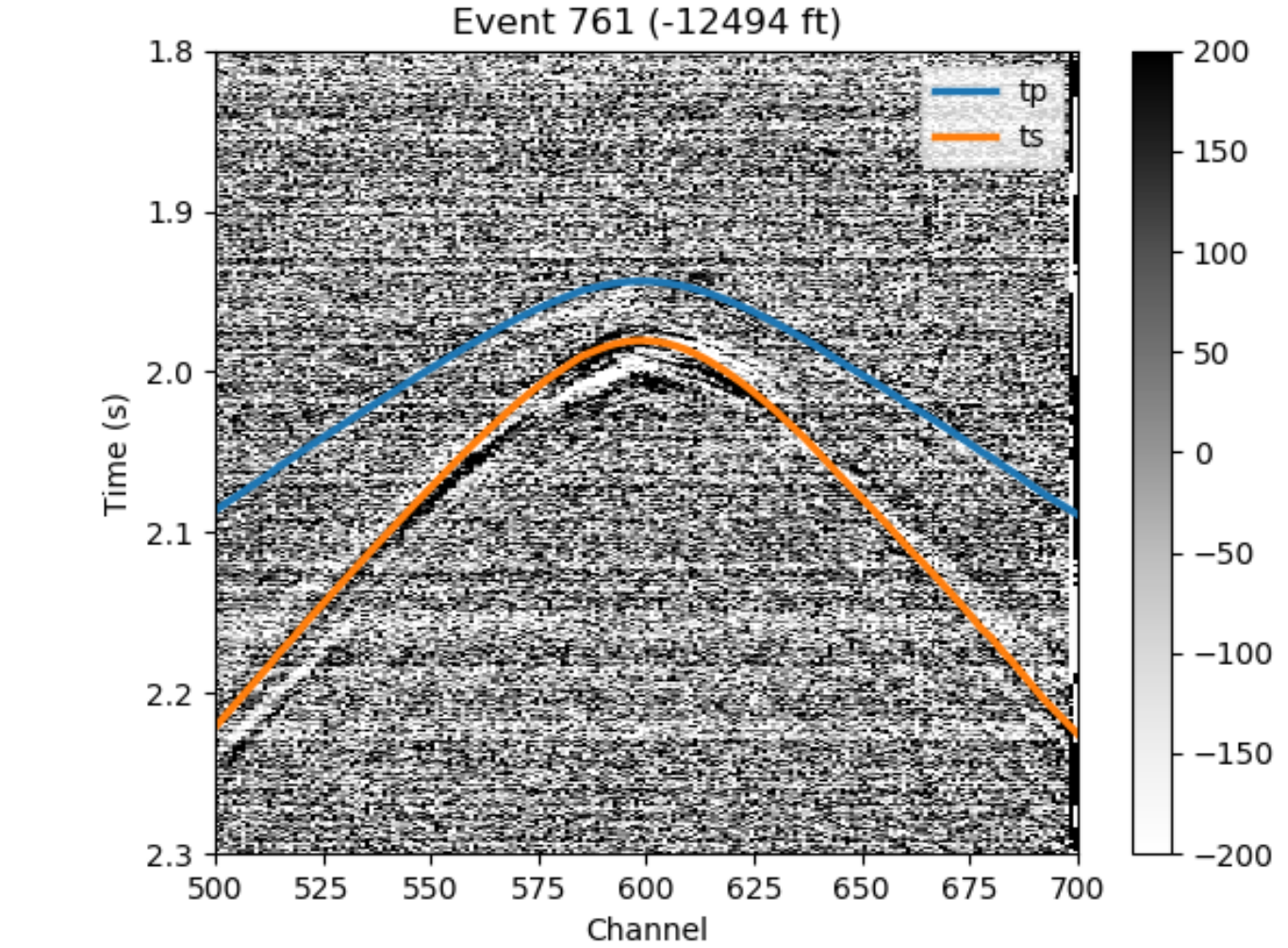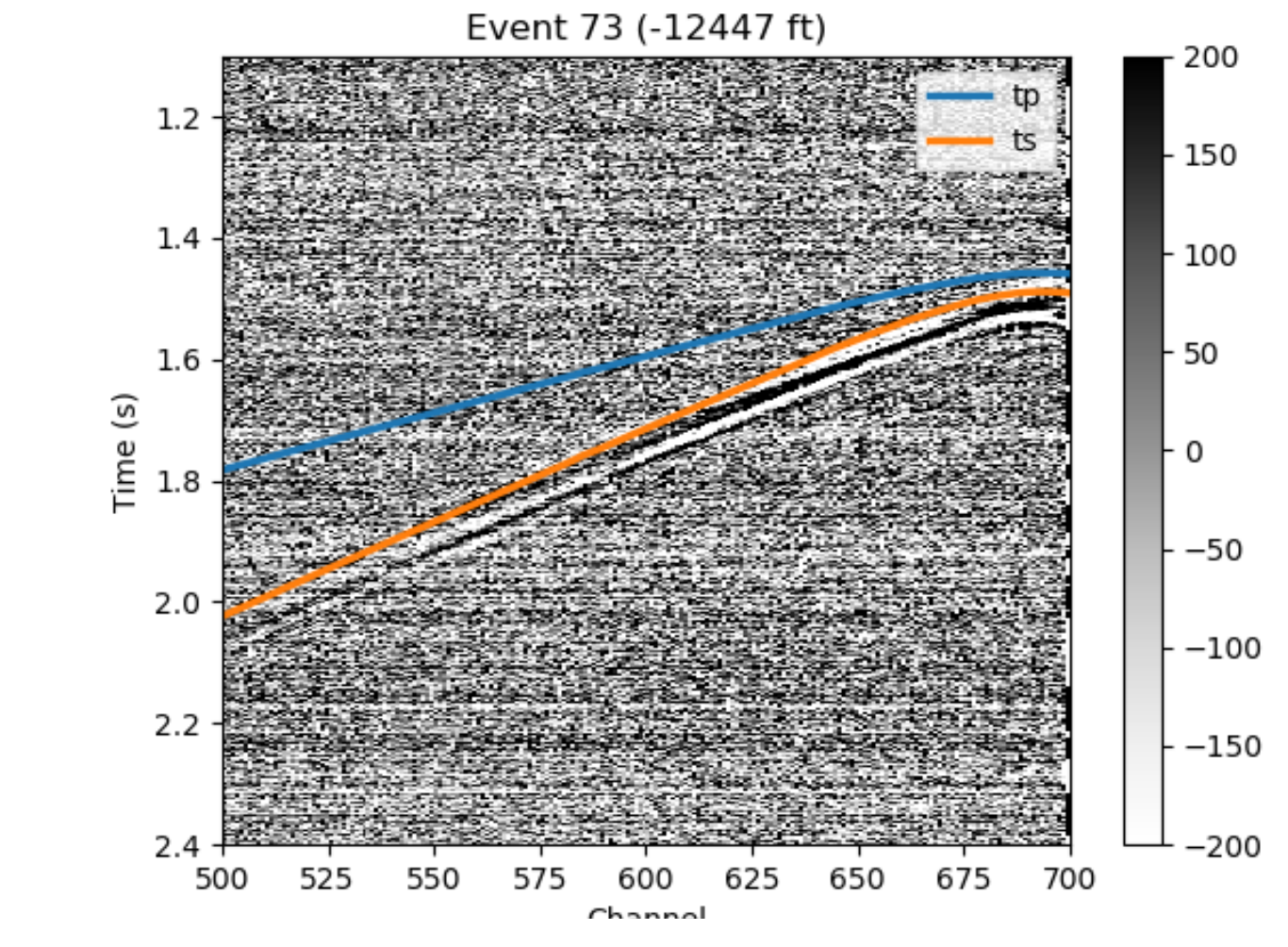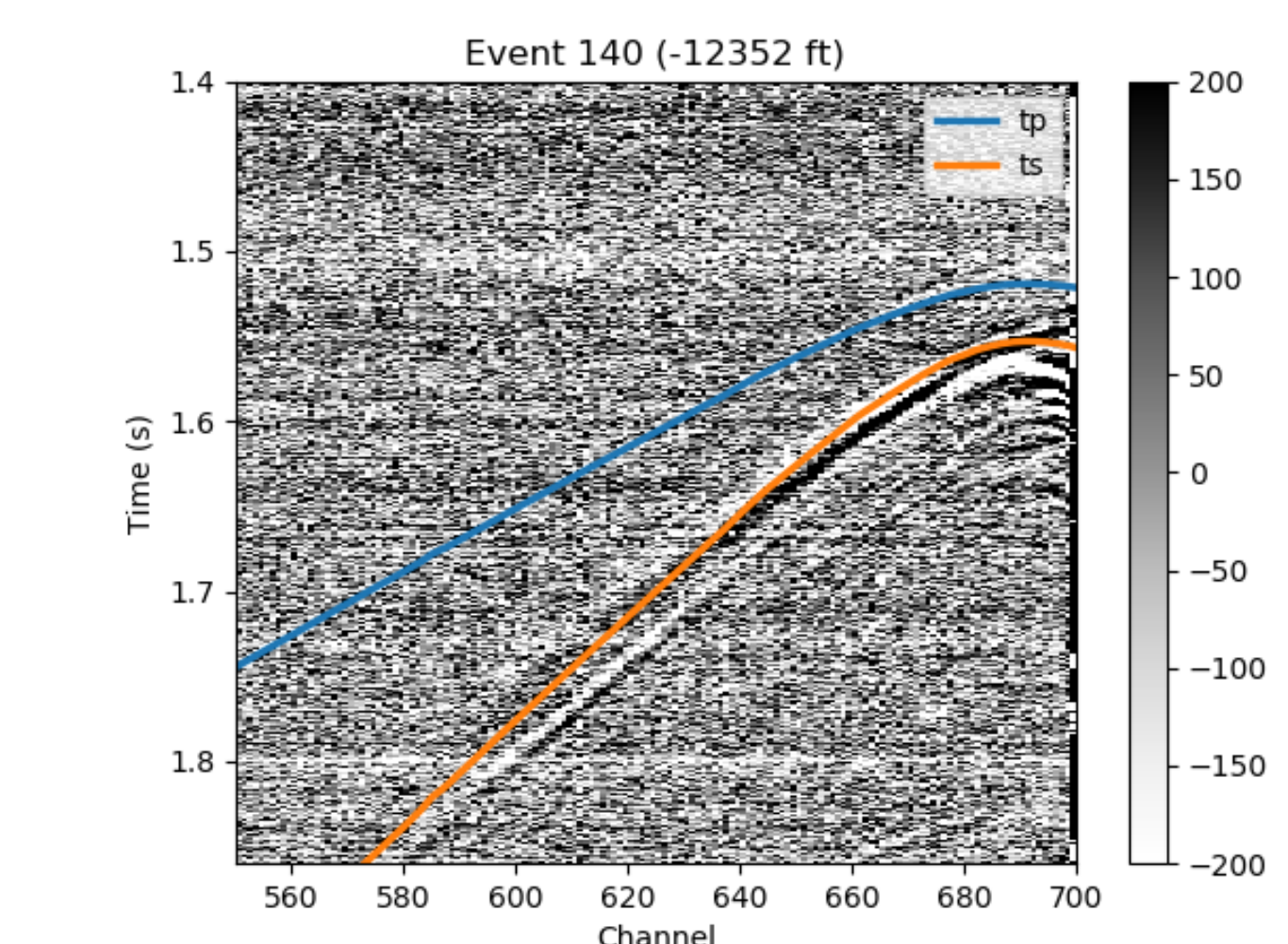
Future Work

- Determine corrected event depths from event time change
- Invert guided wave dispersion curves for P and S velocities
- Analyze time-lapse changes due to hydraulic fracturing