Receiver Position Adjustment

NZ 3D Processing

02 September 2020

INSTITUTE FOR GEOPHYSICS

CGG
Passion for Geoscience

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Processing flow

1. Convert to CGG internal format
2. Nav merge / trace edit

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Outline

- **Objective:**

  To fix the issue that offset does not match with data causing water bottom misalignment in stacks.

- **Procedure:**

  Pick the direct arrival time (D-wave time) to calculate new offset values that match with data.
  Re-calculate receiver positions using the new offset values, assuming shot positions and azimuth angles are correct.
  Only the following sail lines are adjusted: Seq 001~012, 016, 018, 029, 049, 051, 056, and 058.

- **Display:**

  Receiver position map, common offset, 2d stack, and 3d stack.

- **Observation and Recommendation:**

  The result shows proposed adjustment of receiver positions are effective. Recommend to proceed with this adjustment before more accurate positions available from acquisition team.

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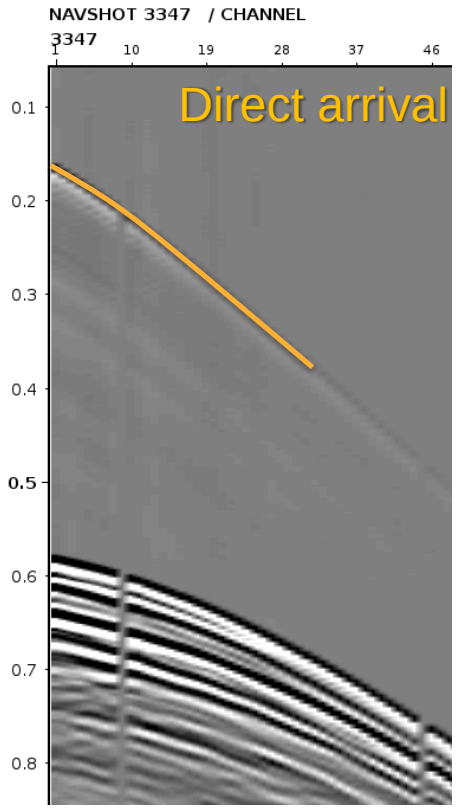
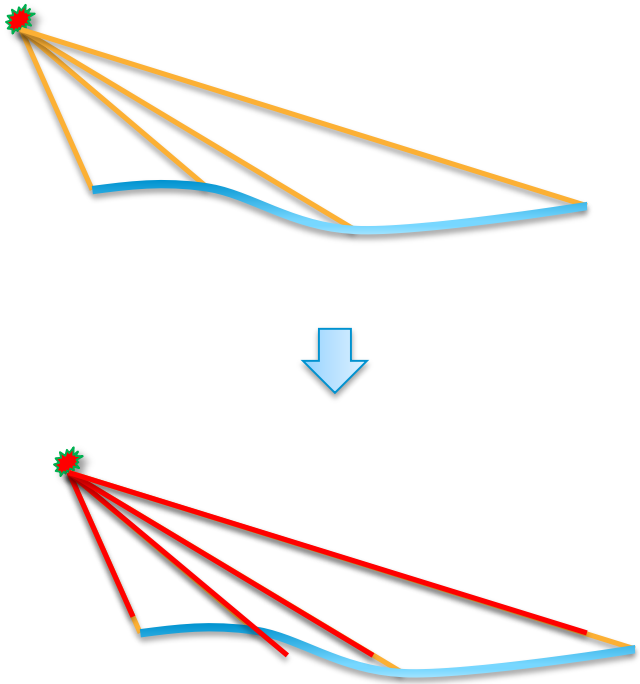
Receiver Position Adjustment Procedure





- Direct arrival (D-wave) time was picked for the 1st, 10th, 40th channels, where good S/N ratio enables accurate picking. A linear interpolation from the picked times to original D-wave times (from old offsets) was done between picked channels and channel 40 to 120 to ensure a smooth change.

- New offset was calculated from the picked time and then used for calculating the new receiver positions, assuming shot positions and azimuth angles are not changed.

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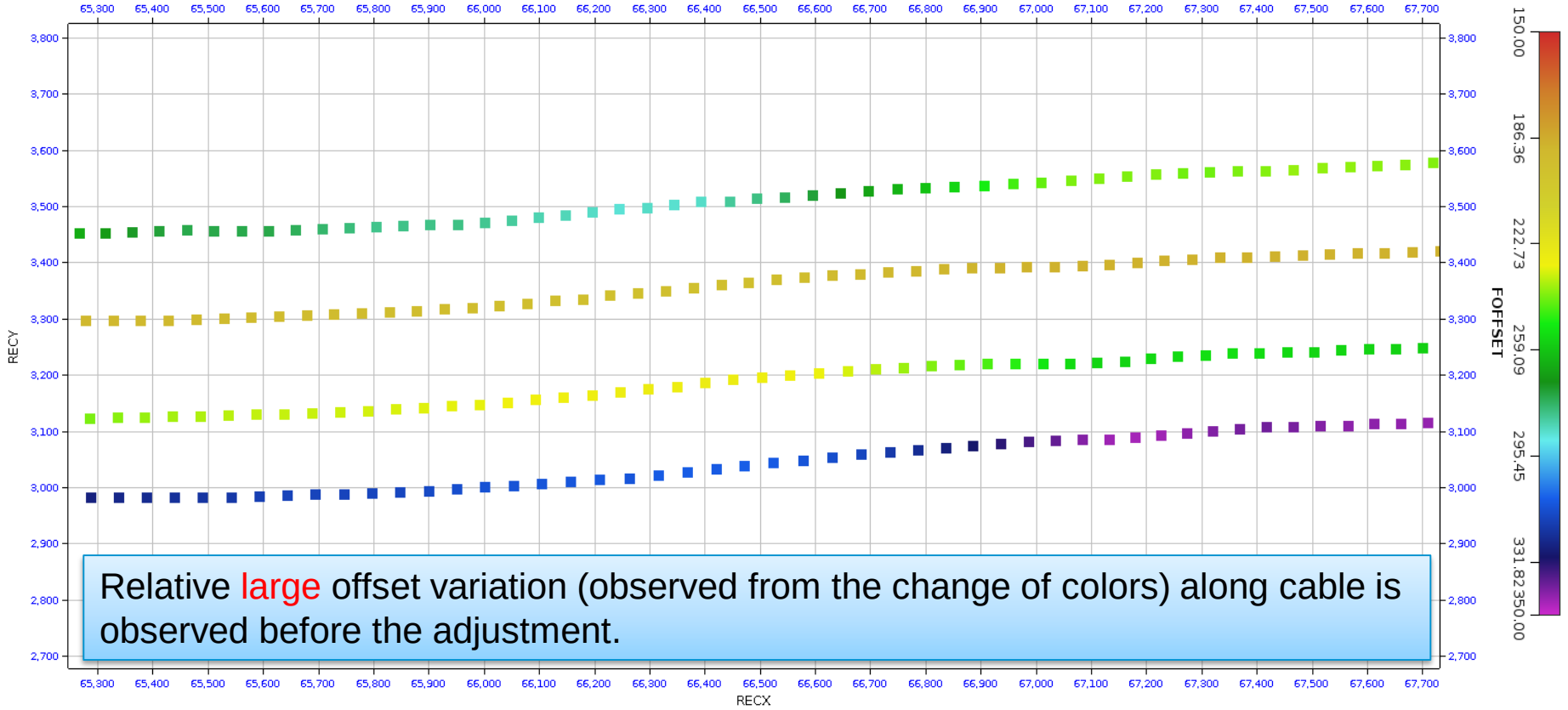
Receiver Position Map: Before Adjustment



Relative large offset variation (observed from the change of colors) along cable is observed before the adjustment.

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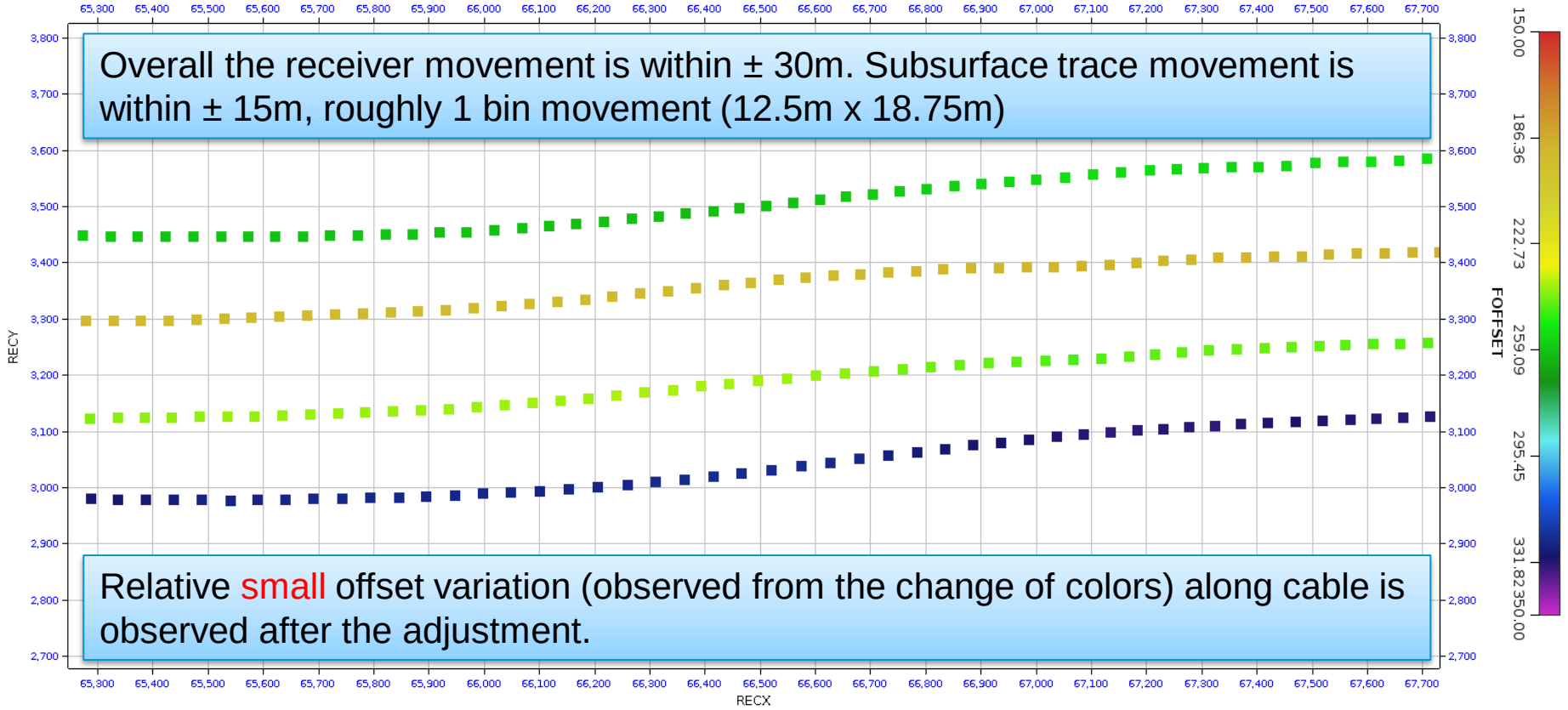
Receiver Position Map: After Adjustment



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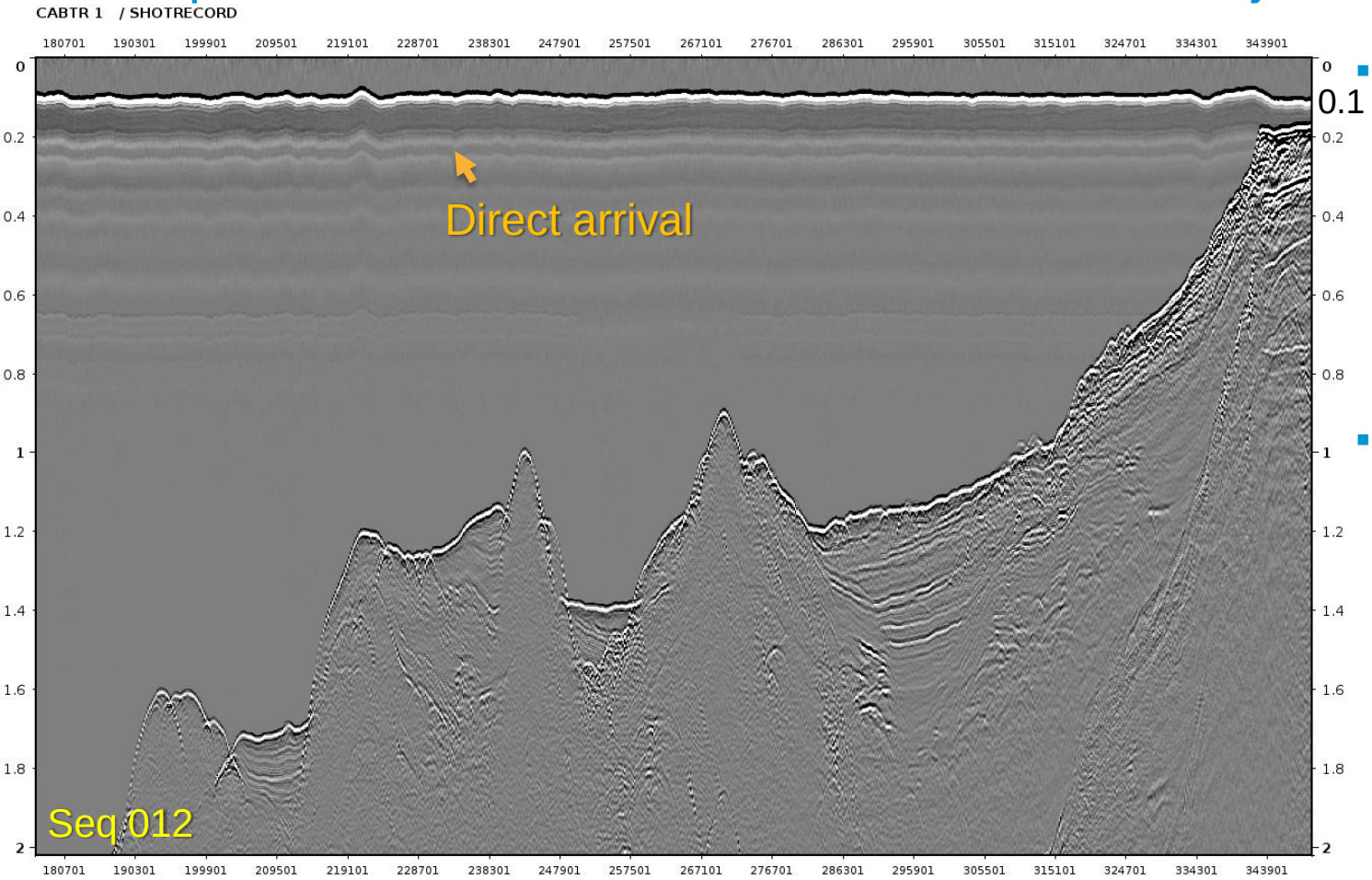
Seq 012 Gun 1 Channel 1 after LMO: Before Adjustment



- A linear move-out (LMO) correction with water velocity (1520 m/s) and a shift down 0.1 sec was applied to flatten the direct arrival wave.
- Before the receiver position adjustment, direct arrival does not align at 0.1 sec, indicating inaccurate offset value calculated from shot and receiver positions.

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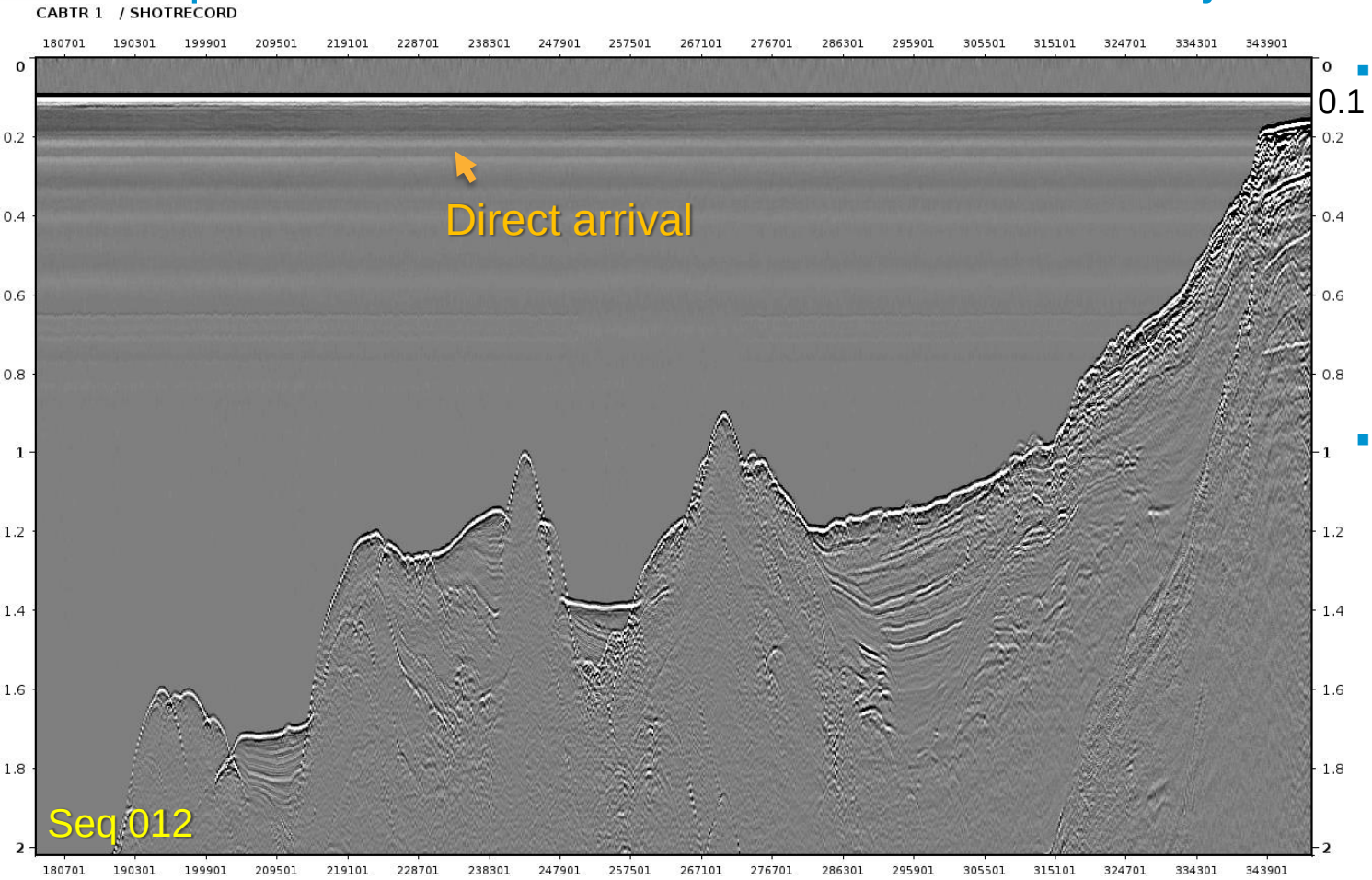
Seq 012 Gun 1 Channel 1 after LMO: After Adjustment



- A linear move-out (LMO) correction with water velocity (1520 m/s) and a shift down 0.1 sec was applied to flatten the direct arrival wave.
- After the receiver position adjustment, direct arrival now align at 0.1 sec.

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2D stack

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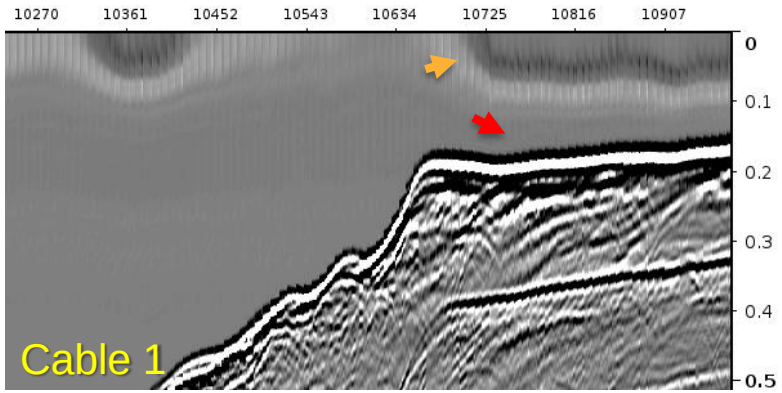
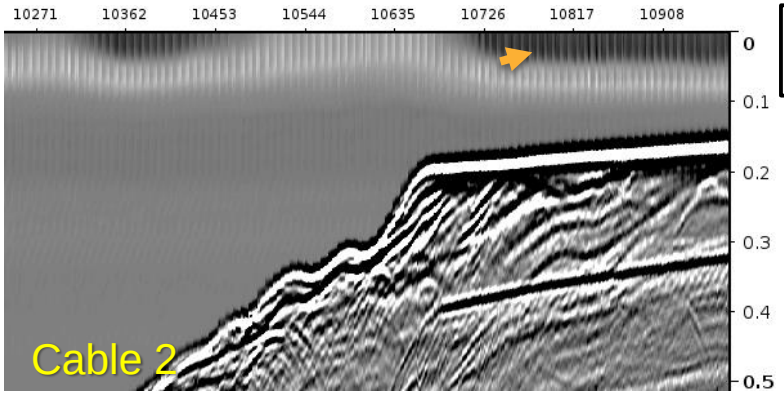
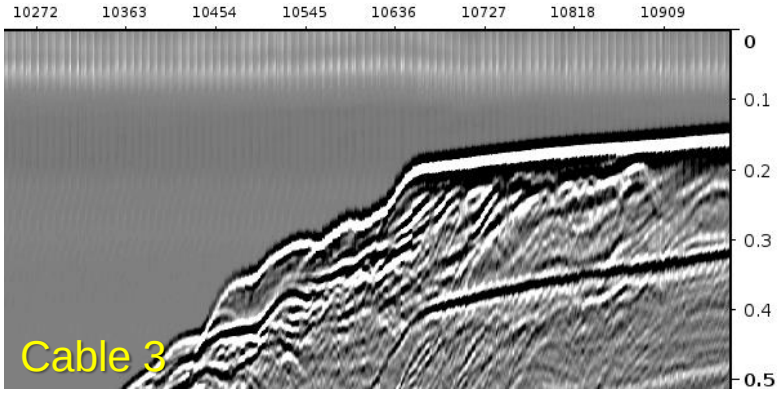
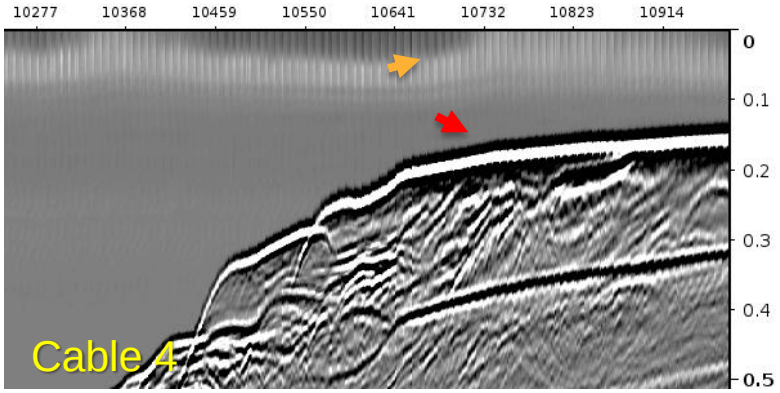
Seq 012: Before Adjustment

- The 2D stacks of each cable from Seq 012, Gun 1 show inconsistent water bottoms and direct arrivals.









Direct arrival
Water Bottom

- This kind of variation can not be fix via tidal statics or water column statics. These two static corrections are mainly for small alignment between different sail lines, not within the same line.

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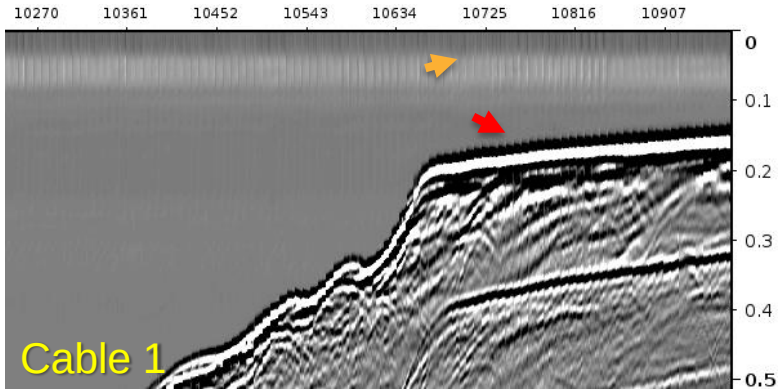
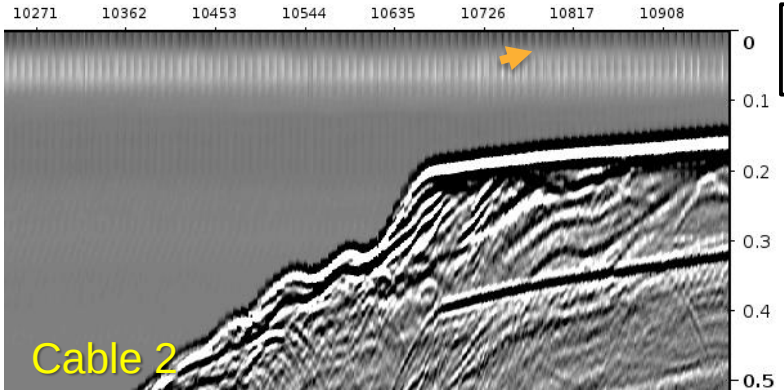
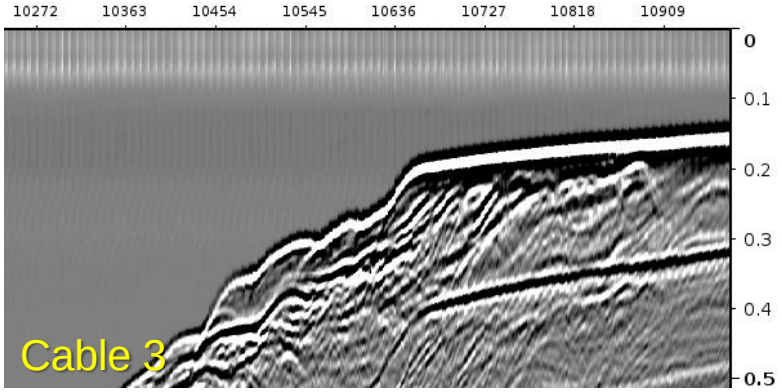
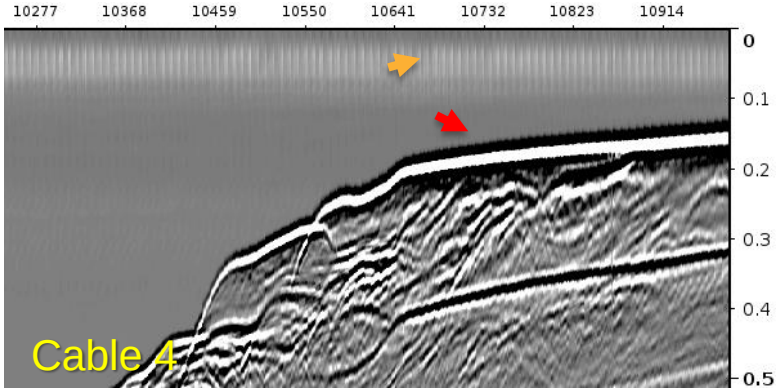
Seq 012: After Adjustment

- The 2D stacks of each cable from Seq 012, Gun 1 show more consistent water bottoms and direct arrivals after receiver position adjustment.









Direct arrival
Water Bottom

- After adjust the receiver positions, the stacks of different cables are more consistent around less dipping water bottom.

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3D Stack
12.5m x 18.75m

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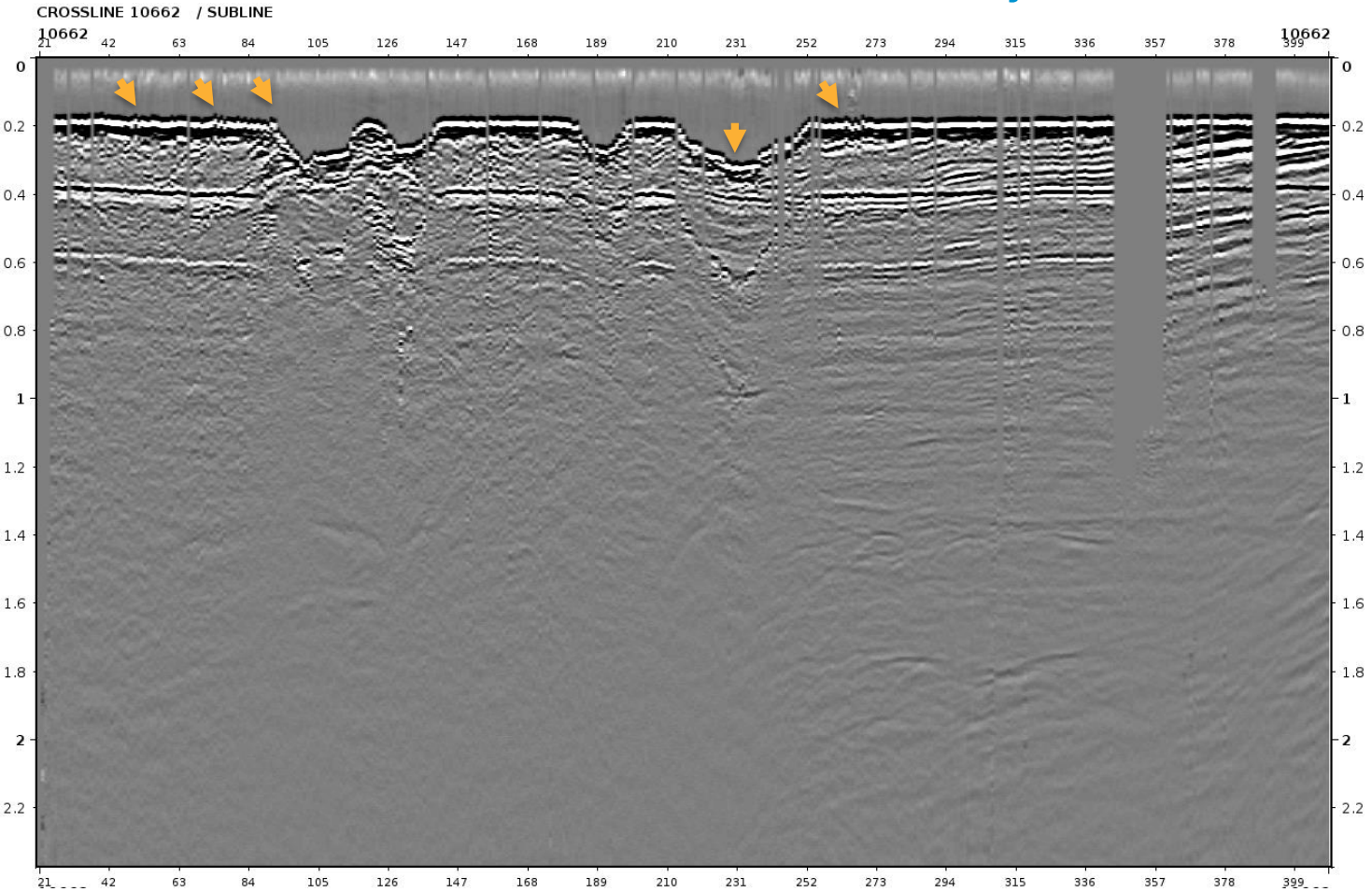
3D Stack Crossline 10662: Before Adjustment



- On crossline view, multiple Inlines show zigzag shapes of water bottom caused by inaccurate receiver positions.

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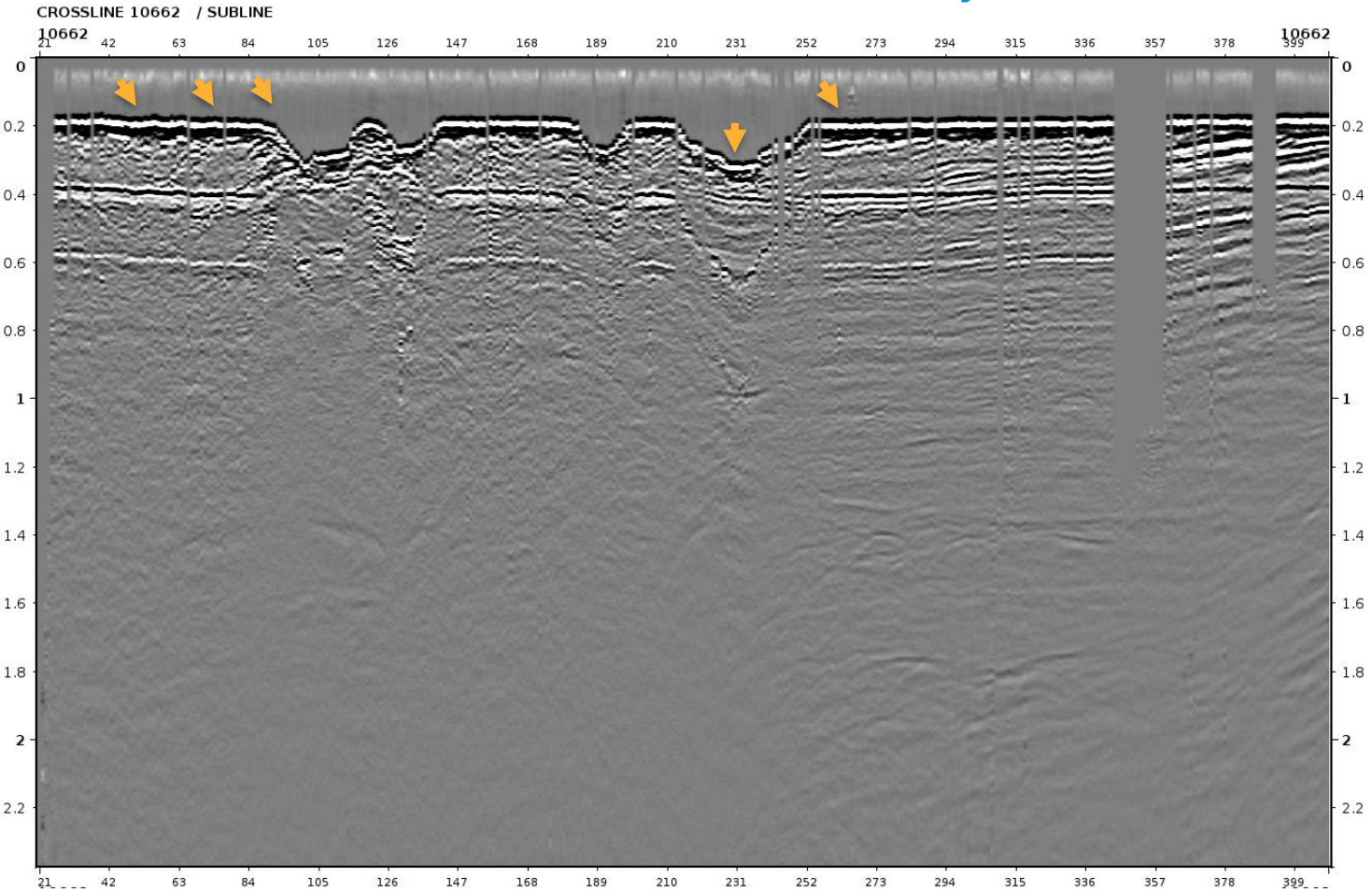
3D Stack Crossline 10662: After Adjustment



- After receiver position adjustment, water bottom is more continuos.

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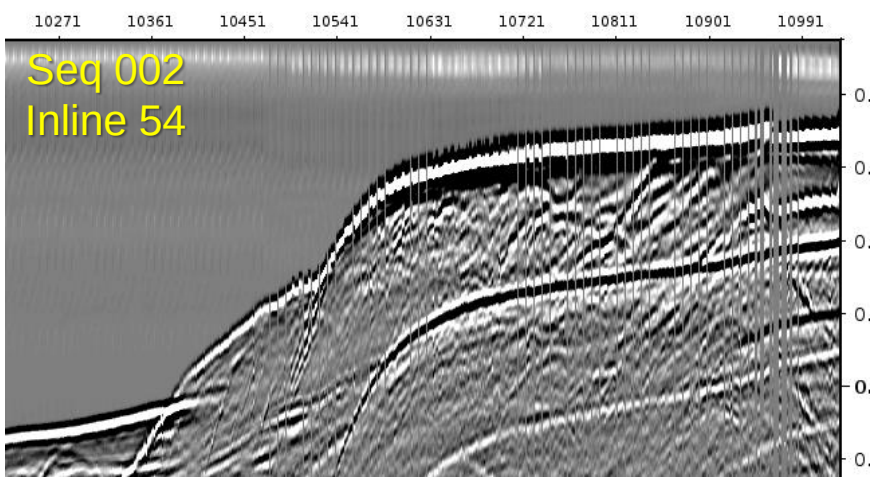
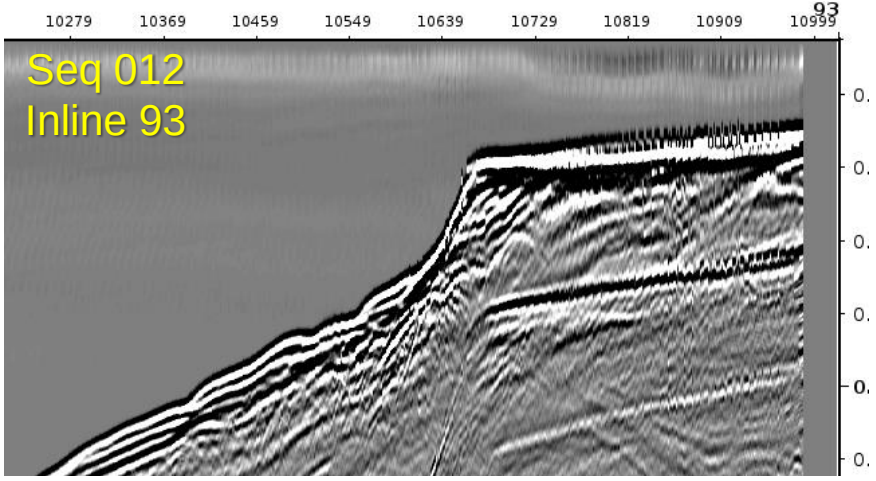
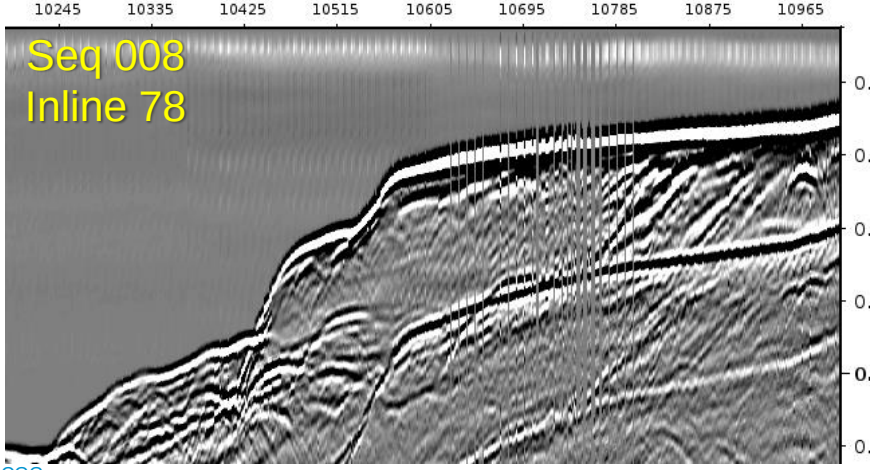
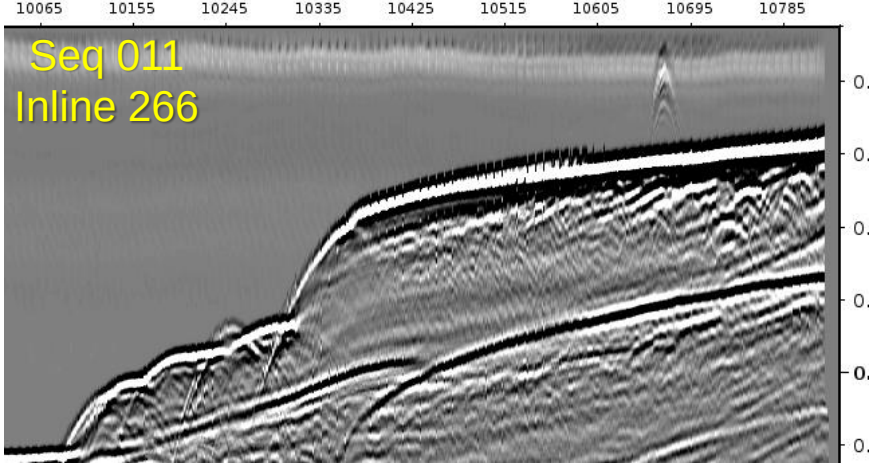
3D Stack Inlines: Before Adjustment









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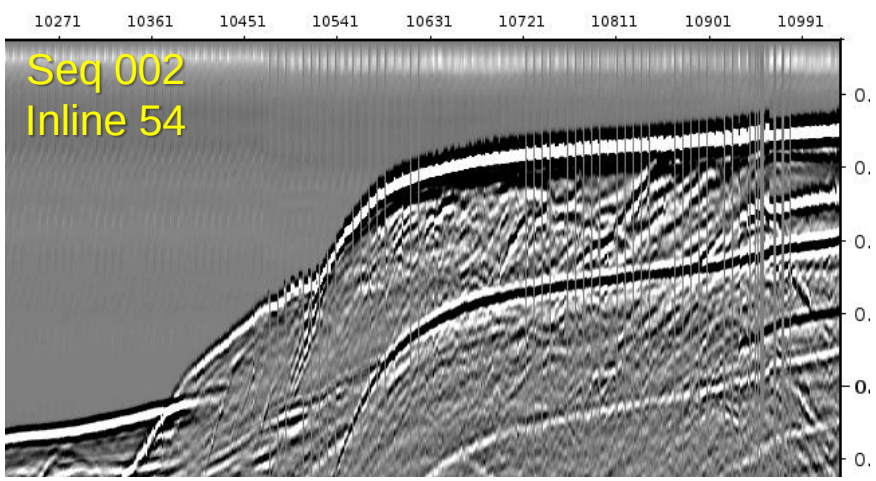
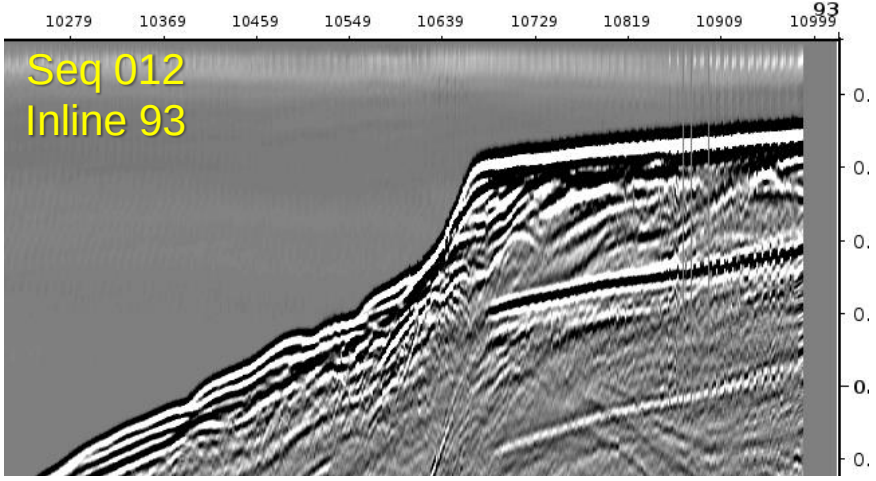
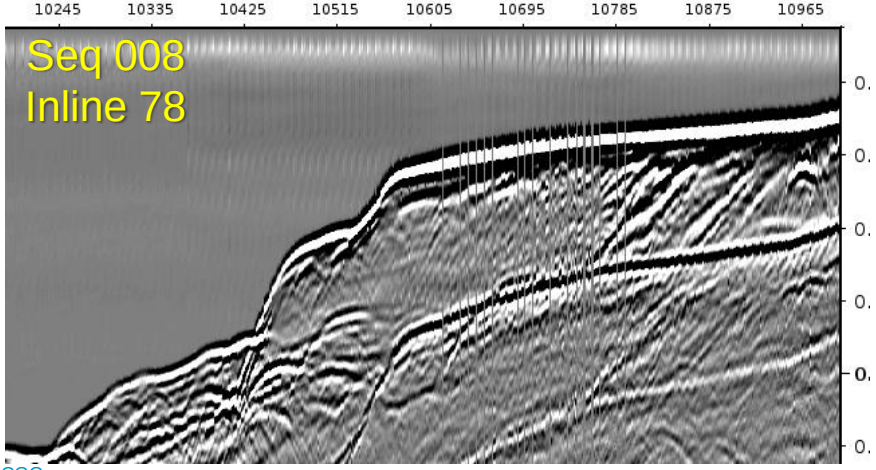
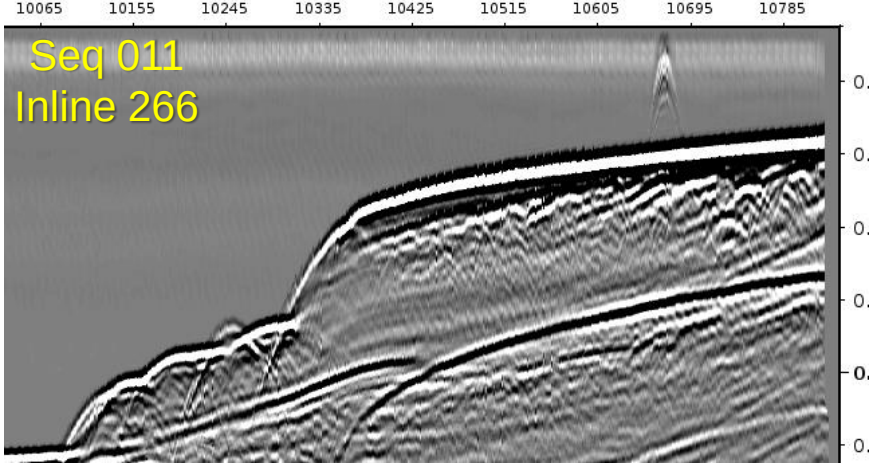
3D Stack Inlines: After Adjustment









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