

UGOU021 PreSTM 2 Velocity Review Report Update

GTO-19-C031-02 SCAN Acquisition Seismic Processing Order #2

2 DECEMBER 2020

Energie Beheer Nederland B.V.

2D Seismic PreSTM Processing, Onshore Netherlands

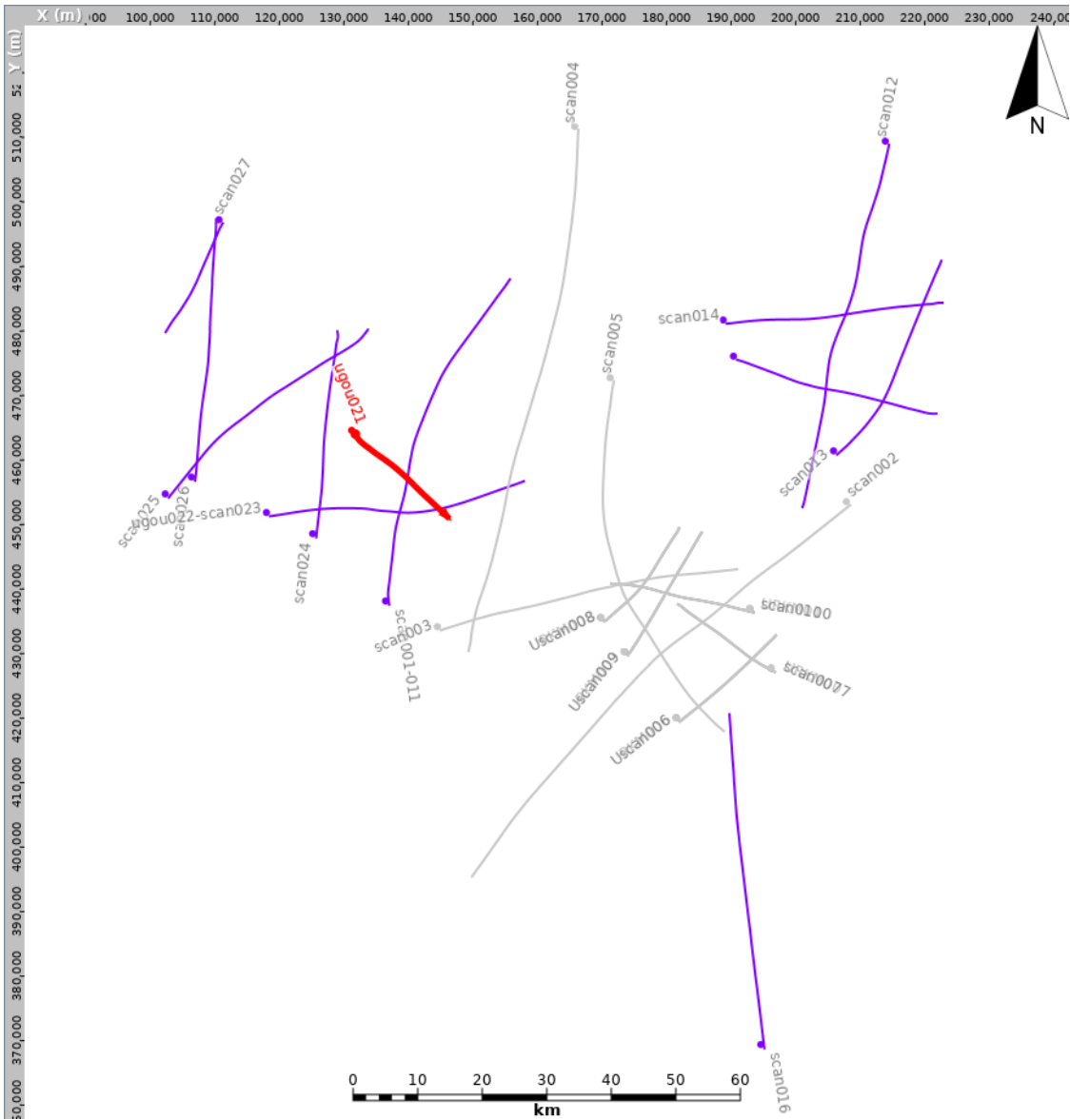
- This report documents the results of running the PreSTM 2 migration with revised velocities.
- EBN supplied a generalised interval velocity model based on the interpretation from the fast-track stack and this was used to steer the velocity picking in areas where the velocity trend was not always clear. This has led to improved stack response at the southeastern end of the line.
- The velocity picks were amended further in order to try to follow the supplied interpretation more closely, in particular at the chalk level. This wasn't particularly intuitive as enforcing the trend sometimes conflicted with what is seen on the gather and semblance displays.

Processing sequence

- Data reformat: SEGY to internal format
- Geometry: Crooked line with 2.5 m CDP interval
- Weak shots: 0-500 m offsets only (not applied for 016)
- Spherical divergence correction: T
- Geophone response correction:
- Refraction statics: Delay time using $V_0 = 1000$ m/s $V_R = 1700$ m/s $SRD = NAP$
- Noise attenuation: +/- 1250 m/s Weiner dip filter
- Edits: Kill invalid shots and receivers
- Noise attenuation: Despike
- Noise attenuation: Wavelet (D20) transform filter (muting the largest 10% of coefficients by 90% in scales 6-10)
- SCAC 1: Source and receiver designed on NMO corrected gathers over 200-2200 ms
- Noise attenuation: TFDN
- Inverse Q: $Q = 100$ phase and amplitude using 40 Hz reference frequency and 12 dB gain stabilisation
- DBS: Surface consistent with 160 ms operator length with 16 ms predictive gap
0.1% white noise stabilisation - Design window: 200-3000 ms
- Velocity analysis: 1 km interval
- Noise attenuation: 1.75 ms/tr (2857 m/s) dip filter and wavelet transform filter on shots
- Residual statics: Surface consistent using MASTT
- Velocity analysis: 1 km interval
- Residual statics: Surface consistent using MASTT
- SCAC 2: Source and receiver designed on NMO corrected gathers over 200-2200 ms

Processing sequence (continued)

- Remove spherical divergence: T
- Low cut filter: 2.5 Hz low cut filter
- Migration (PreSTM 1): Isotropic 4th order curved ray Kirchhoff using smoothed (5000-300-3) stacking velocities
- Velocity analysis: Remove PreSTM 1 velocities and pick 2nd order velocities at 1 km intervals and 500 m where required
Effective Eta picked automatically every 250 m
- Migration (PreSTM 2): Kirchhoff VTI migration using smoothed (2000-200-2) 2nd order picked velocities and auto picked effective Eta
- Conversion to zero phase:
- Trace drop: Far offsets dropped to match migration input gather
- Scaling: 500 ms AGC
- Stack: 1/N (1/vN for scaled stacks) with 45° mute
- Bandpass filter: 2-6-120-150 Hz on selected stacks only
- Scaling: 1000 ms AGC on selected stacks only
- Migration parameters: 3 km aperture
TV dip: 0-45° 1250-45° 2500-30°
Anti-alias constant = 2
- Smoothing parameters: Horizontal half width (m) – vertical half width (ms) – relative weight at max time



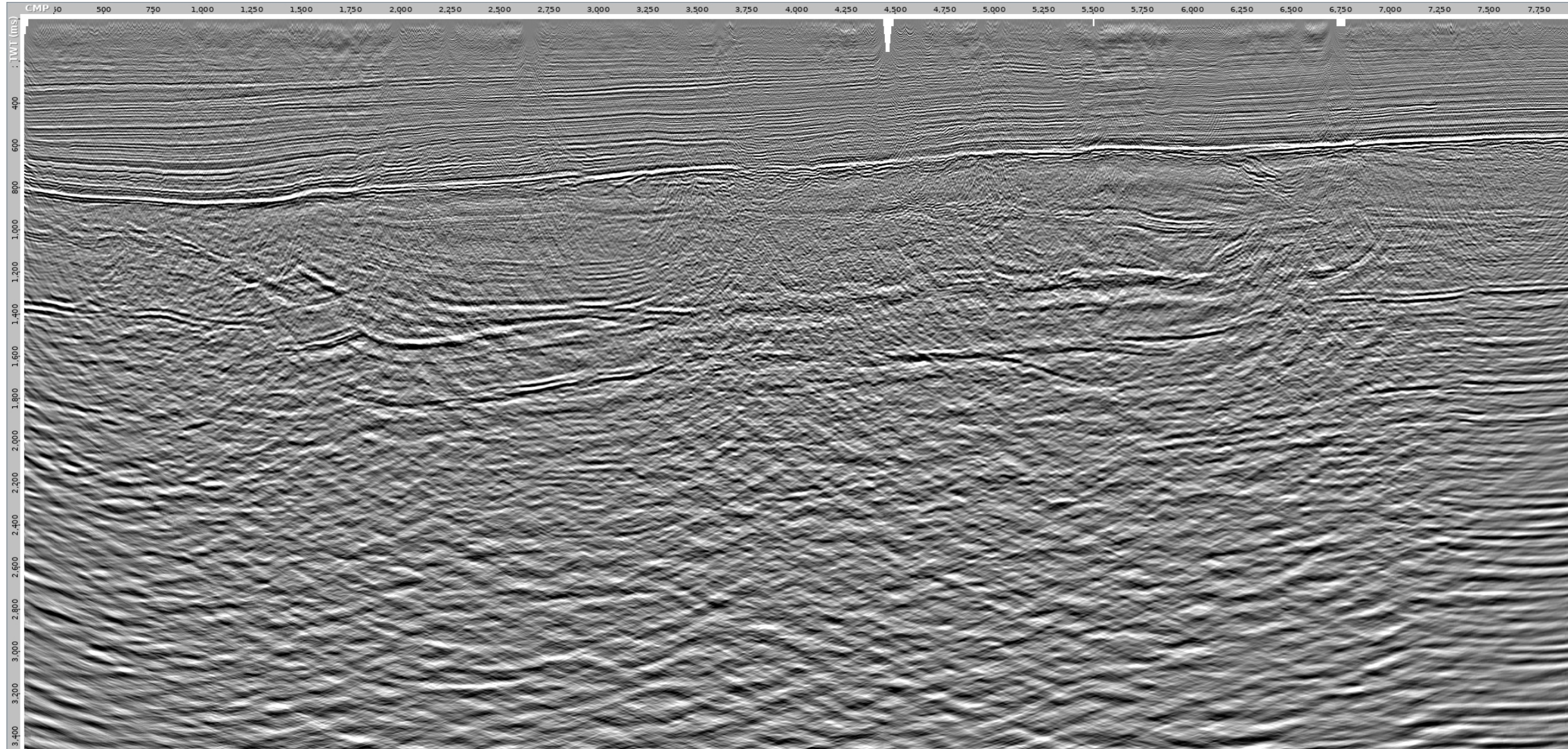
UGOU021 PreSTM 1 AGC stack

At floating datum with 2-6-120-150 Hz filter and 1000 ms post-stack scaling



NW

SE



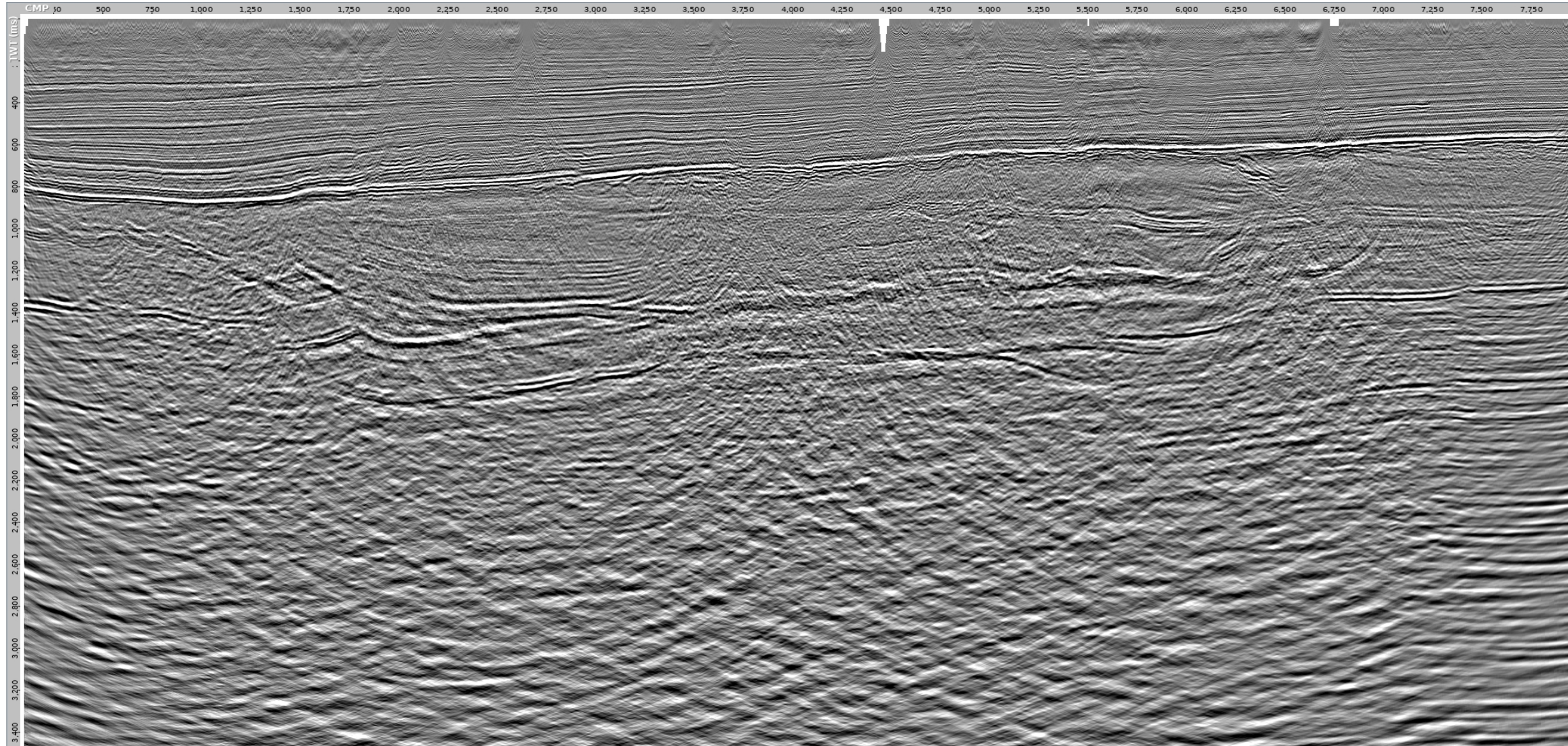
UGOU021 PreSTM 2 AGC stack

At floating datum with 2-6-120-150 Hz filter and 1000 ms post-stack scaling



NW

SE



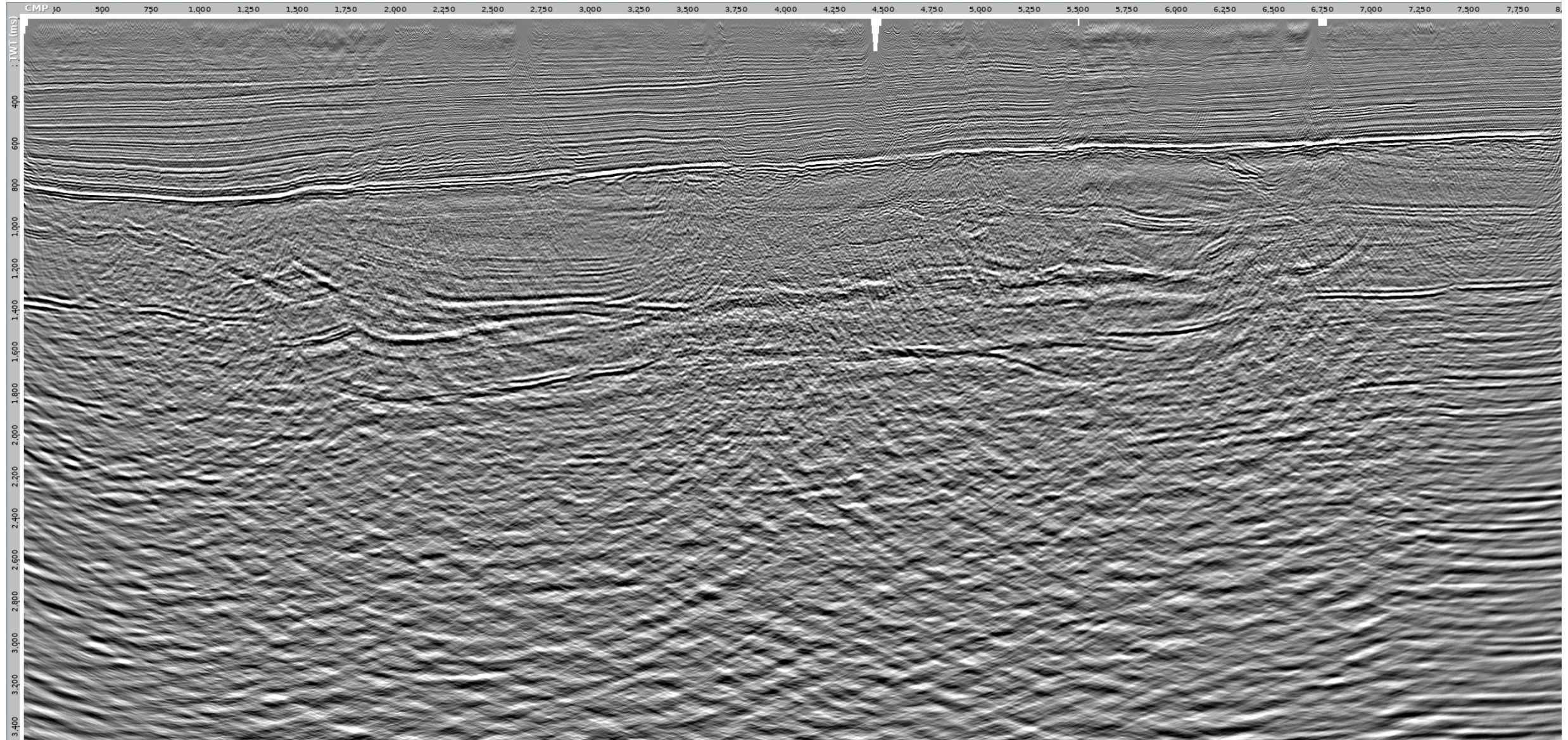
UGOU021 PreSTM 2 AGC stack with revised velocities

At floating datum with 2-6-120-150 Hz filter and 1000 ms post-stack scaling



NW

SE



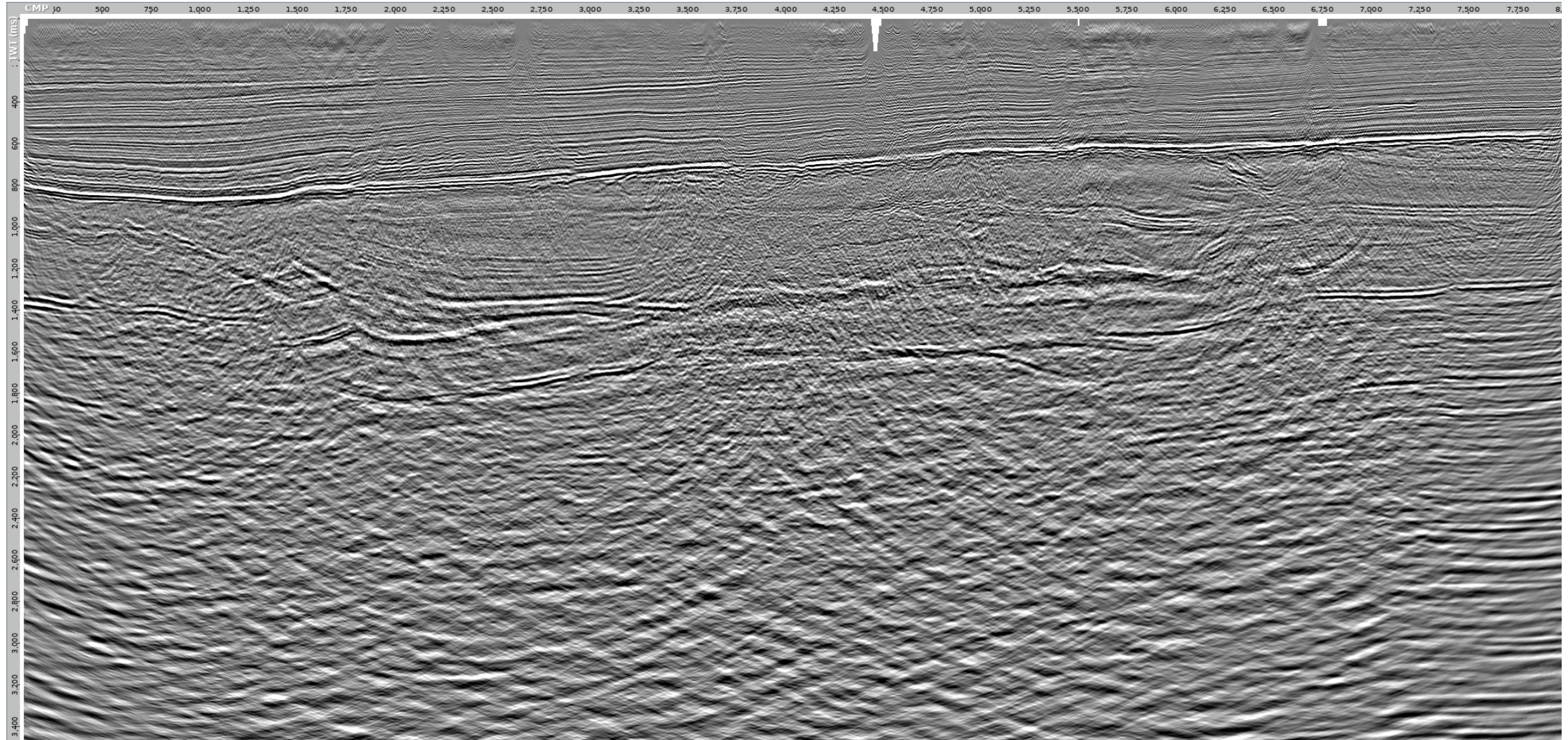
UGOU021 PreSTM 2 AGC stack with further revised velocities

At floating datum with 2-6-120-150 Hz filter and 1000 ms post-stack scaling



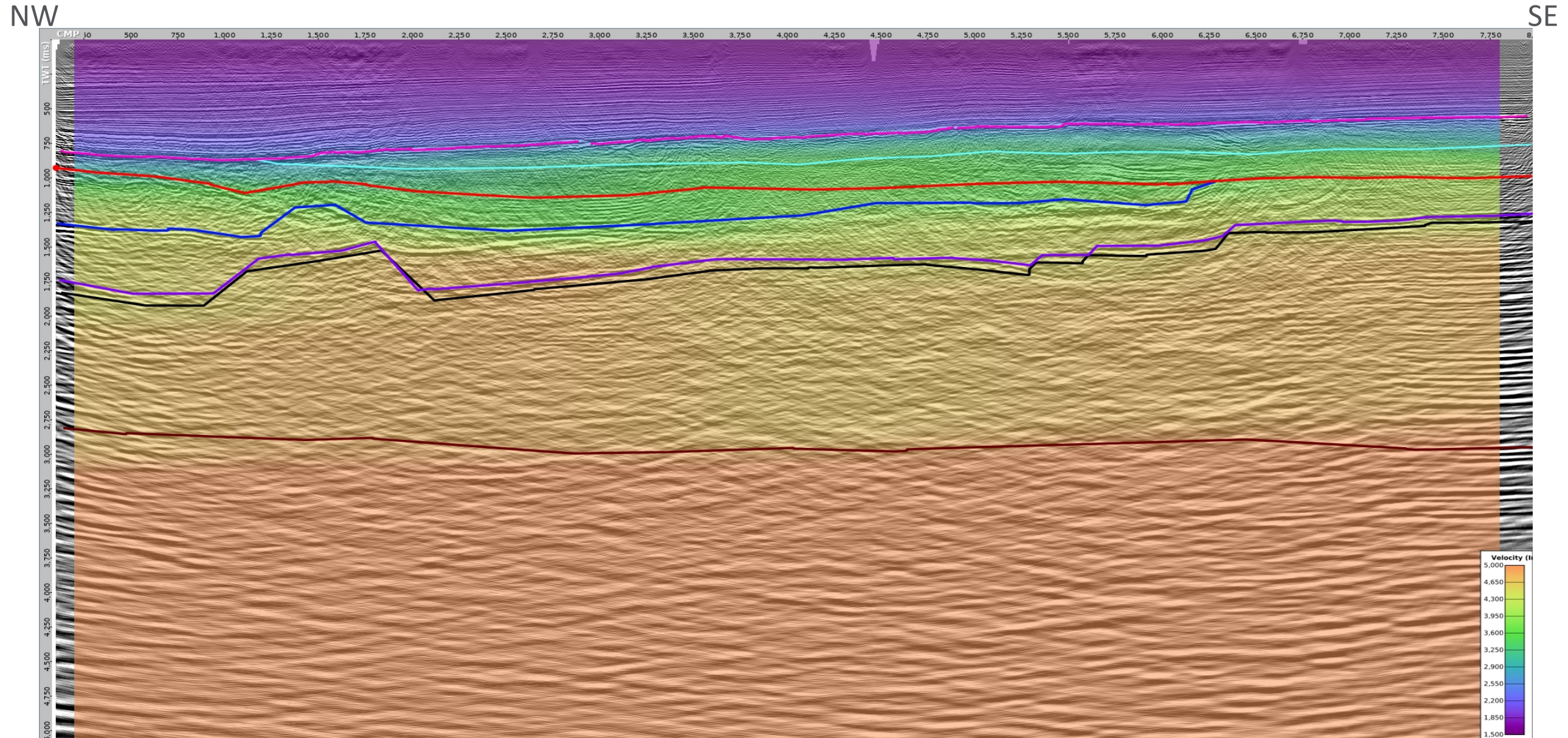
NW

SE



UGOU021 PreSTM 1 stack with interval velocity overlay

At floating datum - stack has 500 ms pre-stack AGC applied



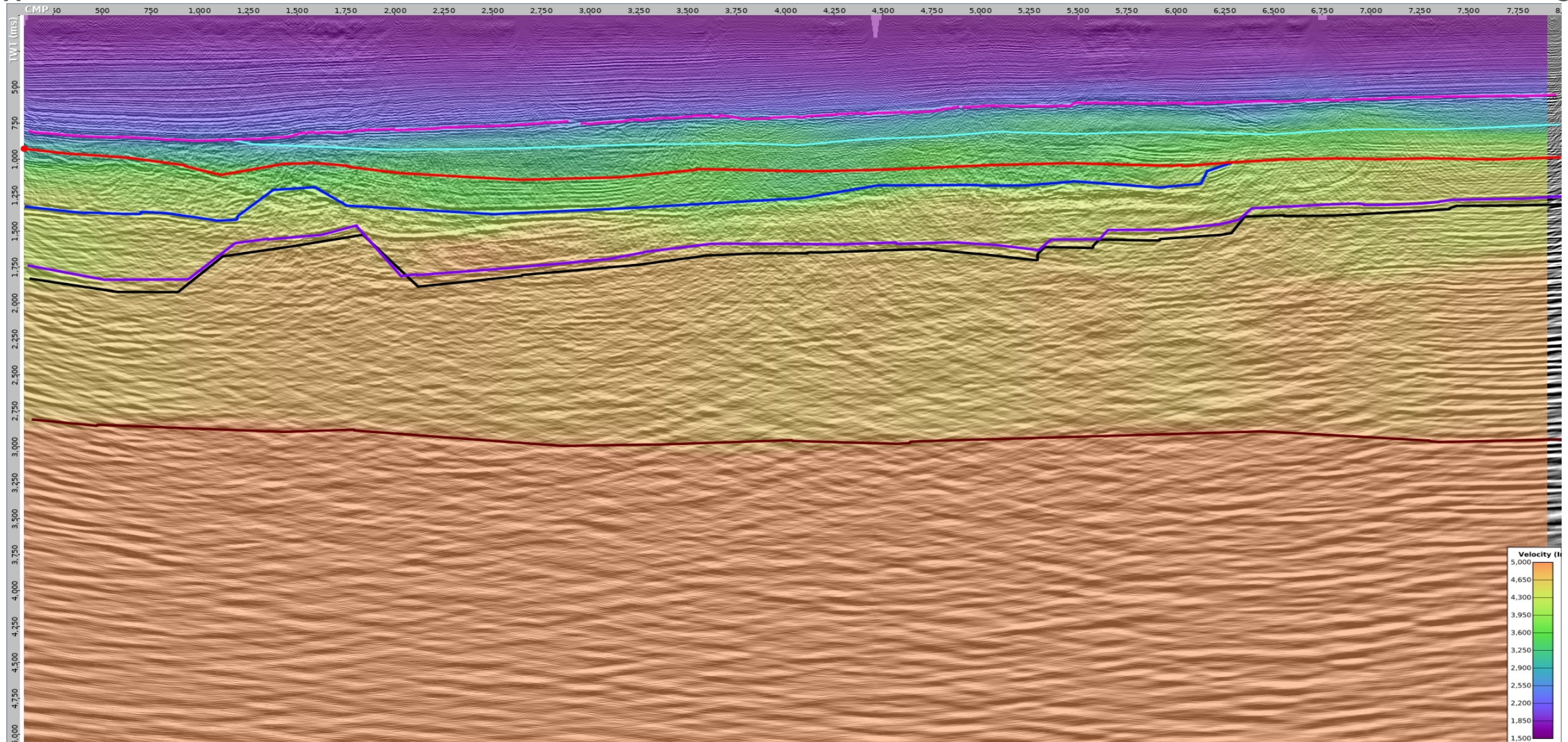
UGOU021 PreSTM 2 stack with interval velocity overlay

At floating datum - stack has 500 ms pre-stack AGC applied



NW

SE



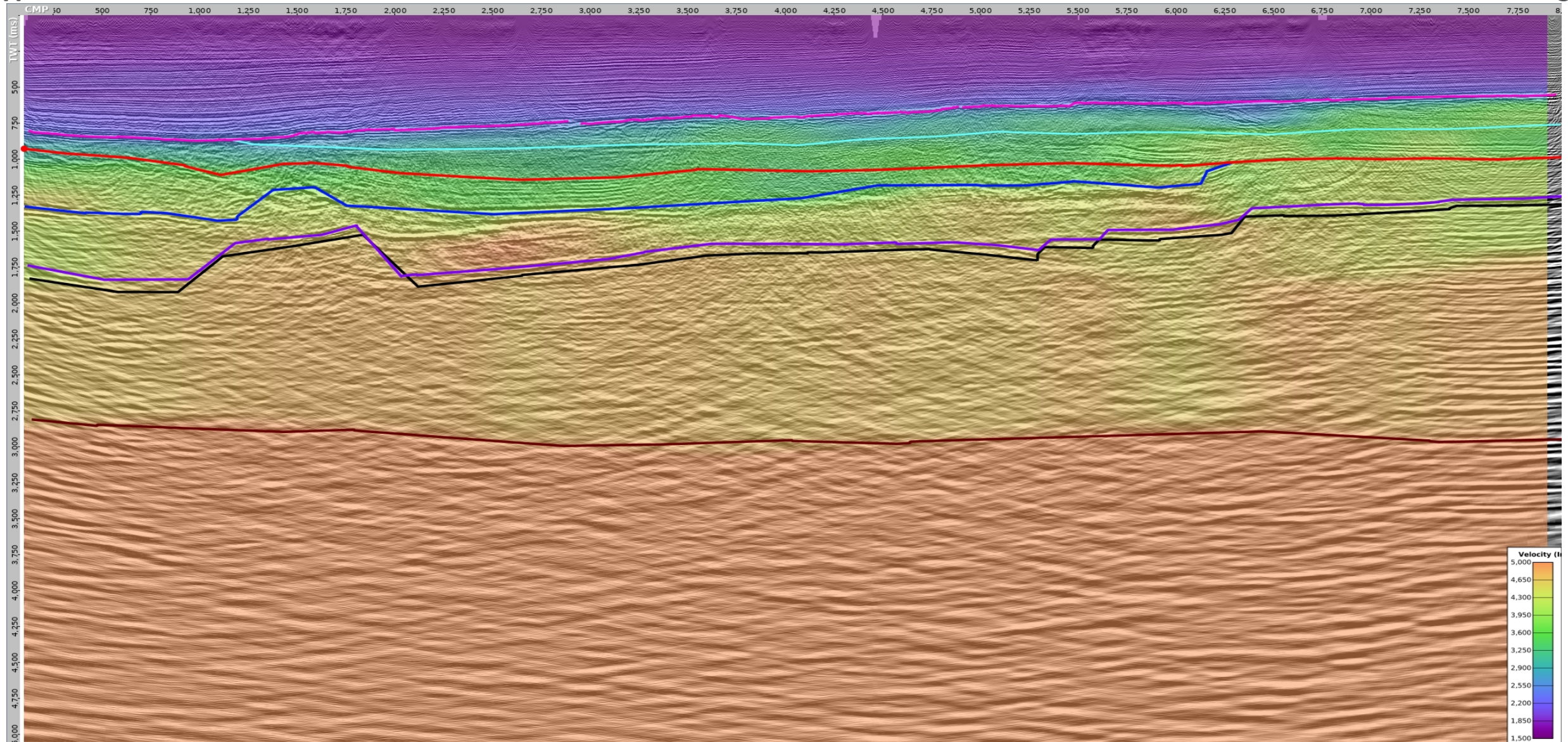
UGOU021 PreSTM 2 stack with revised interval velocity overlay

At floating datum - stack has 500 ms pre-stack AGC applied



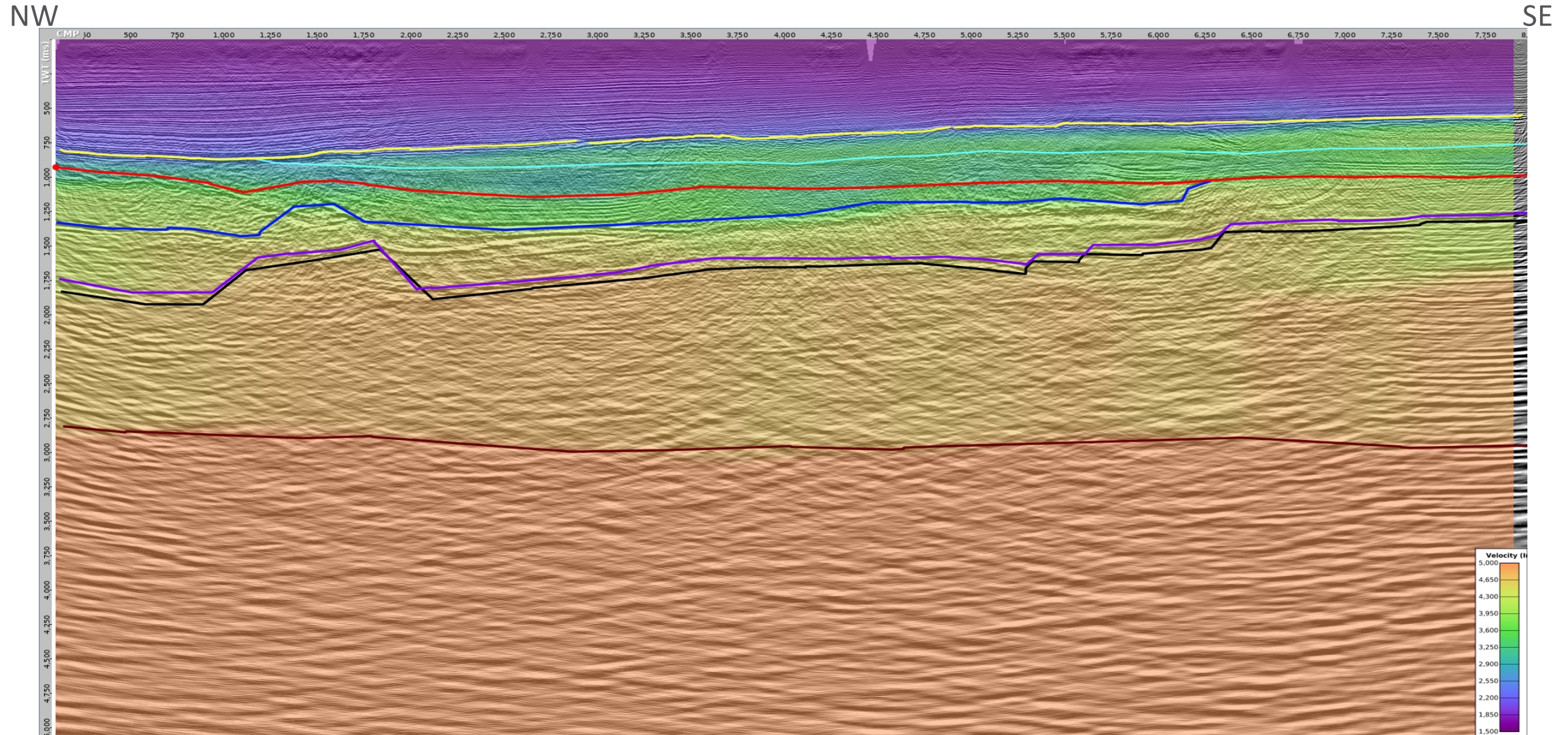
NW

SE



UGOU021 PreSTM 2 stack with further revised interval velocity overlay

At floating datum - stack has 500 ms pre-stack AGC applied

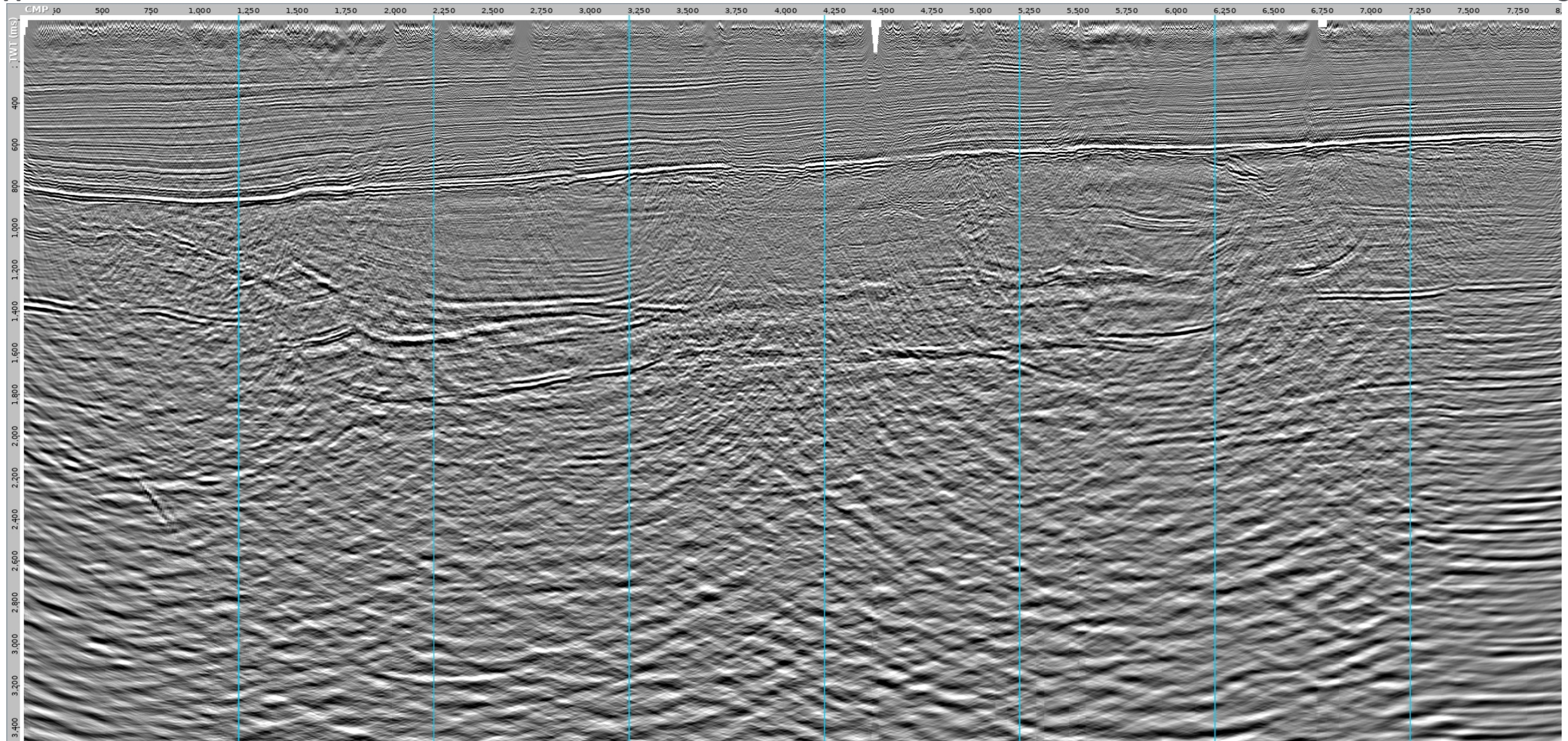


UGOU021 gather locations for subsequent slides



NW

SE



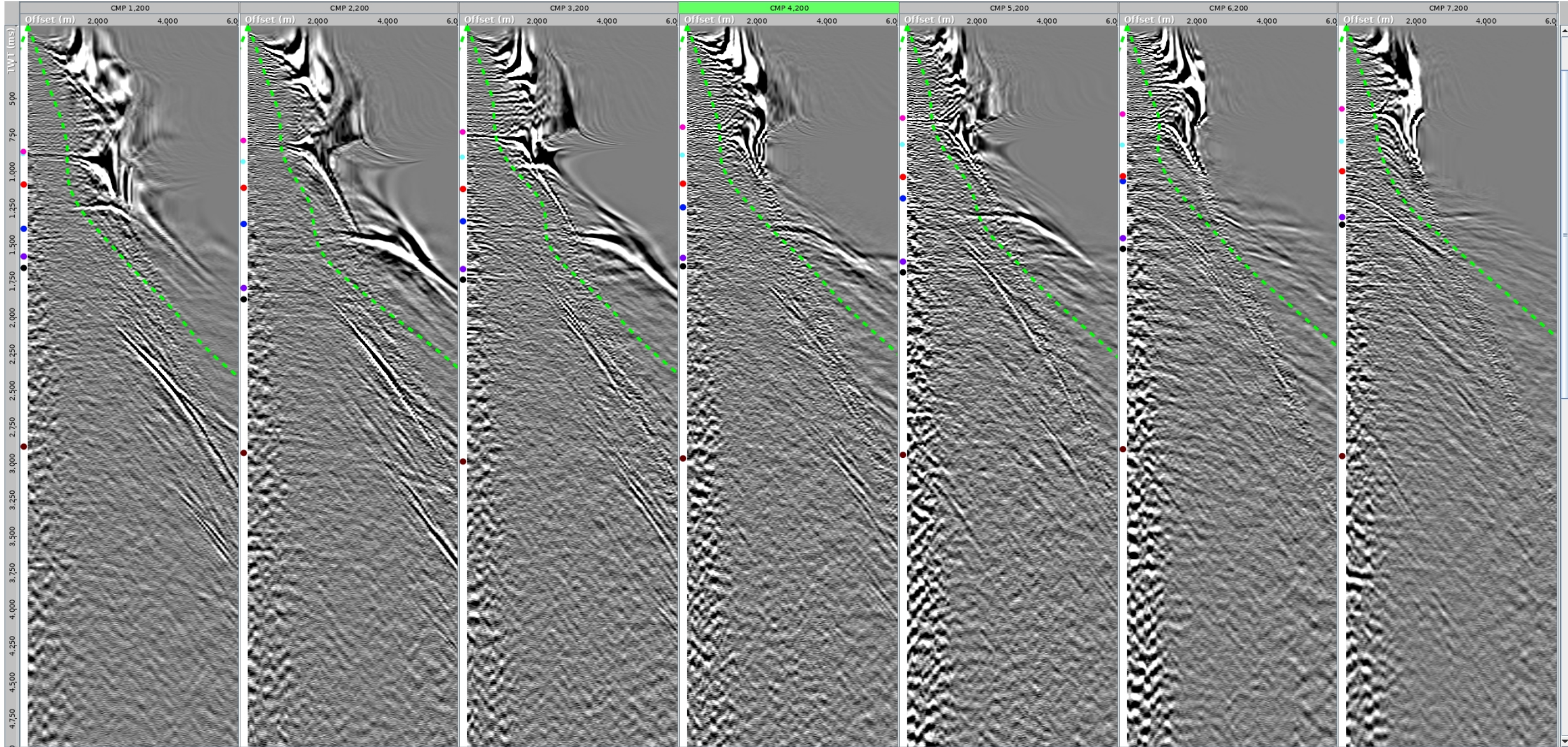
UGOU021 PreSTM 1 gathers

At floating datum



NW

SE



45°

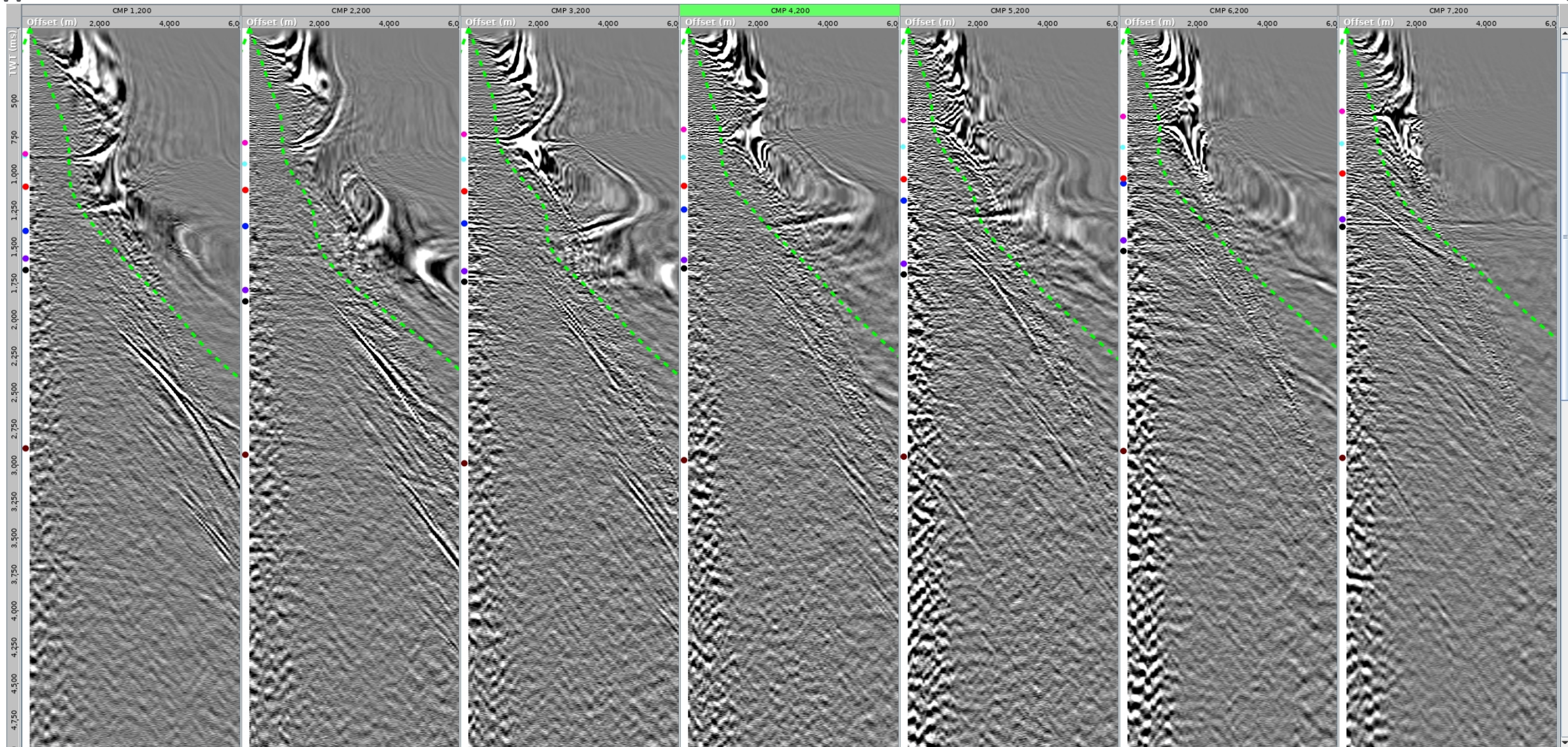
UGOU021 PreSTM 2 gathers

At floating datum



NW

SE

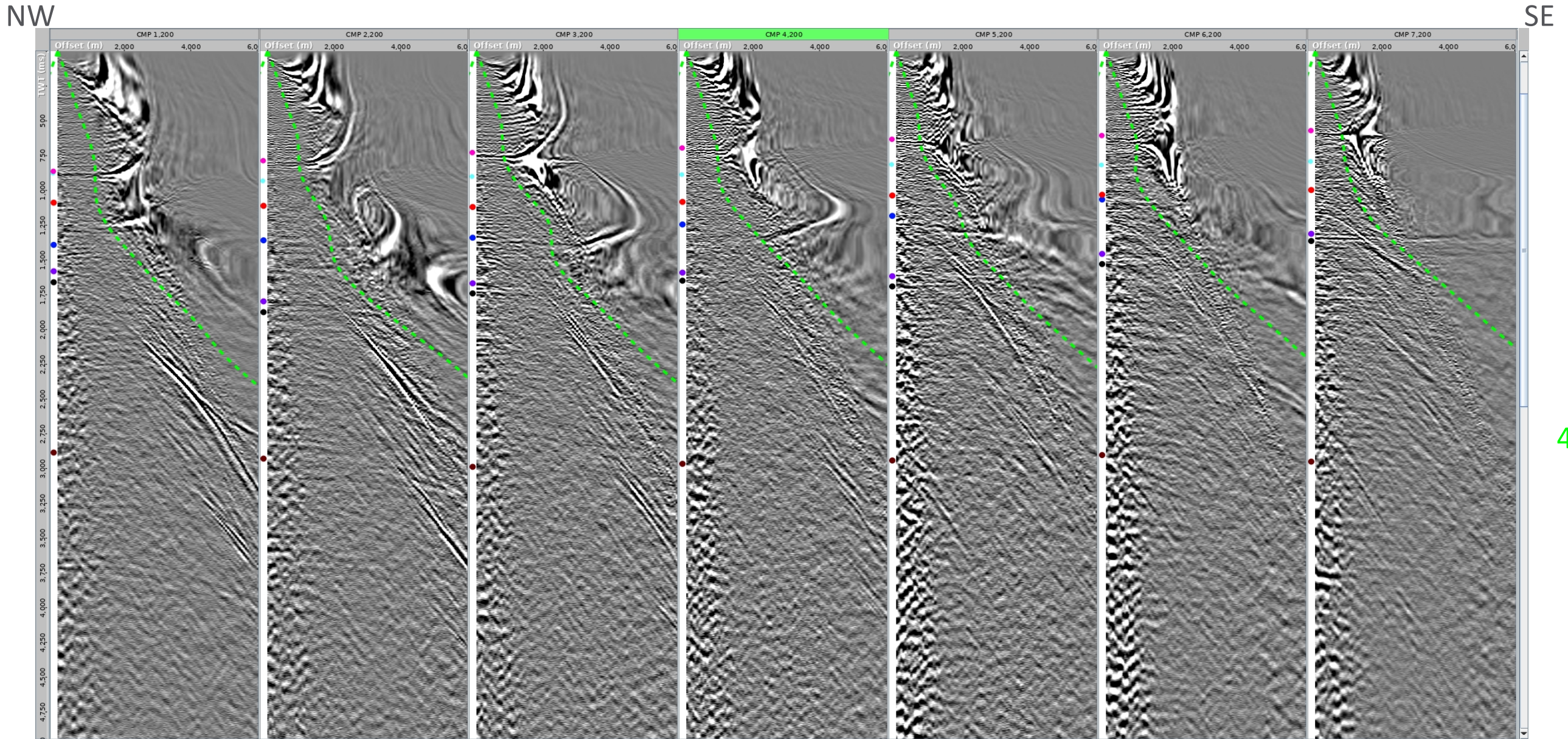


45°



UGOU021 PreSTM 2 revised velocity gathers

At floating datum



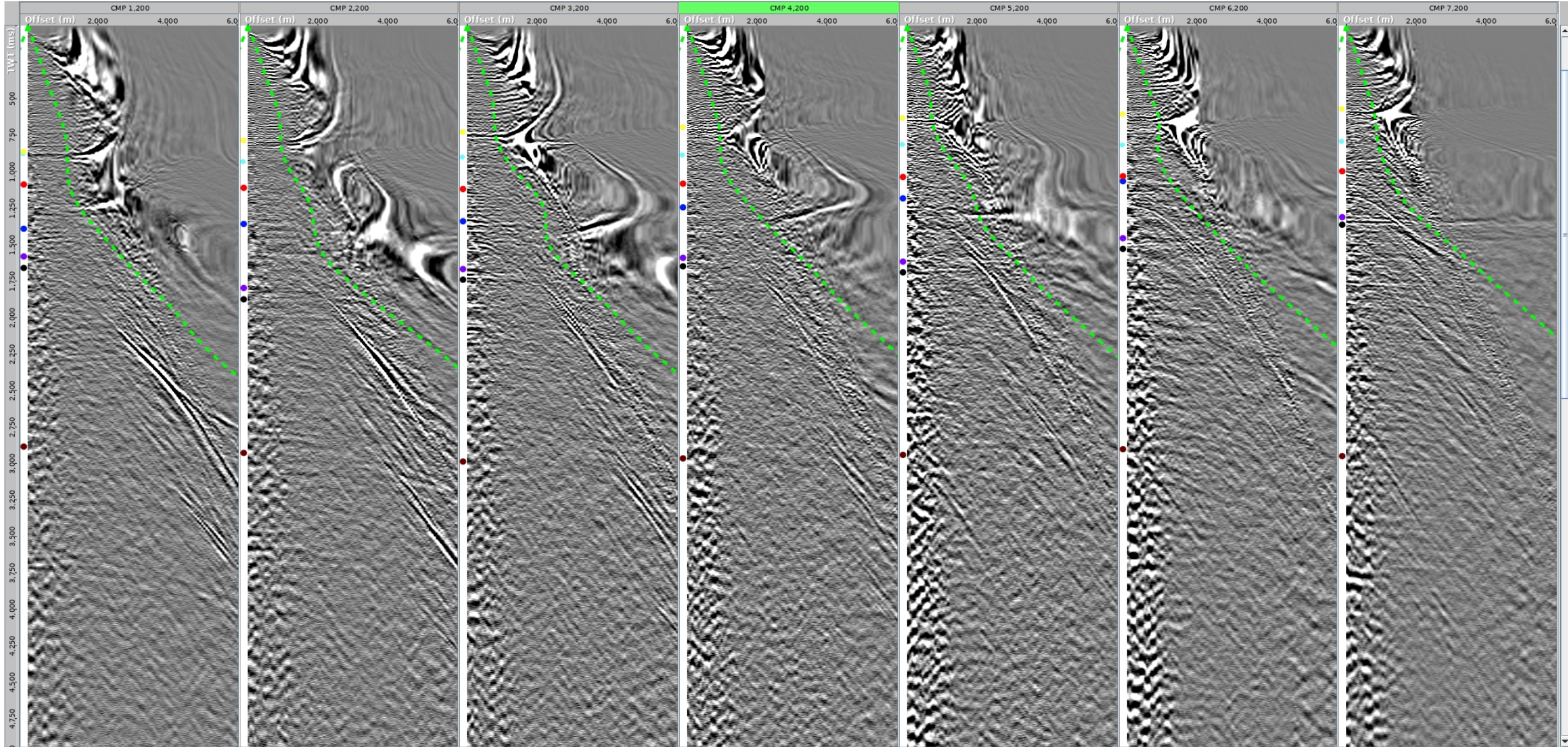
UGOU021 PreSTM 2 further revised velocity gathers

At floating datum



NW

SE

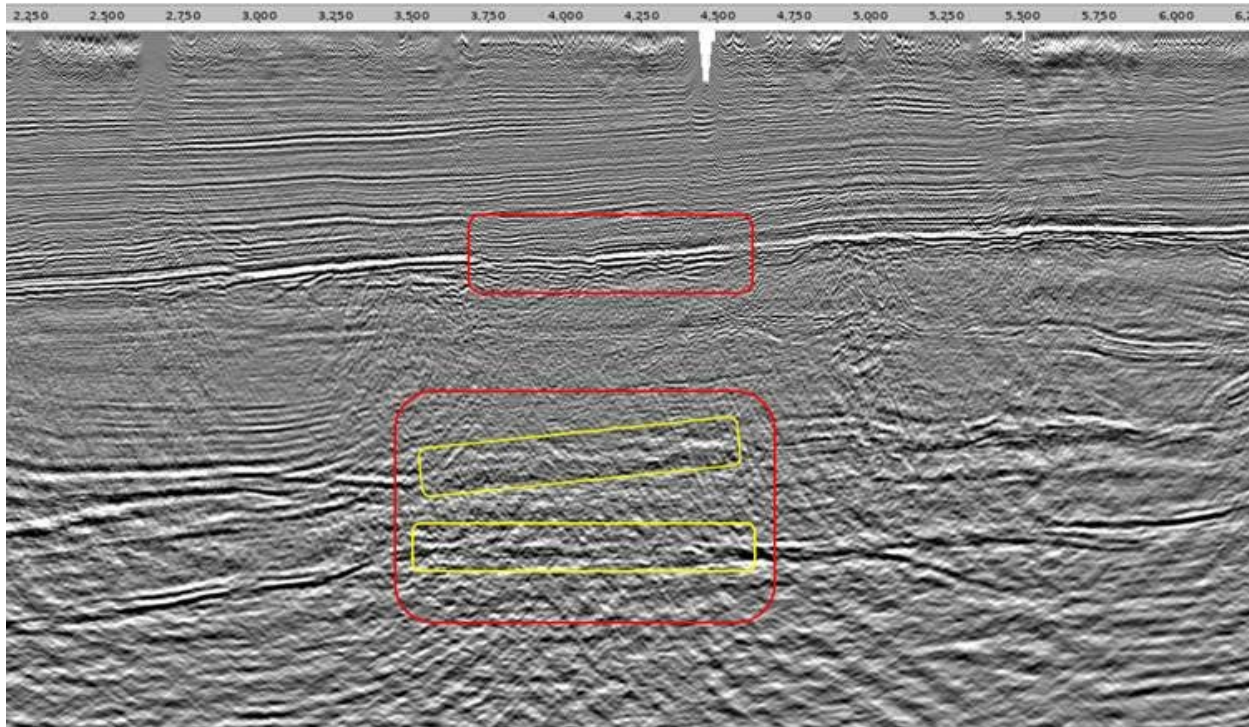


45°

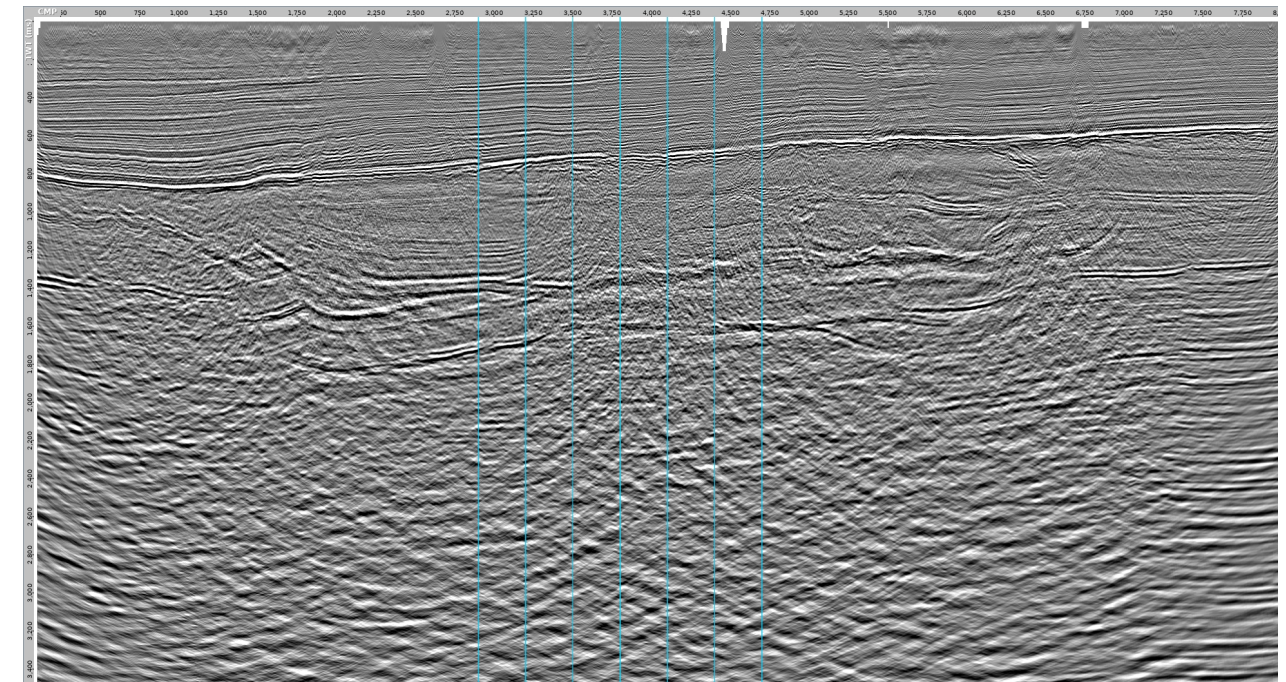
UGOU021 area highlighted by EBN and gather locations for the subsequent slide



- Gathers that encompass the highlighted areas have been selected for display.



Areas highlighted by EBN



Location of gathers in the subsequent slide

UGOU021 PreSTM 2 revised velocity gathers

At floating datum



NW

SE

