

UGOU021 Velocities, Amplitudes and Residual Statics Report Update

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

16 NOVEMBER 2020

Energie Beheer Nederland B.V.
2D Seismic PreSTM Processing, Onshore Netherlands

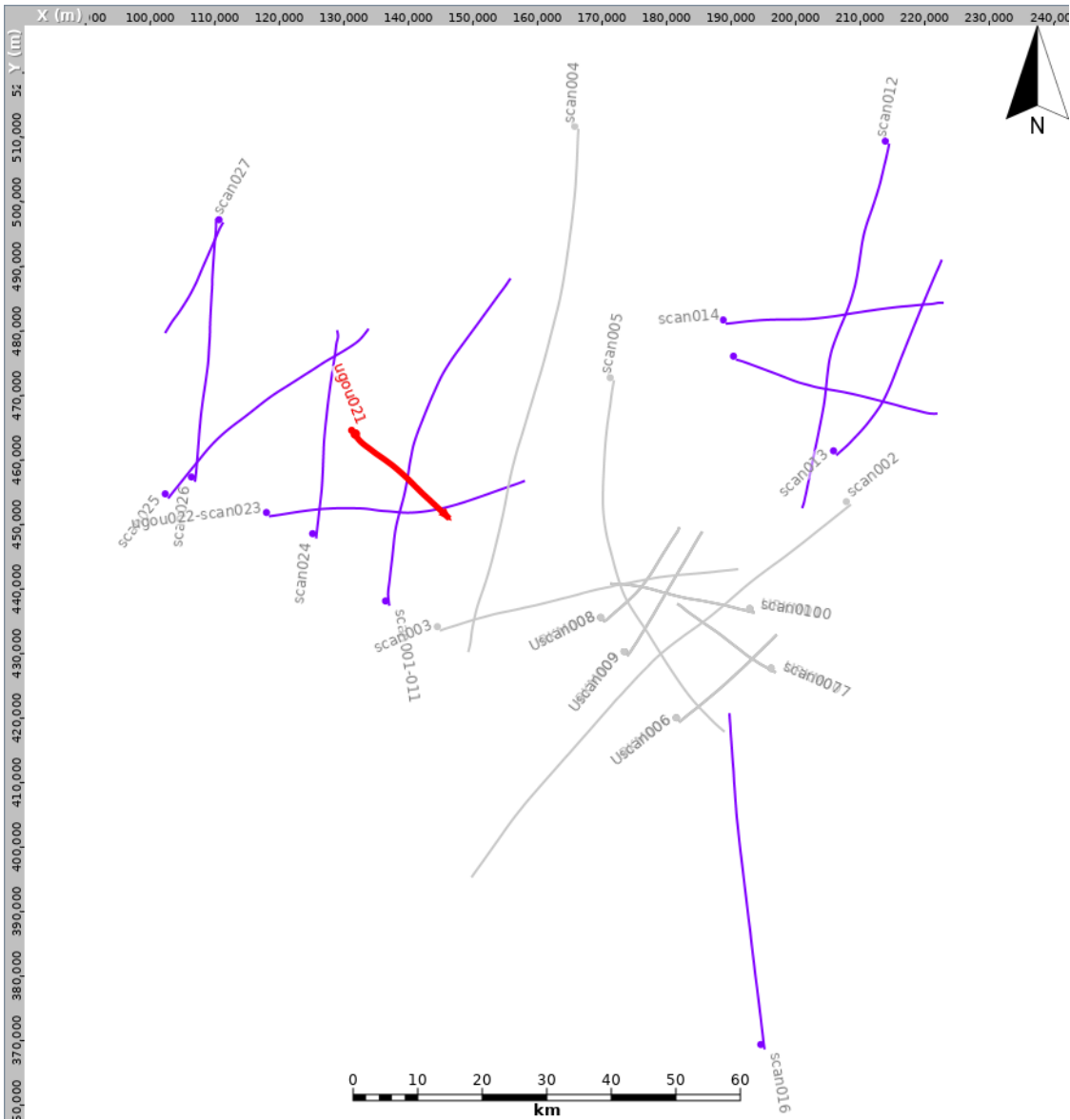
- This report documents results from the the surface consistent residual statics, surface consistent amplitude compensation and velocity analyses. It includes the velocity modifications discussed during the meeting held on Monday 16 November.
- The report also includes amplitude spectra taken from the true amplitude stacks at the key processing stages indicated in the processing sequence on the subsequent slides.

Processing sequence

- Data reformat: SEGY to internal format
- Geometry: Crooked line with 2.5 m CDP interval
- Weak shots: 0-500 m offsets only
- Spherical divergence correction: T
- Geophone response correction:
- Refraction statics: Delay time using $V_0=1000$ m/s $V_R=1700$ m/s $SRD=NAP$
- **RAW STACK**
- Noise attenuation: +/-1250 m/s Weiner dip filter
- Edits: Kill invalid shots and receivers
- **DENOISE 1**
- 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 components designed on NMO corrected gathers over 200-2200 ms
- Noise attenuation: TFDN
- **DENOISE 2C**
- Inverse Q: $Q=100$ phase and amplitude using 40 Hz reference frequency and 12 dB gain stabilisation

Processing sequence (continued)

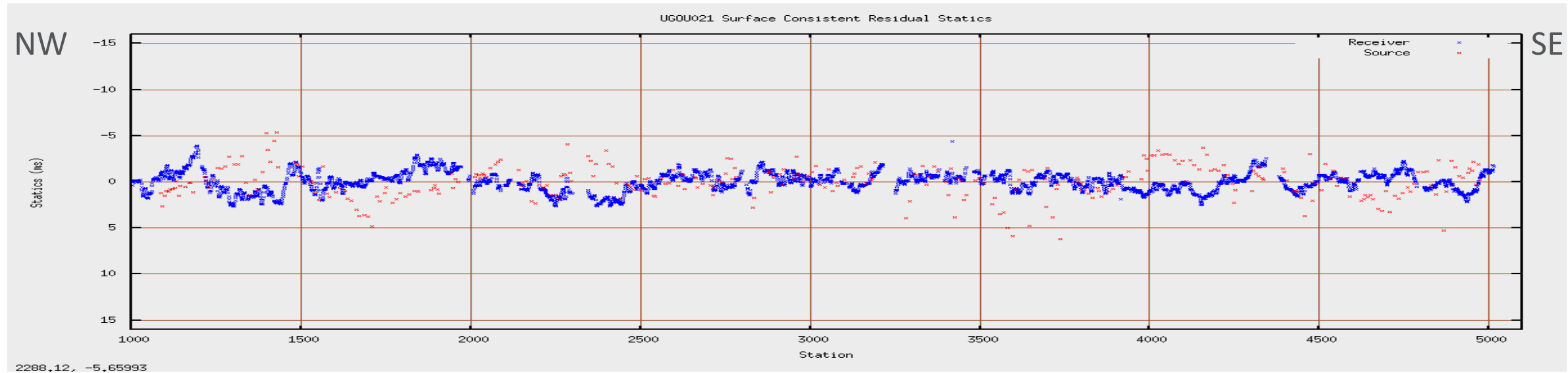
- DBS: Surface consistent with 160 ms operator length with 16 ms predictive gap
0.1% white noise stabilisation - Design window: 200-3000 ms
- **DECONVOLUTION**
- Velocity analysis: 1 km interval
- Noise attenuation: 1.75 ms/tr (2857 m/s) dip filter and wavelet transform filter on shots
- **DENOISE 3**
- Residual statics: Surface consistent using MASTT
- Velocity analysis: 1 km interval
- Residual statics: Surface consistent using MASTT
- SCAC 2: Source and receiver components designed on NMO corrected gathers over 200-2200 ms
- **INPUT TO MIGRATION**
- AGC: 500 ms (scaled stacks only)
- Stack: $1/N$ ($1/\sqrt{N}$ for scaled stacks) with 55° mute
- Static: Static to shift from floating to final datum (NAP) where applicable



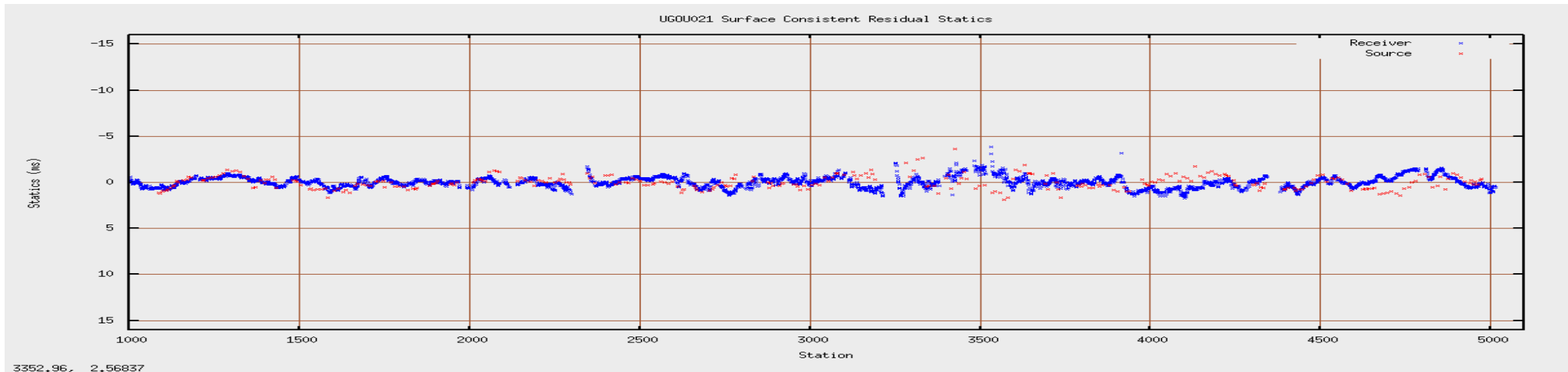
UGOU021 surface consistent residual statics profiles



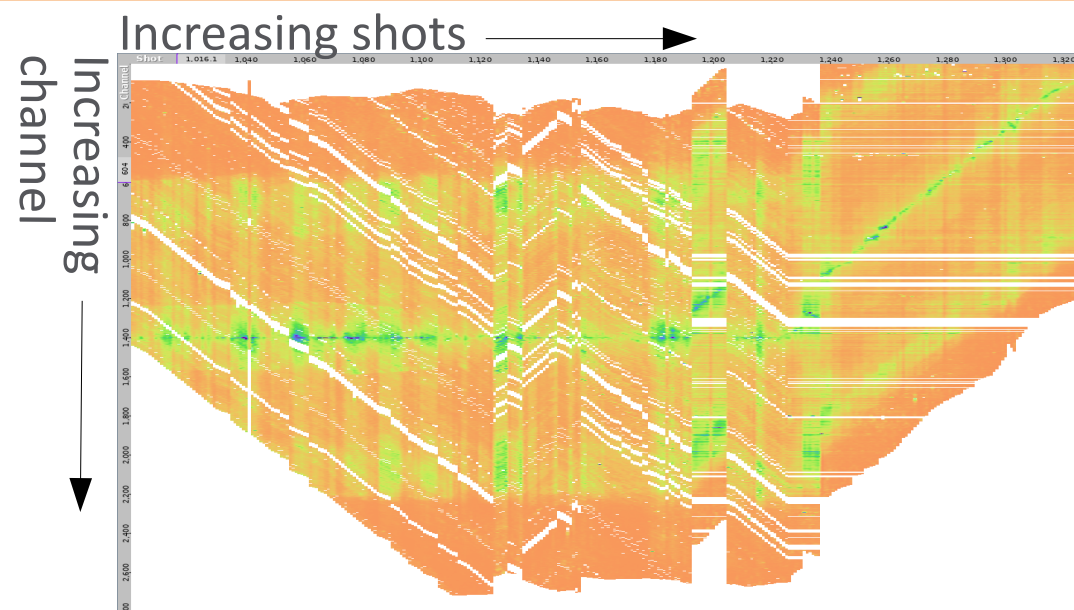
Pass 1



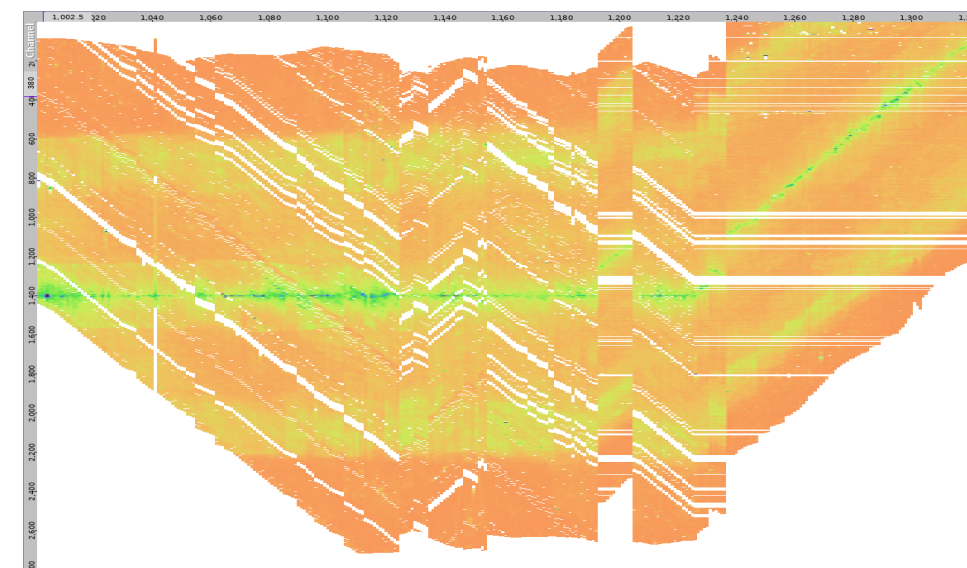
Pass 2



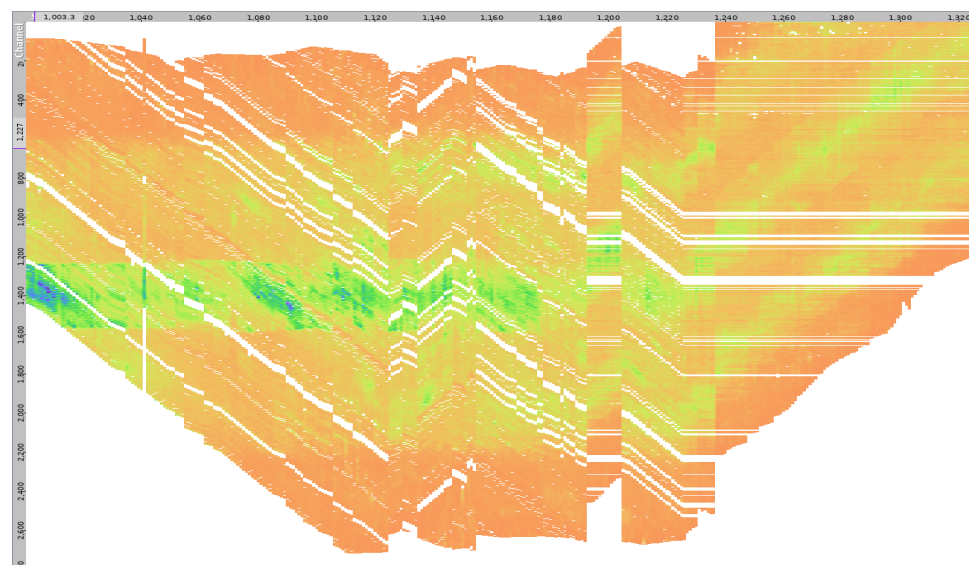
UGOU021 RMS amplitude maps for surface consistent amplitude compensation



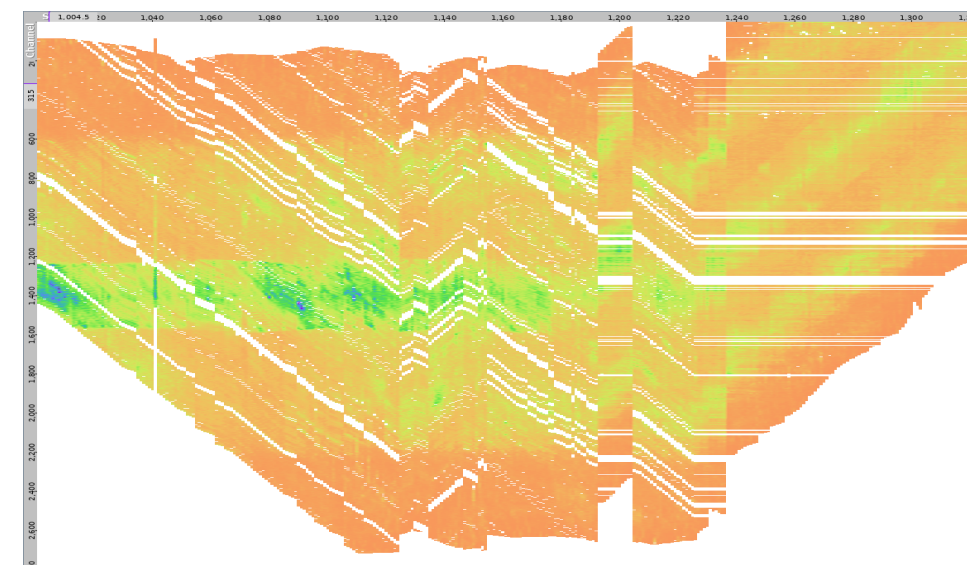
Pre SCAC1



Post SCAC1



Pre SCAC2

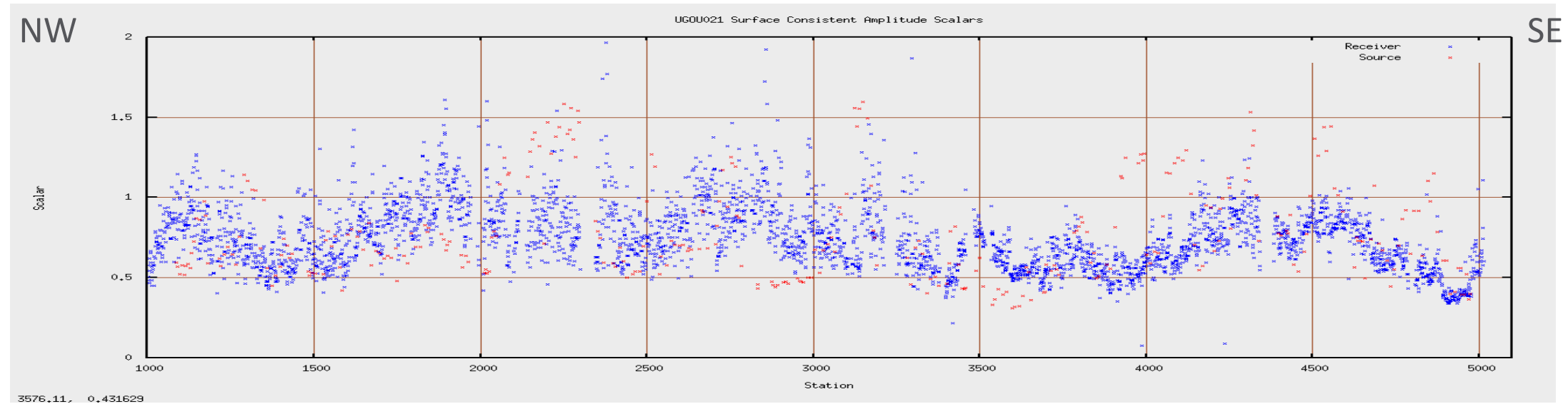


Post SCAC2

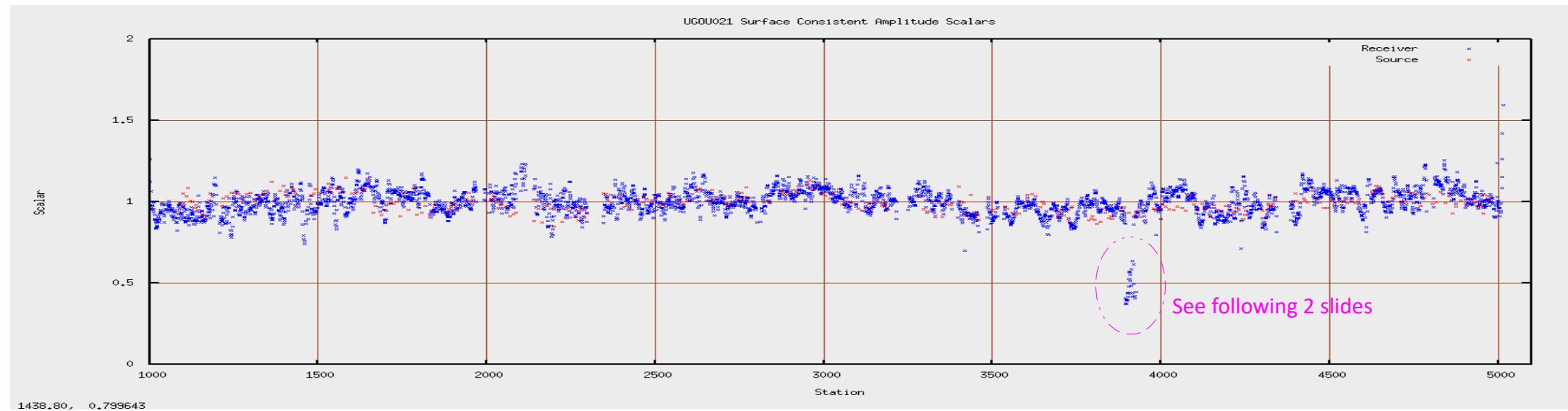
UGOU021 surface consistent amplitude scalar profiles



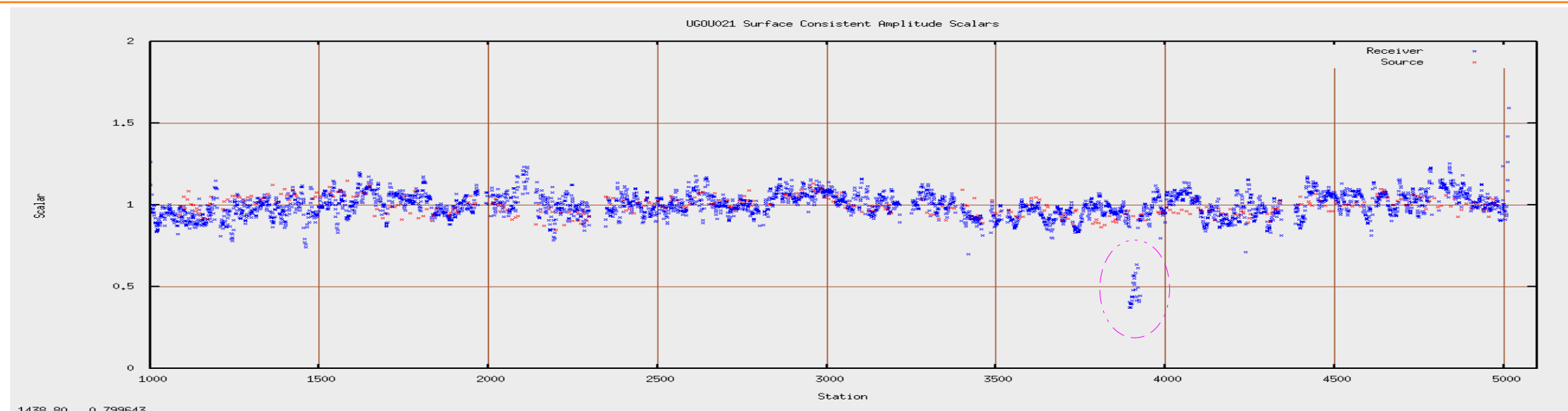
Pass 1



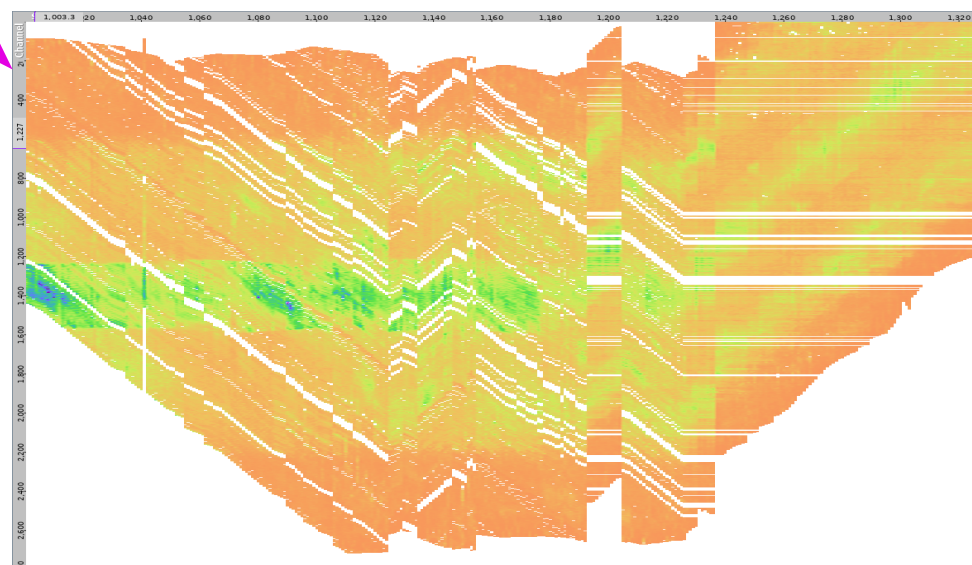
Pass 2



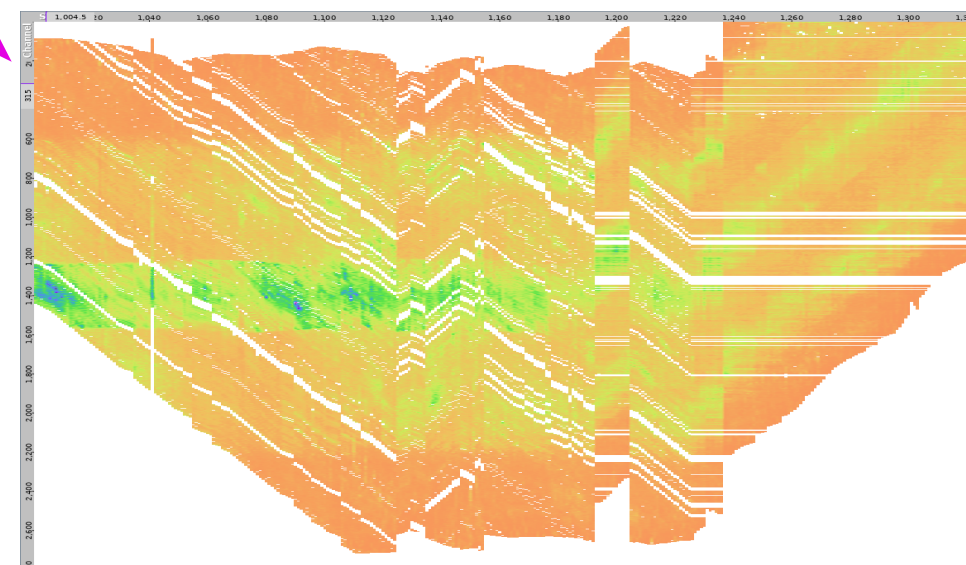
UGOU021 outlier receiver SCAC2 values near RP 3900



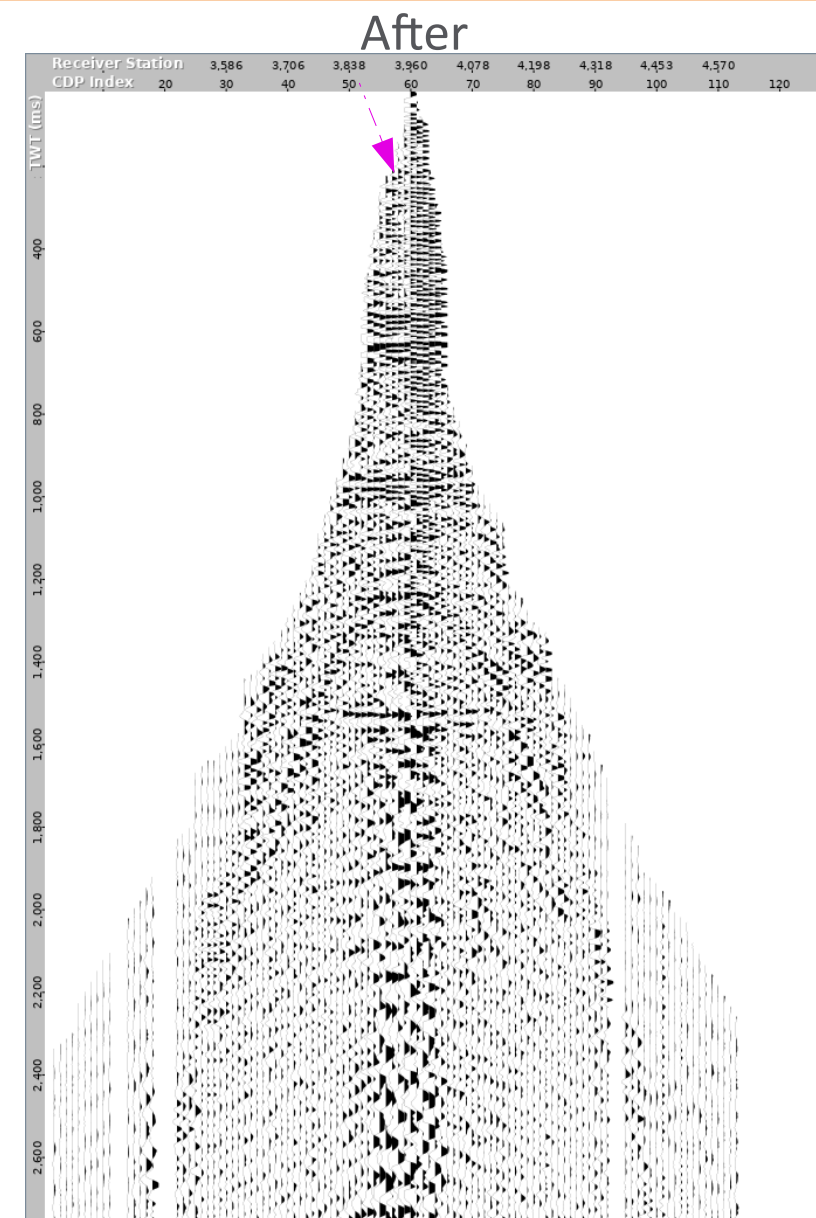
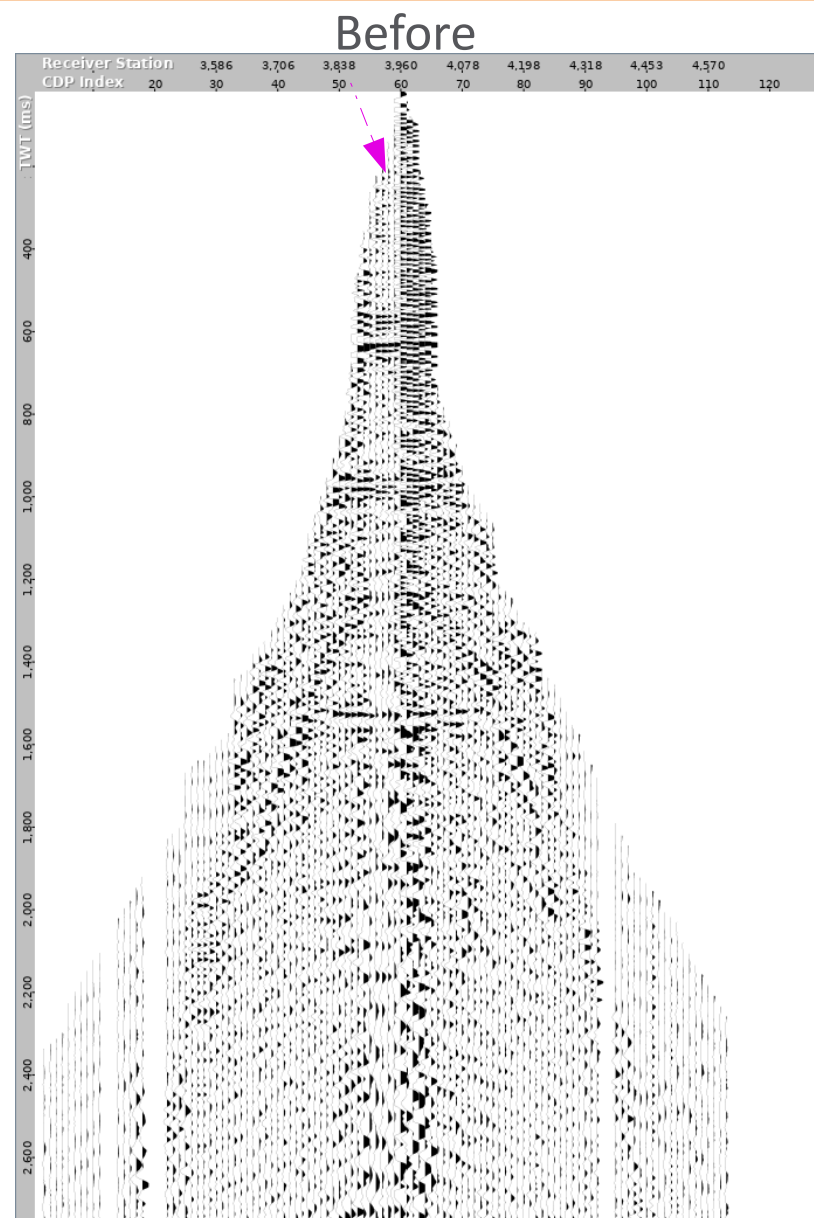
Before



After

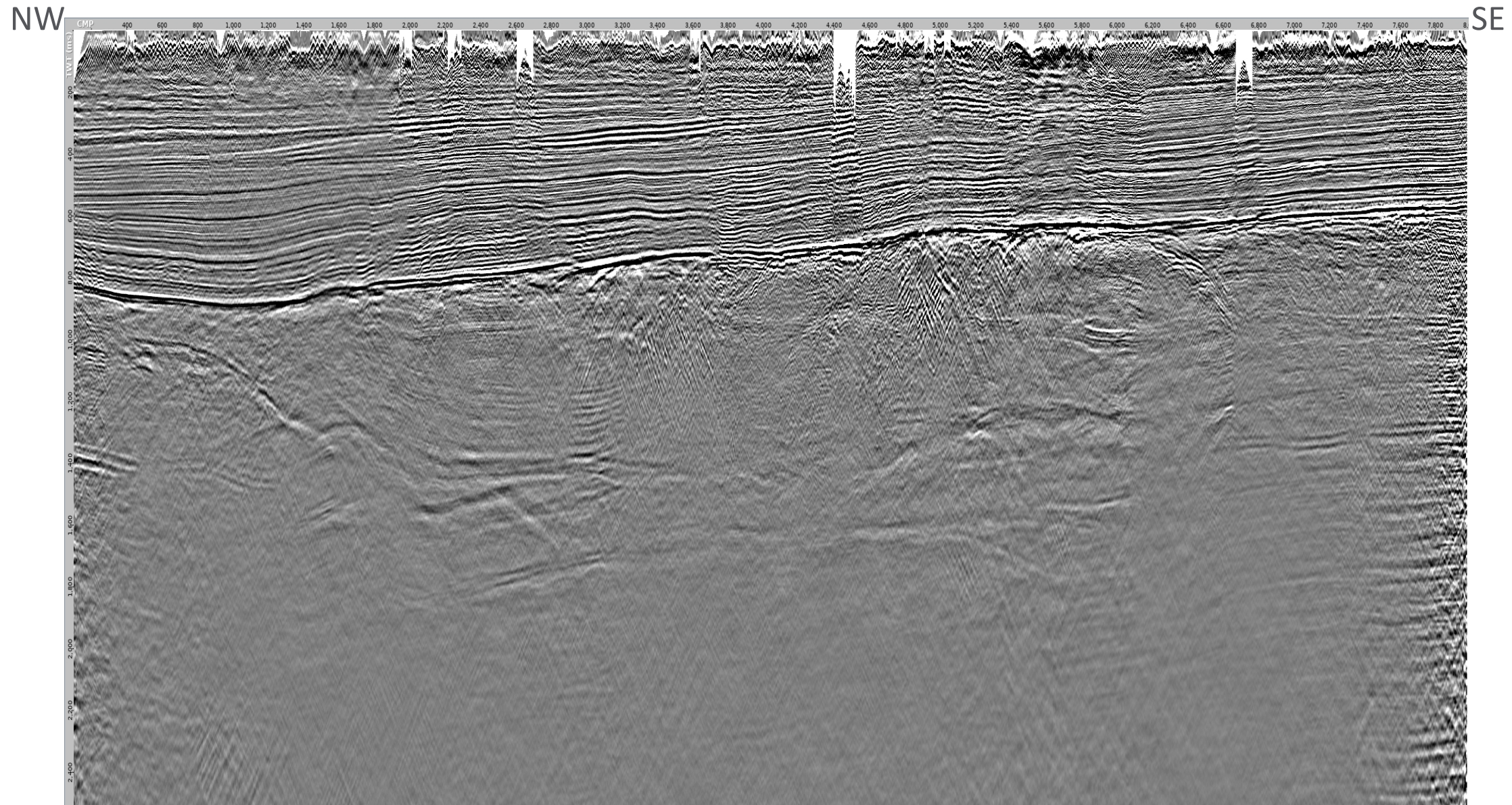


UGOU021 outlier receiver SCAC2 values near RP 3900 viewed on CDP 5890



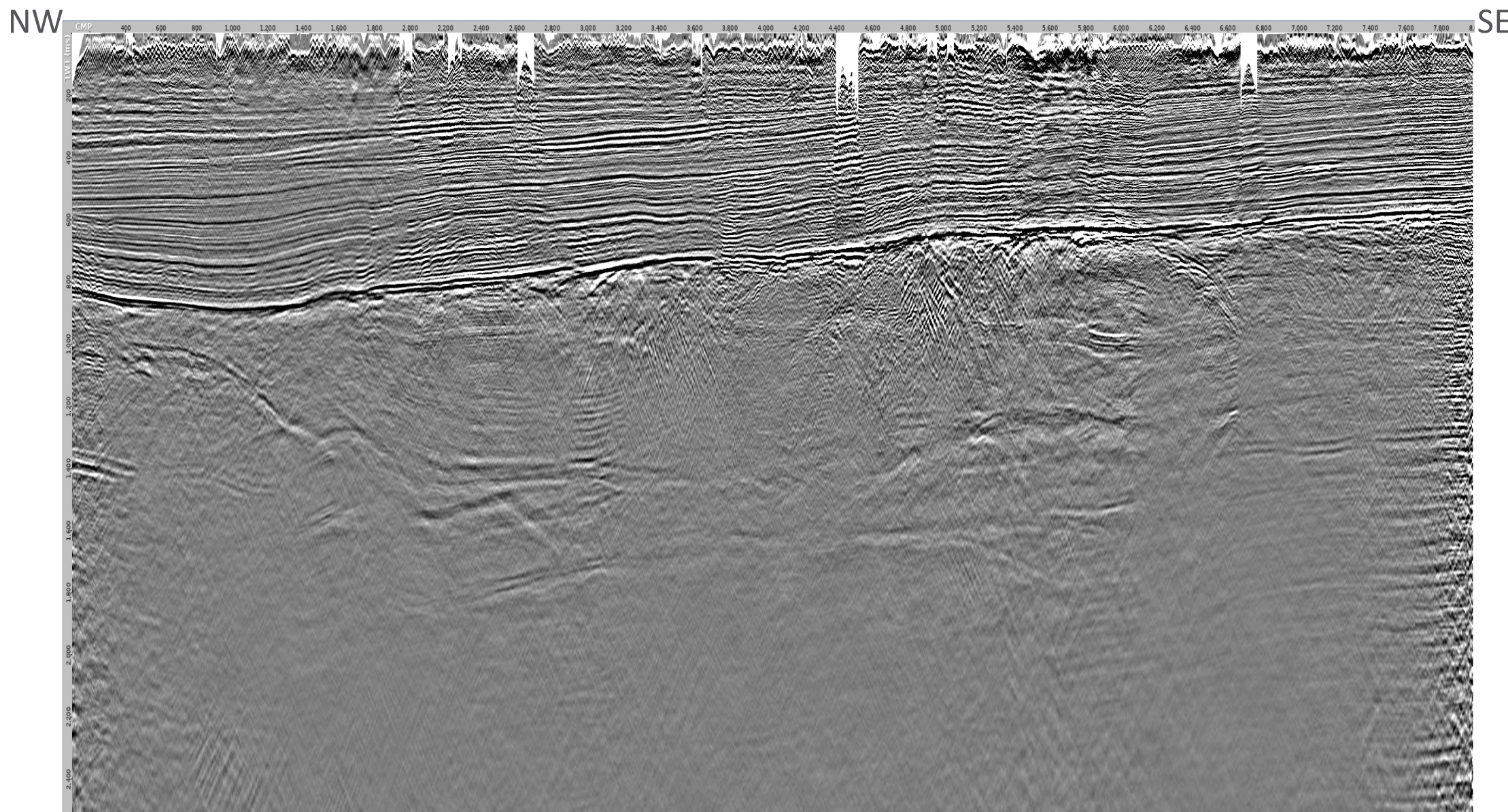
UGOU021 SCAC1 stack

At floating datum with 2-6-150-170 Hz filter

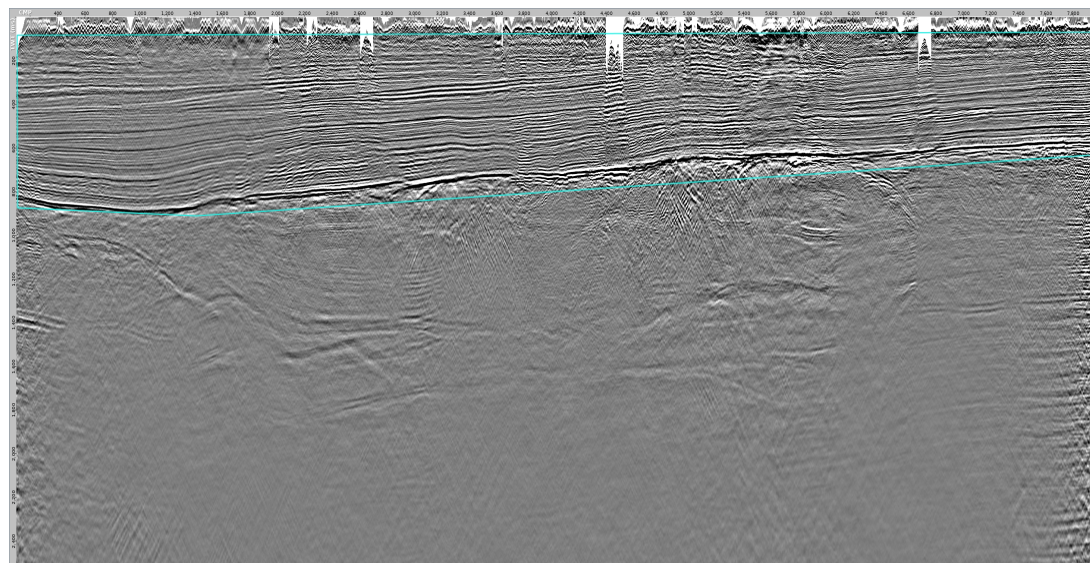


UGOU021 SCAC2 stack

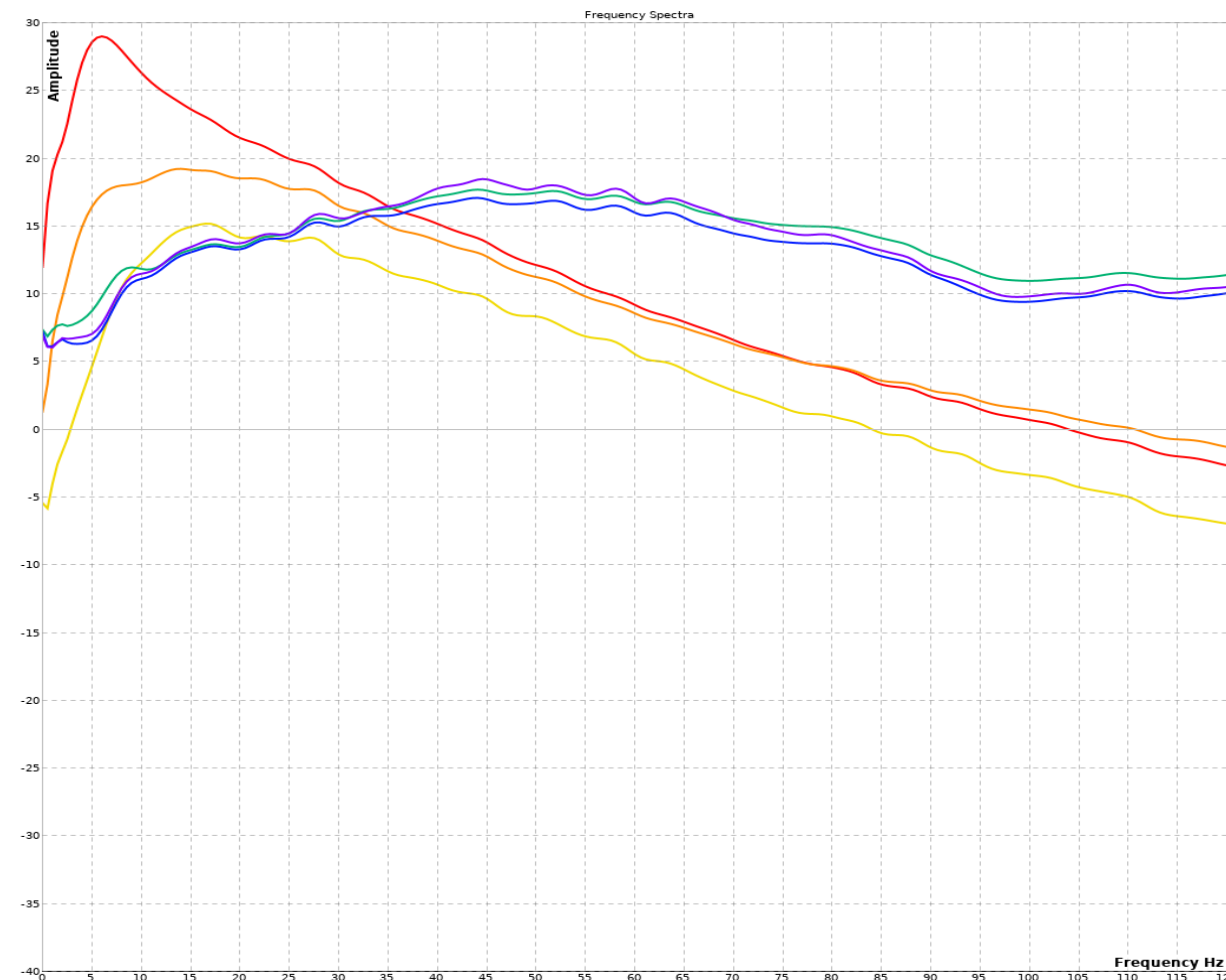
At floating datum with 2-6-150-170 Hz filter



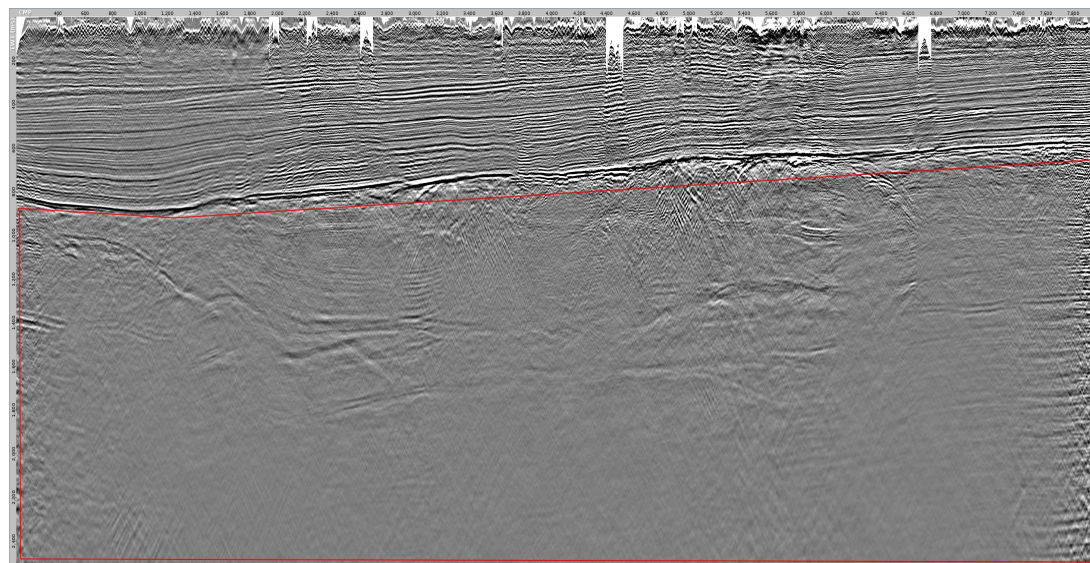
UGOU021 shallow window amplitude spectra (dB)



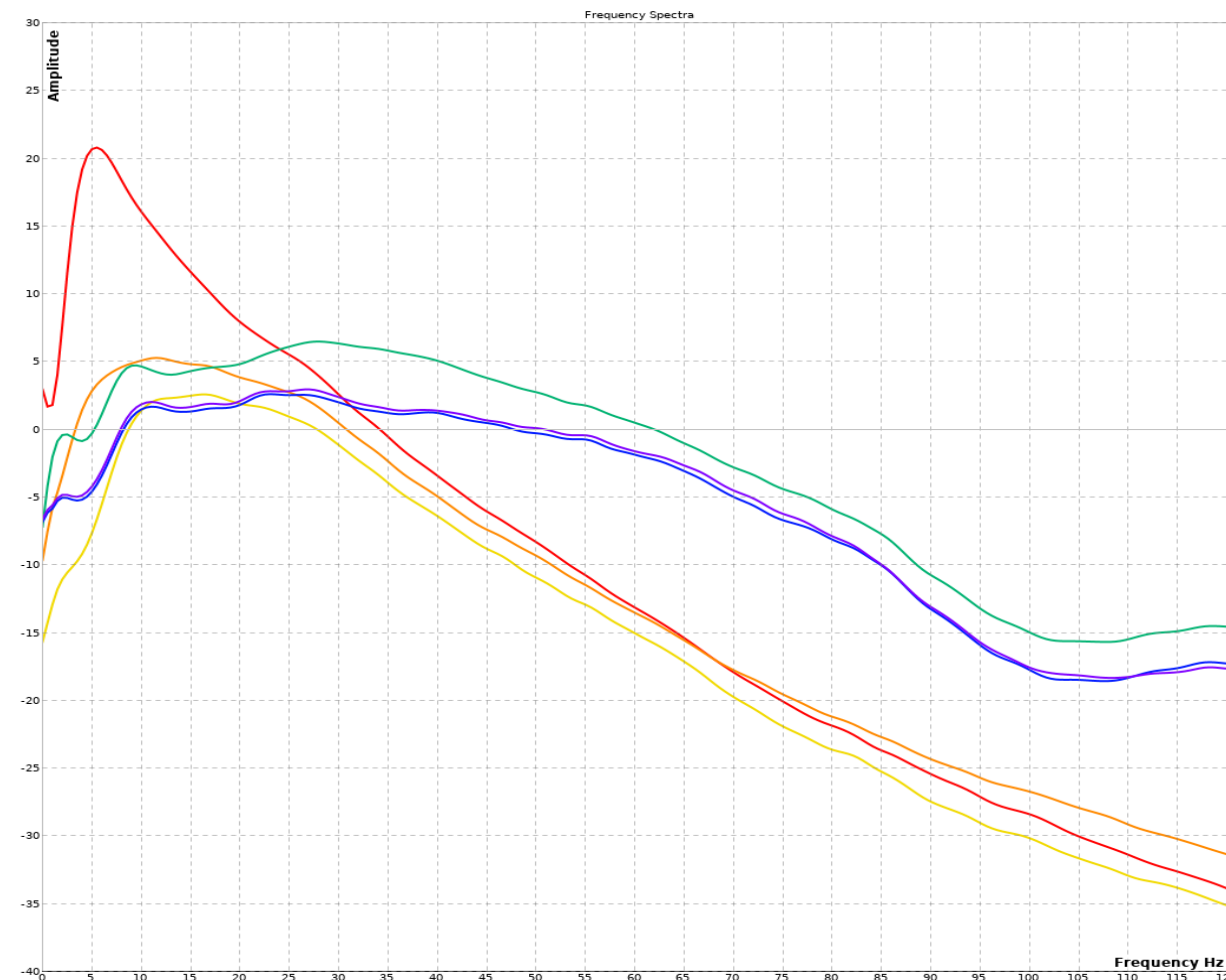
- Raw
- Denoise 1
- Denoise 2c
- Deconvolution
- Denoise 3
- Input to migration



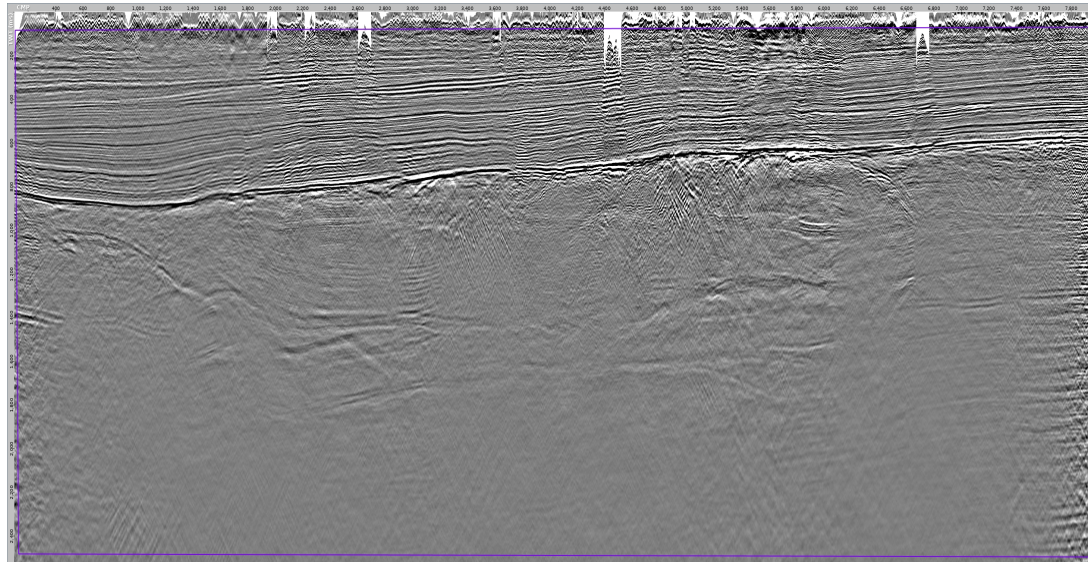
UGOU021 deep window amplitude spectra (dB)



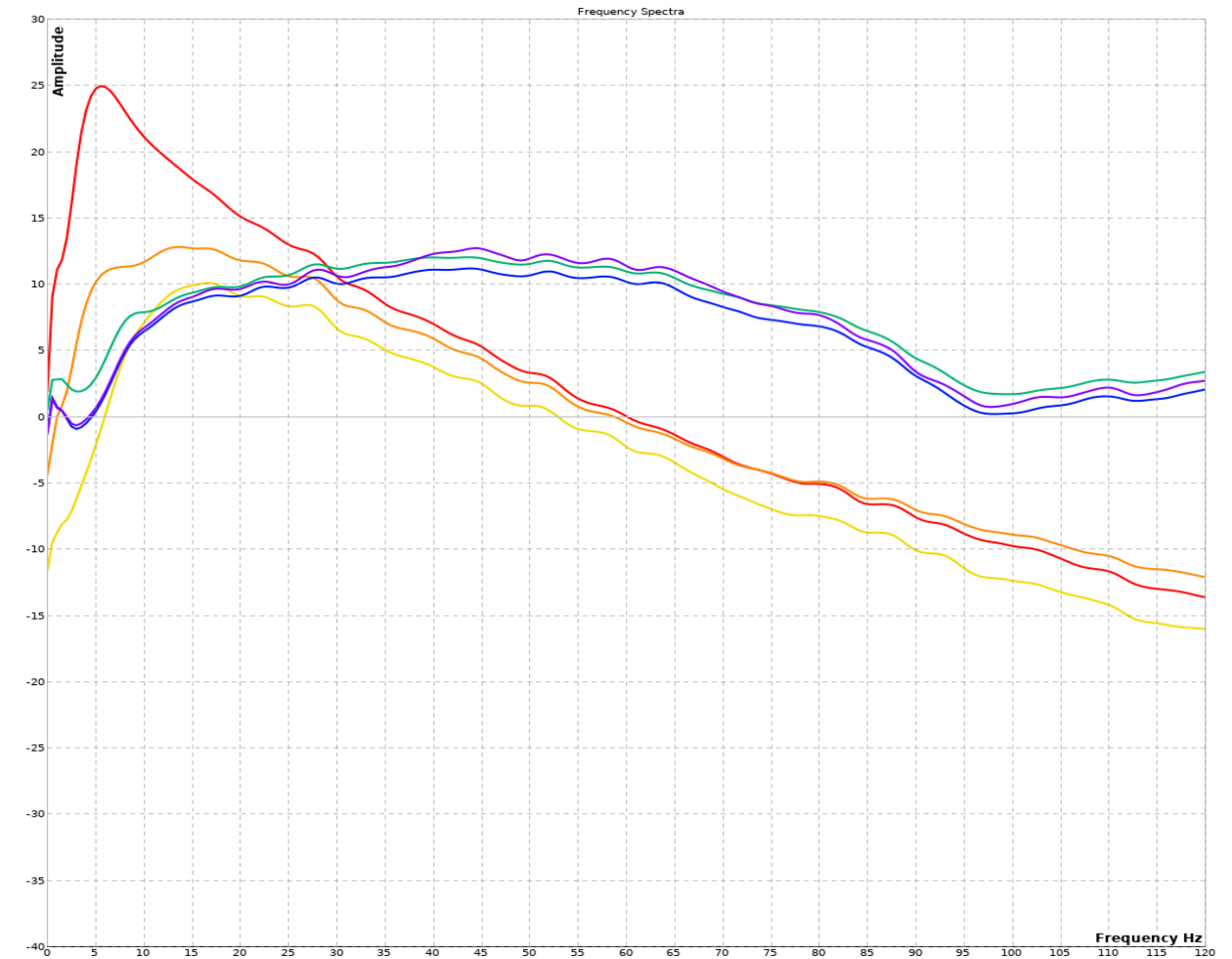
- Raw
- Denoise 1
- Denoise 2c
- Deconvolution
- Denoise 3
- Input to migration



UGOU021 long window amplitude spectra (dB)

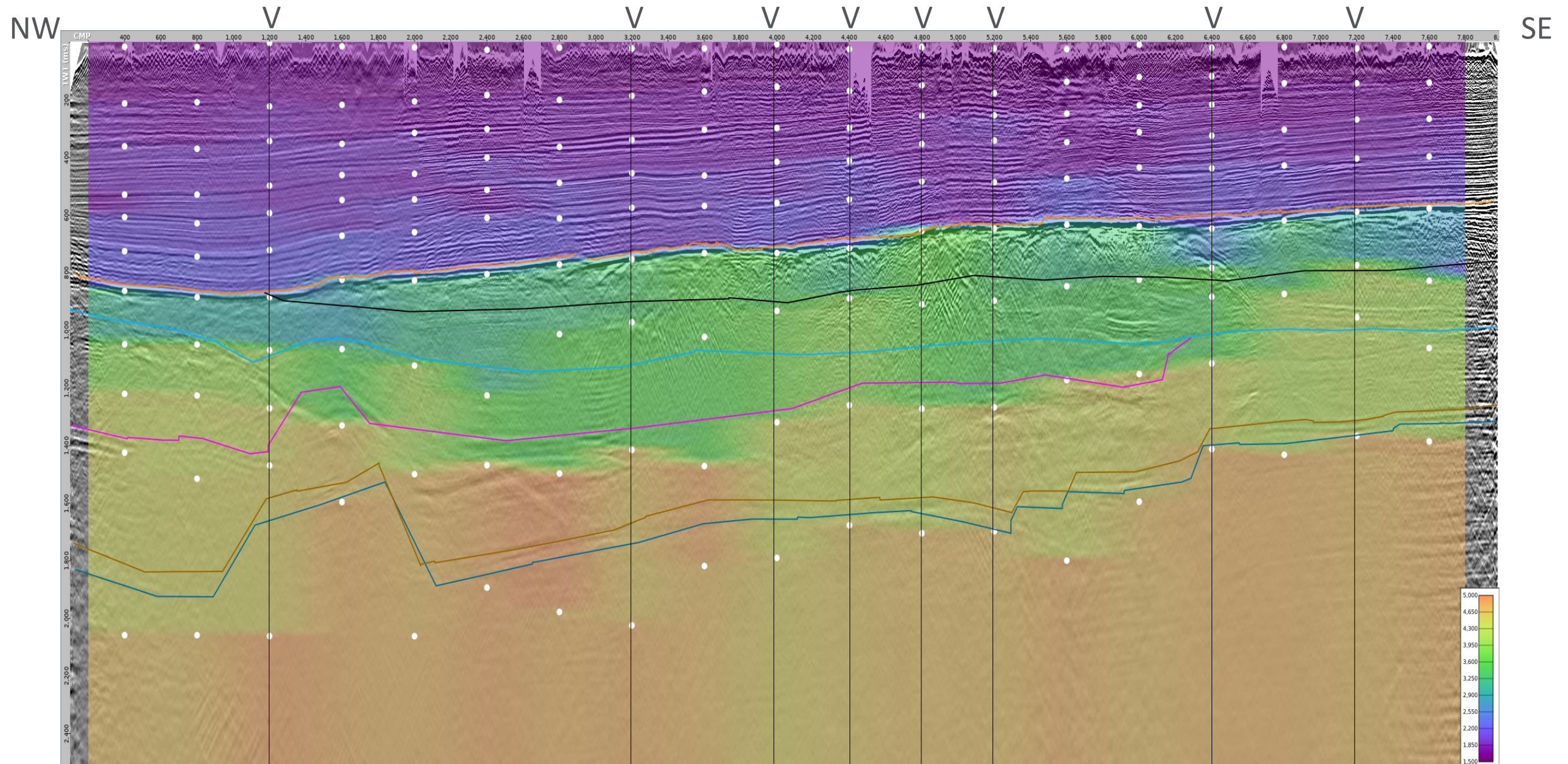


- Raw
- Denoise 1
- Denoise 2c
- Deconvolution
- Denoise 3
- Input to migration

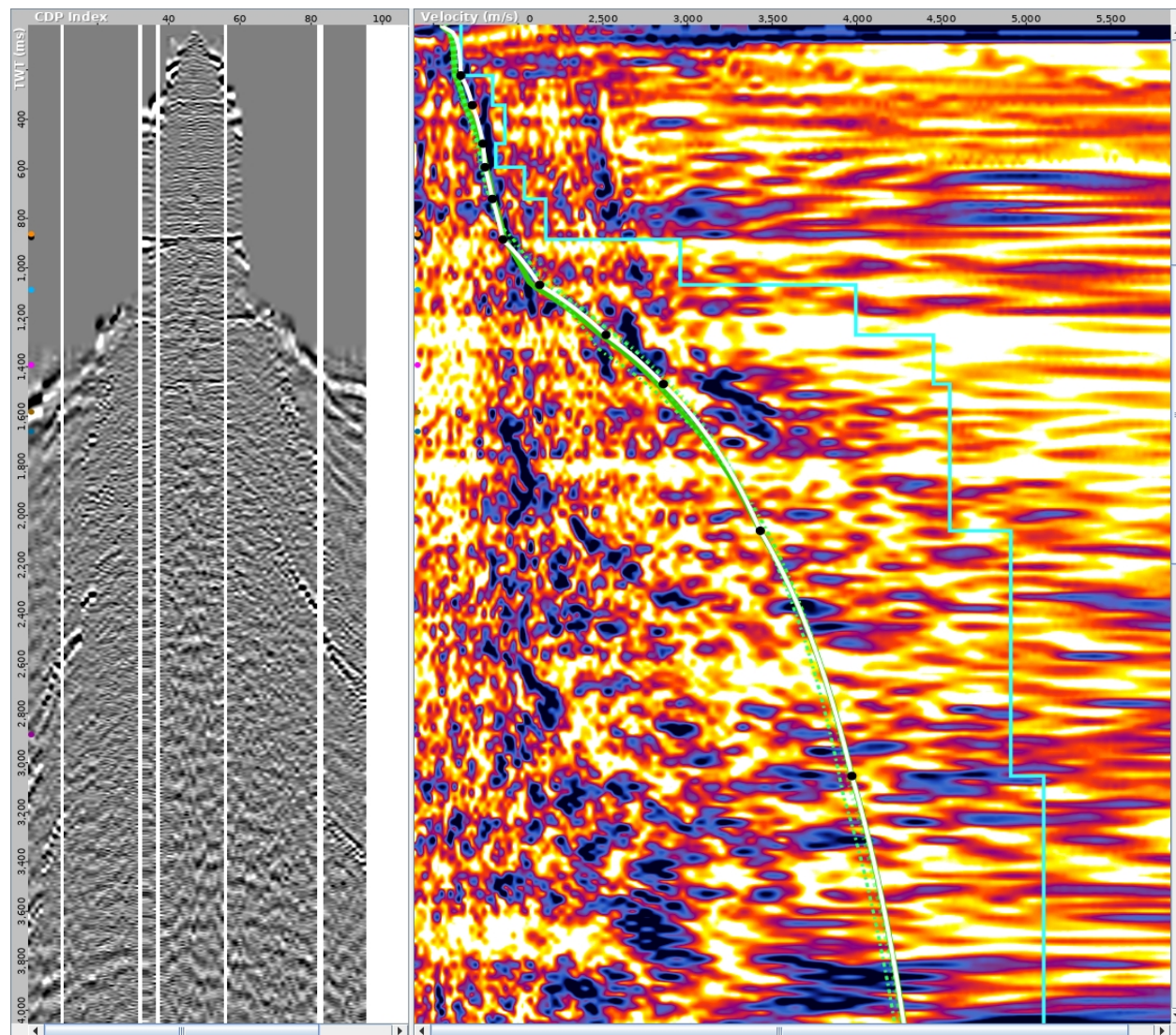


UGOU021 stack showing location of velocity analyses in the subsequent slides

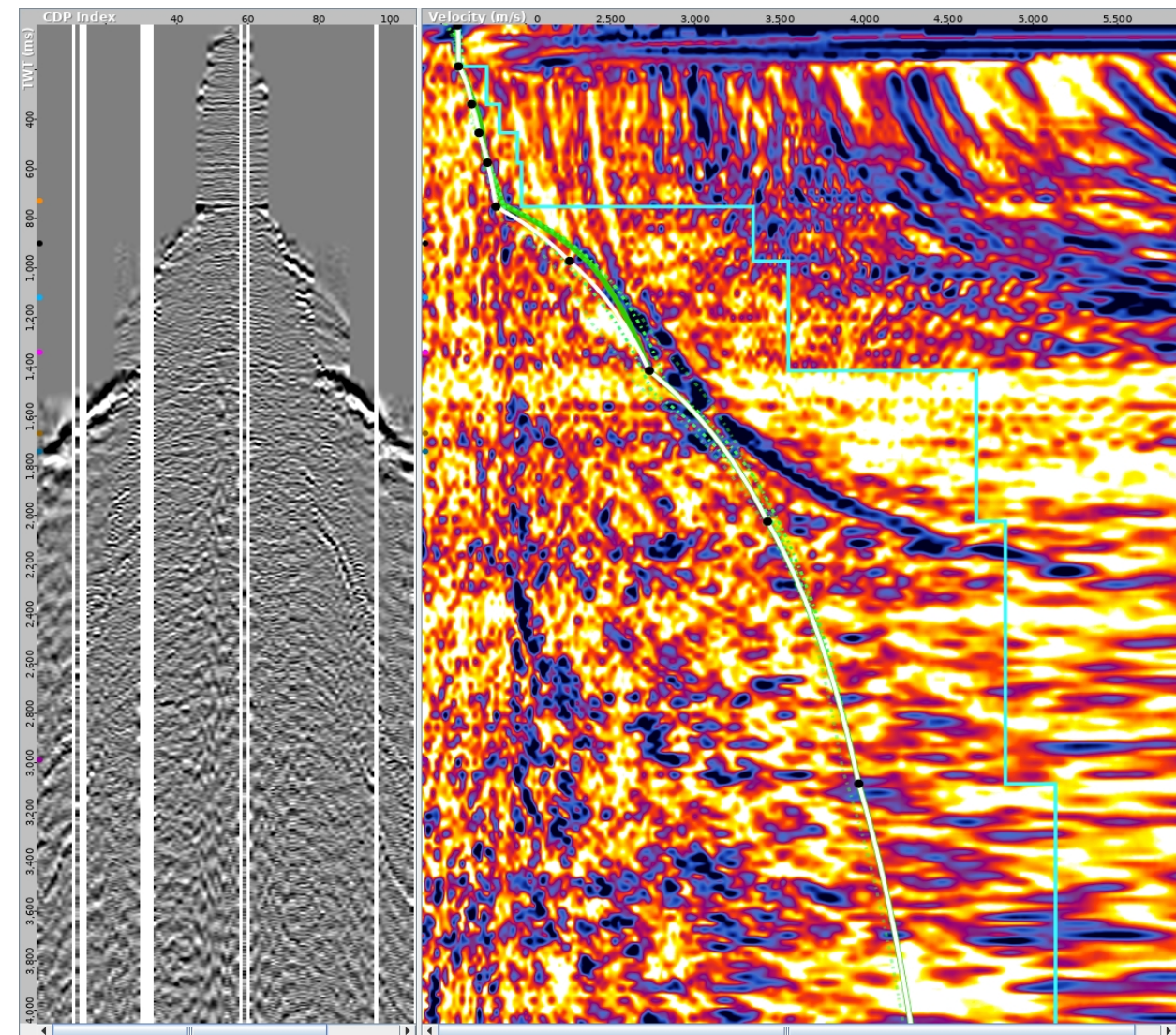
The underlying stack and velocity is shown again in slide 25



CDP 1200



CDP 3200

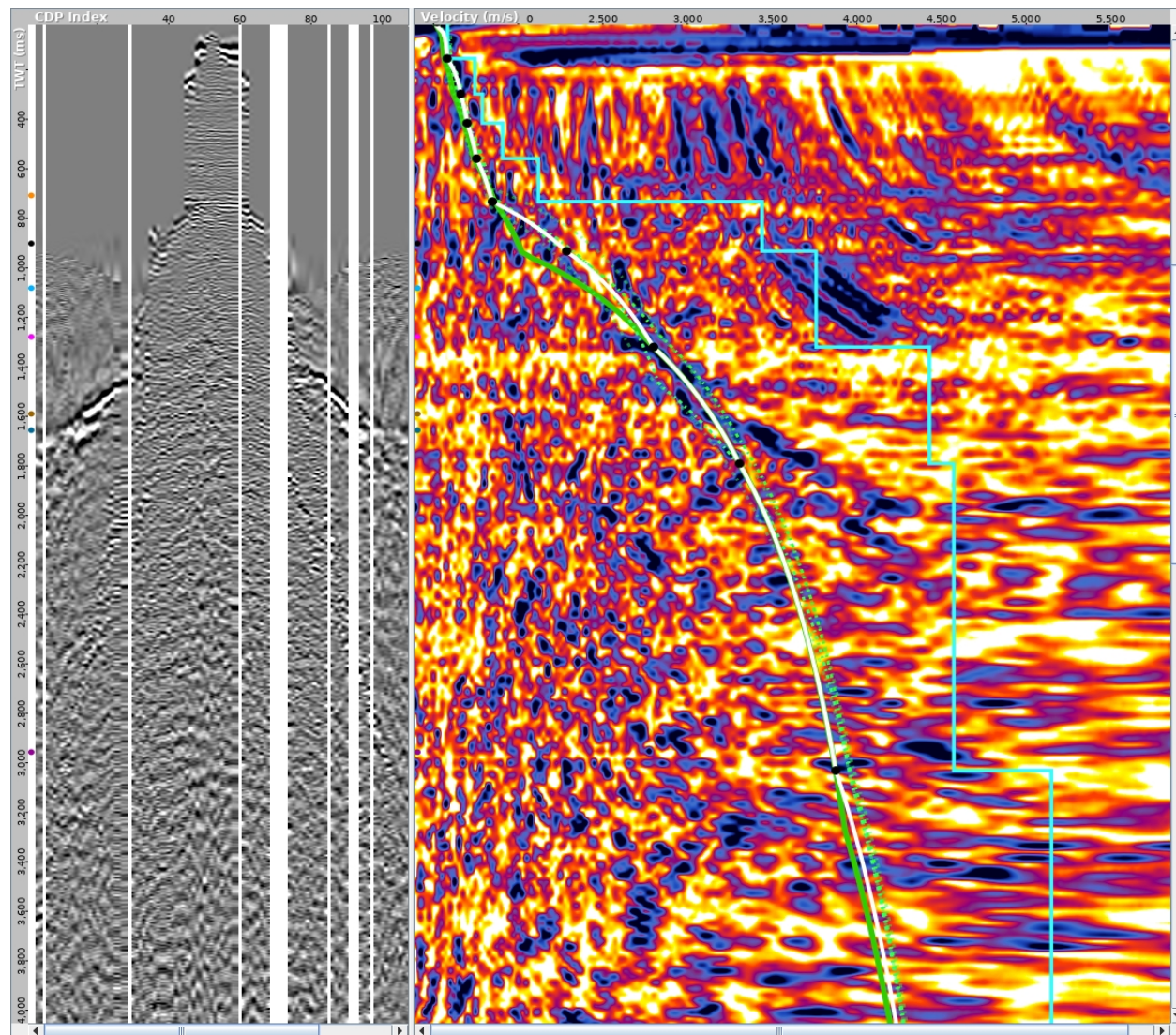


rms function for initial velocities

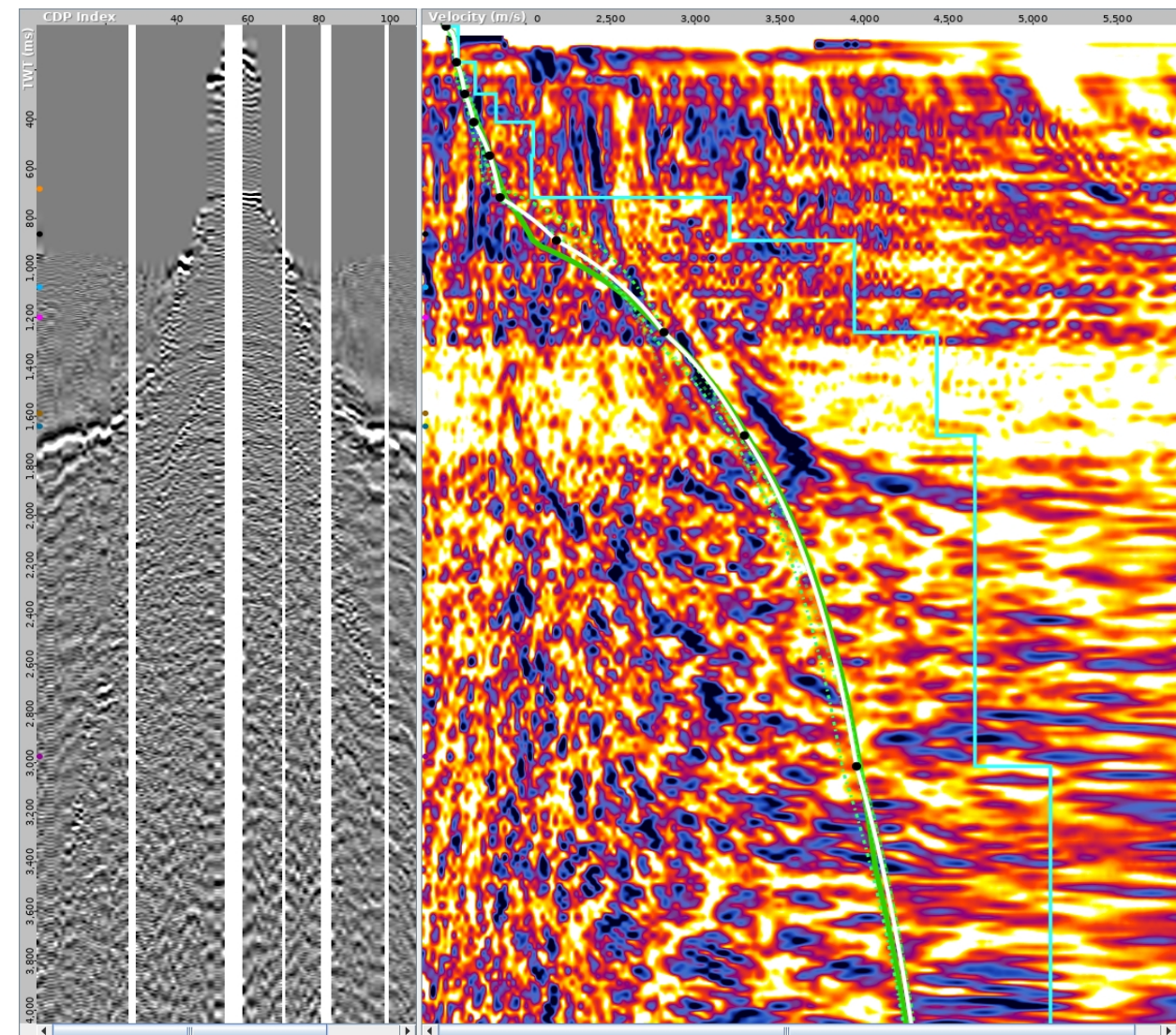
rms function for 2nd pass velocities

interval function for 2nd pass velocities

CDP 4000



CDP 4400

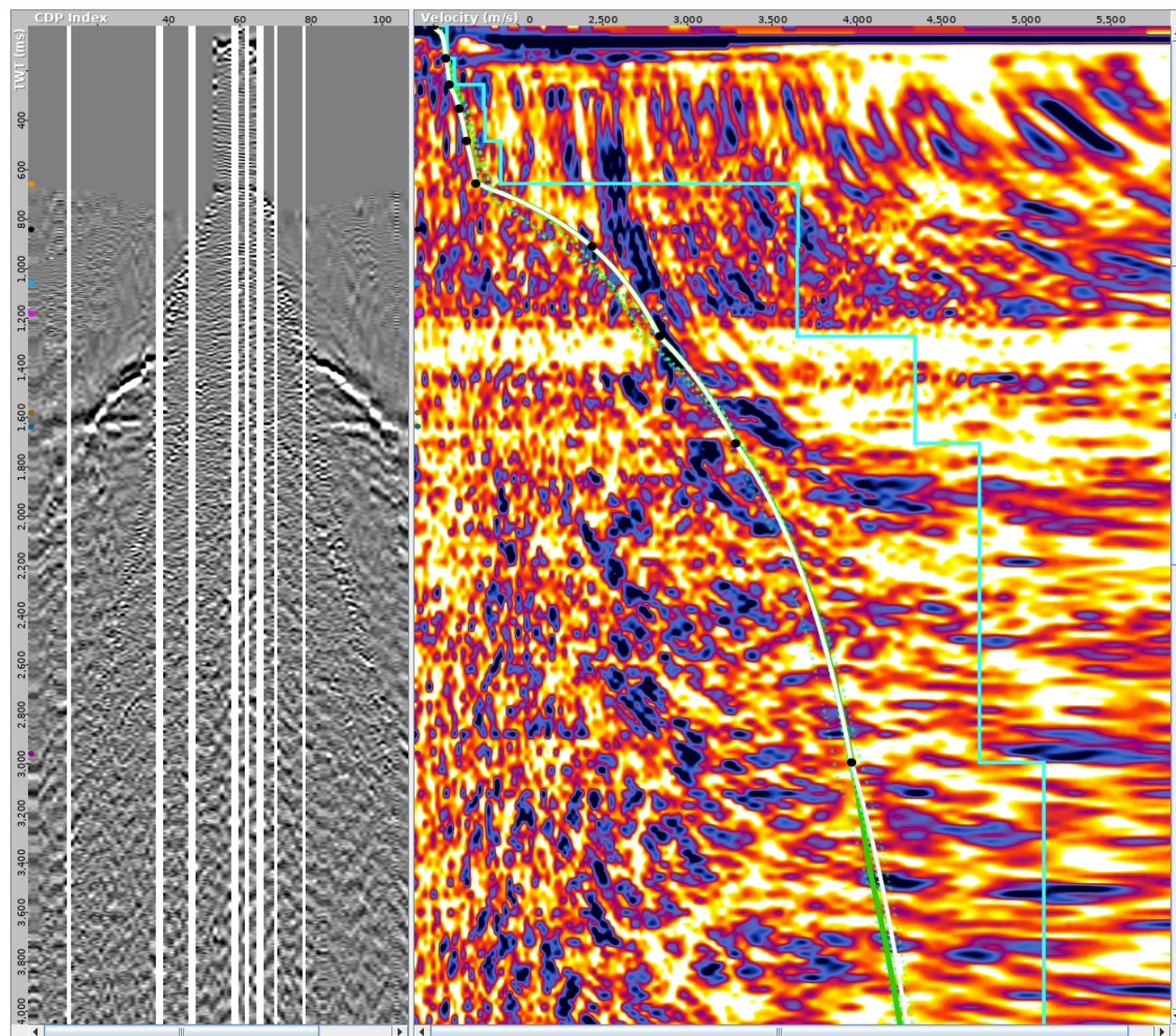


rms function for initial velocities

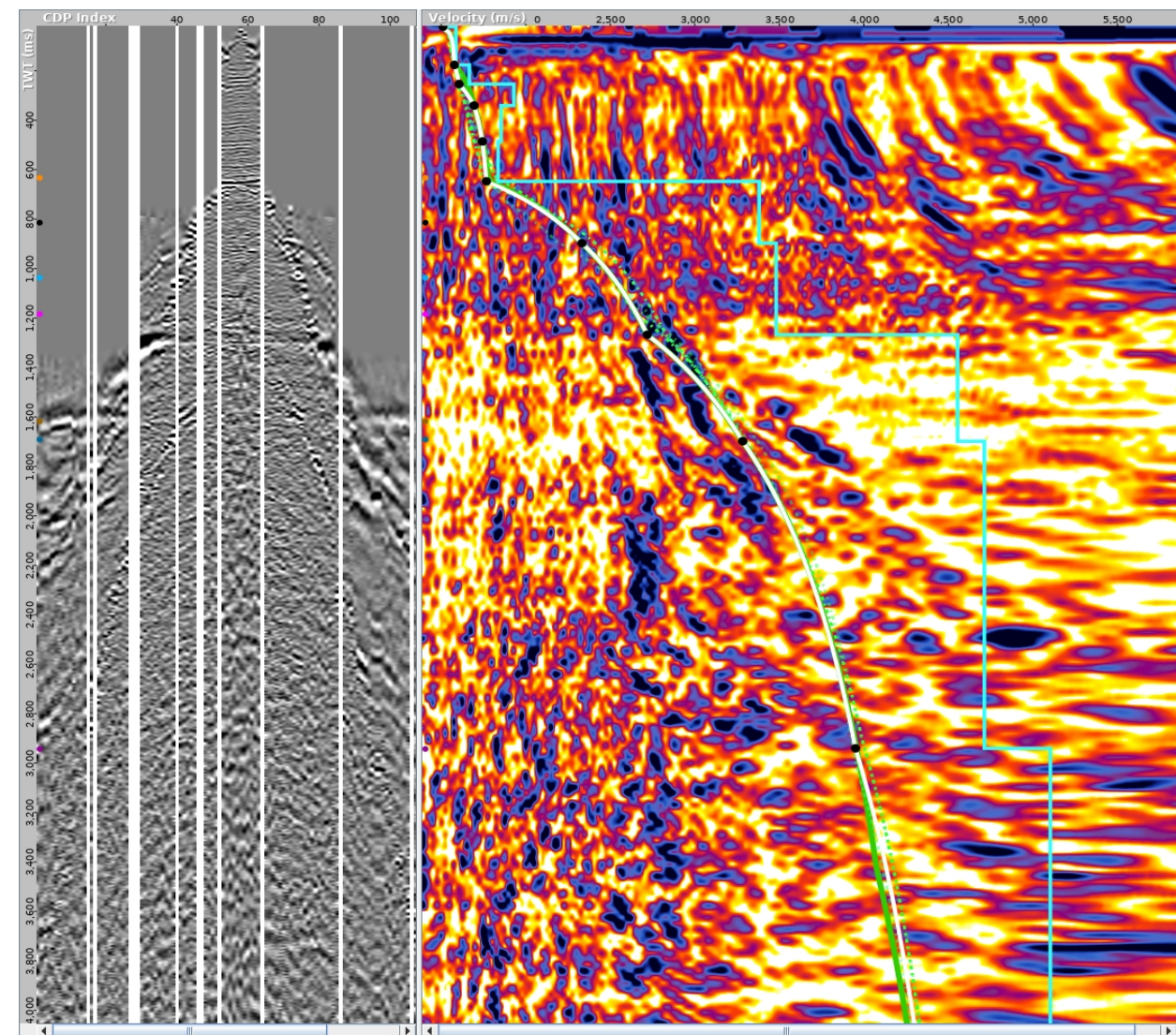
rms function for 2nd pass velocities

interval function for 2nd pass velocities

CDP 4800



CDP 5200

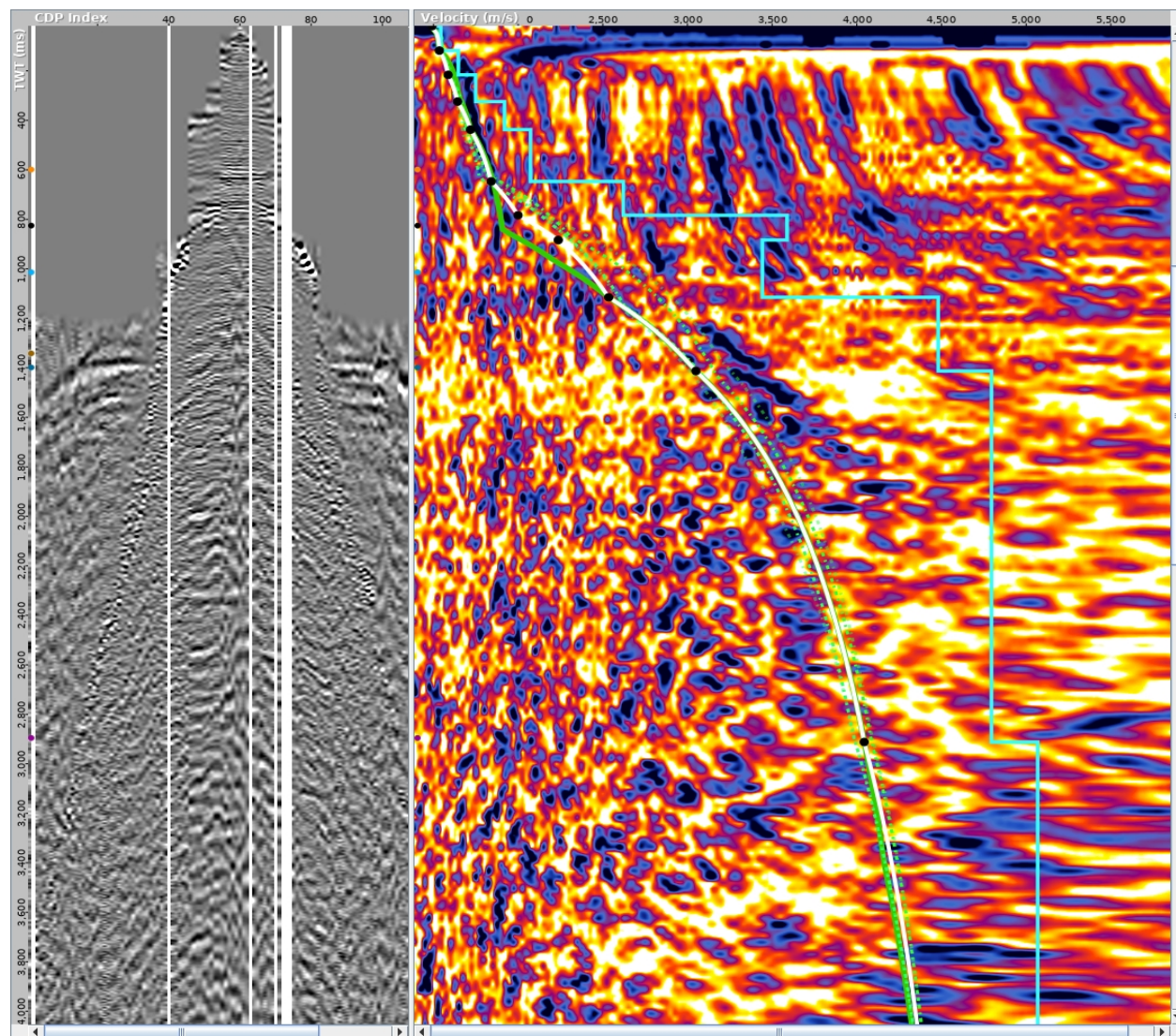


rms function for initial velocities

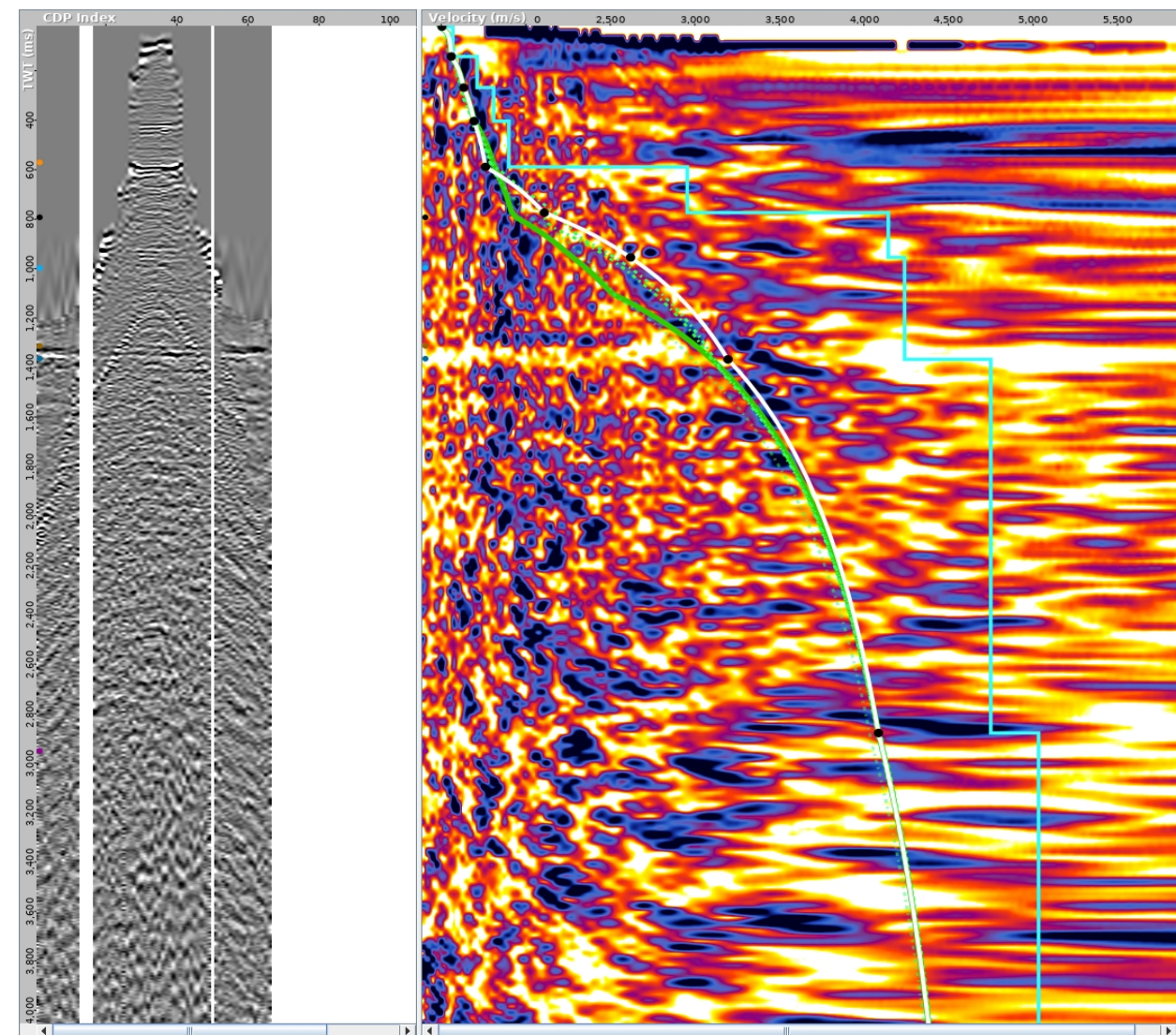
rms function for 2nd pass velocities

interval function for 2nd pass velocities

CDP 6400



CDP 7200



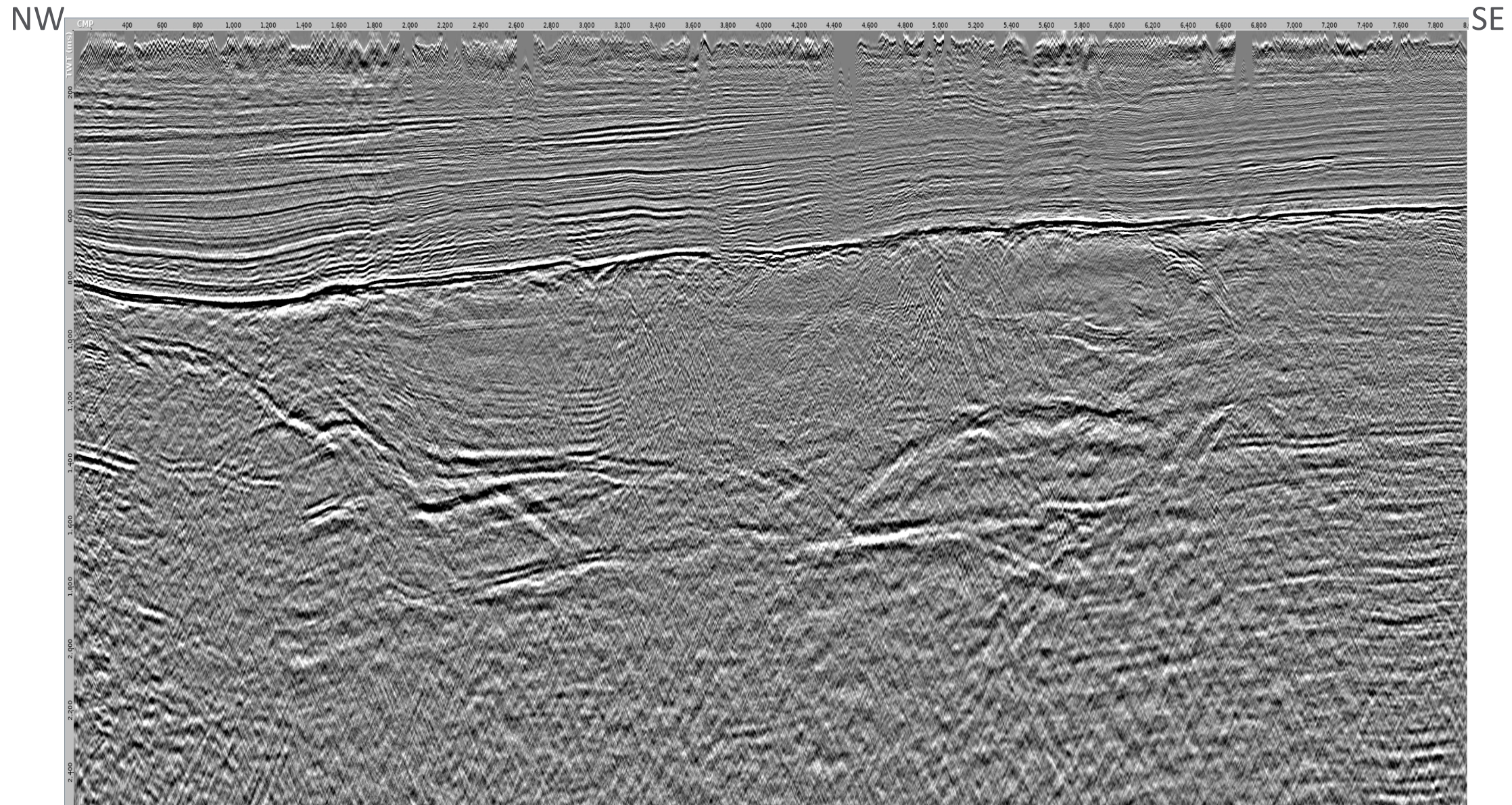
rms function for initial velocities

rms function for 2nd pass velocities

interval function for 2nd pass velocities

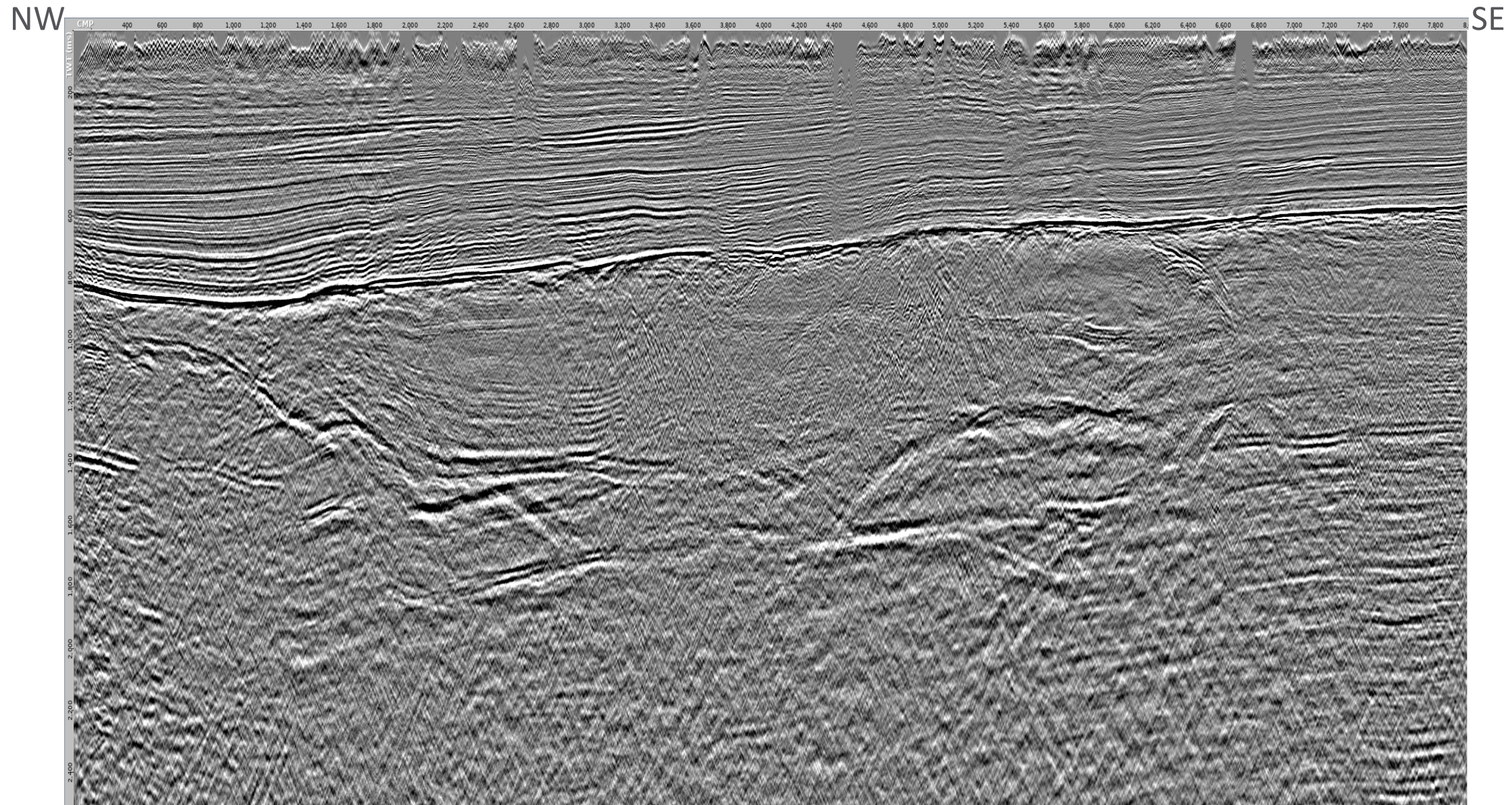
UGOU021 initial velocity stack

At final datum with 2-6-150-170 Hz filter



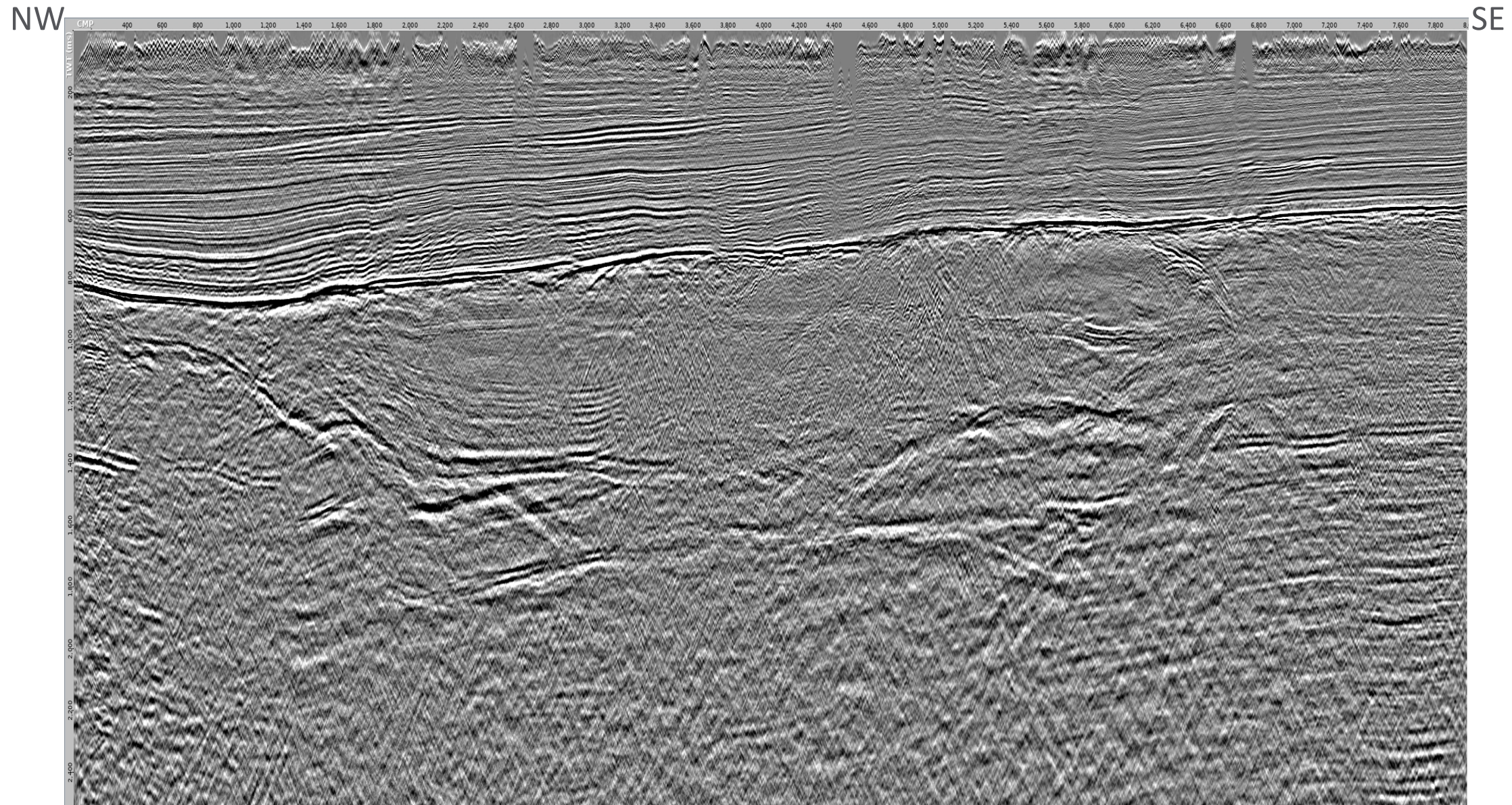
UGOU021 initial velocity and residual statics stack

At final datum with 2-6-150-170 Hz filter



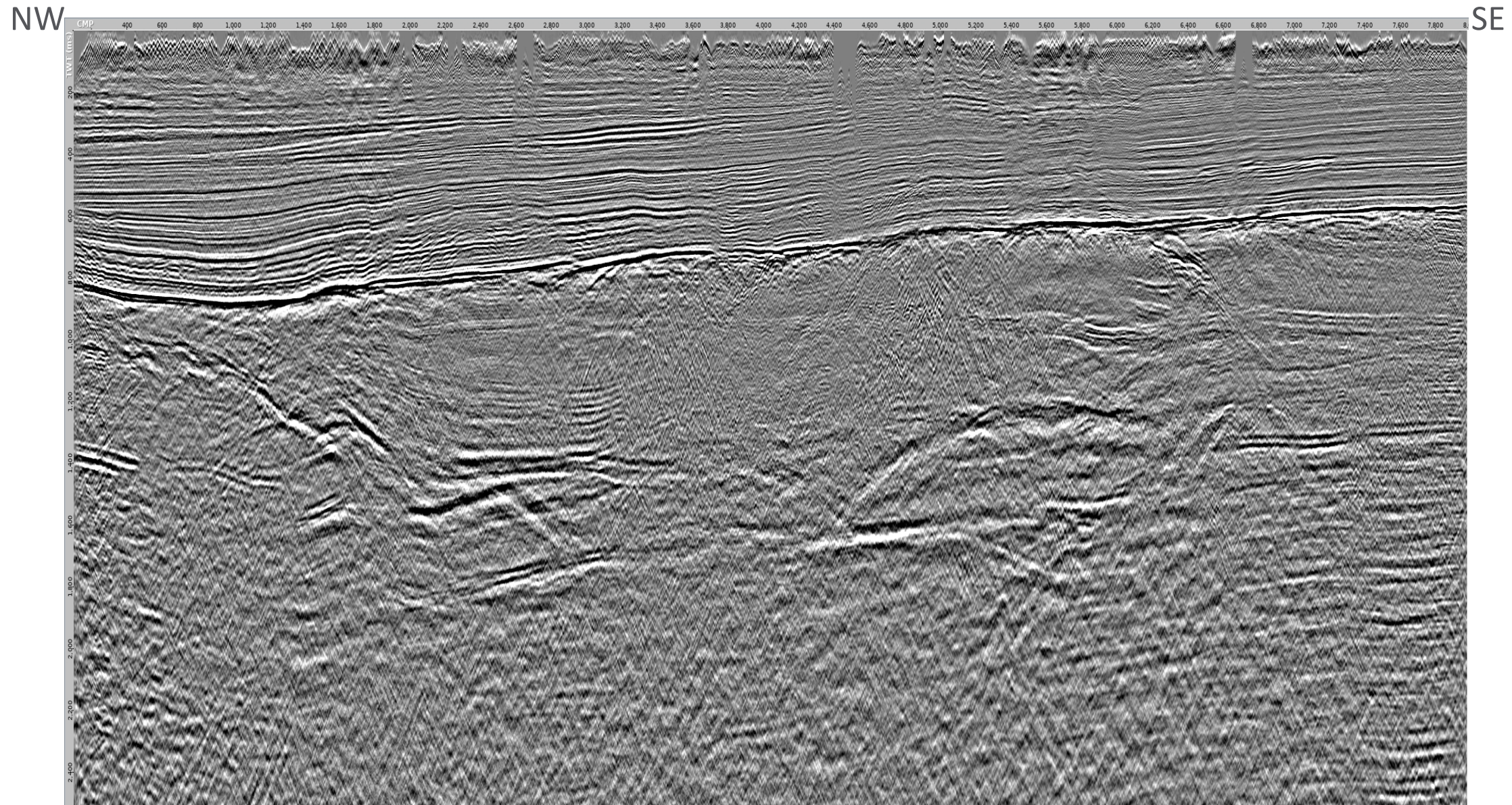
UGOU021 2nd pass velocity stack

At final datum with 2-6-150-170 Hz filter



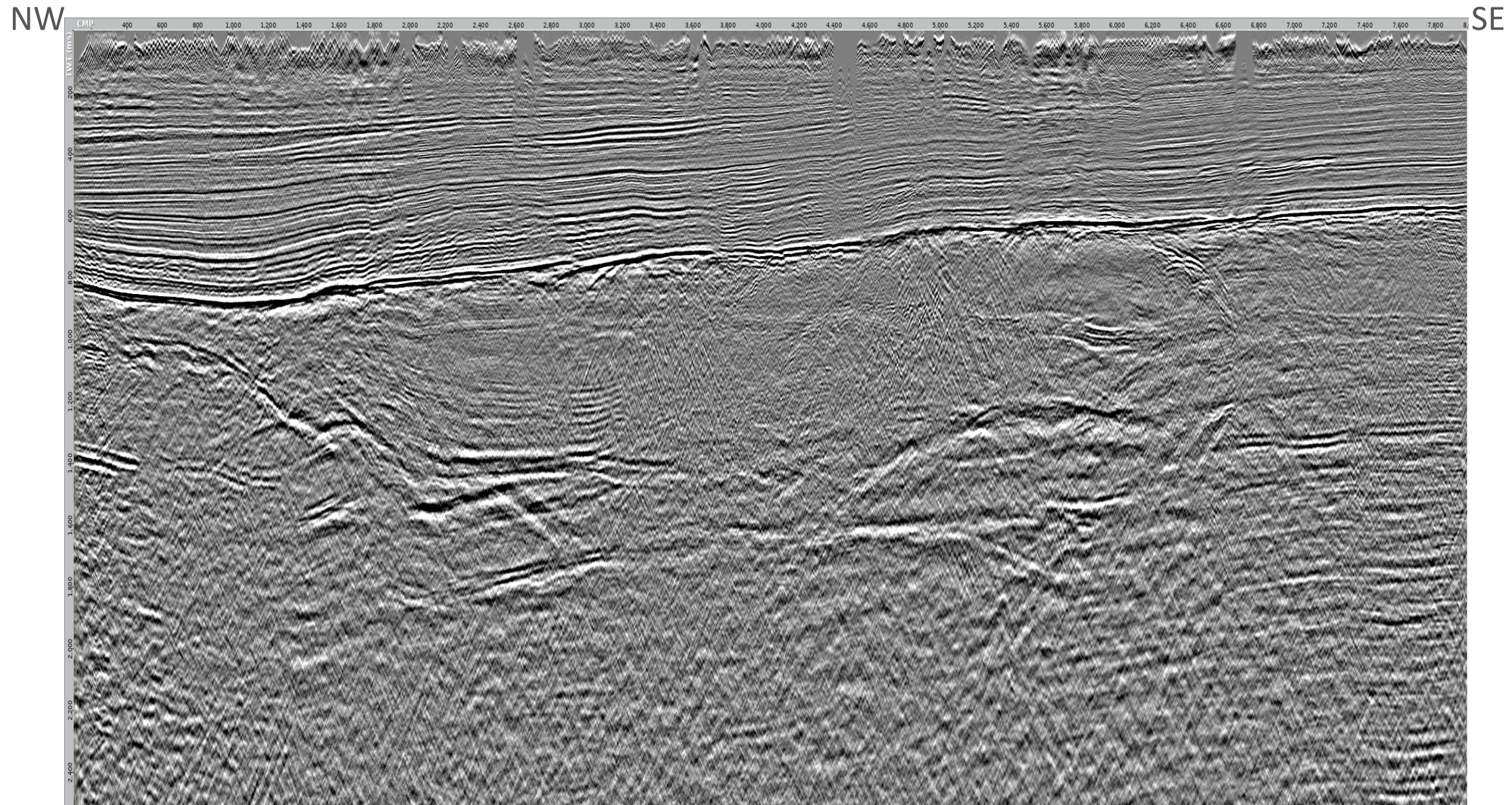
UGOU021 revised 2nd pass velocity stack

At final datum with 2-6-150-170 Hz filter



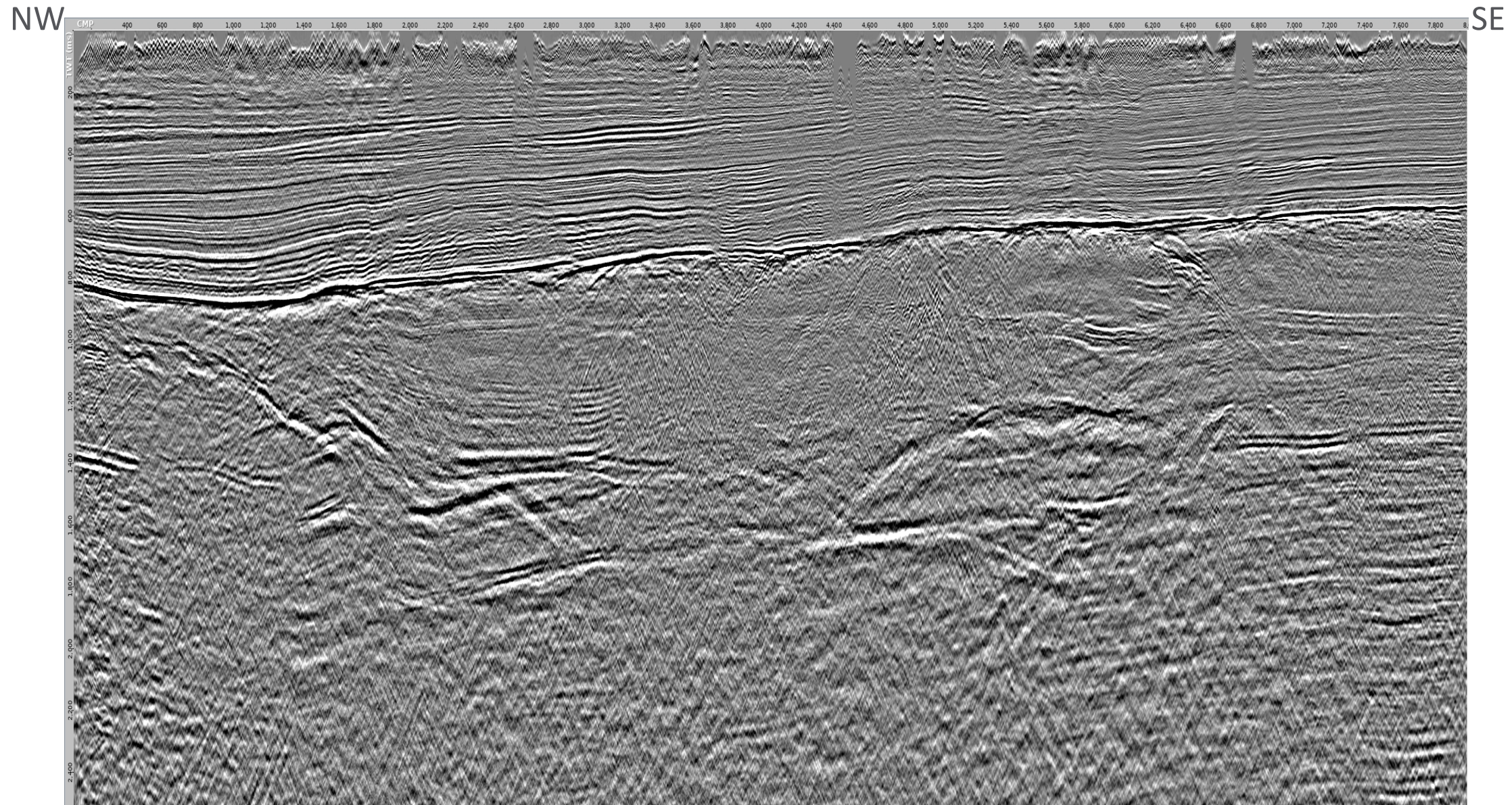
UGOU021 2nd pass velocity and residual statics stack

At final datum with 2-6-150-170 Hz filter



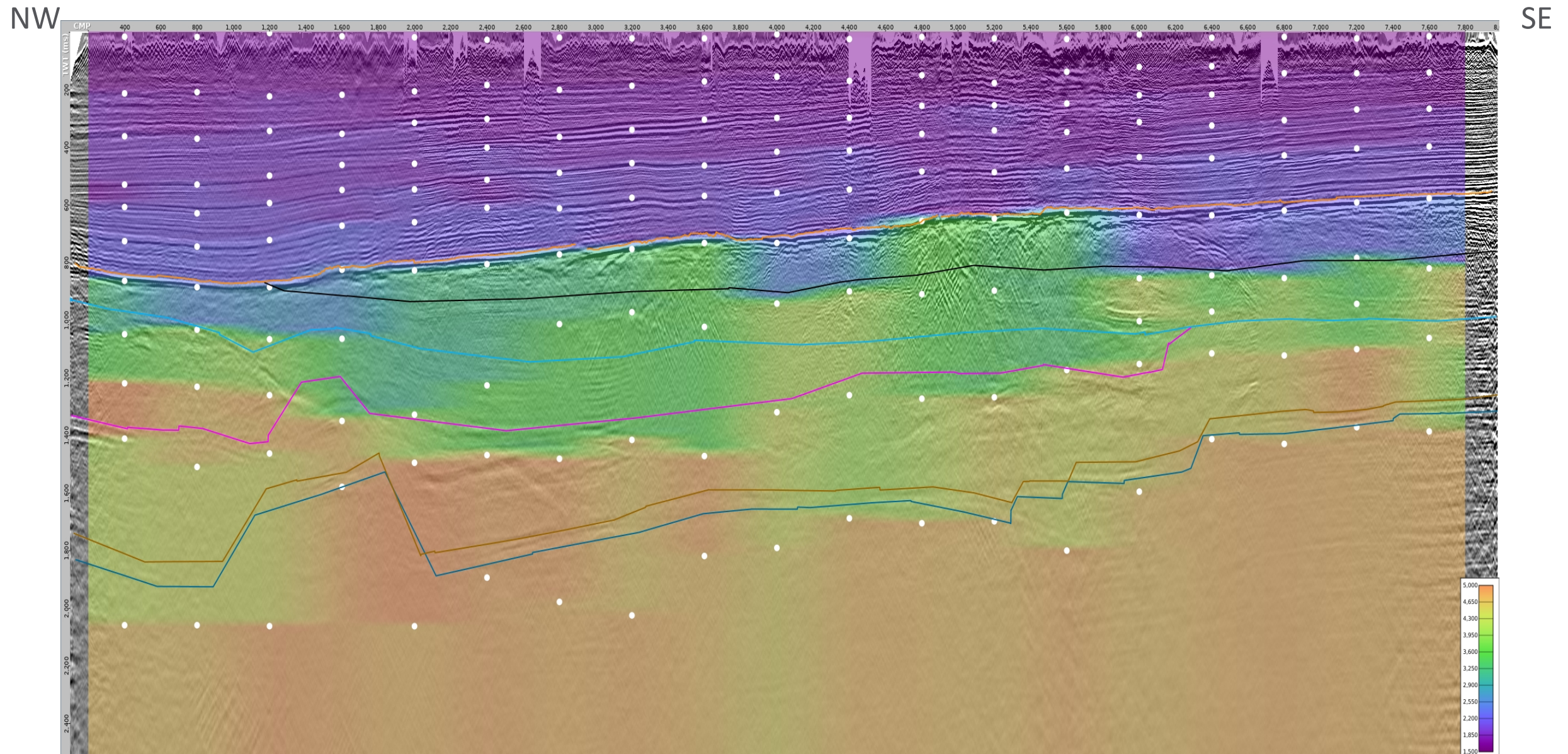
UGOU021 revised 2nd pass velocity and residual statics stack

At final datum with 2-6-150-170 Hz filter



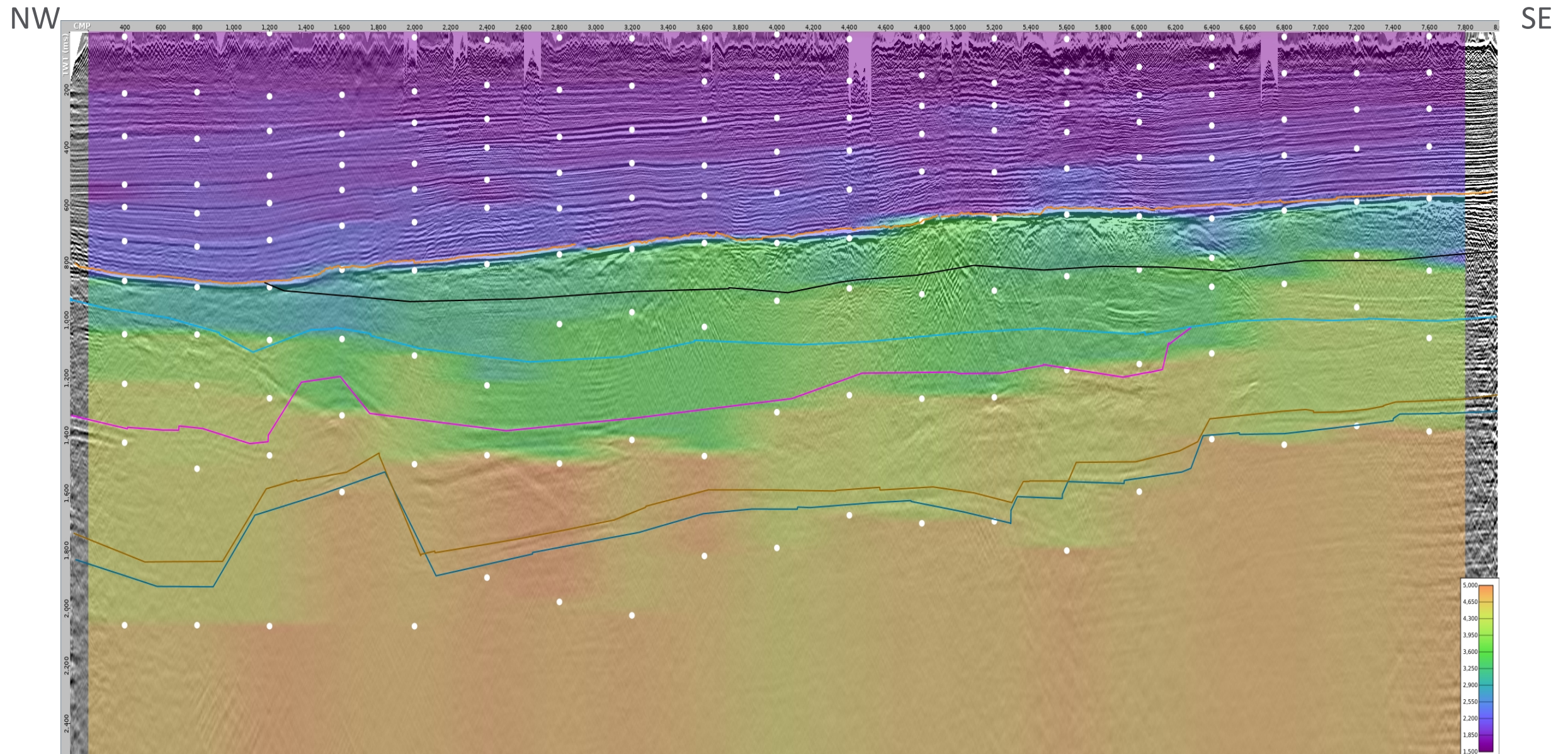
UGOU021 stack with 2nd pass velocities and residual statics and interval velocity overlay

At floating datum with supplied horizons annotated - picking trends are based on the initial velocity picks prior to receiving the horizons



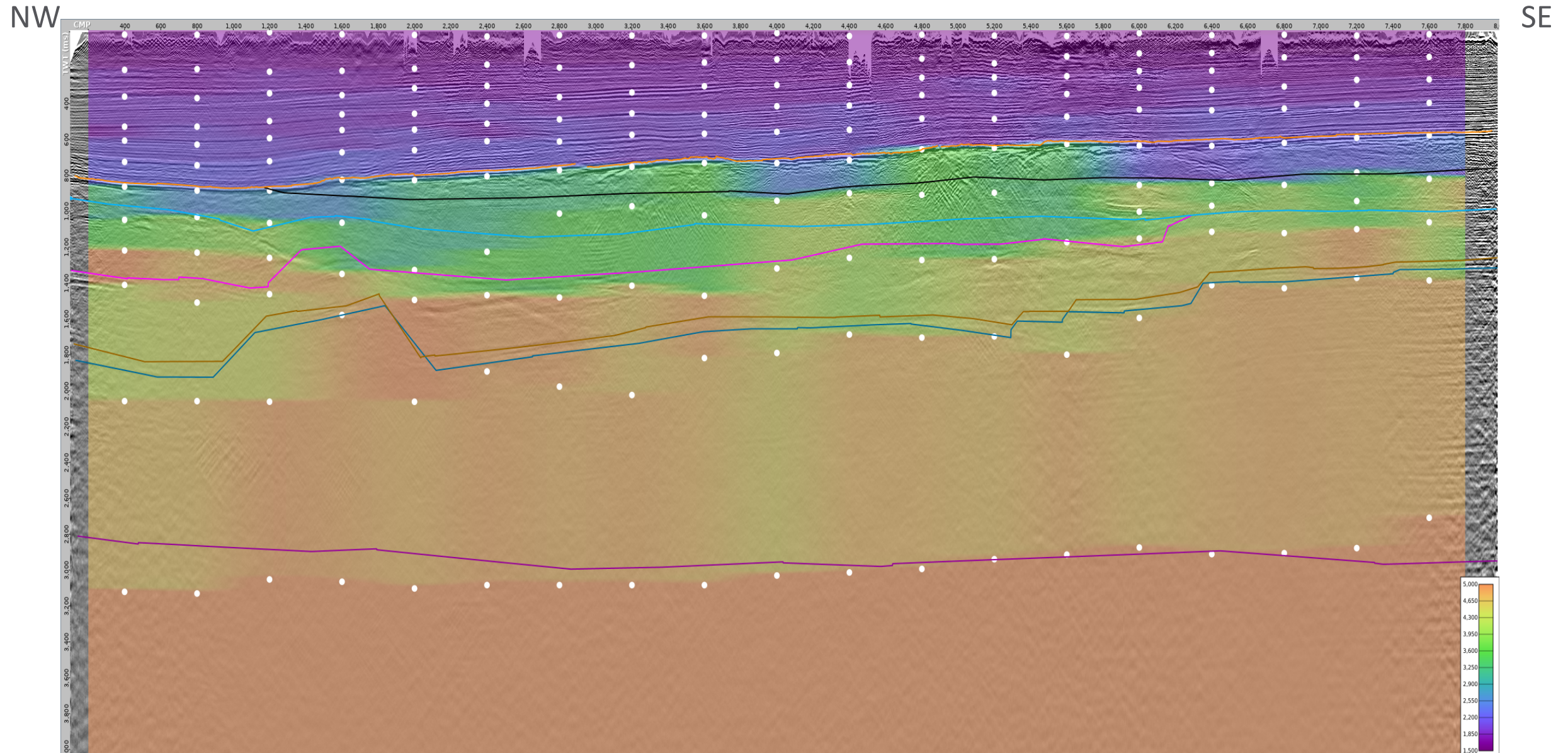
UGOU021 stack with revised 2nd pass velocities and residual statics and interval velocity overlay

At floating datum with supplied horizons annotated - picking trends are based on the initial velocity picks prior to receiving the horizons



UGOU021 stack with 2nd pass velocities and residual statics and interval velocity overlay displayed to 4000 ms

At floating datum with supplied horizons annotated - picking trends are based on the initial velocity picks prior to receiving the horizons



UGOU021 stack with revised 2nd pass velocities and residual statics and interval velocity overlay displayed to 4000 ms

At floating datum with supplied horizons annotated - picking trends are based on the initial velocity picks prior to receiving the horizons

