



Delta Front Mass Wasting and its Potential Effects on Oil and Gas Infrastructure

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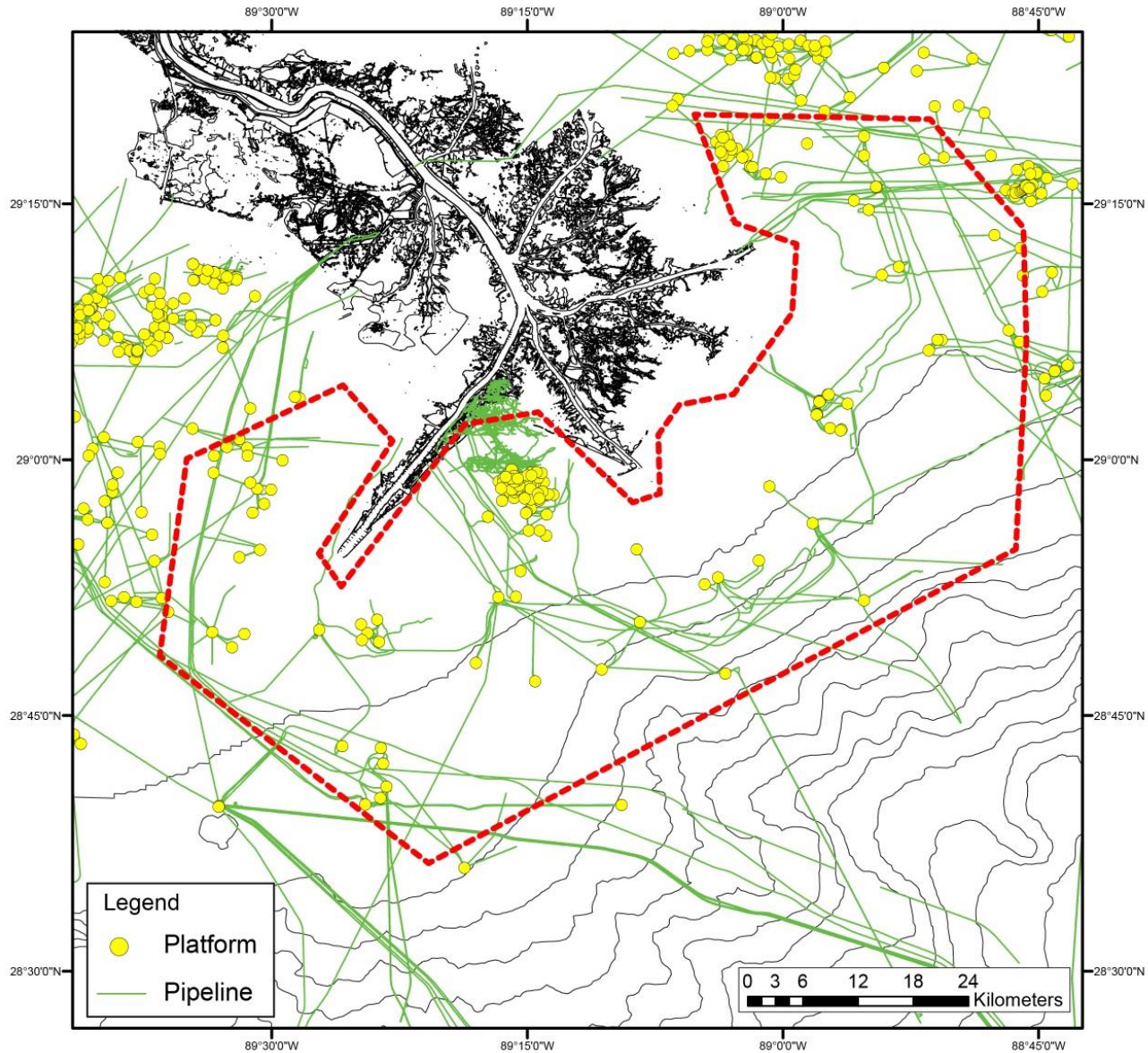
Nic Allen and the crew of the *R/V Point Sur*

Examples of data shown in this presentation are preliminary and subject to change as processing is completed. The USGS will release these data in accordance with USGS Fundamental Science Practices at a date to be determined.

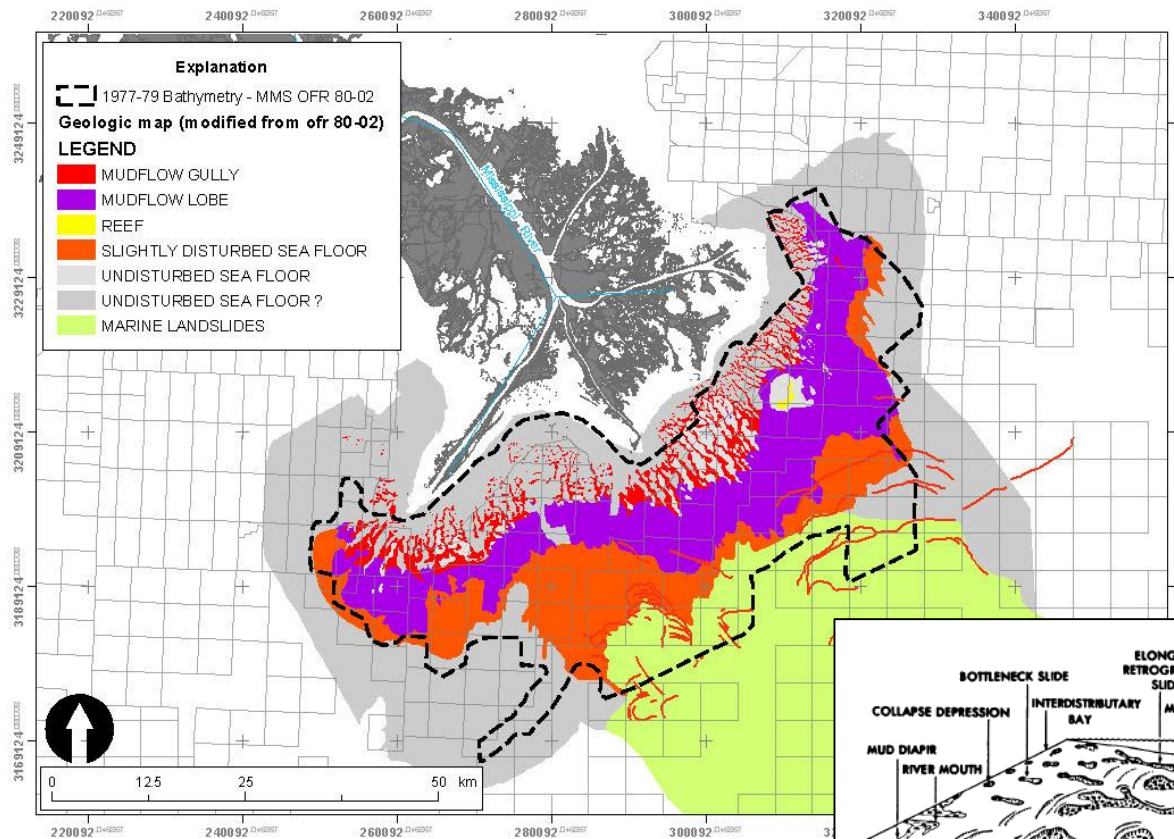
Mudflow Hazards of the MRDF

- Hazards to oil and gas infrastructure from hurricane-induced mudflows on the Mississippi River Delta Front are well known and have been studied, at times extensively (e.g., Coleman, Prior, Garrison, etc.), over the last few decades.
- Wave-induced Cyclic loading of failure pre-conditioned seafloor during Hurricanes Camille, Ivan, and Katrina triggered mudflows which damaged or destroyed platforms, wells, and pipelines.
- Key Questions:
 1. Are these mudflows triggered under non-hurricane conditions? Is seafloor movement episodic only or does part/all of the system constantly deforming. Which areas are currently moving?
 2. What is the long-term history of mudflows? Can this be used to identify areas of increased hazard potential.
 3. What role do environmental factors such as sediment availability and biogenic gas production and release play in maintaining the mudflow system?

Mudflow Hazards of the MRDF



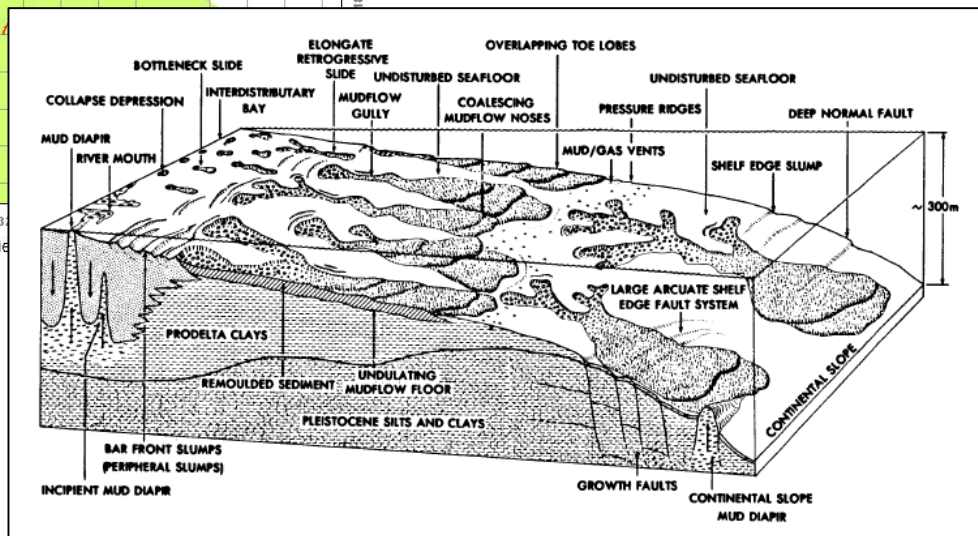
Mudflow Hazards of the MRDF



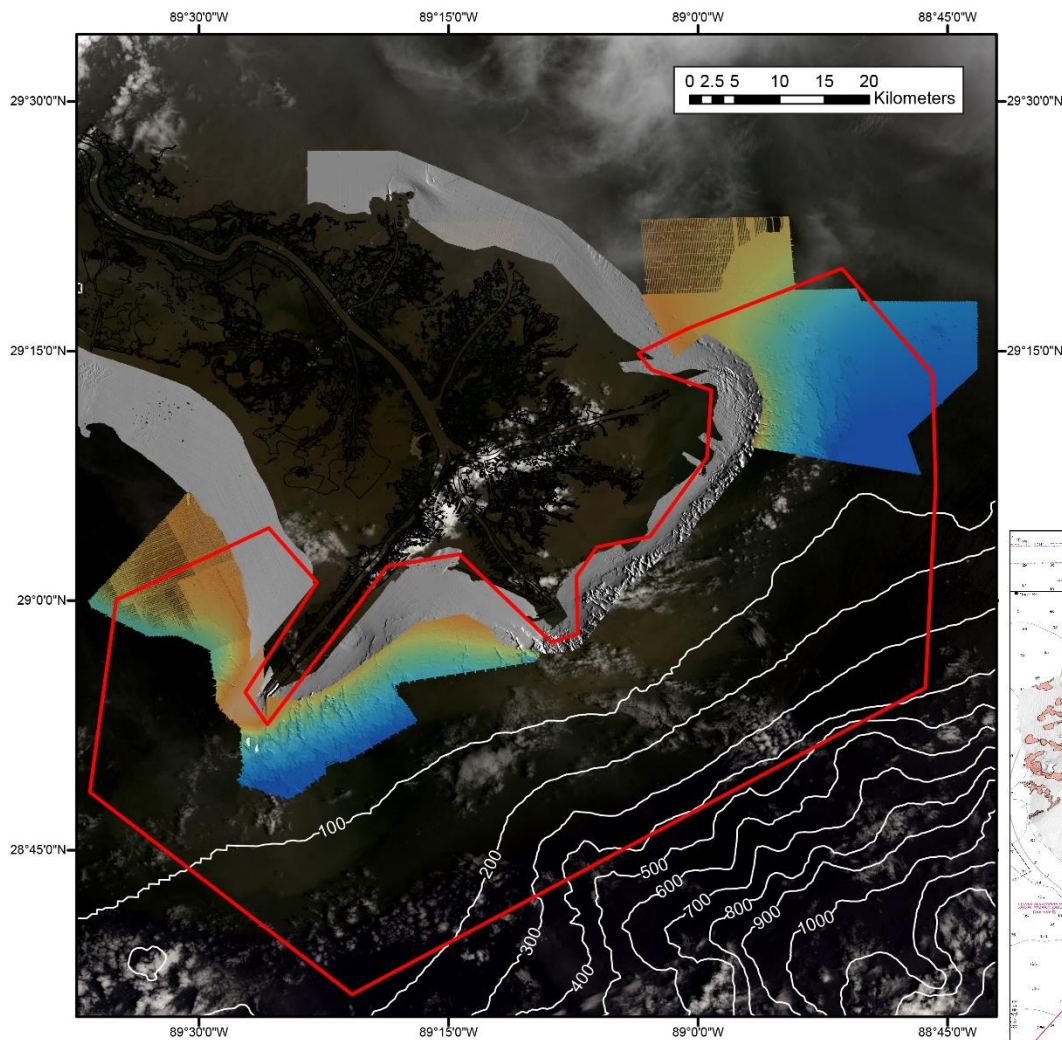
Hitchcock et al., 2006

Figure 5. Geologic and geomorphic map of site region (modified from Hitchcock et al., 2006)

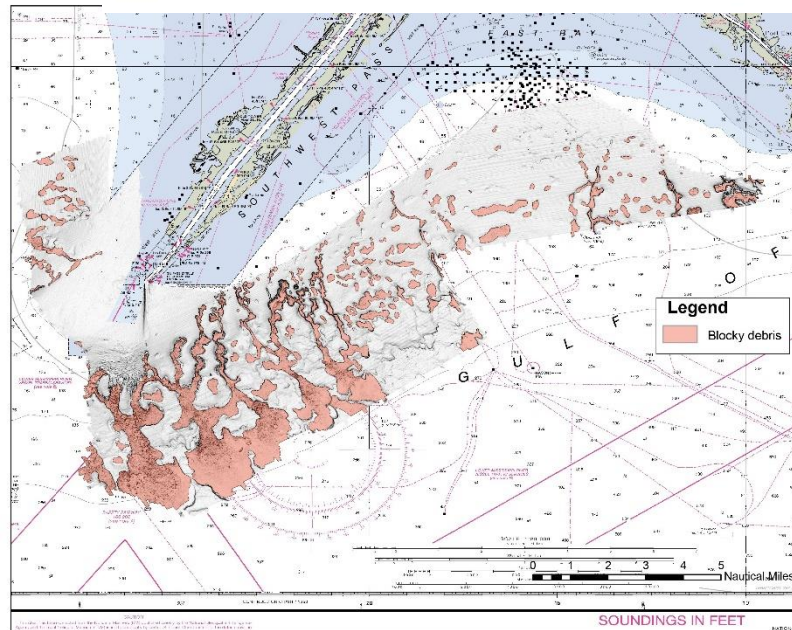
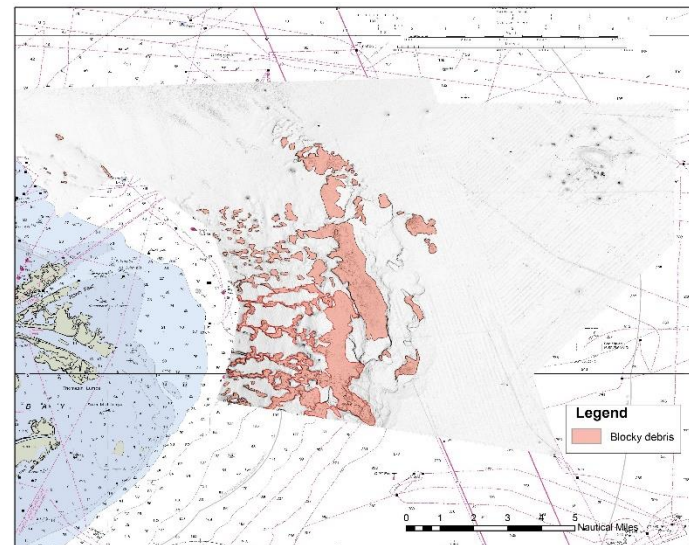
Coleman, Prior and Garrison, 1980



Mudflow Hazards of the MRDF



NOAA High-resolution bathymetry datasets

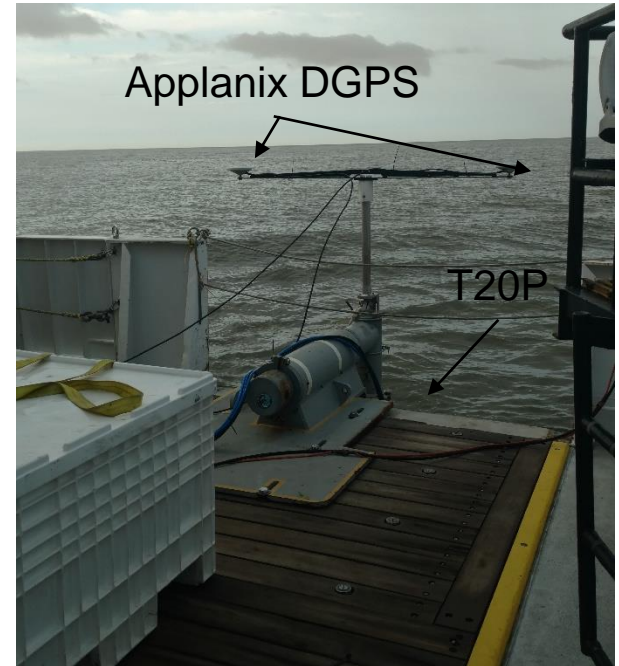


Survey Equipment

Vessel: R/V Point Sur

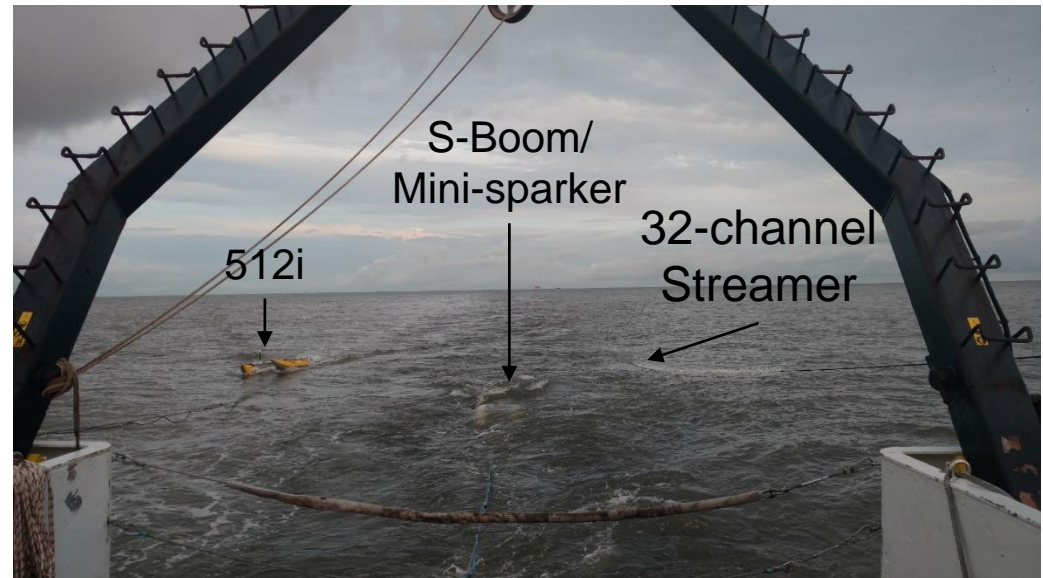
Bathymetry

- Dual-head Reson T20-P (220-300 kHz, 1024 beams, 160-165 degrees)
- Applanix POS/MV Surfmaster (PPK solutions)
- Head-mounted Applied Microsystems surface SVP
- ODIM/Brooke Ocean MVP 30
- AML MinoxX profiler



Seismic

- Sig 1200 Mini-sparker (300J)
- Applied Acoustics S-Boom (700J)
- Applied Acoustics Single-plate AA251 Boomer
- Edgetech 512i (Chirp)
- 32-channel solid-state GeoEel streamer (1.5625 m channel spacing)



5-Day Survey Coverage

Bathymetry

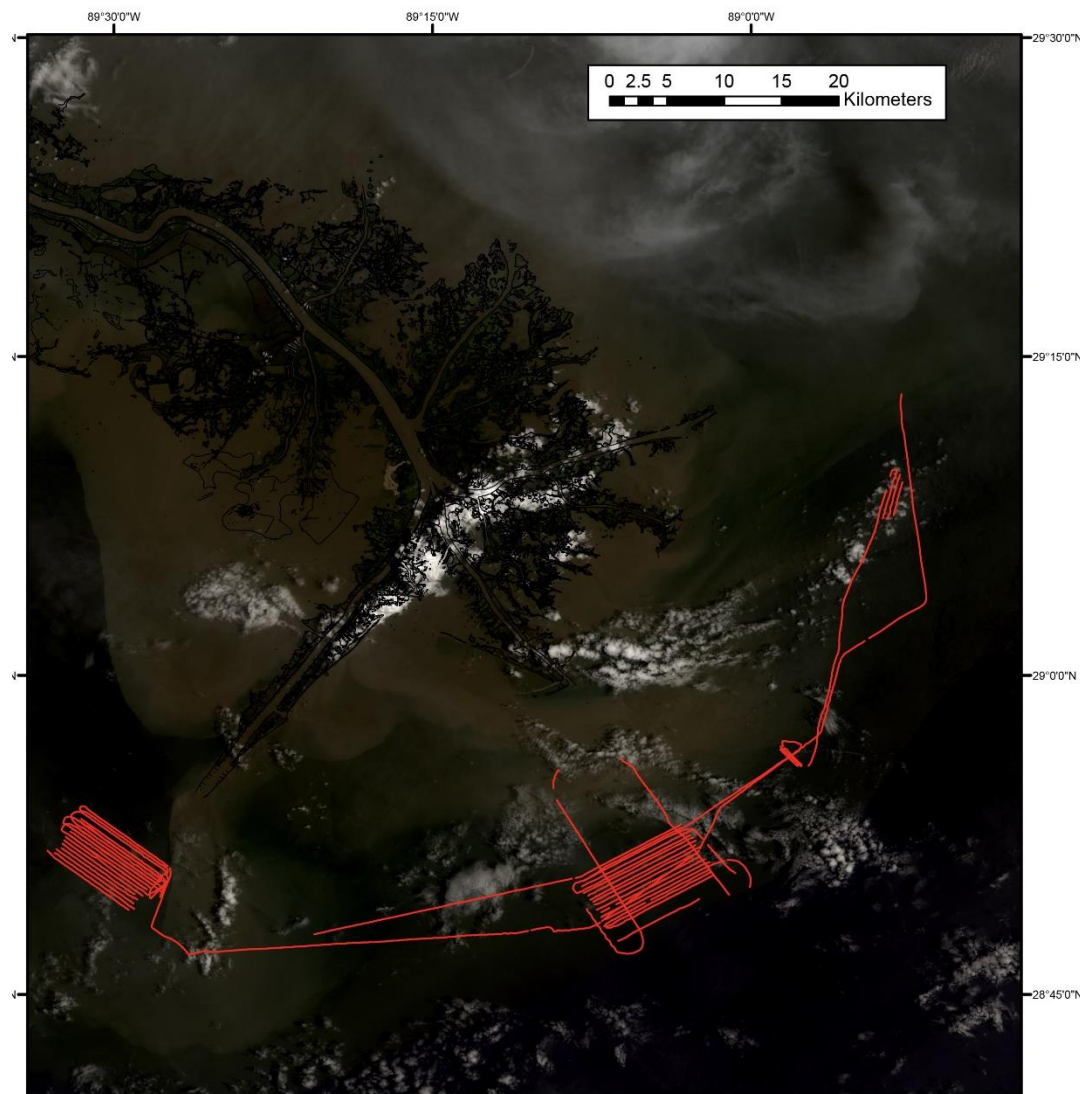
- 600 km of high-resolution multibeam bathymetry/acoustic backscatter/water column data in survey and transit modes

Seismic

- MCS - 240 km of boomer
- 300 km of mini-sparker
- 425 km of 512i Chirp

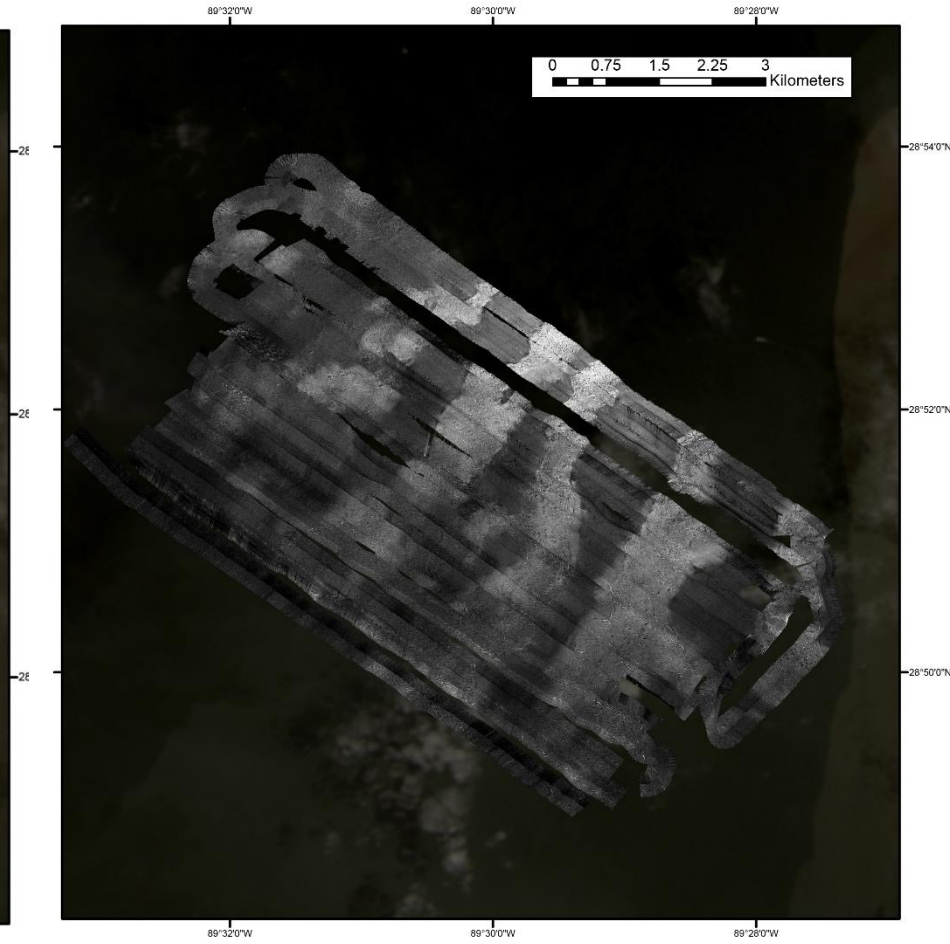
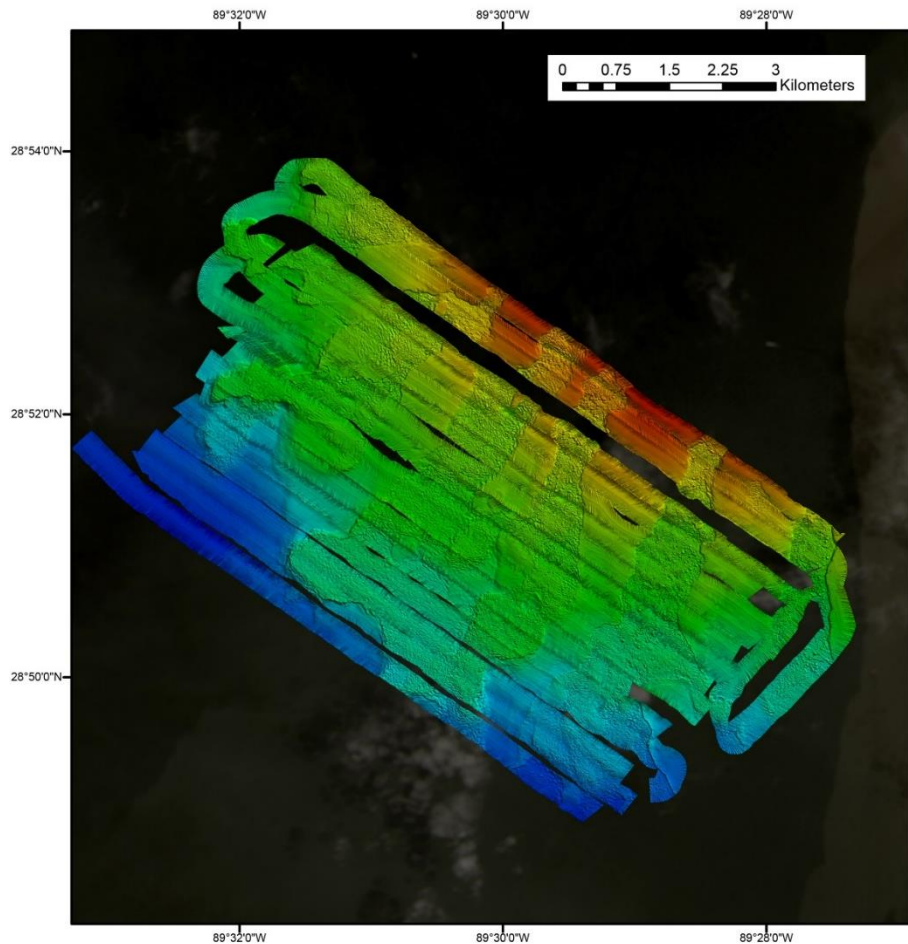
Sound Velocity

- 74 MVP sound velocity profiles

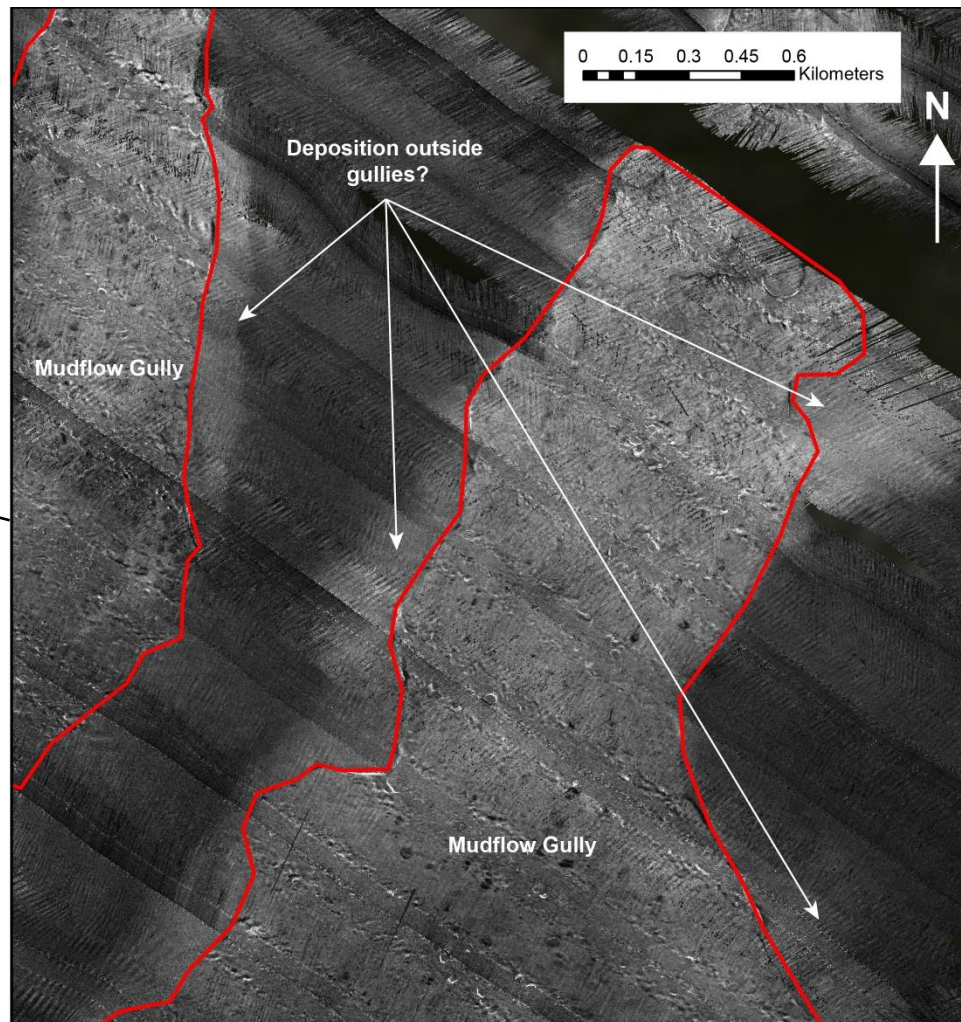
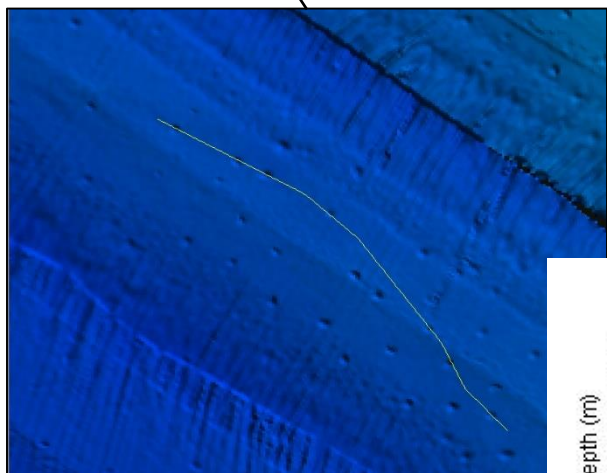
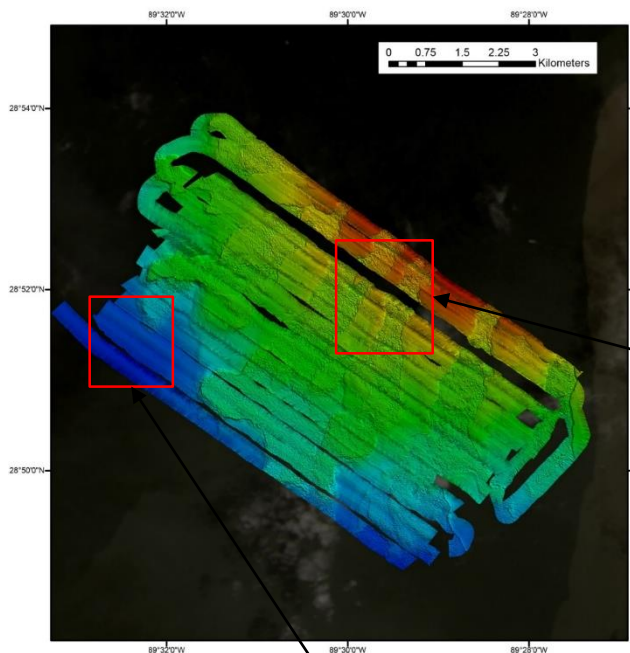


Landsat 8 (05/28/2017)

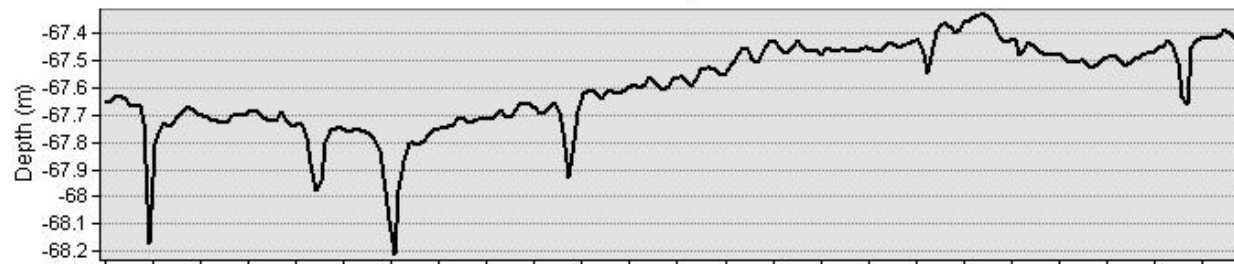
Southwest Pass Survey Site



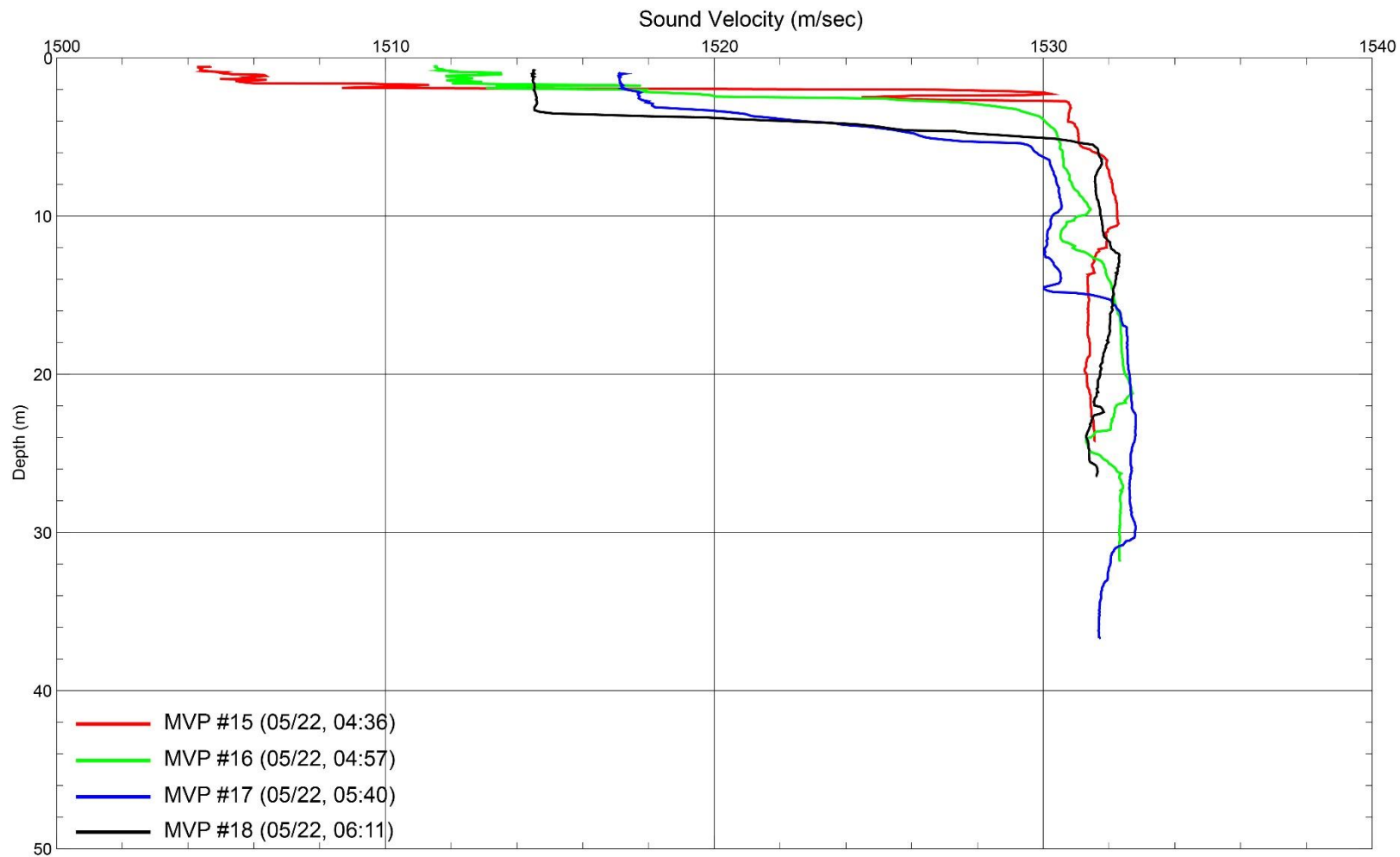
SW Pass Survey Site



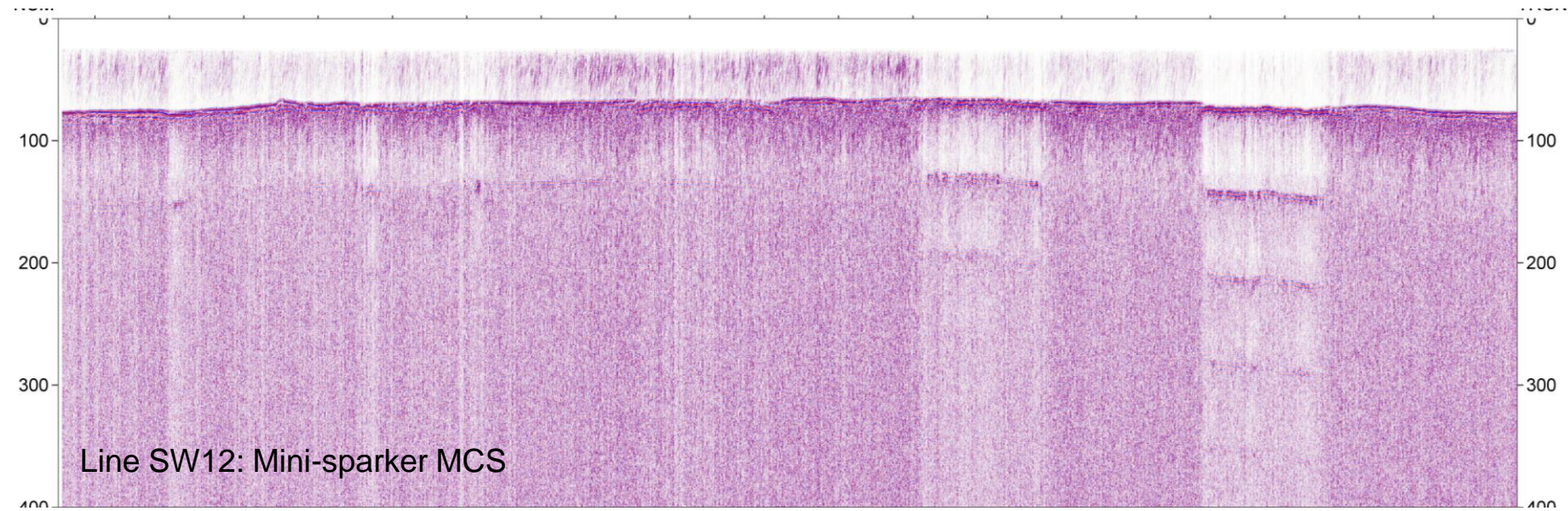
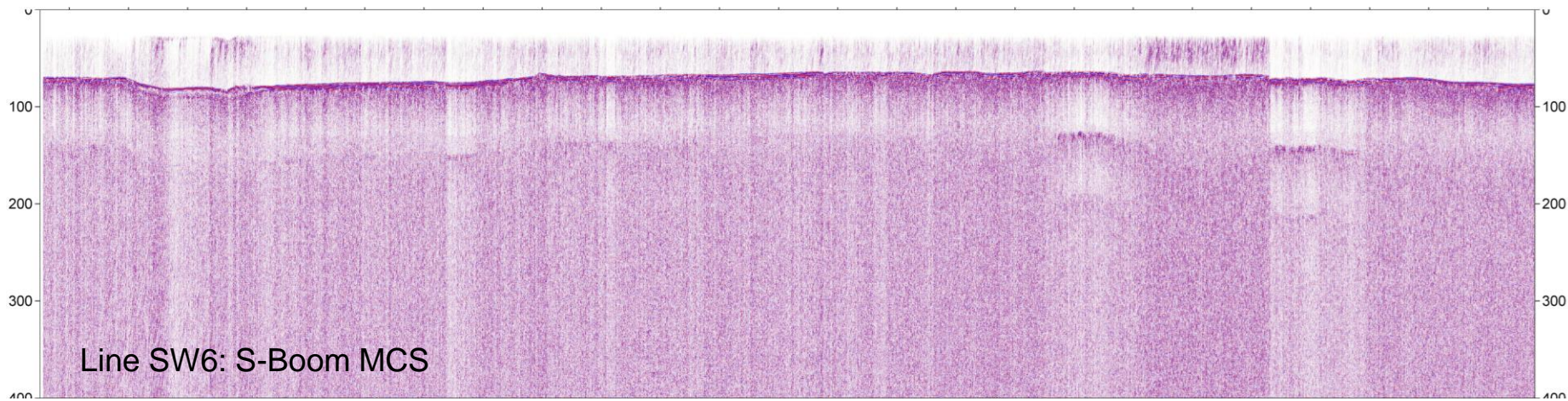
SW Pass "Dimples"



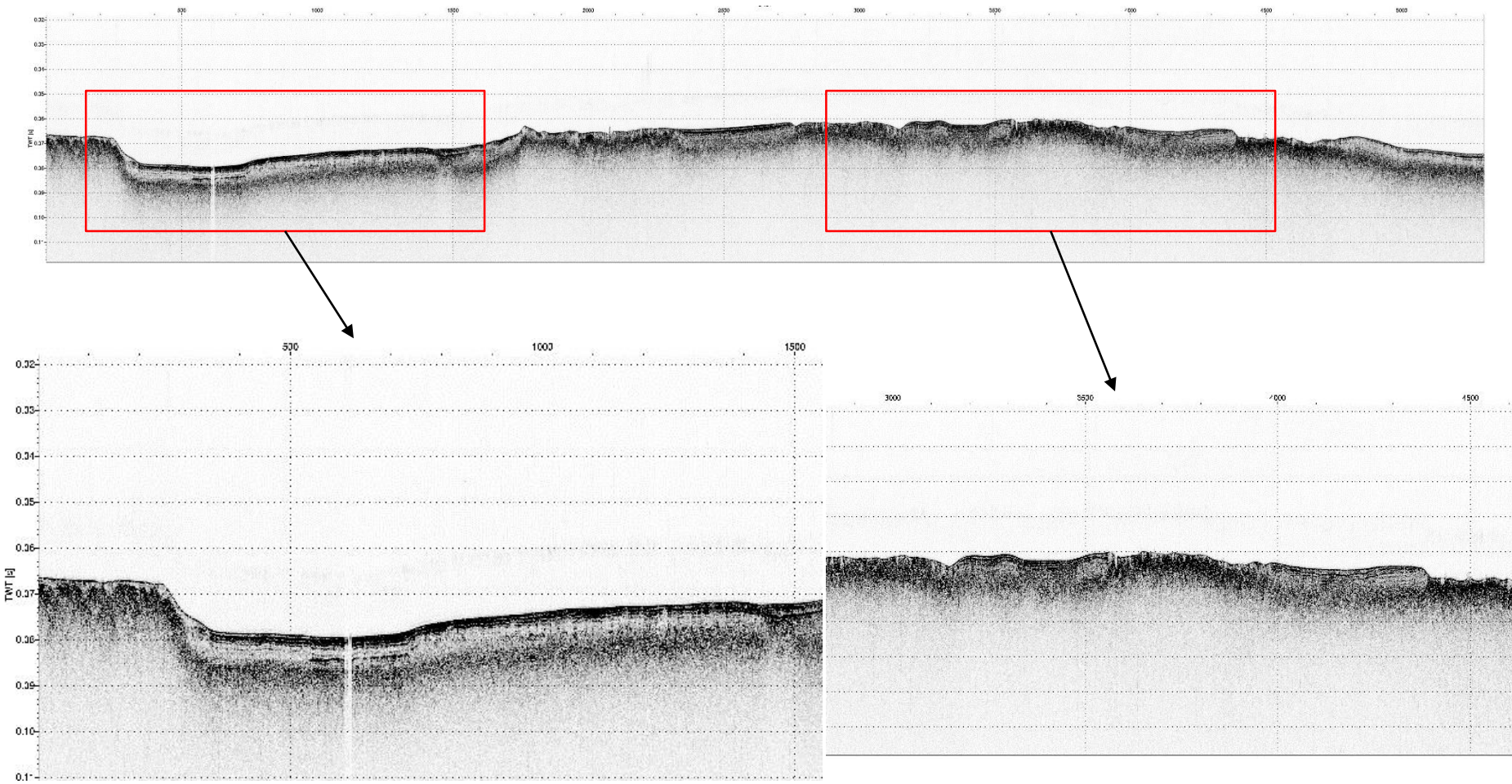
SW Pass Mixed Water Mass



SW Pass Seismic

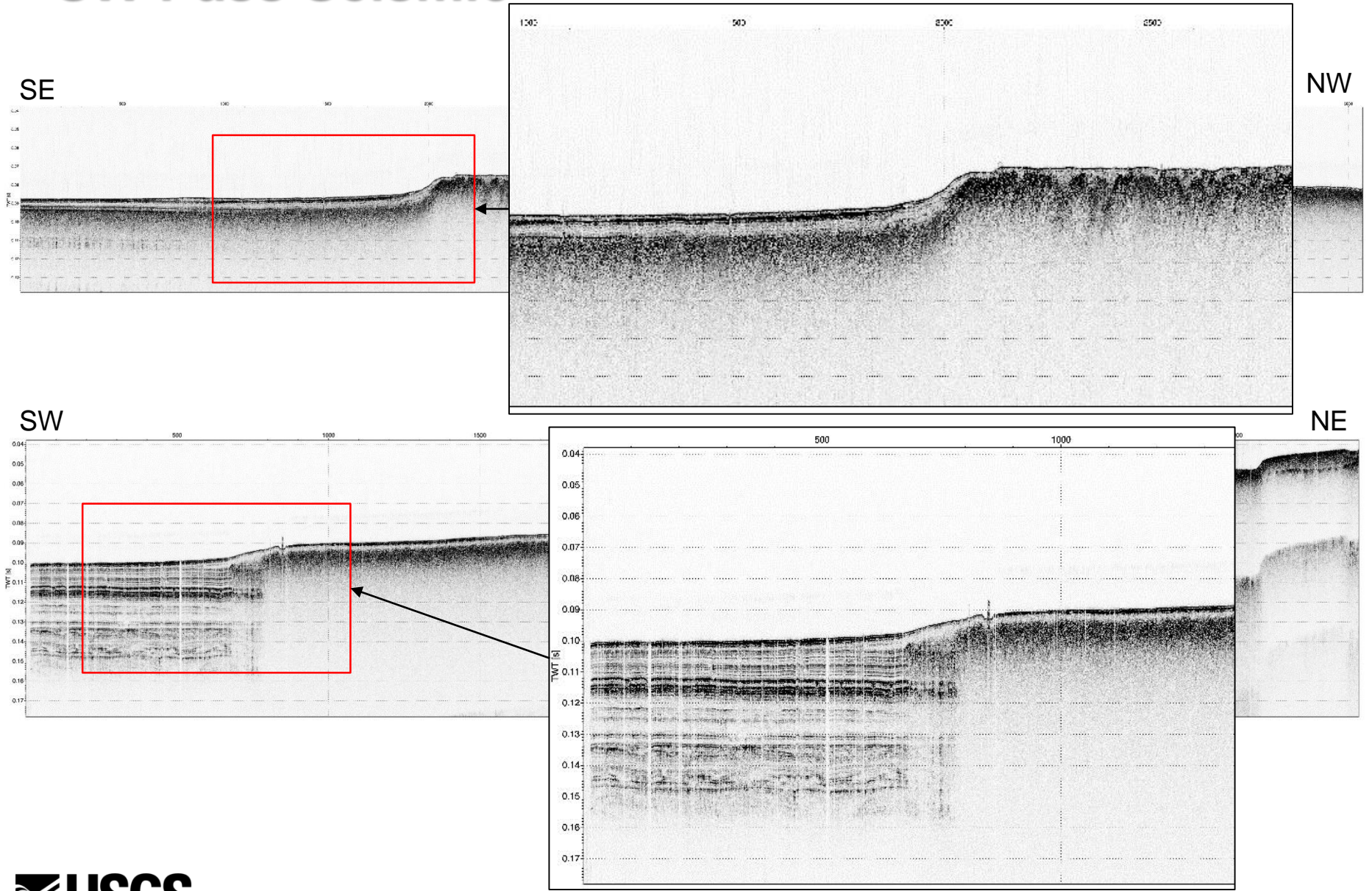


SW Pass Seismic

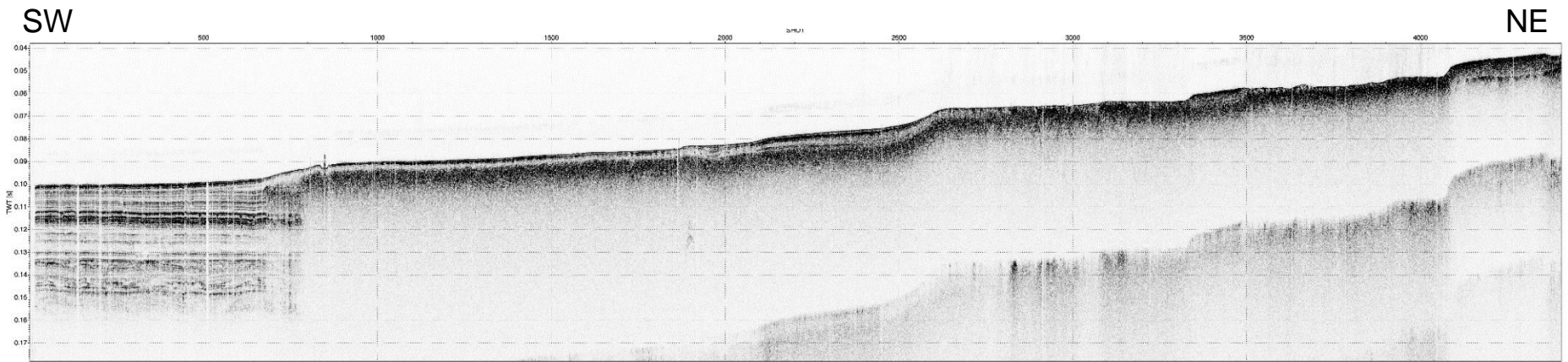
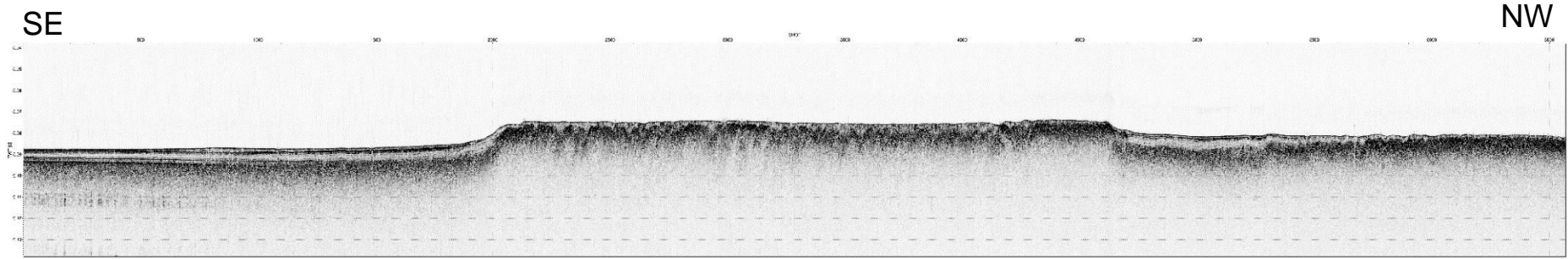


512i Chirp Line 24

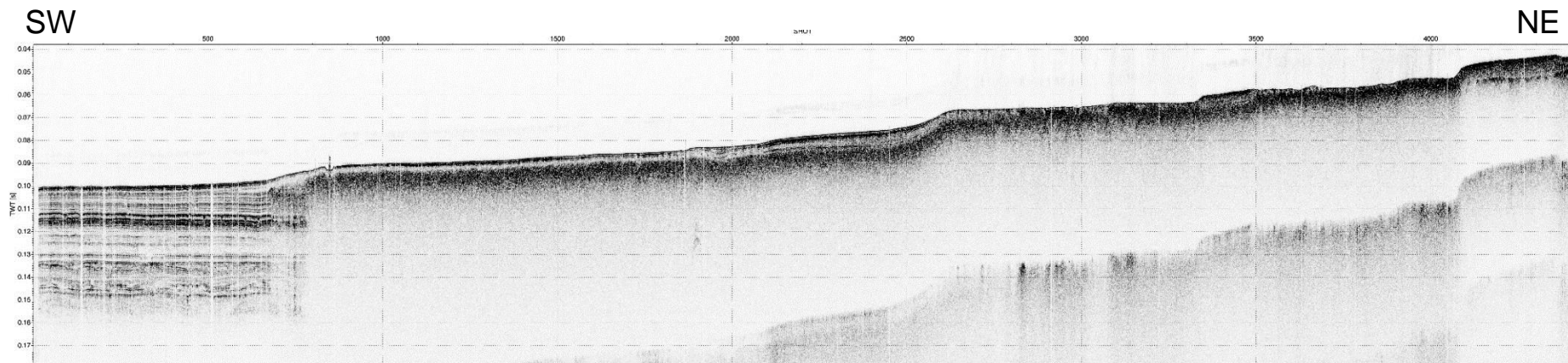
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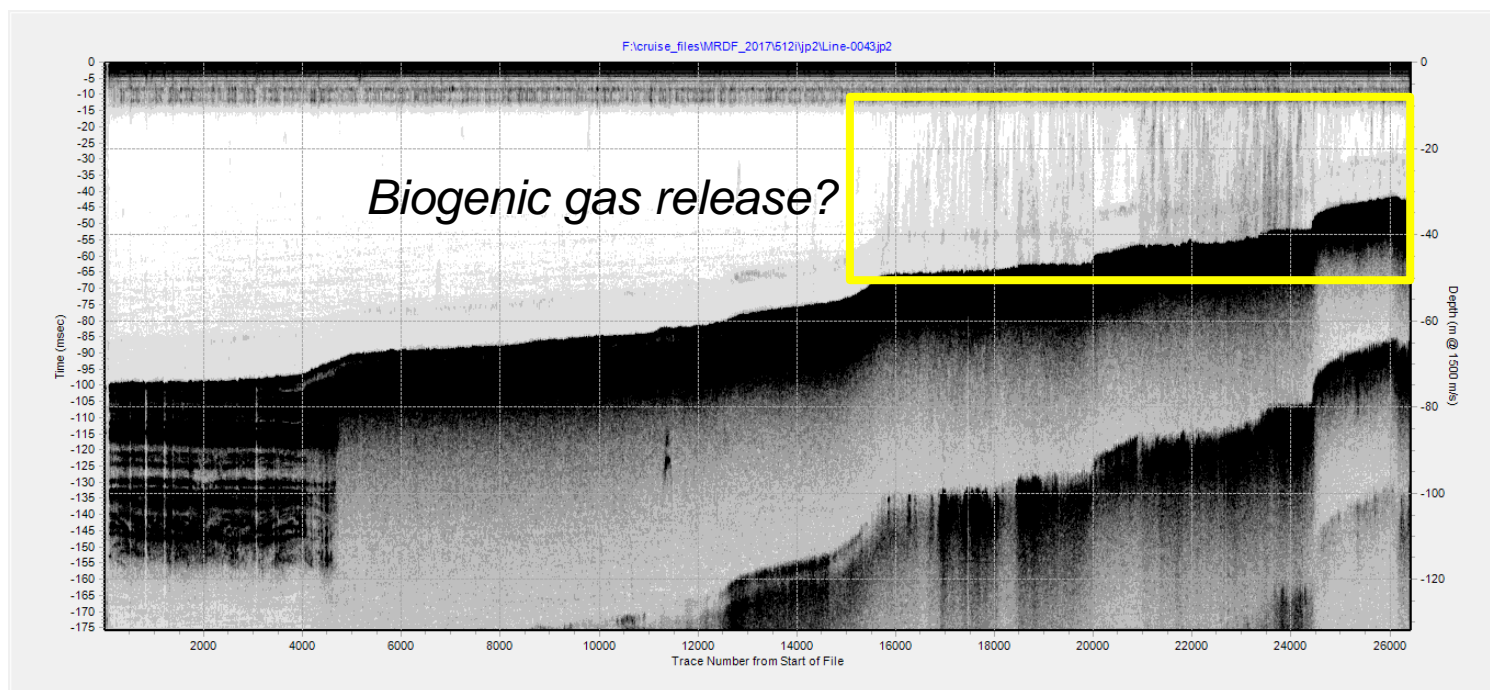
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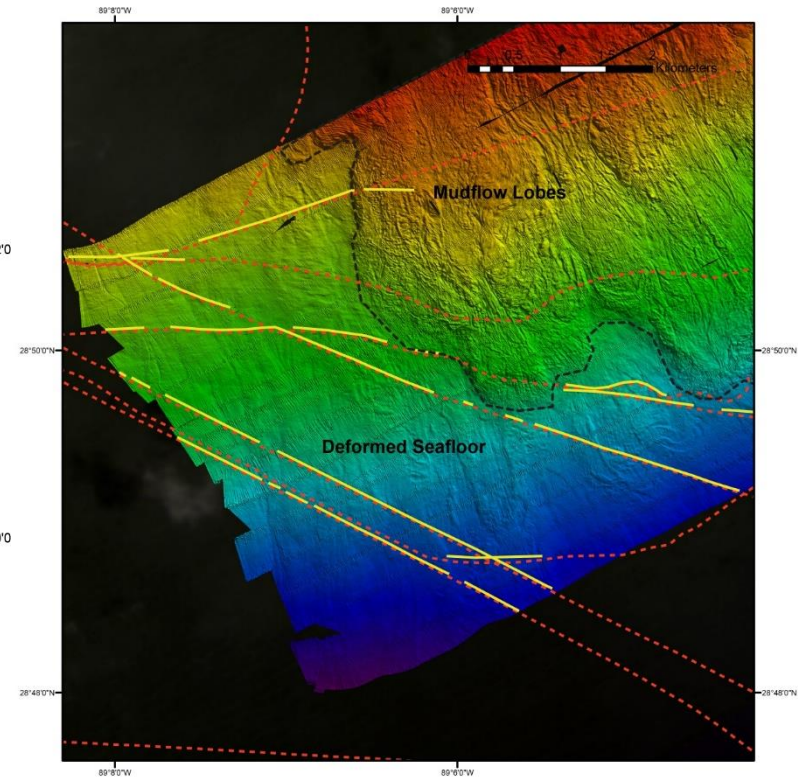
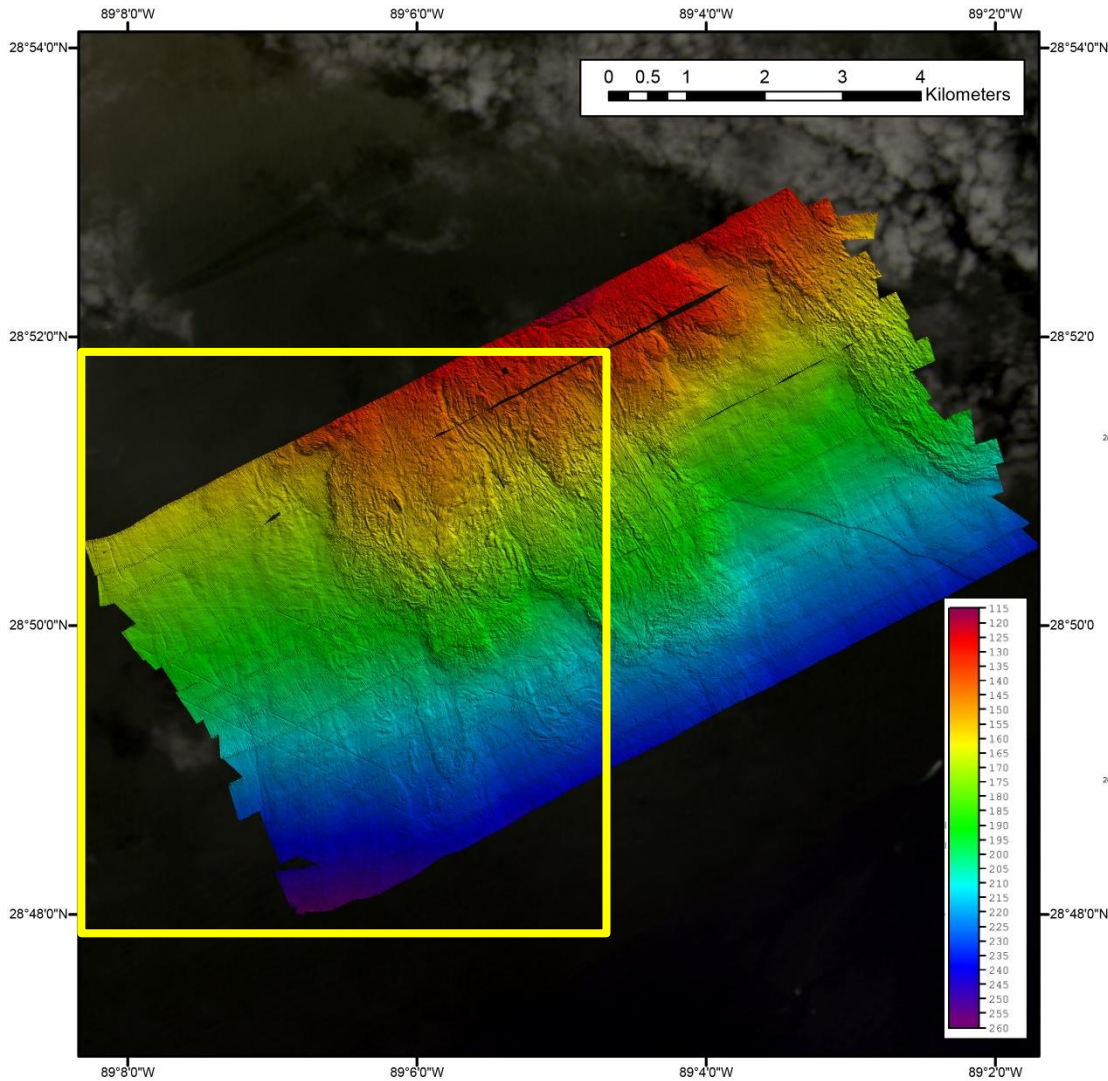
SW Pass Seismic



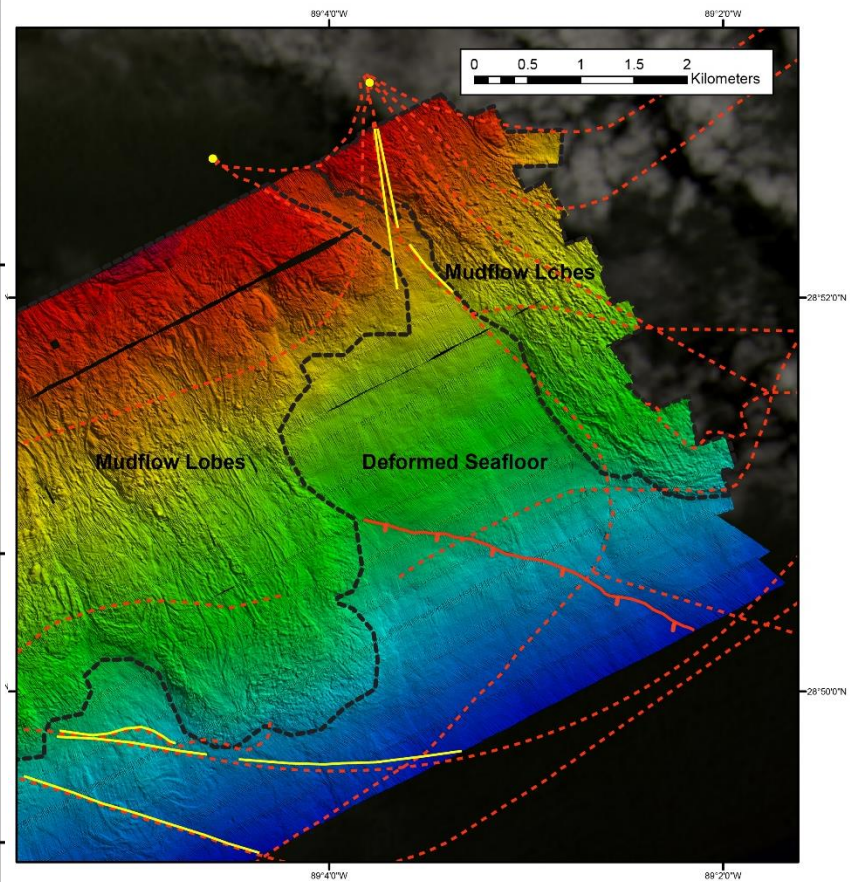
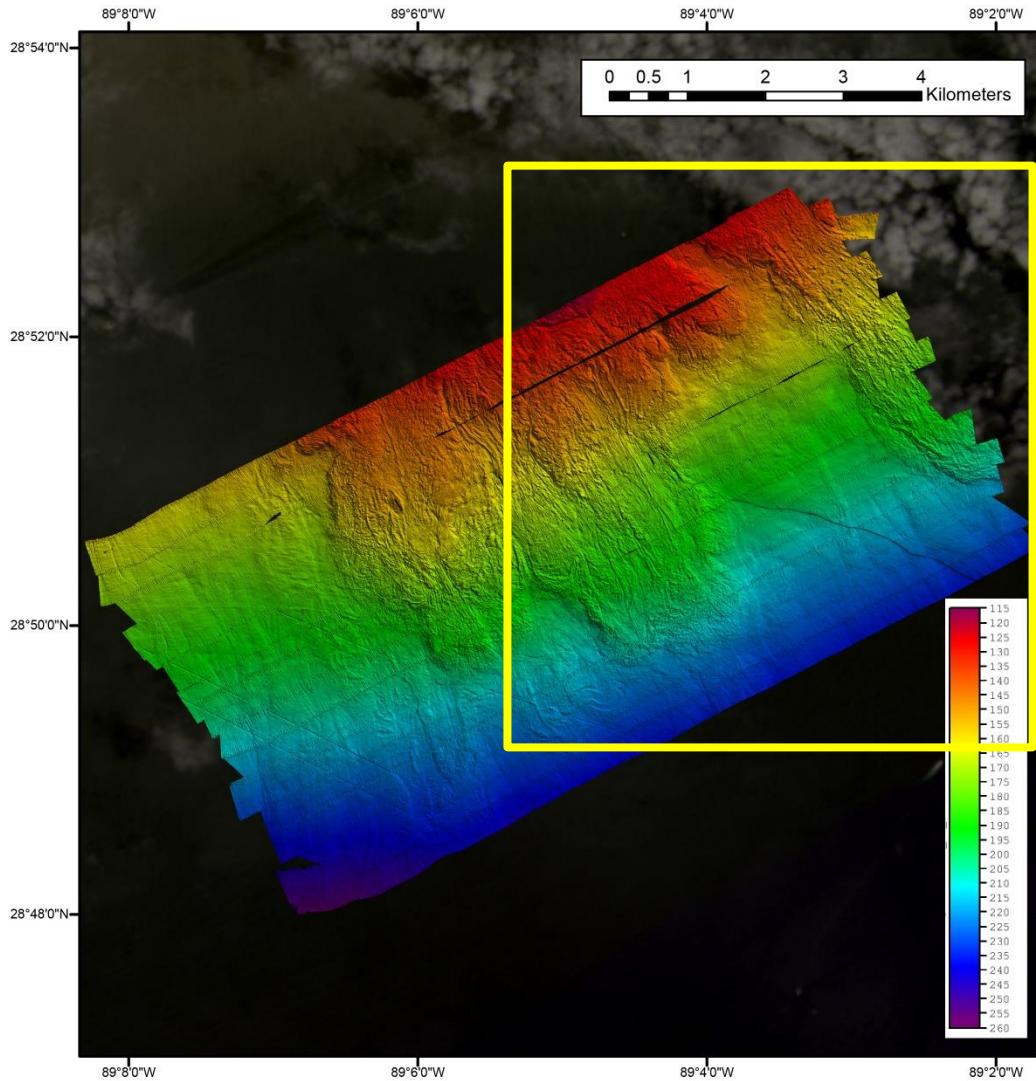
Compressed and
oversaturated



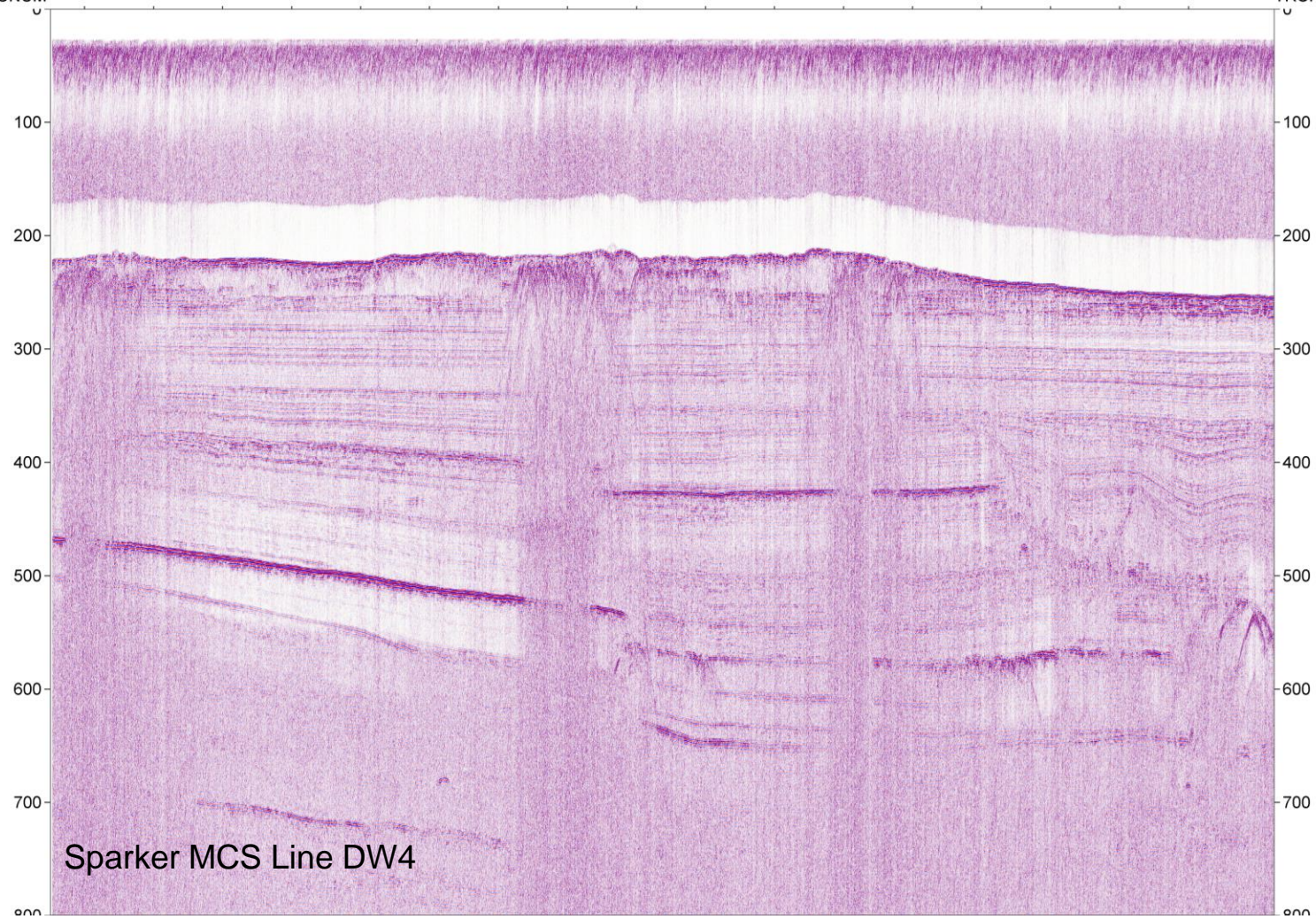
Deep Water Survey Site



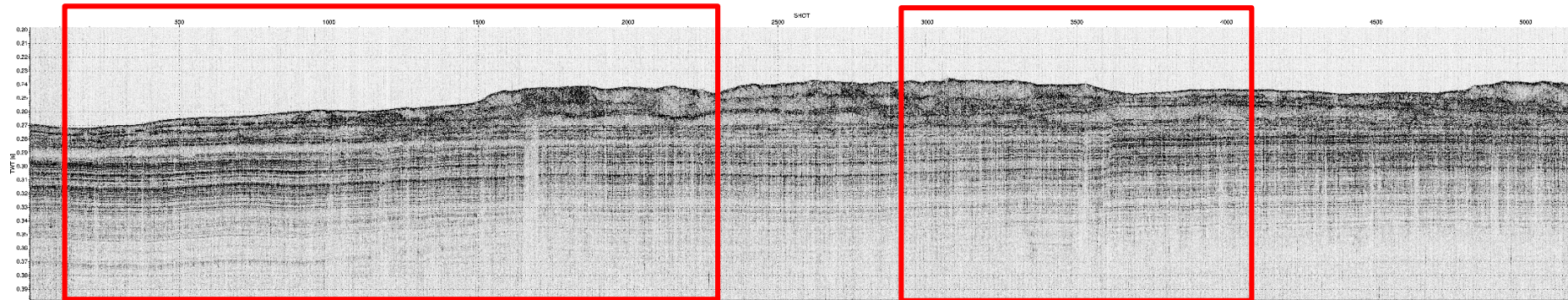
Deep Water Survey Site



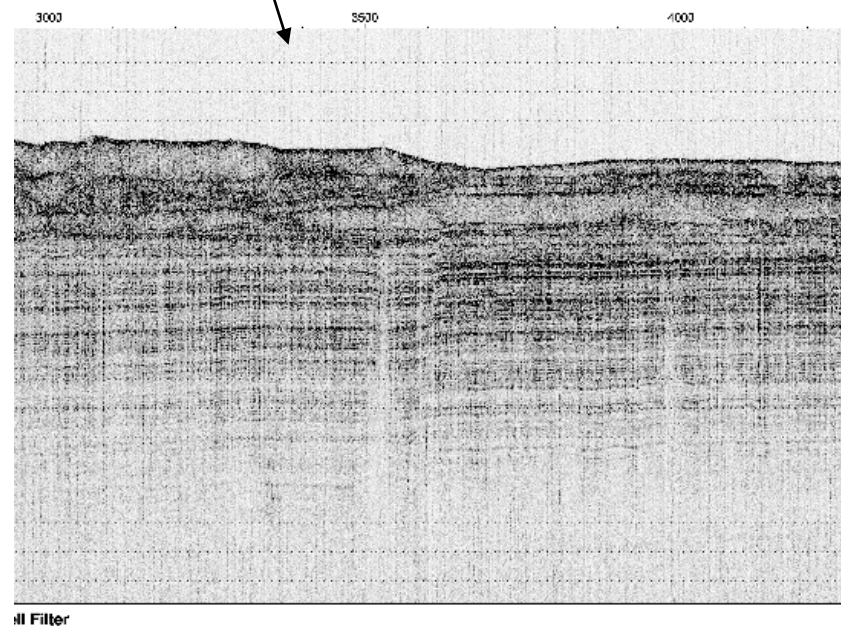
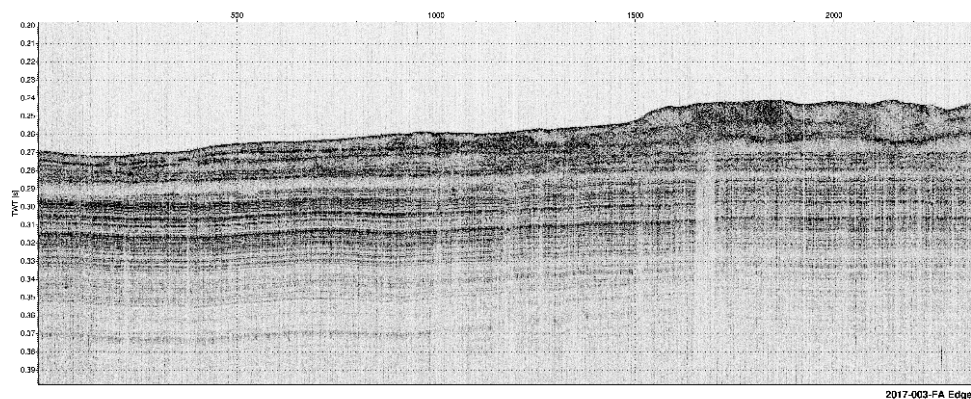
Deep Water Survey Site



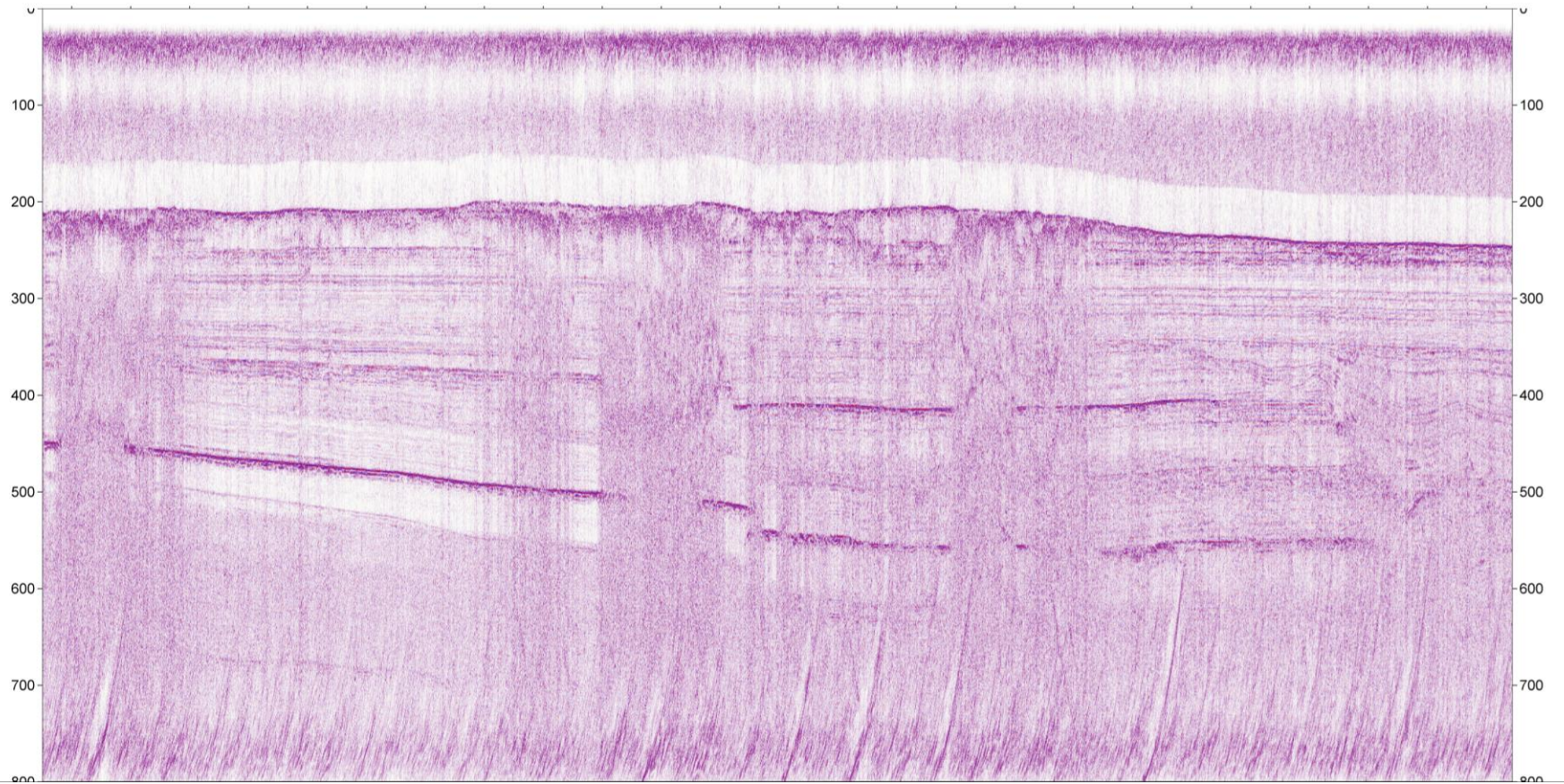
Deep Water Survey Site



512i Chirp Line 52



Deep Water Survey Site

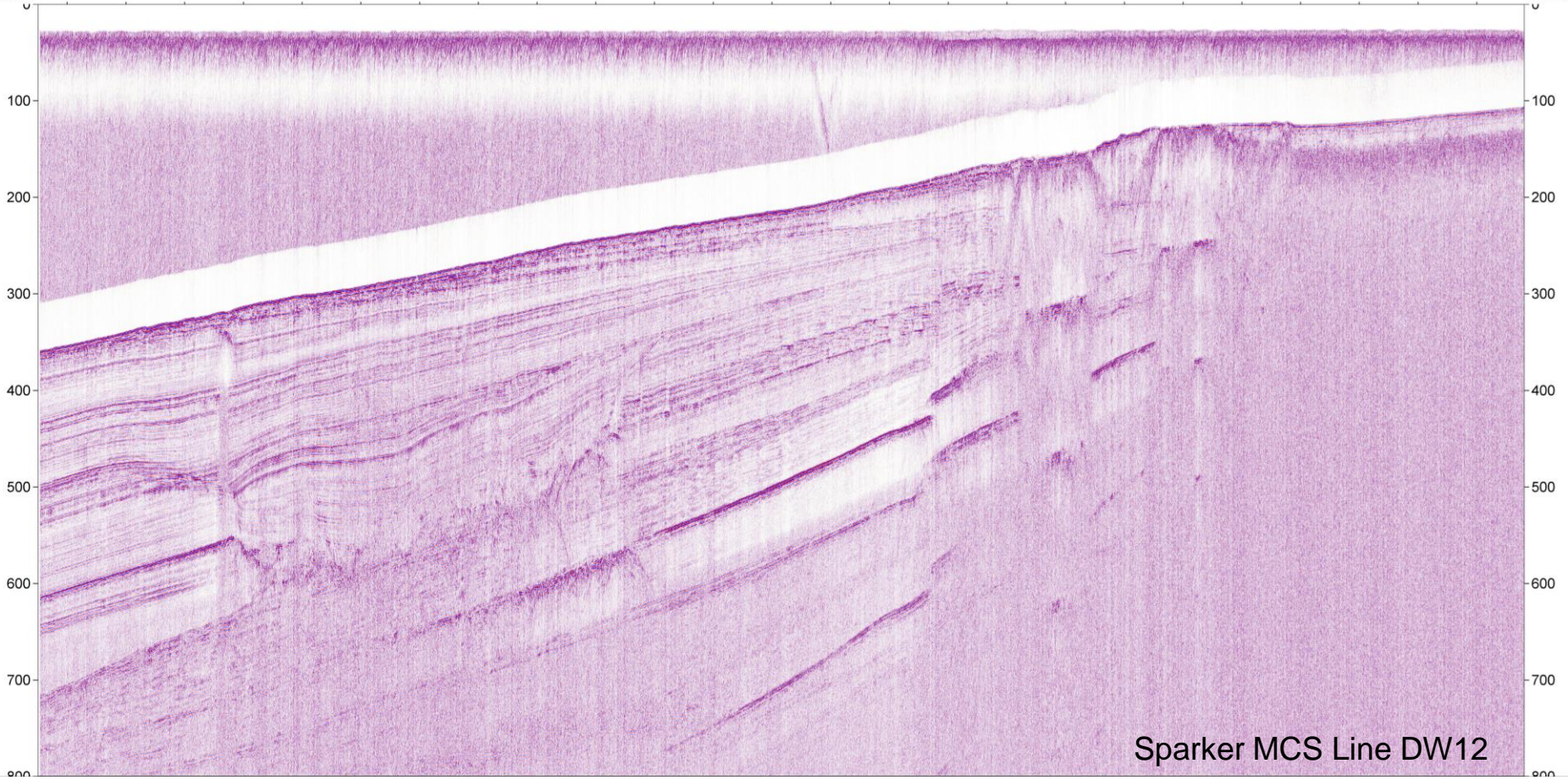


Sparker MCS Line DW26 - migrated

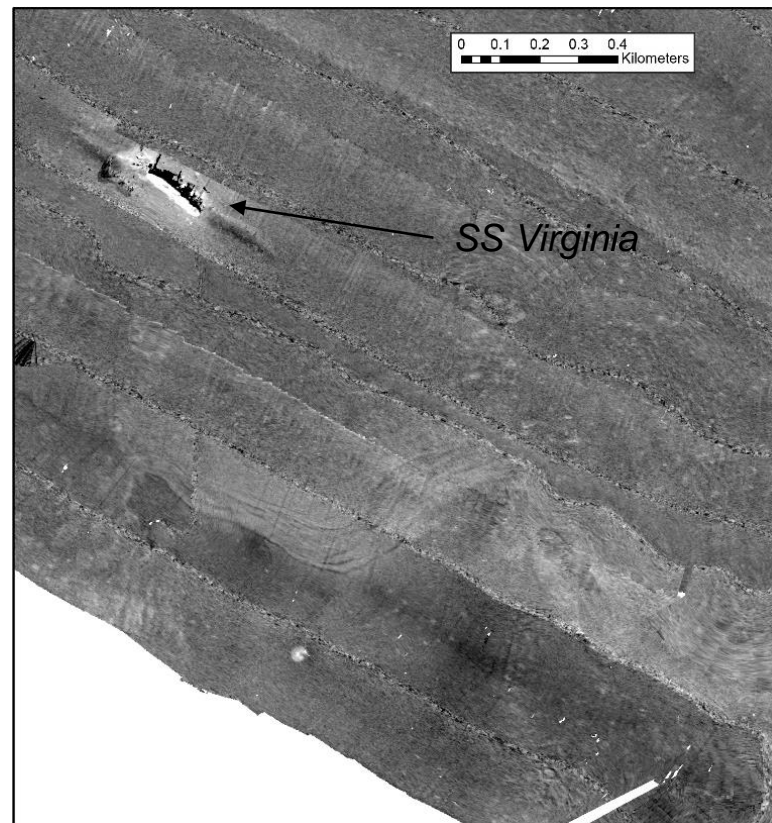
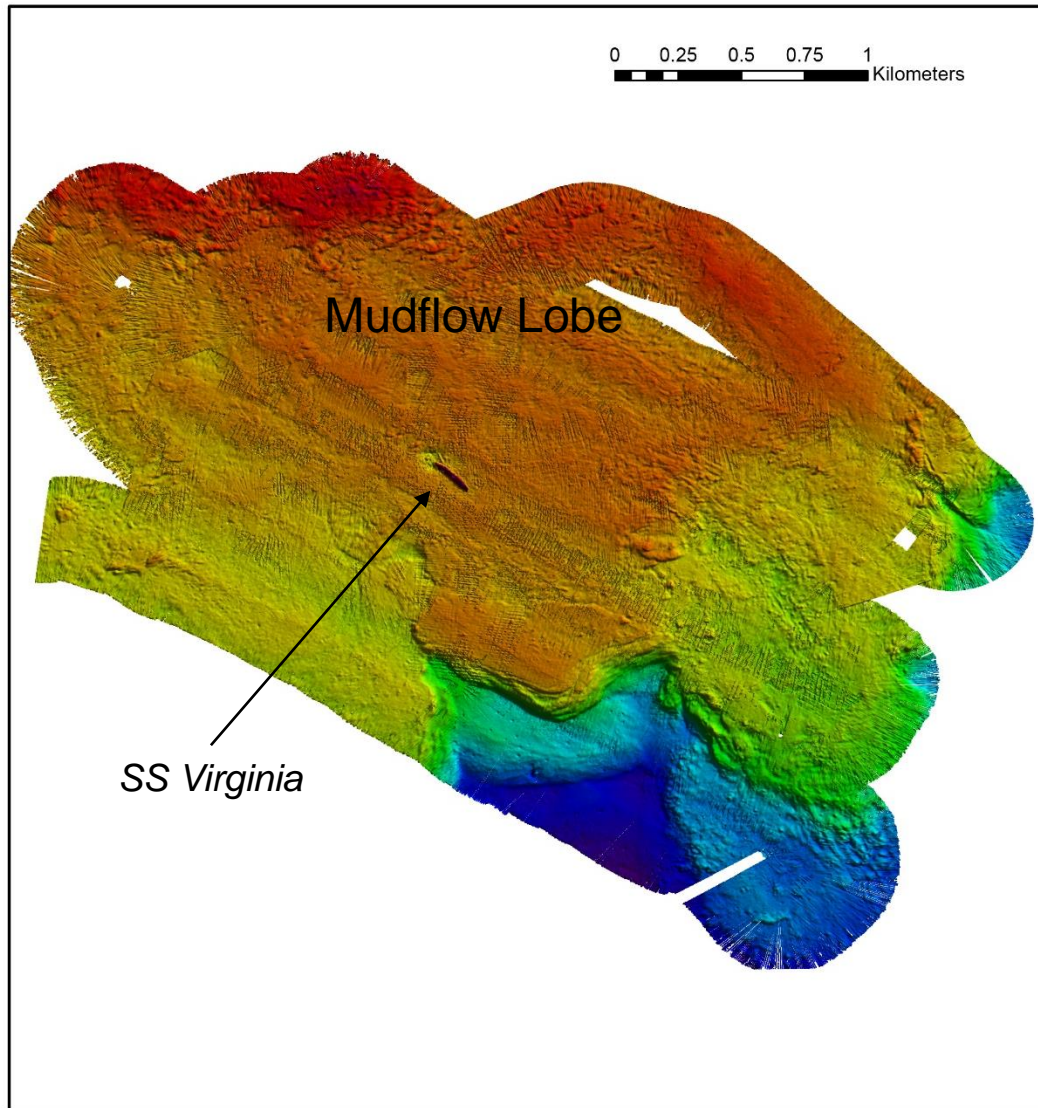
Deep Water Survey Site

SSE

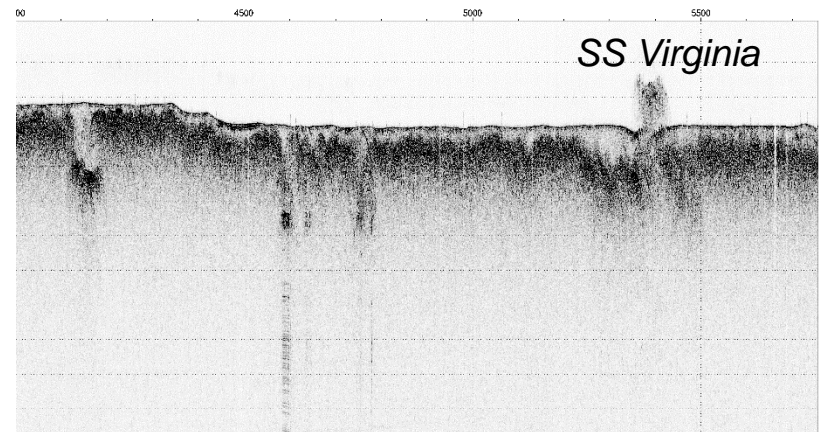
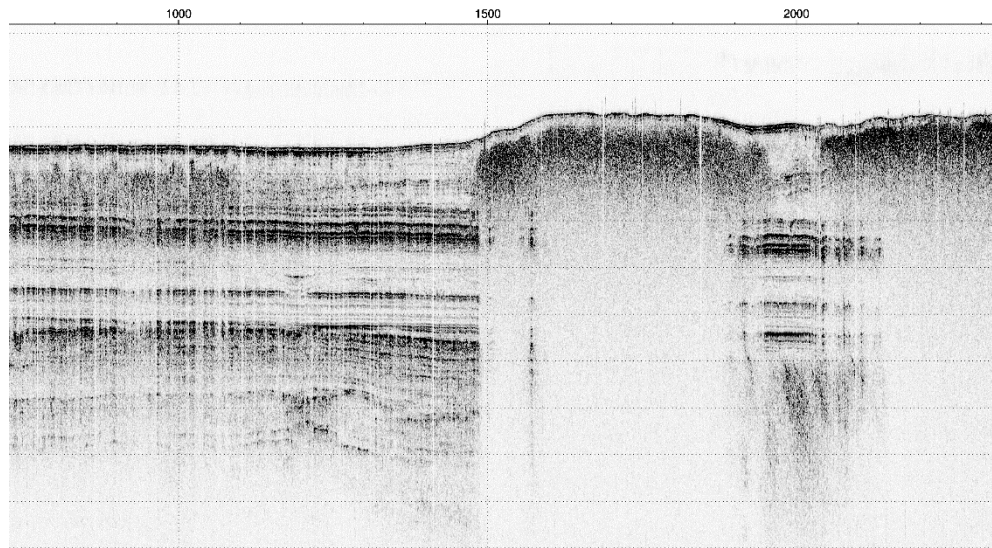
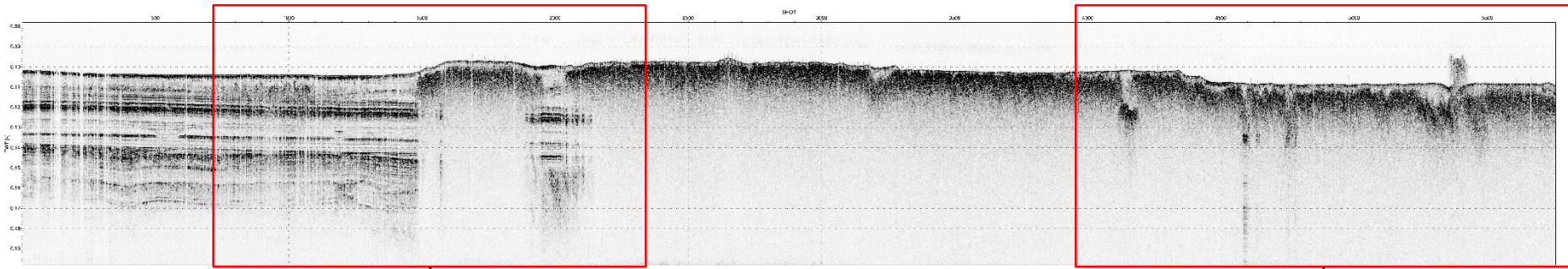
NNW



SS Virginia



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Thank You
Questions?

