SITE SUMMARIES

Site: HR1a

Priority: Primary
Position: 44.586159°N, 125.119213°W
Water Depth: 890 m
Sediment Thickness: ~7 km
Target Drilling Depth: 350 mbsf
Approved Maximum Penetration: 350 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To determine the source and distribution of hydrate in the steeply dipping, stratified sediments on the eastern flank of Hydrate Ridge; the nature of the B/B′ reflections that underlie the BSR; and the composition, structure and gas content of the seismically incoherent unit underlying the deformed and uplifted sediments on the east flank of Hydrate Ridge. To sample subsurface biosphere and determine impact on methanogenesis and oxidation of methane.

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. Three holes. Frequent use of PCS and/or HYACE.

Logging and Downhole Program: LWD; triple combo, APC-temperature, DVTP, APC methane tools; VSP and walkaway VSP.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.

Site: HR1b

Priority: Alternate
Position: 44.586056˚N, 125.134881˚W
Water Depth: 850 m
Sediment Thickness: ~7 km
Target Drilling Depth: 150 mbsf
Approved Maximum Penetration: 150 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To sample reflection pair B/B′ when they are above the BSR for comparison with proposed Site HR1a. Samples from this site will test the hypothesis that reflections B and B′ represent carbonate formation along permeable horizons as part of a feedback process that further focuses fluid flow.

Drilling Program: APC to refusal, XCB to refusal. Possible use of PCS and/or HYACE.

Logging and Downhole Program: LWD, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible.

Site: HR1c

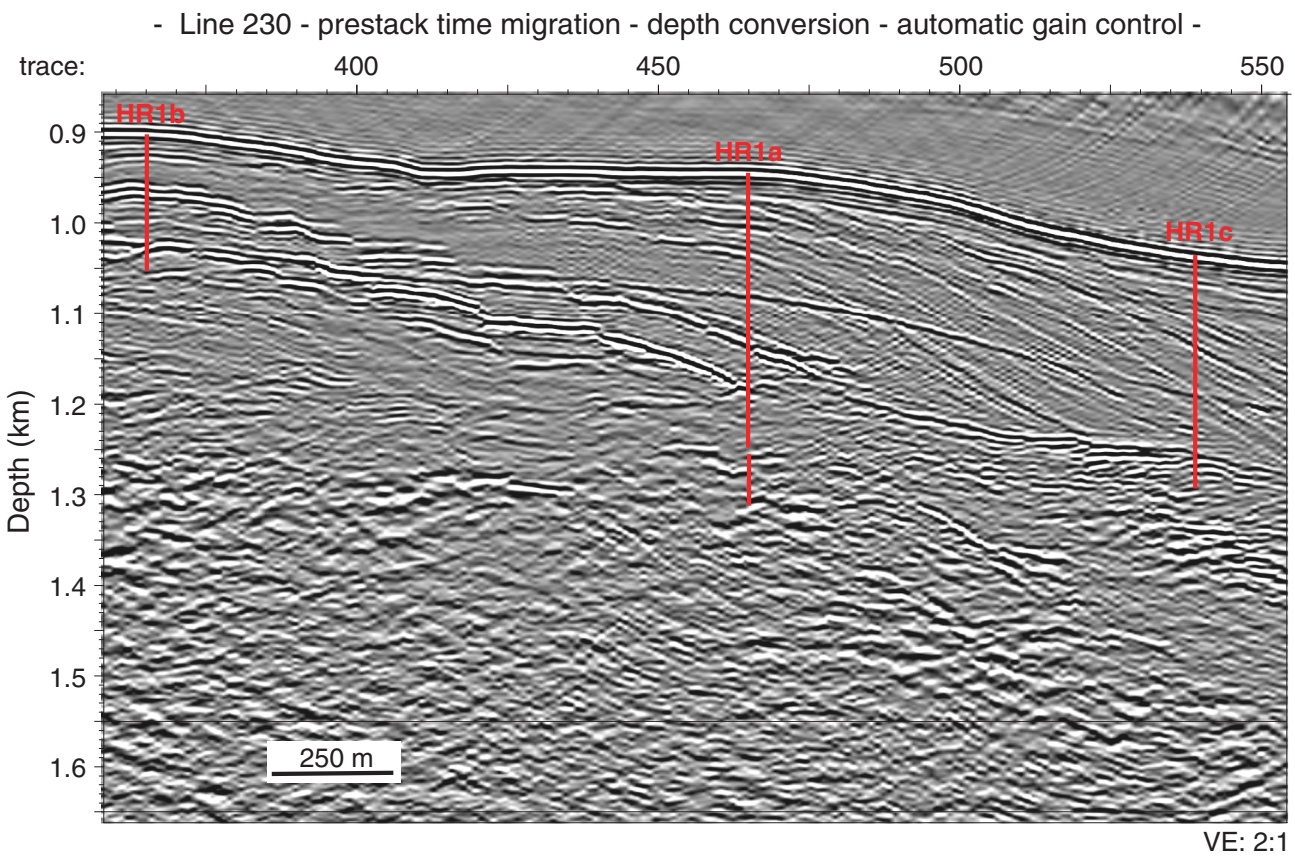
Priority: Alternate
Position: 44.588421˚N, 125.107920˚W
Water Depth: 970 m
Sediment Thickness: ~7 km
Target Drilling Depth: 260 mbsf
Approved Maximum Penetration: 260 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To sample a negative polarity reflection beneath the BSR that was originally interpreted to be a "double BSR" of unknown origin but that appears in the 3-D data to be an unconformity related to high-amplitude reflections B and B', which are targeted by proposed Sites HR1a and HR1b.

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. Two holes. Possible use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.



Slice of prestack time migrated data along line 230 showing location of proposed Sites HR1a and HR1b. Vertical axis has been converted to depth using the 3D velocity model derived from travel times recorded on ocean bottom seismometers.

Site: HR2

Priority: Alternate
Position: 44.57037˚N, 125.075417˚W
Water Depth: 1200 m
Sediment Thickness: ~7 km
Target Drilling Depth: 620 mbsf
Approved Maximum Penetration: 620 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To establish the source and distribution of gas hydrate and associate subsurface biosphere in a slope basin characterized by rapid deposition of terrestrial sediments (same as proposed Site HR2alt; this site would be drilled if problems were encountered at proposed Site HR2alt).

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. Three holes. Frequent use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.

Site: HR2alt

Priority: Primary
Position: 44.57031˚N, 125.074193˚W
Water Depth: 1210 m
Sediment Thickness: >7 km
Target Drilling Depth: 620 mbsf
Approved Maximum Penetration: 620 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To establish the source and distribution of gas hydrate in this setting, which is characterized by rapid deposition of terrestrial sediments. This site provides a test of the generality of models for hydrate formation in a region of rapid sedimentation developed from results of Leg 164.

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. At least two holes. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools; VSP, walkaway VSP.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible.

Site: HR2altB

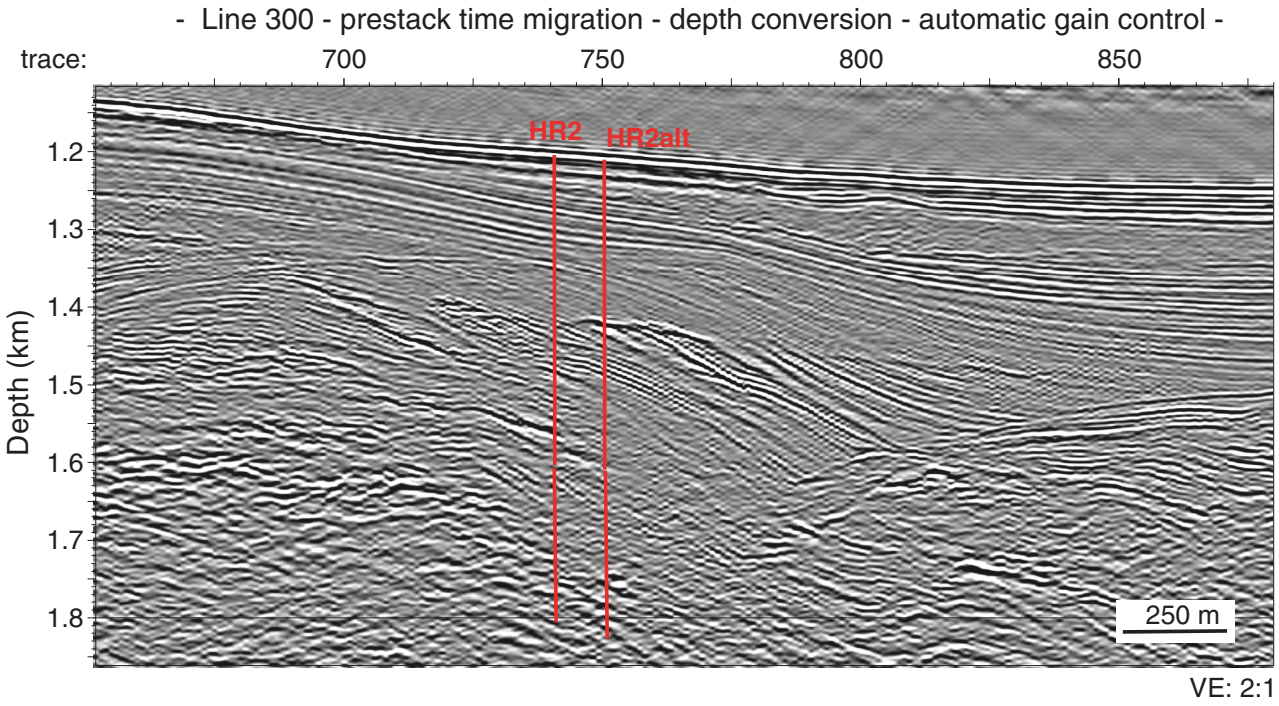
Priority: Alternate
Position: 44.57031˚N, 125.074193˚W
Water Depth: 1200 m
Sediment Thickness: ~7 km
Target Drilling Depth: 650 mbsf
Approved Maximum Penetration: 650 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To establish the source and distribution of gas hydrate in a slope basin characterized by rapid deposition of terrestrial sediments (same as proposed Site HR2alt; this site would be drilled if problems were encountered at proposed Site HR2alt).

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. At least two holes. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools; VSP, walkaway VSP.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible.



Slice of prestack time migrated data along line 300 showing location of proposed Sites HR2 and HR2alt. Vertical axis has been converted to depth using the 3D velocity model derived from travel times recorded on ocean bottom seismometers. See Figure F5 for HR2 altB.

Site: HR3a

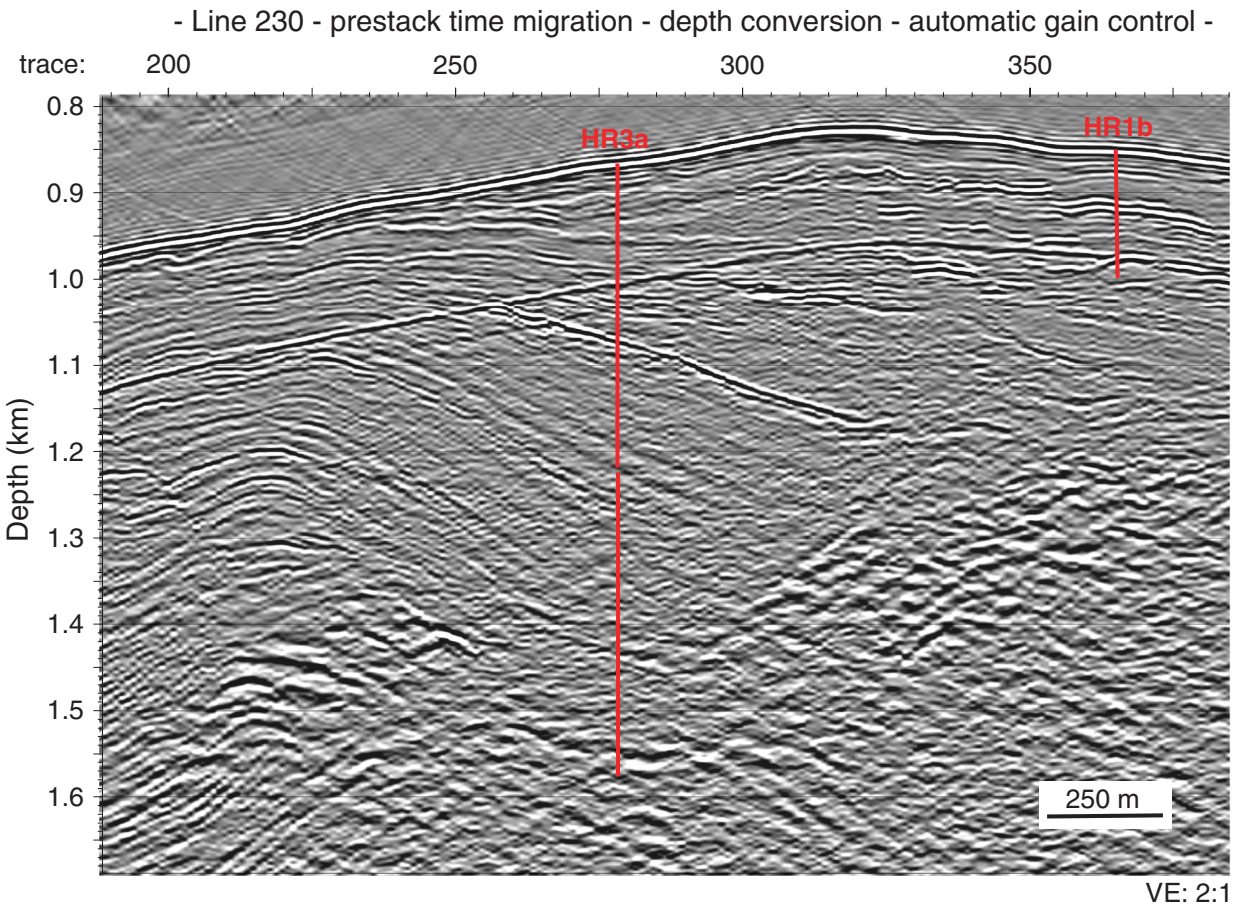
Priority: Primary
Position: 44.586152 N, 125.148464 W
Water Depth: 870 m
Sediment Thickness: ~7km
Target Drilling Depth: 700 mbsf
Approved Maximum Penetration: 700 mbsf
Seismic Coverage: TTN112 3D high resolution seismic survey

Objectives: To provide a nearly complete section through the uplifted and folded strata that host the BSR on the western flank of Hydrate Ridge. Sampling the entire section will provide constraints for interpreting variations in the BSR strength and in the continuity of reflections crossing the BSR. This site crosses several anomalous high-amplitude reflections that may be conduits for regional fluid flow, including reflection A, which can be traced to a "bright spot" beneath the summit.

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. At least two holes. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools; VSP.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.



Slice of prestack time migrated data along line 230 showing location of proposed Sites HR3a and HR1b. Vertical axis has been converted to depth using the 3D velocity model derived from travel times recorded on ocean bottom seismometers.

Site: HR4a

Priority: Primary
Position: 44.568605˚N, 125.149480˚W
Water Depth: 794 m
Sediment Thickness: ~ 7 km
Target Drilling Depth: 100 mbsf
Approved Maximum Penetration: 100 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To sample the high-reflectivity seafloor near the "pinnacle." We expect to sample carbonate rocks at very shallow depth underlain by sediments strongly affected by the upward fluid migration that has resulted in formation of the pinnacle.

Drilling Program: APC to refusal, XCB to refusal. May be necessary to start drilling with XCB because of possibility of shallow carbonate.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: authigenic carbonates, interlayered silts and clays.

Site: HR4b

Priority: Primary
Position: 44.570386˚N, 125.147657˚W
Water Depth: 780 m
Sediment Thickness: ~7 km
Target Drilling Depth: 60 mbsf
Approved Maximum Penetration: 60 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To sample the high-amplitude chaotic reflectivity that is associated with the massive hydrates at the seafloor. Samples from this site will test the hypothesis that this reflective character is the signature of a zone of abundant massive hydrate.

Drilling Program: APC to refusal, XCB to refusal. At least two holes. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Silts and clays interlayered with massive hydrate, some authigenic carbonates possible.

Site: HR4c

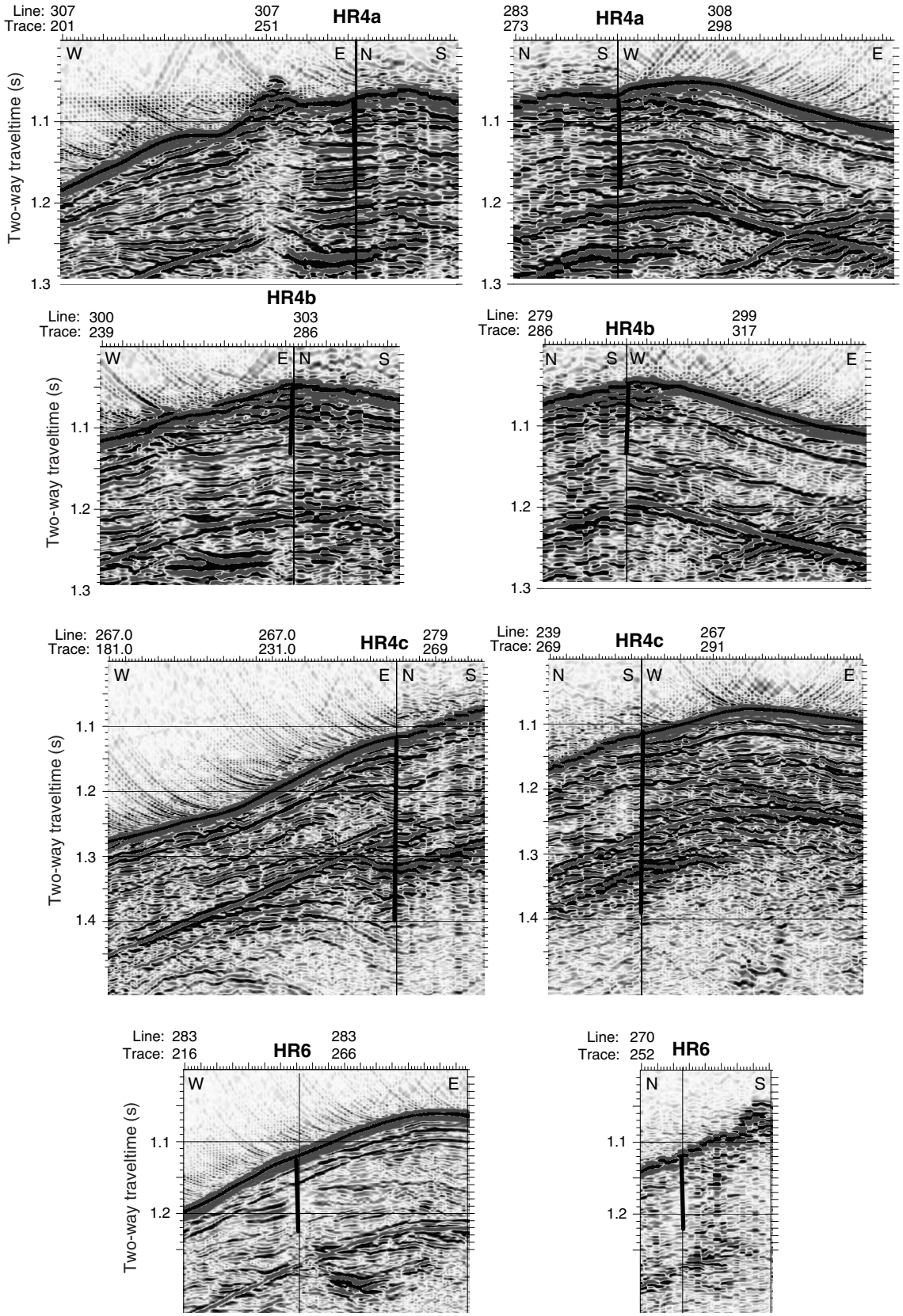
Priority: Primary
Position: 44.577631˚N, 125.150153˚W
Water Depth: 830 m
Sediment Thickness: ~7 km
Target Drilling Depth: 240 mbsf
Approved Maximum Penetration: 240 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To sample the hydrate stability zone and underlying reflection A updip from proposed Site HR3a. This site is designed to define updip variability along reflection A and is needed for evaluating the feasibility of a future experiment to measure temporal evolution of fluid flow.

Drilling Program: APC to refusal, XCB to refusal, RCB as necessary to reach target depth. At least two holes. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible.



Relative true amplitude data showing locations of HR4a-c and HR6. For HR4, two "L-shaped" slices are shown.

Site: HR5a

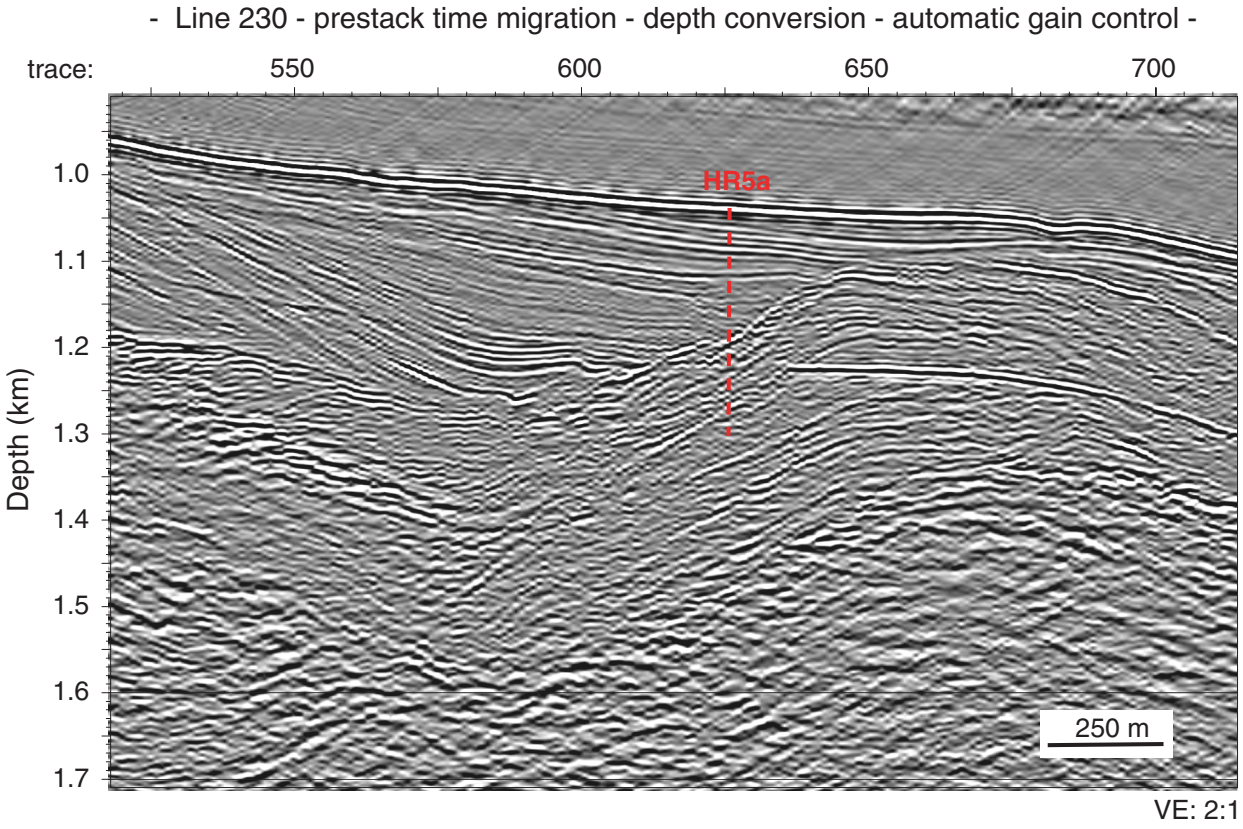
Priority: Alternate
Position: 44.586096˚N, 125.093815˚W
Water Depth: 1035 m
Sediment Thickness: ~7 km
Target Drilling Depth: 260 mbsf
Approved Maximum Penetration: 260 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey

Objectives: To constrain the timing of formation of this anticline, the nature of the sediments that host an anomalously strong BSR beneath it, and the nature of reflection C in the uplifted basin to the west.

Drilling Program: APC to refusal, XCB to refusal. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD, triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.



Slice of prestack time migrated data along line 230 showing location of proposed Site HR5. Vertical axis has been converted to depth using the 3D velocity model derived from travel times recorded on ocean bottom seismometers.

Site: HR6

Priority: Alternate
Position: 44.574176˚N, 125.152910˚W
Water Depth: 830 m
Sediment Thickness: ~7 km
Target Drilling Depth: 60 mbsf
Approved Maximum Penetration: 60 mbsf
Seismic Coverage: TTN112 3-D high-resolution seismic survey. Proposed site HR6 seismic is shown on page 42.

Objectives: To test whether a "bright spot" on deep-towed seafloor reflectivity is a buried carbonate formation that may be an incipient "pinnacle."

Drilling Program: APC to refusal, XCB to refusal. Use of PCS and/or HYACE.

Logging and Downhole Program: LWD (if there is time), triple combo, APC-temperature, DVTP, APC methane tools.

Nature of Rock Anticipated: Interlayered silts and clays, some authigenic carbonates possible, highly deformed accretionary complex sediments.

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