

Integrated Ocean Drilling Program Expedition 316 Scientific Prospectus Addendum

NanTroSEIZE Stage 1: NanTroSEIZE Shallow Megasplay and Frontal Thrusts

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Published by
Integrated Ocean Drilling Program Management International, Inc.,
for the Integrated Ocean Drilling Program

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Kimura, G., Screaton, E.J., and Curewitz, D., 2007. NanTroSEIZE Stage 1: NanTroSEIZE shallow megasplay and frontal thrusts addendum. *IODP Sci. Prosp.*, 316 addendum. doi:10.2204/iodp.sp.316add.2007

Distribution:

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This publication was prepared by the CDEX Science Operator, as an account of work performed under the international Integrated Ocean Drilling Program (IODP), which is managed by IODP Management International (IODP-MI), Inc. Funding for the program is provided by the following agencies:

National Science Foundation (NSF), United States

Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

European Consortium for Ocean Research Drilling (ECORD)

Ministry of Science and Technology (MOST), People's Republic of China

Korea Institute of Geoscience and Mineral Resources (KIGAM), Interim Asian Consortium

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This IODP *Scientific Prospectus* is based on precruise Science Advisory Structure panel discussions and scientific input from the designated Co-Chief Scientists on behalf of the drilling proponents. During the course of the cruise, actual site operations may indicate to the Co-Chief Scientists, the Operations Superintendent, and the Expedition Project Manager that it would be scientifically or operationally advantageous to amend the plan detailed in this prospectus. It should be understood that any proposed changes to the science deliverables outlined in the plan presented here are contingent upon approval by the CDEX Director of the IODP Department in consultation with IODP-MI.

Abstract

Integrated Ocean Drilling Program (IODP) Expedition 316 is an integral part of the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) complex drilling project based on IODP proposals 603-CDP3, 603A-Full2, 603B-Full2, 603C-Full, and 603D-Full2 (available at www.iodp.org/NanTroSEIZE). This addendum presents the revised operations schedule for Expedition 316 based on new site survey data and operational requirements. Several new alternate and contingency sites are described that were not identified previously in the Expedition 316 *Scientific Prospectus*.

Introduction

The three expeditions that make up NanTroSEIZE Stage 1 operations (Expeditions 314, 315, and 316) are designed to log, core, and measure in boreholes along a transect across the Nankai Trough subduction zone from the oceanic plate through the accretionary prism and into the forearc region. The original sites chosen for drilling are intended to investigate the character of sedimentary inputs, faulting, and fluid flow at the toe of the accretionary prism; the geometry and mechanical characteristics of faults and sediments in the megasplay system; and the character and history of the sediments deposited into the Kumano Basin. The overarching goal of this project is to understand the character, evolution, seismogenic potential, and current behavior of sediments, faults, and fluids along this subduction margin.

Because of the large number of sites chosen for drilling and the wide variety of potential challenges to drilling in this area (ranging from weather and currents, sediment/borehole stability, methane hydrate deposits, and/or potential gas or fluid overpressure), an array of alternate sites has been designated for contingency operations. As the processing and interpretation of the high-resolution three-dimensional (3-D) seismic data have progressed, the specific locations, depths, and potential challenges associated with particular scientific targets have been refined. The factors detailed above have required several minor changes and additions to the planned operations, outlined in this addendum to the Expedition 316 *Scientific Prospectus* (Kimura et al., 2007).

Changes to the drilling program

Contingency sites added

Two new contingency sites have been added and approved by the Integrated Ocean Drilling Program Environmental Pollution and Safety Panel and Site Survey Panel based on

1. Newly recognized scientific targets determined from 3-D seismic data,
2. Anticipated extra contingency time, and
3. The need for alternate sites in areas where drilling/weather/current conditions may be better than at primary sites.

Proposed contingency Sites NT2-05A and NT2-10A are located on the trench slope, between proposed Sites NT2-01D and NT1-03B (Table **T1**). The details of these sites are as follows:

- Proposed Site NT2-05A: 33° 12.433' N 136° 43.867' E, water depth = 2839 m, total depth = 275 meters below seafloor (mbsf)
- Proposed Site NT2-10A: 33° 12.830' N 136° 43.600' E, water depth = 2758 m, total depth = 325 mbsf.

See Figures **F1**, **F2**, and **F3** for location, seismic data, and borehole position/depth information.

Both sites are available for contingency operations for both logging-while-drilling (LWD) and coring/measurement operations using the hydraulic piston coring system. The scientific significance of the new contingency sites is related to the recognition that significant amounts of material shed from uplifted thrust blocks transported to the surface by faulting on the megasplay system have been deposited on older thrust blocks downslope toward the trench. Cores taken in these sedimentary packages may reveal the timing and relative age of past fault motions through the identification of provenance and age of deposited material and the age across any unconformities between newly deposited sediments and older uplifted fault blocks.

Proposed Site NT2-01B moved to proposed Site NT2-01D

Proposed Site NT2-01B, scheduled for LWD, coring, and casing operations during Expeditions 314 and 316, has been relocated based on refined processing and interpretation of the 3-D seismic data. The new proposed Site NT2-01D (Figs. **F4**, **F5**) has the

same scientific targets, target depths, and proposed drilling program and is located at 33°13.398' N, 136°42.140' E at a water depth of 2346 m and proposed total depth of 1000 mbsf (Table **T1**).

Reference

Kimura, G., Screaton, E.J., and Curewitz, D., 2007. NanTroSEIZE Stage 1: NanTROSEIZE shallow megasplay and frontal thrusts. *IODP Sci. Prosp.*, 316. [doi:10.2204/iodp.sp.316.2007](https://doi.org/10.2204/iodp.sp.316.2007)

Table T1. Location, depths, and basic program for the changed and added drilling sites (primary and contingency) for Stage 1 operations.

Proposed site	Location		Water depth (m)	TD (mbsf)	Program
	Latitude	Longitude			
NT2-01D	33° 13.398' N	136° 42.140' E	2346	1000	Hole A - LWD Hole B - HPCS/ESCS Hole C - RCB Case to TD
NT2-05A	33° 12.433' N	136° 43.867' E	2839	275	HPCS to TD
NT2-10A	33° 12.830' N	136° 43.600' E	2758	325	HPCS to TD

Note: TD = total depth, LWD = logging while drilling, HPCS = hydraulic piston corer system, ESCS = extended shoe coring system.

Figure F1. Seafloor bathymetry map (50 m contour interval) showing locations of proposed contingency Sites NT2-05A and NT2-10A and the seismic lines (black lines) displayed in Figures F2 and F3. Red circles = proposed holes, red lines = three-dimensional survey boundaries.

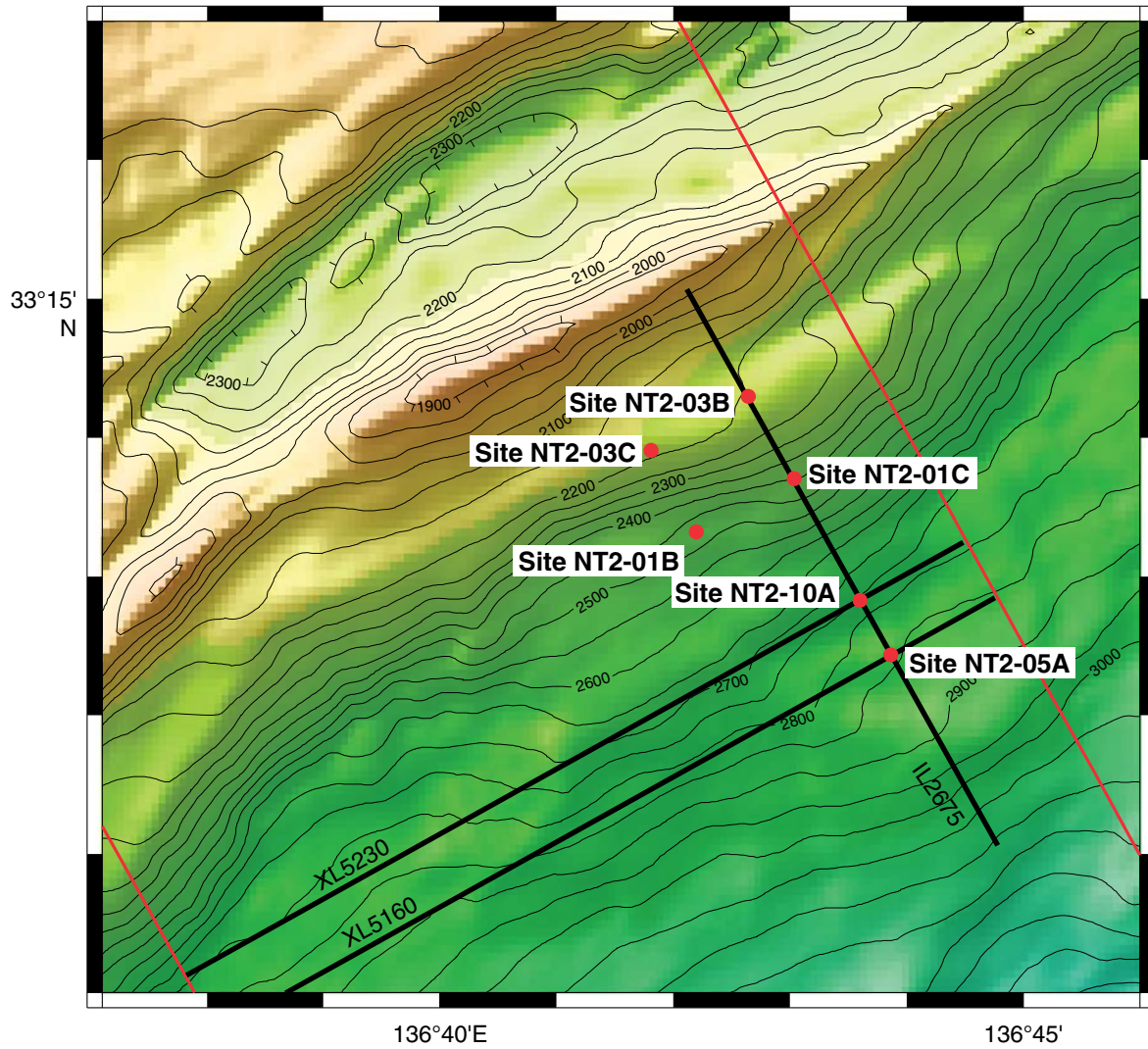


Figure F2. Seismic inlines (trench perpendicular) showing the seismic structure, borehole location, and depth for proposed contingency Sites NT2-05A and NT2-10A. **A.** Depth-migrated seismic data. **B.** Seismic data in two-way traveltimes. VE = vertical exaggeration.

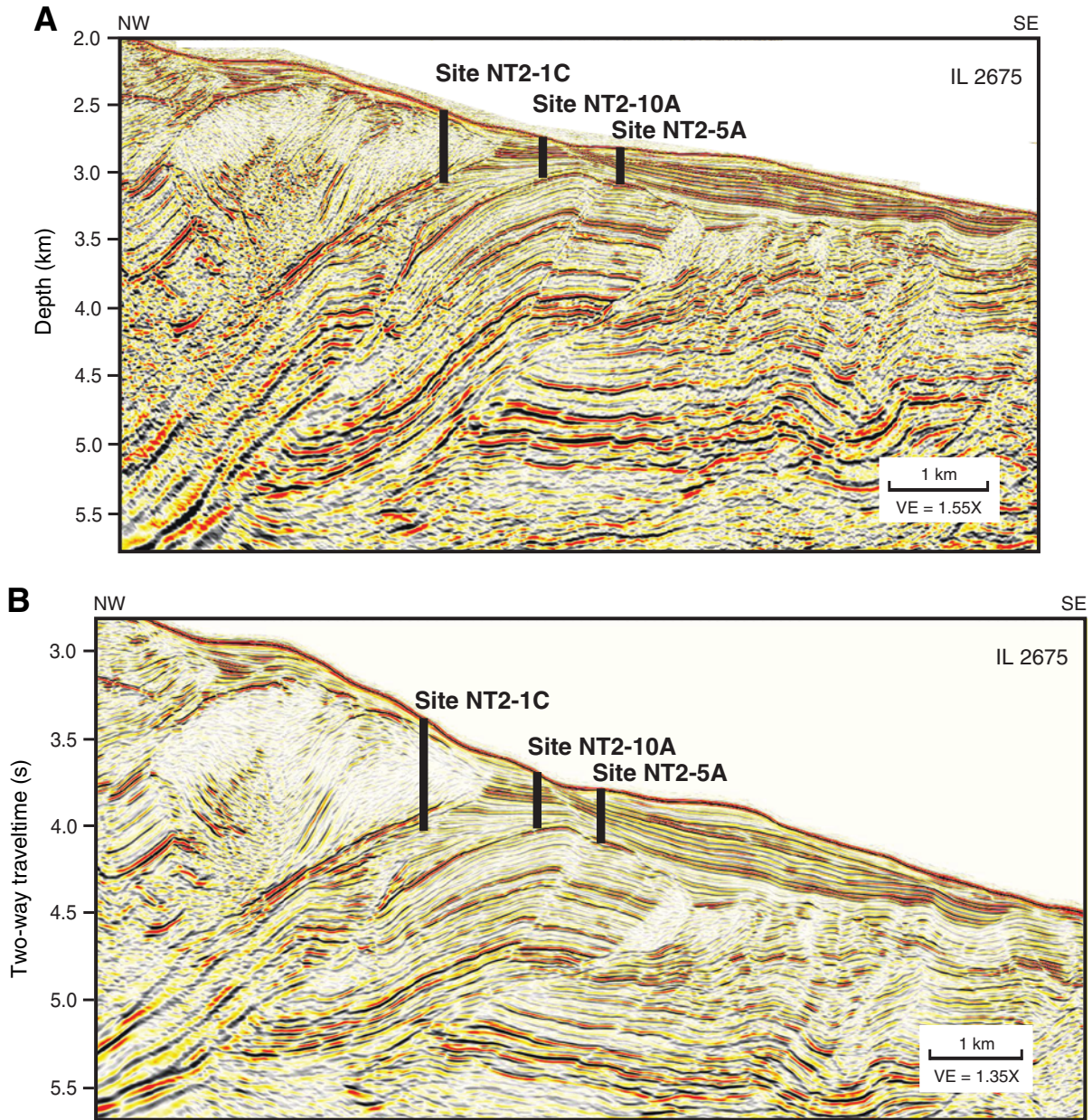


Figure F3. Seismic crosslines (trench parallel) showing the seismic structure, borehole location, and depth for proposed contingency Sites (A) NT2-05A and (B) NT2-10A. VE = vertical exaggeration.

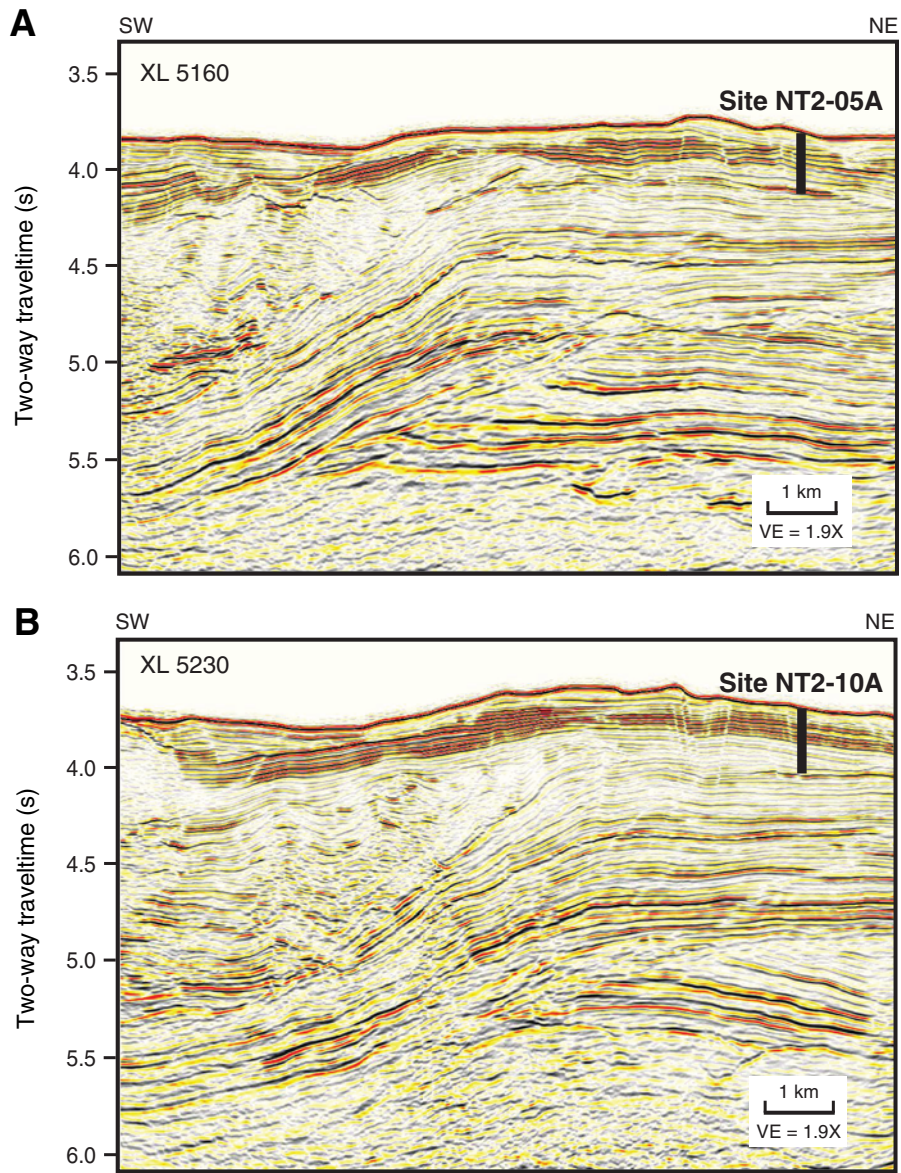


Figure F4. Seafloor bathymetry (50 m contour interval) showing locations of new proposed contingency Sites NT2-05A and NT2-10A and the position of proposed Site NT2-01D, relocated from proposed Site NT2-01B. Black lines = seismic lines displayed in Figure F5, red circles = proposed sites, red lines = three-dimensional survey boundaries.

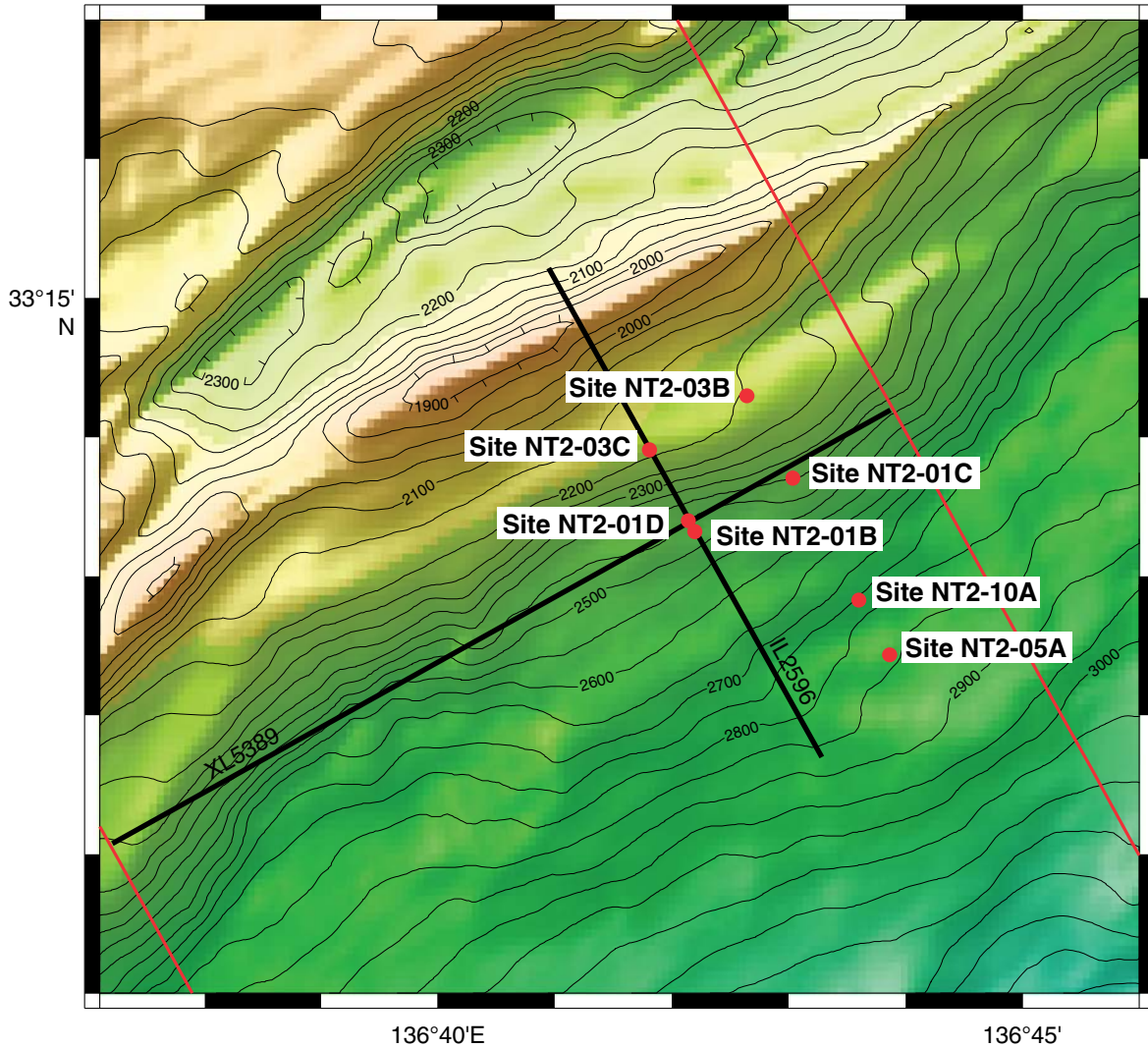
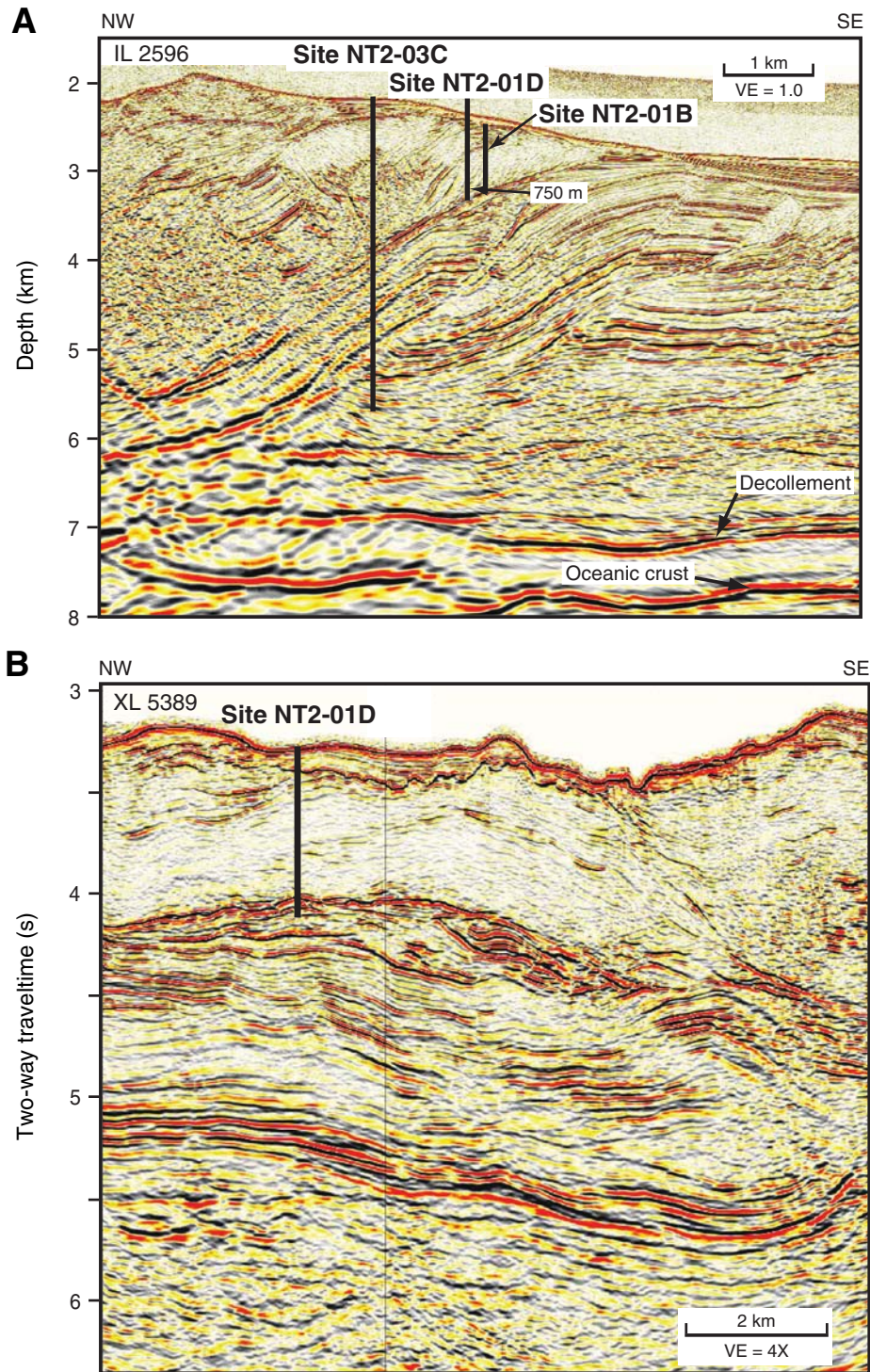


Figure F5. Seismic structure and borehole location/depth for proposed Site NT2-01D. **A.** Depth-migrated seismic line perpendicular to trench showing location of both new proposed Site NT2-01D and older proposed Site NT2-01B. **B.** Trench-parallel seismic line showing the structure and depth of proposed Site NT2-01D. VE = vertical exaggeration.



Scientific participant change

Science Party member Sylvia Stegmann has withdrawn from the expedition and has been replaced by Michael Strasser who will be filling the same role as Sedimentologist.

Sedimentologist

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