

8. SITE 1273¹

Shipboard Scientific Party²

OPERATIONS SUMMARY

Transit to Site 1273

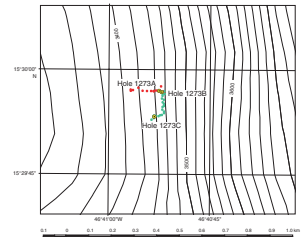
Site 1273 is the southernmost drilling target on our transect of sites north of the 15°20'N Fracture Zone. This site was selected based on review of videotapes from *Faranaut* Dive 16, which recovered samples of peridotite and gabbro.

Hole 1273A

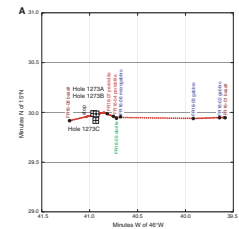
At 1716 hr on 12 June 2003 we arrived at the coordinates for the Site 1273 camera survey. While we deployed a bottom-hole assembly (BHA) including seventeen 8.25-in drill collars (nominally a total of 159 m long) at the end of the drill string, the subsea camera was lowered along with a positioning beacon. Our camera survey track (Fig. F1) was from west to east starting on a flat, sedimented terrace, moving downslope until we arrived at the edge of a precipitous cliff. During *Faranaut* Dive 16, the submarine traversed upslope >100 m in <5 min until the sea-floor slope sharply decreased at the same water depth as our camera survey. Outcrop was exposed along all of this part of the dive track, and a sample of serpentinized peridotite was collected (Fig. F2). Inferring that we were near the same outcrop recorded on the dive survey videotapes, we moved 50 m back up the shallow slope to deploy the beacon, and at 0515 hr on 13 June we initiated Hole 1273A ~30 m west of the cliff edge.

Only one core was recovered from Hole 1273A (Table T1) before we were forced to abandon coring because of collapse of the borehole wall. Hole 1273A ended at 0920 hr on 13 June as the bit was pulled free of the seafloor.

F1. Survey tracks and hole locations, p. 5.



F2. Hole locations and bathymetric section, Site 1273, p. 6.



T1. Coring summary, Site 1273, p. 10.

¹Examples of how to reference the whole or part of this volume.
²Shipboard Scientific Party addresses.

Hole 1273B

Hole 1273B was spudded at 1050 hr on 13 June, after offsetting the ship ~15 m east (closer to the cliff edge). Cores 2R to 3R penetrated quickly (from 11.6 to 26.2 meters below seafloor [mbsf] in <2 hr), and, as in Hole 1273A, the driller could not keep the hole cleared of debris. Hole 1273B was completed by 1900 hr on June 13 as the bit was pulled free of the seafloor.

Hole 1273C

Since our site survey bathymetry data indicated the flat terrace where we drilled Holes 1273A and 1273B continued south for at least 500 m, we began a second subsea camera survey tracking south along the top of the cliff. After moving ~100 m while crossing back and forth across the cliff edge, we located a massive outcrop that we considered an ideal target for coring. At 0100 hr on June 14 we spudded Hole 1273C a few meters west of the cliff in sediment <2 m thick. Core 1R was advanced to 18 mbsf because material collapsing into the hole prevented us from setting the pipe to extract the core barrel. Cores 2R and 3R were difficult to core, as material seemed to be falling into the hole as soon as we stopped coring to make a pipe connection. After recovering Core 3R, the drill pipe would not pass 20 mbsf, indicating 8 m of material had fallen into the bottom of the hole. Given that recovery in all three holes was limited to small fragments of basalt with only two small pieces of peridotite, we chose to end coring attempts at Site 1273.

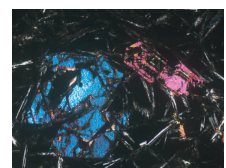
IGNEOUS AND MANTLE PETROLOGY

The limited material recovered from Holes 1273A, 1273B, and 1273C is almost exclusively basalt. Three rounded pieces of serpentinized harzburgite were recovered from Hole 1273C. Most basalts look like sectors of pillows with a crust of fresh glass. A few pieces retain adhered hyaloclastite. The basalts are not deformed, display no structural features, and except for one (Section 209-1273A-1R-1 [Piece 9]), all pieces are small and nonoriented.

The basalts are predominantly aphyric with a few plagioclase phenocrysts dispersed in the matrix (<0.5%). Plagioclase crystals are as large as 5 mm in Section 209-1273C-1R-1 (Pieces 4, 8); 2 mm in Section 2R-1 (Piece 2); and 1 mm in Section 209-1273B-3R-1 (Piece 8). All of the basalts have 1%–8% vesicles with a maximum size of 1.5 mm. The vesicles are randomly distributed overall but slightly more abundant toward the rims of pieces interpreted to be pillow fragments. A sector of pillow basalt with variolitic structure toward the rim is in Section 209-1273B-3R-1 (Piece 8). Thin section examination reveals the basalts have a microcrystalline to intergranular texture (Sample 209-1273A-1R-1 [Piece 2, 5–8 cm]). Subhedral to euhedral olivine microphenocrysts make up to 2% of the rock and are <1 mm in size. The groundmass is composed of acicular plagioclase laths, quench clinopyroxene, and minor amounts of fresh brown glass and skeletal opaque minerals. Small melt inclusions are hosted in olivine microphenocrysts (Fig. F3).

Basalts from Sections 209-1273A-1R-1 and 209-1273B-1R-1 and 3R-1 show no visible alteration, except thin coatings of Fe-Mn oxides. A pillow-rind breccia in Section 209-1273B-2R-1 (Piece 1) is ~10% altered to clay and Fe oxyhydroxide, mostly within the red clayey breccia ce-

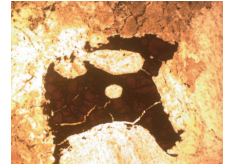
F3. Olivine crystals in fresh basaltic glass, p. 8.



ment. Piece 2 of that section contains small rubbly pieces of the same pillow-rind breccia along with fresh basalt. Similar to all other pieces from Section 209-1273C-1R-1, Pieces 12 and 13 are fresh basalt, except acicular zeolite and green clay lining vesicle walls.

The harzburgite recovered from Hole 1273C (Sample 209-1273C-1R-1, 46–48 cm) has a protogranular texture and the only fresh mineral is spinel (Fig. F4). The harzburgite is completely altered, with olivine replaced by serpentine and brown clay, whereas orthopyroxene is altered to talc, serpentine, and minor chlorite and tremolite.

F4. Fresh red-brown spinel in serpentinized harzburgite, p. 9.



REFERENCES

- Fujiwara, T., Lin, J., Matsumoto, T., Kelemen, P.B., Tucholke, B.E., and Casey, J., 2003. Crustal evolution of the Mid-Atlantic Ridge near the Fifteen-Twenty Fracture Zone in the last 5 Ma. *Geochem. Geophys. Geosyst.*, 4:10.1029/2002GC000364.

Figure F1. Bathymetric map indicating subsea camera survey tracks (red = survey 1, green = survey 2) and hole locations. Bathymetric data courtesy of T. Fujiwara and T. Matsumoto of JAMSTEC (Fujiwara et al., 2003).

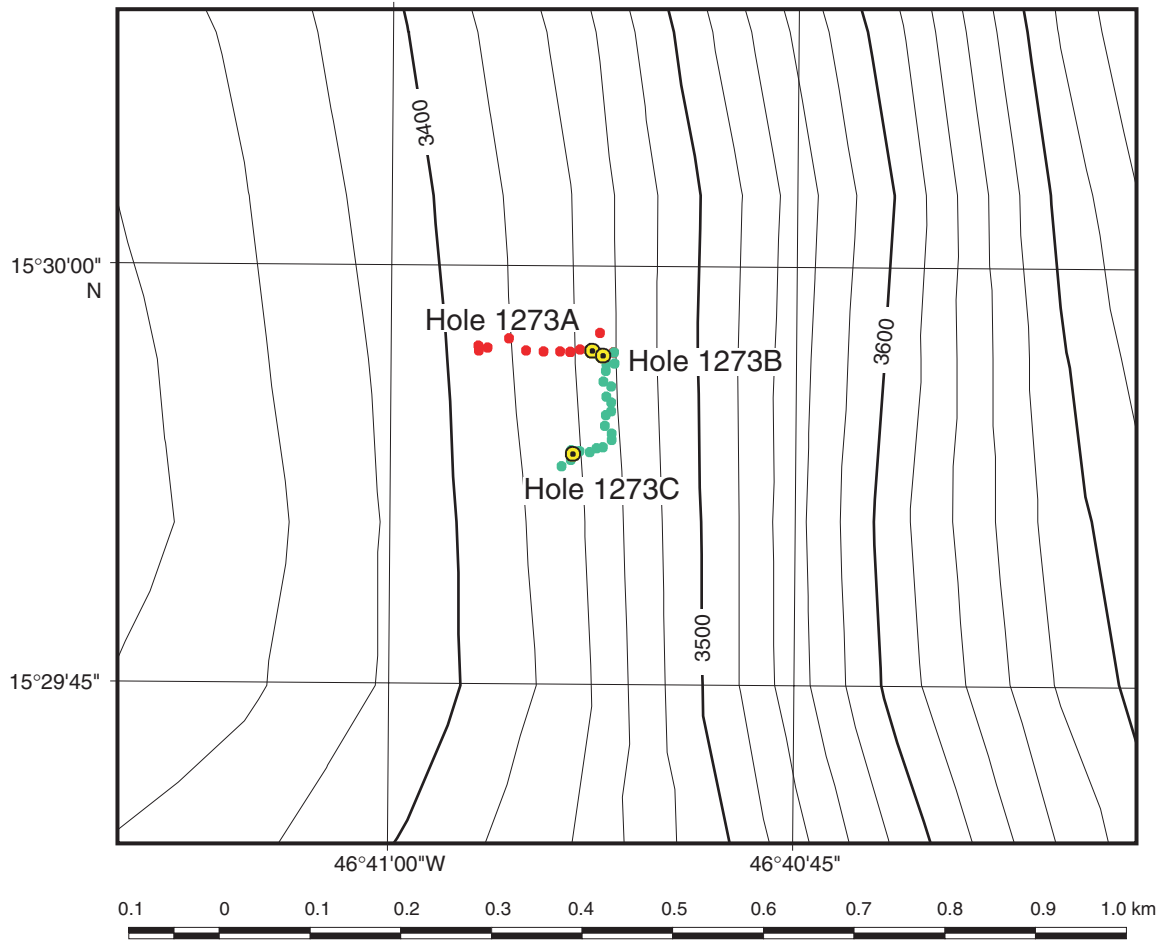


Figure F2. A. Location map with track of *Faranaut* Dive 16 (red dotted line), locations, and lithologies of samples from that dive, and the approximate positions of Holes 1273A, 1273B, and 1273C. (Continued on next page.)

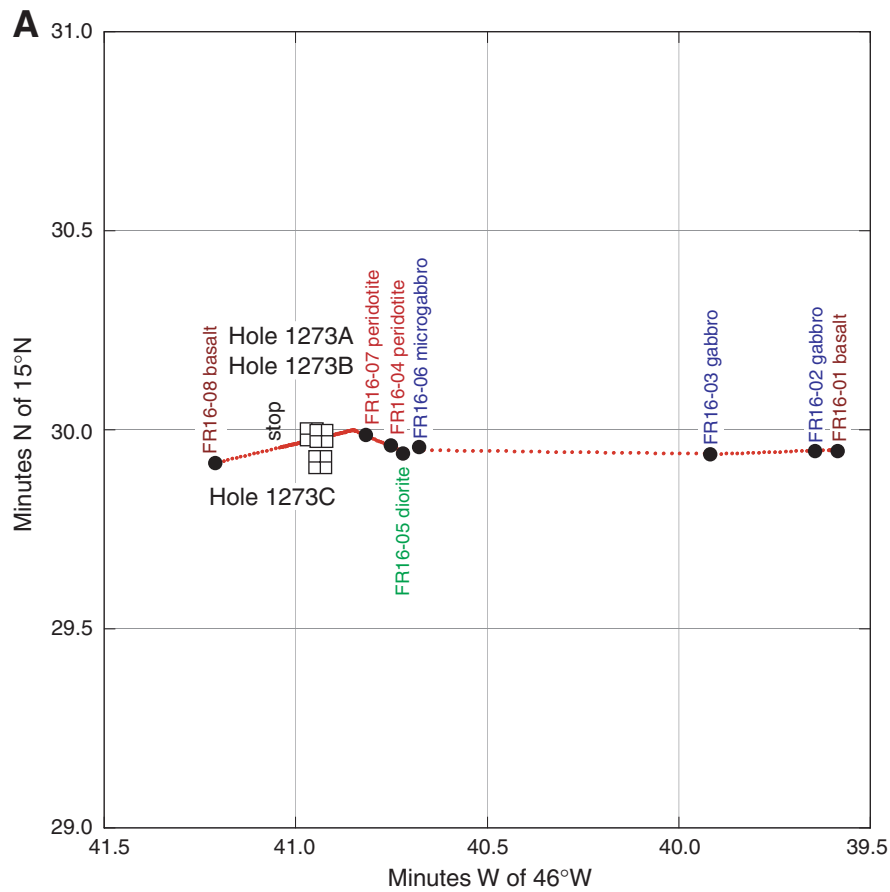


Figure F2 (continued). B. Bathymetric section based on *Faranaut* Dive 16, projected along 270° with no vertical exaggeration. Locations and lithologies of samples collected during the dive, as well as the approximate positions of Holes 1273A, 1273B, and 1273C are indicated.

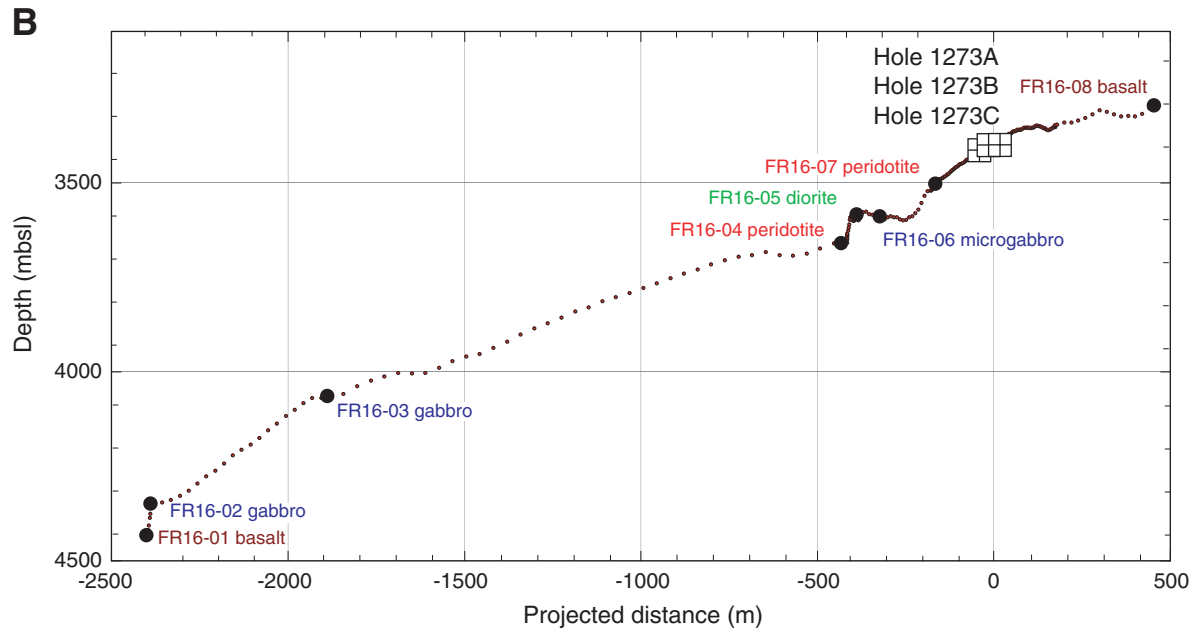


Figure F3. Photomicrograph showing euhedral and embayed olivine crystals in a groundmass of fresh basaltic glass with acicular plagioclase. Arrows indicate location of melt inclusions (Sample 209-1273A-1R-1, 5-8 cm) (cross-polarized light: blue + light gray filters; field of view = 1.2 mm; image 1273A_001).

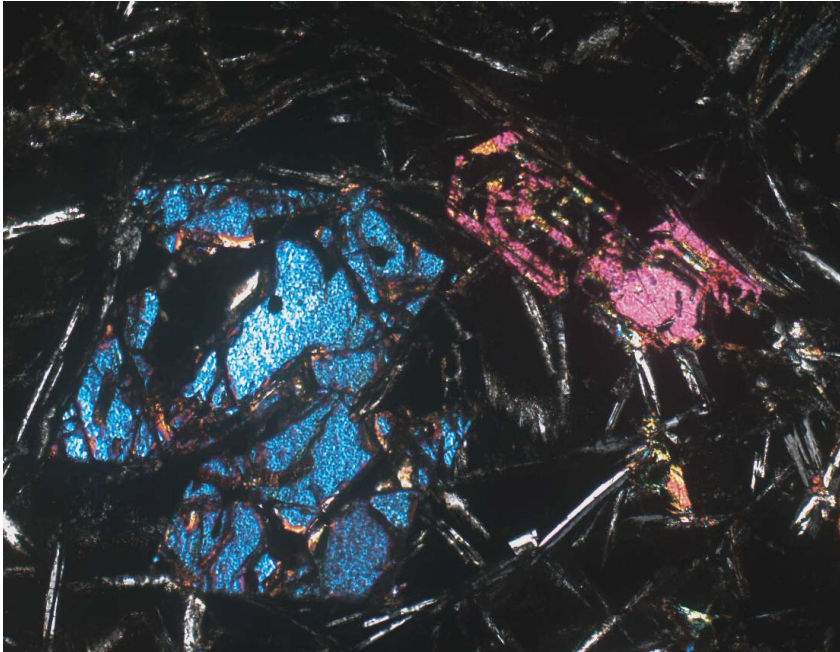


Figure F4. Photomicrograph showing fresh red-brown spinel in completely serpentinized harzburgite (Sample **209-1273C-1R-1, 46–48 cm**) (plane-polarized light: blue +light gray filters; field of view = 35 mm; image 1273C_001).

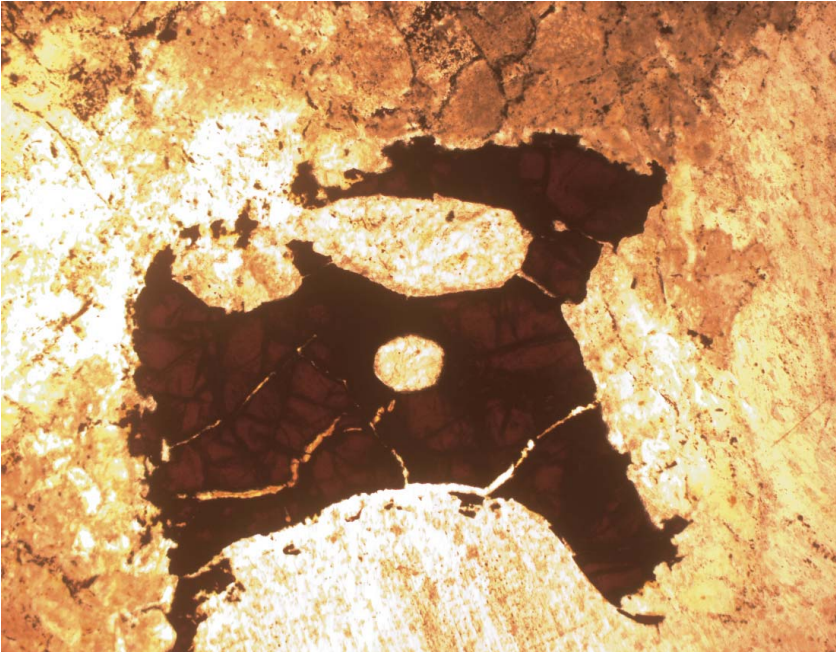


Table T1. Coring summary, Site 1273.

Hole 1273A

Latitude: 15°29.9789'N
 Longitude: 46°40.8745'W
 Time on site: 47.5 (1715 hr, 12 June–1645 hr, 14 June 2003)
 Time on hole: 16.0 (1715 hr, 12 June–0915 hr, 13 June 2003)
 Seafloor (drill pipe measurement from rig floor, mbrf): 3428.0
 Distance between rig floor and sea level (m): 11.2
 Water depth (drill pipe measurement from sea level, m): 3416.8
 Total depth (drill pipe measurement from rig floor, mbrf): 3441.6
 Total penetration (meters below seafloor, mbsf): 13.6
 Total length of cored section (m): 13.6
 Total core recovered (m): 0.39
 Core recovery (%): 2.87
 Total number of cores: 1

Hole 1273B

Latitude: 15°29.9760'N
 Longitude: 46°40.8655'W
 Time on hole: 9.75 (0915 hr, 13 June–1900 hr, 13 June 2003)
 Seafloor (drill pipe measurement from rig floor, mbrf): 3430.0
 Distance between rig floor and sea level (m): 11.2 m
 Water depth (drill pipe measurement from sea level, m): 3418.8
 Total depth (drill pipe measurement from rig floor, mbrf): 3456.2
 Total penetration (meters below seafloor, mbsf): 26.2
 Total length of cored section (m): 26.2
 Total core recovered (m): 0.46
 Core recovery (%): 1.76
 Total number of cores: 3

Hole 1273C

Latitude: 15°29.9172'N
 Longitude: 46°40.8834'W
 Time on hole: 21.75 (1900 hr, 13 June–1645 hr, 14 June 2003)
 Seafloor (drill pipe measurement from rig floor, mbrf): 3419.0
 Distance between rig floor and sea level (m): 11.2
 Water depth (drill pipe measurement from sea level, m): 3407.8
 Total depth (drill pipe measurement from rig floor, mbrf): 3446.7
 Total penetration (meters below seafloor, mbsf): 27.7
 Total length of cored section (m): 27.7
 Total core recovered (m): 0.62
 Core recovery (%): 2.24
 Total number of cores: 3

Core	Date (Jun 2003)	Local time (hr)	Depth (mbsf)		Length (m)		Recovery (%)	Remarks
			Top	Bottom	Cored	Recovered		
209-1273A-								
1R	13	1005	0.0	13.6	13.6	0.39	2.9	
Cored total:					13.6	0.39	2.9	
209-1273B-								
1R	13	1230	0.0	11.6	11.6	0.04	0.3	
2R	13	1415	11.6	16.6	5.0	0.20	4.0	
3R	13	2030	16.6	26.2	9.6	0.22	2.3	
Cored totals:					26.2	0.46	1.8	
209-1273C-								
1R	14	0555	0.0	18.0	18.0	0.40	2.2	AHC
2R	14	1015	18.0	23.7	5.7	0.22	3.9	AHC
3R	14	1440	23.7	27.7	4.0	0.00	0.0	AHC; no recovery
Cored totals:					27.7	0.62	2.2	

Note: AHC = active heave compensation. This table is also available in [ASCII](#).