16. SITE 775[1]

Shipboard Engineering and Scientific Parties[2]

HOLE 775A

Date occupied: 23 January 1989

Date departed: 23 January 1989

Time on hole: 14 hr, 18 min

Position: 19°51.00′N, 121°42.98′E

Bottom felt (rig floor; m, drill-pipe measurement): 506.0

Distance between rig floor and sea level (m): 10.5

Water depth (drill-pipe measurement from sea level, m): 495.5

Total depth (rig floor, m): 512.0

Penetration (m): 6.0

Number of cores: 1

Total length of cored section (m): 6.0

Total core recovered (m): 0.31

Core recovery (%): 5.17

Oldest sediment cored:
Depth sub-bottom (m): 6.0
Nature: well-cemented volcanic sand and rubble

HOLE 775B

Date occupied: 23 January 1989

Date departed: 23 January 1989

Time on hole: 4 hr, 0 min

Position: 19°51.00′N, 121°42.98′E

Bottom felt (rig floor; m, drill-pipe measurement): 506.0

Distance between rig floor and sea level (m): 10.5

Water depth (drill-pipe measurement from sea level, m): 495.5

Total depth (rig floor, m): 526.5

Penetration (m): 20.5

Number of cores: 0

Total length of cored section: 0

Total core recovered: 0

HOLE 775C

Date occupied: 23 January 1989

Date departed: 24 January 1989

Time on hole: 7 hr, 0 min

Position: 19°51.00′N, 121°42.98′E

Bottom felt (rig floor; m, drill-pipe measurement): 506.0

Distance between rig floor and sea level (m): 10.5

Water depth (drill-pipe measurement from sea level, m): 495.5

Total depth (rig floor, m): 517.2

Penetration (m): 11.2

Number of cores: 0

Total length of cored section: 0

Total core recovered: 0

Principal results: Three shallow holes were drilled at Site 775, located in Luzon Strait south of Site 773 (original ENG-1 site). These holes represented a last attempt to find shallow basement rock suitable for testing the diamond coring system. Unfortunately, the attempt failed, principally because of the lack of sufficient sediment cover and also because of adverse operating conditions caused by high winds and seas.

Hole 775A was cored to a total depth (TD) of 6 mbsf. Recovery was 31 cm of well-cemented volcanic sand and rubble, including biogenic grains, andesitic basalt, and manganese layers. (This was the only core cut; it was not described or curated.) Hole 775B was washed to a TD of 20.5 mbsf, and Hole 775C was washed to a TD of 11.2 mbsf.

A water-gun profile obtained during the site approach indicated that the seamount on which the site was picked is a volcanic edifice with little likelihood of a significant thickness of sediment and with side slopes of 20° to 30°.

BACKGROUND AND OBJECTIVES

The main objective of this site was once more to try to pick a suitable place where basement rocks were shallow beneath a relatively thin veneer of sediments so that the diamond coring system (DCS) could be given a final test before being loaded on a supply boat in a day and a half. Because of adverse operating conditions, that objective was not attained.

OPERATIONS

Introduction

As time had nearly expired for testing of the DCS, Site 775 was picked strictly on the basis of the bathymetry shown on the ship's chart. An all-encompassing session of ODP engineers estimated the time required to drill a site in about 500 m of water to a basement horizon, to pick up the DCS, and to get five cores in order to prove the capability of the system to drill basement rock in deep water from a floating vessel. A site was picked on the flank of a seamount 35–40 nmi south of Site 774 (Fig. 1). The transit time to Site 775 was only 4 hr, and a shallow-water Datasonics beacon was launched at 0230 hr on 23 January (all times given are Universal Time Coordinated or UTC). A localized quick-gridded survey was done with only the sonar-dome-mounted transducers to determine the location of a relatively flat area. By the time a suitable site had been located, the first beacon, of only 190 dB, could not be heard with the dynamic-positioning (DP) system in auto-mode. A second retrievable Datasonics beacon, of 17.5-kHz frequency, was launched at 0456 hr.

Since the bottom profile showed little or no sediment thickness, and the pipe trip was so quick, we decided to run the vi-

[1] Harding, B. W., Storms, M. A., et al., 1990. *Proc. ODP, Init. Repts.*, 124E: College Station, TX (Ocean Drilling Program).

[2] Shipboard engineering and scientific parties are as given in the listing of participants preceding the contents.

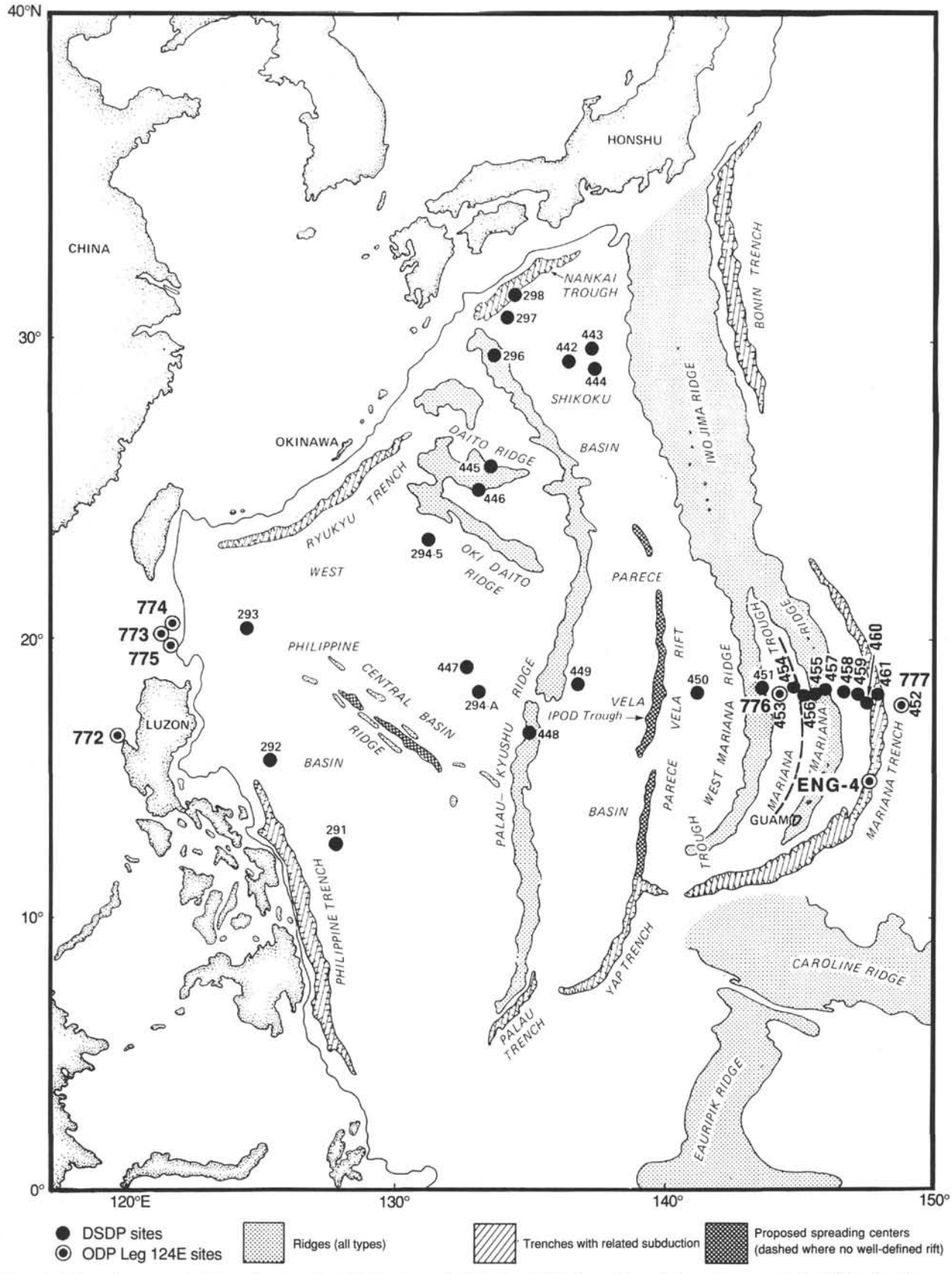

Figure 1. Map of western Pacific region showing DSDP sites and ODP Leg 124E sites. Adapted from Hussong et al. (1982, Fig. 1).

bration-isolated television frame (VIT) to bottom in order to find a sediment pond in which to spud. The whole time that the pipe trip was being made, and the VIT being run, the weather was getting rougher by the minute. The DP alarms for caution and cessation of rotation of the drill string had to be relaxed from 2% and 4% to 4% and 7% because of the rough weather and the extremely shallow water. ODP's operations superintendent did not think that relaxation of the DP offset limits would in any way put the drill string in jeopardy. Once the VIT had arrived at the seafloor, a grid was run on DP in a box pattern for 1.25 hr in order to locate a ponding of sediment. The view revealed a flat bottom, volcanic rubble overlying bare basalt.

Hole 775A

At 1330 hr a small sediment pond was located, and the bit was washed in with 8,000–10,000 lb of bit weight and no rotation, since the camera was still in the water. At 1456 hr, washing was stopped, and the VIT was run back to bottom to observe whether or not any hole had been made. Observation of the seafloor showed that approximately 6 m of penetration had been achieved. The core barrel could not be pulled unless the hole were drilled deeper; also, the VIT had to be removed from the water in order to rotate the drill pipe aggressively and to make any hole. The drill pipe, therefore, was pulled clear of the seafloor, and the VIT removed from the water. A single was laid out, and Core 124E-775A-1X was retrieved. The core consisted of 0.31 m of well-cemented sand and andesitic basalt rubble. The coring summary for this site is given in Table 1.

Hole 775B

Since the site showed that penetration could reasonably be expected, and that perhaps true basement could be reached within several tens of meters, Hole 775B was spudded at 1720 hr, and the first 20.5 m was washed in. Two wireline runs were required because of a sheared overshot pin on the first run. In order to pull up to a connection where the pipe could be broken to get the core barrel, only 4.5 m of pipe was left in the hole. The weather had gotten so rough that the pipe was certain to heave out of the hole, so it was pulled clear of the seafloor, and the vessel was offset to spud another hole.

Hole 775C

Hole 775C was spudded at 2155 hr, and 11.2 m was washed in 88 min. Starting a hole in Force 8–9 winds and seas, in a reasonably unstable geological setting, proved to be hopeless. The ODP operations superintendent decided at 0001 hr on 24 January to abandon Hole 775C, pull the drill string, and head for a lee where transfer of personnel and DCS equipment could safely be made with a supply boat from Manila, scheduled to arrive on the following day (25 January). The thrusters and hydrophones were pulled, and the ship was secured for transit at 0345 hr.

SITE GEOPHYSICS

The primary criterion for the selection of Site 775 was a relatively shallow water depth in order to minimize trip time. The site chosen by the engineering staff was about one-third of the way down a small conical hill about 40 km south of Site 773 and also in Luzon Strait. The peak of this bathymetric feature comes to within 155 m of the surface, and contours on a regional bathymetric map indicated that slopes would be between 20° and 30°. Based upon morphology alone, this feature was thought to be a moderate-sized volcanic edifice of recent origin with little likelihood of sediment being present. The geologists felt this was probably a bare rock drilling target. However, because time was short, engineering considerations prevailed.

Our approach to the target was from the north at a speed of 11 kt. The peak was crossed at a depth of about 145 m and was found to be a double peak suggestive of a caldera-like structure. Our course continued to the south, and, when a depth of 500 m was indicated, a beacon was dropped. During the slowing of the ship and return to the site of the beacon drop, records of depth and position were taken every minute. When the beacon site was occupied, the signal from the beacon was found to be erratic, and a second beacon was prepared for deployment. Moreover, the bathymetric map prepared after launch indicated that the beacon had come to rest on a 30° slope. During the post-drop bathymetric survey, it had been noted that an apparently flatter area was present about 1000 m southwest of the initial beacon. Based upon this information, the ship was allowed to drift to the southwest to verify this observation, and the second beacon was dropped at the site shown in Figure 2.

Based upon the character of the bottom returns during the survey and the regional setting, the seafloor was thought to consist of volcanic rubble and lava flows with little or no sediment present. Video observations subsequently confirmed these interpretations.

Table 1. Coring summary for Site 775.

Core no.	Date (Jan. 1989)	Time (UTC)	Interval cored (mbsf)	Length cored (m)	Length recovered (m)	Recovery (%)
124E-775A-						
1X	23	1640	0–6.0	6.0	0.31	5.17

LITHOSTRATIGRAPHY

Only one core was cut at this site, Core 124E-775A-1X, to 6 mbsf (TD). Recovery was 31 cm of well-cemented volcanic sand and rubble, including andesitic basalt, with olivine near the bottom. Other constituents included manganese layers and many biogenic grains. (This core was not described or curated.) Holes 775B and 775C were both washed to total depths of 20.5 and 11.2 mbsf, respectively. The holes were abandoned because of little or no sediment cover and adverse weather conditions, resulting in hole instability and an unsafe rig and drilling environment.

SUMMARY AND CONCLUSIONS

Three holes were spudded at Site 775 (ENG-1C site) in attempting again to find suitable conditions for testing the diamond coring system (DCS). The site was located on a seamount in water 506 mbrf. The shallow water depth, as mentioned earlier, made trip times both much quicker and less expensive. Basement was virtually assured, but adequate sediment cover for spudding was questionable.

After an intense search for a sediment pond with the underwater television system (VIT), Hole 775A was spudded. Following 6.0 m of penetration, drilling was halted, and the VIT system was deployed for confirmation of spud-in. The bit had indeed penetrated sub-bottom, and the site appeared viable. The pipe was pulled clear of the mud line, since drilling could not proceed with the VIT system deployed around the drill string.

Hole 775B was spudded "blind" and was drilled to a total depth (TD) of 526.5 mbrf or 20.5 mbsf. The hole was abandoned, owing to unstable hole conditions (volcanic rubble and breccia) complicated by severe sea conditions.

Hole 775C was successfully spudded and drilled to a TD of 517.2 mbrf or 11.2 mbsf. However, that hole was also unstable, owing to abundant volcanic rubble. Extremely bad sea conditions, causing large-amplitude, short-period heave, coupled with untenable hole stability, ultimately forced the abandonment of all the holes at the site.

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All holes were drilled using an XCB bit with a wash barrel in place. No developmental tools were deployed or evaluated at the site.

Upon completion of Site 775, a transit was made to Luzon Island, where the lee of the island afforded protection for offloading the DCS hardware and personnel. During the offloading process, five stands of 5-in. drill pipe were run, and the latching system for the Japanese "ONDO" temperature-measurement system was tested. That system was scheduled for operational deployment on Leg 131 in the Nankai Trough. The latch system was deployed seven times without success until enough additional weight (heavy-weight sinker bars) was added to the tool. The latch system then was successfully deployed twice, with a total weight below the tool of 1073 lb (487 kg). Although it was identified that more weight was required for the deployment than estimated, the weight of the ONDO tool itself should be more than enough to allow a successful operational deployment.

For complete test details, refer to the ONDO technical report included in the major section entitled "Contributed Papers" near the front of this volume.

REFERENCE

Hussong, D. M., Uyeda, S., Knapp, R., Ellis, H., Kling, S., and Natland, J., 1982. Deep-Sea Drilling Project Leg 60: cruise objectives, principal results, and explanatory notes. *In* Hussong, D. M., Uyeda, S., et al., *Init. Repts. DSDP*, 60: Washington (U.S. Govt. Printing Office), 3–30.

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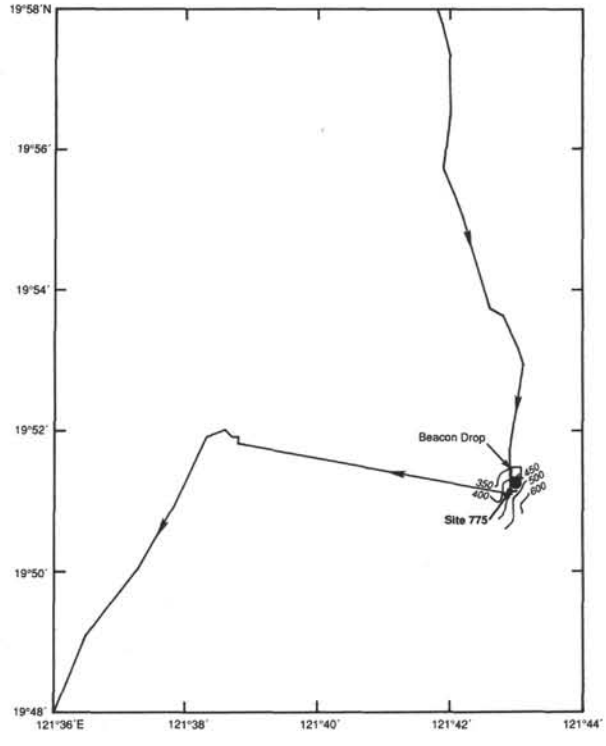

Figure 2. *Resolution*'s track in the vicinity of Site 775. Bathymetry in meters.