3. SITE 156

The Shipboard Scientific Party[1]

SYNOPSIS

Area: Carnegie Ridge, eastern equatorial Pacific

Date Occupied: 11-12 February, 1971

Position:
Lat. 01°40.80'S
Long. 85°24.06'W

Water Depth: 2369 meters (corrected)

Penetration: 4 meters

Number of Holes: 1

Number of Cores: 2

Core Recovery: 0.5 meters

Acoustic Basement:
Depth: At surface
Nature: Probably basalt

Age of Oldest Sediment: Quaternary

This site was accidentally spudded on a small basement pinnacle and was abandoned when hard rock was reached within a few meters from the surface. The section penetrated consisted of coarse winnowed calcareous sand over thin chalk ooze resting on a hard crust of ferromanganese oxide presumably covering basalt.

REGIONAL SETTING AND OBJECTIVES

Three sites in the Panama Basin (one each on the Coiba, Carnegie and Cocos ridges) were selected by the Pacific Site Selection Panel to compare sedimentary sections, basement ages, and the depositional histories of the three ridges. In addition, the sites were chosen to determine the late Cenozoic biostratigraphy of the eastern equatorial Pacific in locations shallow enough to insure preservation of calcareous microfossils and to evaluate the suggestion that elements of the late Tertiary microfossil assemblages have Caribbean affinities owing to their introduction before closure of the Central American seaway.

TOPOGRAPHIC AND GEOLOGIC SETTING

DSDP 156 (Figure 1) is located on the south flank of the Carnegie Ridge about halfway between the ridge crest and the deep Pacific basin to the south. It is 60 km east of DSDP 157. The ridge flank in this area forms a broad east-west trending terrace, which is bordered on the north by the steep upper slope leading to the ridge crest, and on the south by a basement ridge or series of basement pinnacles. The terrace itself is very nearly level and is covered with approximately 500 meters of finely stratified sediment. Prior to the traverse of the area by the D/V *Glomar Challenger* only north-south profiles showing a uniform sediment cover were available. The east-west profile obtained by the *Glomar Challenger*, however, shows the presence of numerous steep-walled and deep erosion gullies (Figure 2) which extend down to the acoustic basement. These gullies divide the terrain into a number of narrow sedimentary mesas with flat tops and irregular outlines.

As no site survey was available, a box pattern was run for site selection. The survey track, laid out under reasonable assumptions of drift direction and speed in the area, was substantially deformed during the course of the survey. Subsequent drift after recovery of the geophysical equipment set the vessel away from the selected sedimentary plateau and onto a small basement pinnacle rising at the edge of one of the erosion gullies. The unhappy nature of this location was discovered only after making a pass across the beacon with seismic reflection equipment during departure from the site.

The acoustic section near the site is slightly thicker than that at DSDP 157 (Chapter 4), but consists of the same finely stratified sediment with several irregular internal unconformities. A relatively transparent zone near the base of the section thickens and thins irregularly over the survey area. The acoustic basement is very smooth and strongly reverberating; it abuts sharply against the few narrow basement pinnacles present in the area.

OPERATIONS

The beacon was dropped on the site at 1000 hours on February 11, 1971 and pipe run in. The same Smith 10 1/8", 4-cone bit with shaped inserts employed at DSDP 155 was used. The bottom proved to be very hard and only 3 meters of core were obtained before it was decided to pull the barrel. A second coring attempt took one hour and 28 minutes to core 4 meters. In view of the risk to the unsupported bottom hole assembly, it was decided to abandon the site and relocate at another more suitable location farther west.

LITHOLOGY

In DSDP 156, 49 cm of sediment was recovered; the core catcher sample at the base of this section consists of hard ferromanganese-oxide crust, presumably coating basalt. The upper 34 cm consist of an incompetent calcareous sand intensely disturbed by coring and containing abundant planktonic foraminifers, radiolarians, and nannofossils. The lower unit, 15 cm thick, is a pale

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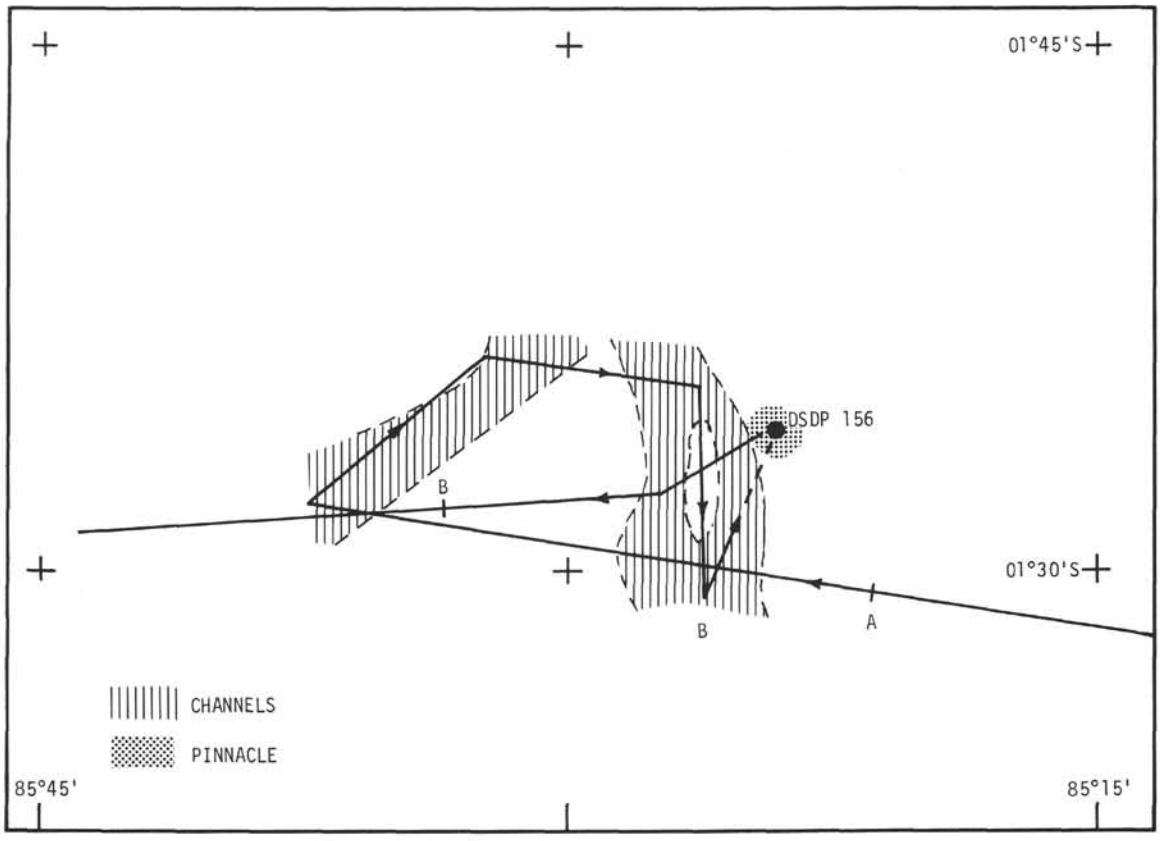

Figure 1. *Survey track and location of DSDP 156. A-B refers to reflection profile of Figure 2.*

yellowish gray, sandy, massive chalk ooze, diatomaceous, with abundant foraminifers, common radiolarians, and a few ebridians and silicoflagellates in a nannofossil matrix. The two units are separated by a light brown sediment with abundant nannofossils and common foraminifers and radiolarians.

The ferromanganese-oxide crust fragments are internally laminated brownish black in color and sooty on fresh fracture. Their upper surfaces are botryoidal and dotted with attached foraminiferal tests; the internal lamination tends to follow the form of the upper surface.

BIOSTRATIGRAPHY

The half meter of sediment recovered at this site contains late Pleistocene assemblages of foraminifera, nannofossils, and Radiolaria, including reworked upper Miocene and Pliocene coccoliths and Radiolaria. The recovered section consists of two distinct lithological types: a pale green, diatomaceous foraminifer-coccolith ooze, overlain by a loose, probably winnowed, foraminiferal sand. Between these two units is some radiolarian-rich, light-brown sediment with abundant coccoliths and common foraminifers and coccoliths.

Radiolarians and coccoliths are well-preserved, whereas foraminifers show a range of preservation in a given sample. *Gephyrocapsa oceanica*, a late Pleistocene tropic to subtropic coccolith with an optimal temperature range of 18°C to 23°C, is abundant and well-developed throughout. Although a warm-water deposition regime is indicated, the diversity of the calcareous assemblages is quite limited for a tropical area; *Cyclococcolithina leptopora, Gephyrocapsa oceanica, Globoquadrina dutertrei*, and *Globorotalia menardii* predominate. Radiolarians are well-diversified with no predominant species.

DISCUSSION AND SUMMARY

The cored section consists of a winnowed pelagic ooze over a relatively undisturbed chalk ooze of Quaternary age with admixed late Tertiary components. The calcareous groups show limited diversity, pointing perhaps to selective solution, but more likely being the result of a restrictive ecologic environment in the boundary area of the equatorial current system and the Peru Current. The drill was stopped by a hard ferromanganese-oxide coating which, in all probability, is the surface of the volcanic pinnacle evident on a seismic reflection profile across the beacon site. The site survey showed clear evidence of strong downcutting erosion of the site area, resulting in the formation of deep gullies or canyons. The difference between north-south reflection profiles discussed by van Andel et al. (1971), which show no erosion, and the deeply dissected east-west profile obtained by the D/V *Glomar*

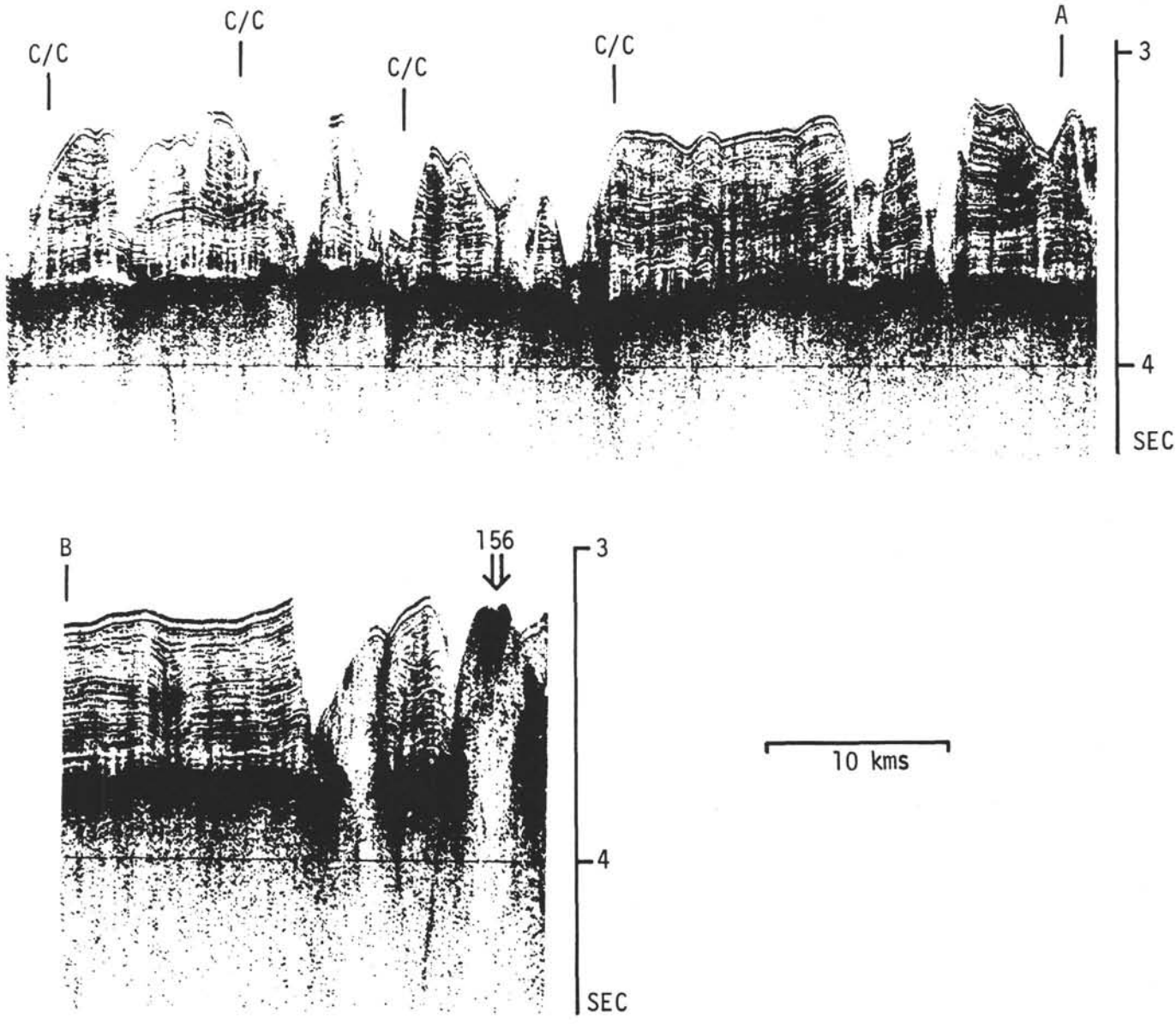

Figure 2. *Acoustic reflection profile of site survey of DSDP 156. Depths in seconds 2-way travel time (1 sec = approx. 800 meters of sediment). A and B refer to Figure 1. Horizontal scale approximate.*

TABLE 1
Coring Summary, DSDP 156

Core	Depth Below Sea Level (m)	Depth Below Sea Floor (m)	Cored (cm)	Recovered (cm)	Recovered (%)
Surface	2384-2387	0-3	300	49	16.3
1	2384-2388	0-4	400	CC[a]	0.0

[a]Core catcher sample.

Challenger indicates that the erosional channels lead from the erosional area at the crest downflank to the deep Pacific basin. The present data do not permit us to establish whether this erosion is continuing at the present time or took place during the recent past.

REFERENCE

van Andel, Tj. H., Heath, G. R., Malfait, B. T., Heinrichs, D. F. and Ewing, J. I., 1971. Tectonics of the Panama Basin. Bull. Geol. Soc. Am. 82, 1489.

DEPTH(m)	CORES No./Depth	LITHOLOGY	SERIES OR SUBSERIES	BIOSTRATIGRAPHY		
				FORAMINIFERA	NANNOFOSSILS	RADIOLARIA
	1	Mn.o. Mn.o. Foraminiferal sand to chalk ooze.	PLEIST.	Quaternary	Gephyrocapsa oceanica	Collosphaera tuberosa

Figure 3. *DSDP 156, graphic hole summary. Vertical scale 1 cm = 10 m (1:1000).*