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CRUISE REPORT

Ship Name: R/V VEMA

Cruise No: 35-05

Departure: June 3, 1978
Date

from Manila, Philippines
Port

Arrival: July 3, 1978
Date

at Tamuning, Guam
Port

Days at Sea: 29
(Count day of departure but
not day of arrival in port)

Days Foreign Port: 3
(number of days in arrival port
before next leg)

Area of Operation:

Southeast Asia region-Philippine Sea (West Philippine Basin and Parece
Vela Basin)

Program Description:

Collection of underway marine geology & geophysics data, seismic refraction data
(with Maxipulse sound source), heat flow data, and a suite of dredge rocks
from each of the two basins studied.

Program supported by what contract: NSF OCE 78-17021

Participants: (All L-DGO unless otherwise specified)

<u>Name</u>	<u>Title</u>
Dennis E. Hayes	Chief Scientist
Malaki Banuve	Coring O. S.
Stephen Lewis	Grad. Res. Asst.
Dwight Mossman	E. T.
Cary Mrozowski	Grad. Res. Asst.
Brian Ostrowski	E. T.
David Roach	Heat Flow
Jeffrey Schwartz	Core Describer
Hector Smith	Airgun

All inquiries regarding cruise should be made to the chief scientist.

CRUISE REPORT

VEMA 35-05

VEMA Cruise 35-05 was composed of two parts, a West Philippine Basin program and a Parece Vela Basin program. The West Philippine Basin program was designed to fill the gaps in the existing set of underway geophysical data, to obtain dredge samples and heat flow data from near or at the Central basin Fault and along its strike, and to obtain a SW-NE seismic profile across the basin. The dredge samples are to be used in the study of petrological and geochemical variations in rocks from various sites along an extinct spreading center and to be used in comparison to a similar set of rocks dredged during the second portion of this leg in the Parece Vela basin. Three dredges and five heat flow stations (four thermograd and one multigrad) were attempted. Eight sonobuoys were shot (six were long-range models); all were run in a NW or SE direction, along the presumed strike of the isochrons in the basin. All sonobuoys on VEMA cruise 35-05 were shot using the MAXIPULSE explosive system as the sound source. The goals in the Parece Vela Basin portion of the leg were similar to those listed above but expanded. In addition to dredging along the axis of the Parece Vela rift (the presumed extinct spreading center) we attempted to dredge various sites across the basin. Ten dredges were attempted. We also tried to establish a cross basin heat flow profile and to fill in the skimpy heat flow station coverage in the basin by occupying five thermograd and two multigrad stations. Twenty sonobuoys were shot (6 were long-range). During VEMA 35-05, ~2100 m.n. and 2800 n.m. of underway geophysical data were collected in the West Philippine Basin and Parece Vela Basin, respectively.

The R/V VEMA departed from Manila, the Philippines, on 4 June 1978. After rounding the southern coast of the island of Luzon, we crossed the Philippine trench and entered the West Philippine Basin (WPB). We altered our course to ~ NE (normal to the trend of the Eocene magnetic anomalies found in the WPB) and steamed until we crossed the Central Basin Fault (CBF). The CBF is the ~ NW-SE trending extinct spreading center which bisects the basin. Two heat flow stations, the first north and the second south of the CBF were attempted at that time.

After the second station, we headed back to the CBF and attempted several dredge stations while proceeding SE along its trend. The first two were unsuccessful but at the third dredge station we recovered a small quantity of material. Preliminary thin section analysis at L-DGO of one of the samples indicates it is altered, glassy, vesicular basalt. Our general lack of recovery at the dredging stations--all of which looked topographically "ideal"--may be due to two factors, a thin but ubiquitous sediment cover on the scarps and our being "blind" during the dredging operations due to poorly functioning 3.5 and 12 kHz PDRs. The condition of the 3.5 kHz PDR eventually became so bad that we shut the system down completely. We next ran two SW-NE trending tracks in the poorly surveyed southeast portion of the basin. A reversed pair of sonobuoys plus a single sonobuoy were shot along track. We then headed ~ NW, zig-zagging across the CBF, and took two more heat flow stations. Five more sonobuoys were shot along a ~ NE course (including one reversed pair) to complete our cross basin seismic profile. A multigrad ("pogo") heat flow station was attempted ~ 90 n.m. NE of the CBF.

After crossing the Palau-Kyushu Ridge at ~19 1/2 °N, 136°E we entered the Parece Vela Basin (PVB) and started the second portion of the leg. This

basin can be divided into a topographically rough western half and a thickly sedimented eastern half which are separated by the ~N-S trending Parece Vela Rift (PVR). The PVR is interpreted as an extinct spreading center. Low amplitude, N-S trending magnetic anomalies have been tentatively identified in the basin and indicate a late Oligocene to middle Miocene age. In the PVB we ran six ~E-W track segments, one ~NE-trending segment and one SSE-trending segment. The SSE-trending track segment was attempted since no geophysical track along the trend of the presumed spreading center is readily available to us. Seven sonobuoys were shot in the western portion of the basin, but only three appear to be useful (the other four were complicated by rough topography). Thirteen sonobuoys were attempted in the eastern half of the basin with much better results. In an attempt to obtain a suite of rocks from various sites along or near the PVR, five dredges were attempted at four sites along this feature. Two were successful. D-5 at ~20°N contained basalt and D-2 at ~18° 21'N contained scoria, pumice, manganese nodules--many of which were cored by basaltic clasts. Along the ~18°20'N E-W track two additional successful dredges were attempted, both in the rough western half of the basin. The dredge at ~132°24'E contained vesicular basalts in various stages of alteration. Some of the basalts had glassy rims. In the westernmost dredge on this line, basalts--some fresh!--were recovered. Two additional successful dredge stations were completed at sites in the western portion of the basin: D-6 at ~20° 56'N, 138° 02' contained only pumice and manganese; D-7, at ~19° 02'N, 138° 58'E altered basalt, pumice and a fossilized mammal (?) bone. Two thermograd and one multigrad heat flow stations were attempted in the western side of the basin

and three thermograd stations were attempted on the eastern side. At 20° 50'N, 140° 32', a multigrad station was conducted on the thick sediments to check for hydrothermal circulation in a type of environment where it theoretically should not occur. Circulation was not indicated by the experiment. The cruise ended in Guam on 3 July 1978.

Comments on Shipboard Systems

3.5 kHz PDR: This system was virtually inoperable. The signal was weak and a persistent 60 cycle noise of unknown origin appeared on the records. We eventually shut the system down completely after determining the records we were obtaining were of such low quality they were useless. After arriving in Guam, the electronic technicians performed a series of diagnostic tests on the below waterline components of the system. Upon completion of the tests, the system functioned well and continued to so during the next leg. The only thing physically done to the system during the tests was to disconnect and reconnect a junction box.

12 kHz PDR: We obtained generally mediocre records with this system. This may be due, in part, to the generally deep water depths and the often rough topographies of the study regions.

Seismic profiler and airgun: This system worked well and even gave acceptable records at speeds over 11 knots.

Magnetometer: Performed well.

Gravimeter: Performed well.

Maxipulse system: This is a system for firing small explosive charges (~5/8 lb. of NCN) safely and at more or less regular intervals. It was installed at Singapore for use during the sonobuoy experiments on this leg.

The system functioned simply and dependably. The energy output was sufficient to obtain mantle refractions with many of the sonobuoys and to penetrate the thick volcanoclastic wedge encountered in the Parece Vela Basin. The profiler records obtained during the sonobuoy experiments were not as good as anticipated. The strong bubble associated with each detonation generated a long-ringing signal which obscured many reflections.

PROVISIONAL

VEN 3505 (MANILA-CUAN)
3574 h/contants

