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CRUISE REPORT

Ship Name: R/V VEMA Cruise No: 3609

Departure: 7 March 1980 (Date) From Hong Kong (Port)

Arrival: 5 April 1980 at Apra, Guam

Days at Sea: 29 days
(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: South China Sea, western and northern margins of Luzon, North Luzon Ridge, Gagua Ridge, and Philippine Sea.

Program Description: Two standard core-heat flow traverses were attempted on this leg, a N-S traverse along the western margin of Luzon (13 stations) and an E-W traverse north of Luzon (11 stations). Three dredges were attempted at the W. Luzon margin, 2 off the Sierra Madre of NE Luzon, 3 along the Cagayan submarine canyon of north Luzon and 3 along the Gagua Ridge. During the Leg ∿ 6700 km of underway geophysical data were collected.

Program supported by what contract: National Science Foundation Grant OCE 79 19069

Participants: (All L-DGO unless otherwise specified)

Name	Title
C. Mrozowski	Chief Scientist
S. Lewis	Chief Scientist
J. Kostecki	Sedimentologist/Stratigrapher
W. Van Steveninck	Heat Flow
P. Woodroffe	E.T.
R. Roessler	E.T.
S. Hudson	Res. Asst.
P. Belknap	Computer Operator
A. Hazelman	Mech. Technician
H. Smith	Mech. Technician
M. Boleikinaualu	Coring Team
S. Rokobuku	Coring Team
W. Schweller	Scientific Observer (Cornell Univ.)
G. Castañeda	Scientific Observer (Philippine Bureau of Mines)

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

V 36-09 Cruise Narrative

PROGRAM DESCRIPTION

This cruise was the first of a two-cruise project to investigate 1) the seaward extension of the major tectonic units and structures on Luzon, 2) the stratigraphy of the region as exposed in the deeply-incised canyons of the Luzon margin, 3) the nature of the Gagua Ridge (i.e. ridge or island arc), 4) the history of subduction at Luzon and the N. Luzon Ridge (the sites of flipping subduction zones), and 5) the thermal effects of the subduction of an extinct spreading center.

VEMA departed Hong Kong on 7 March 1980 and steamed southeast to the western margin of Luzon (see track chart). During this transit geophysical data were collected which compliment existing data from the China margin and the South China Sea.

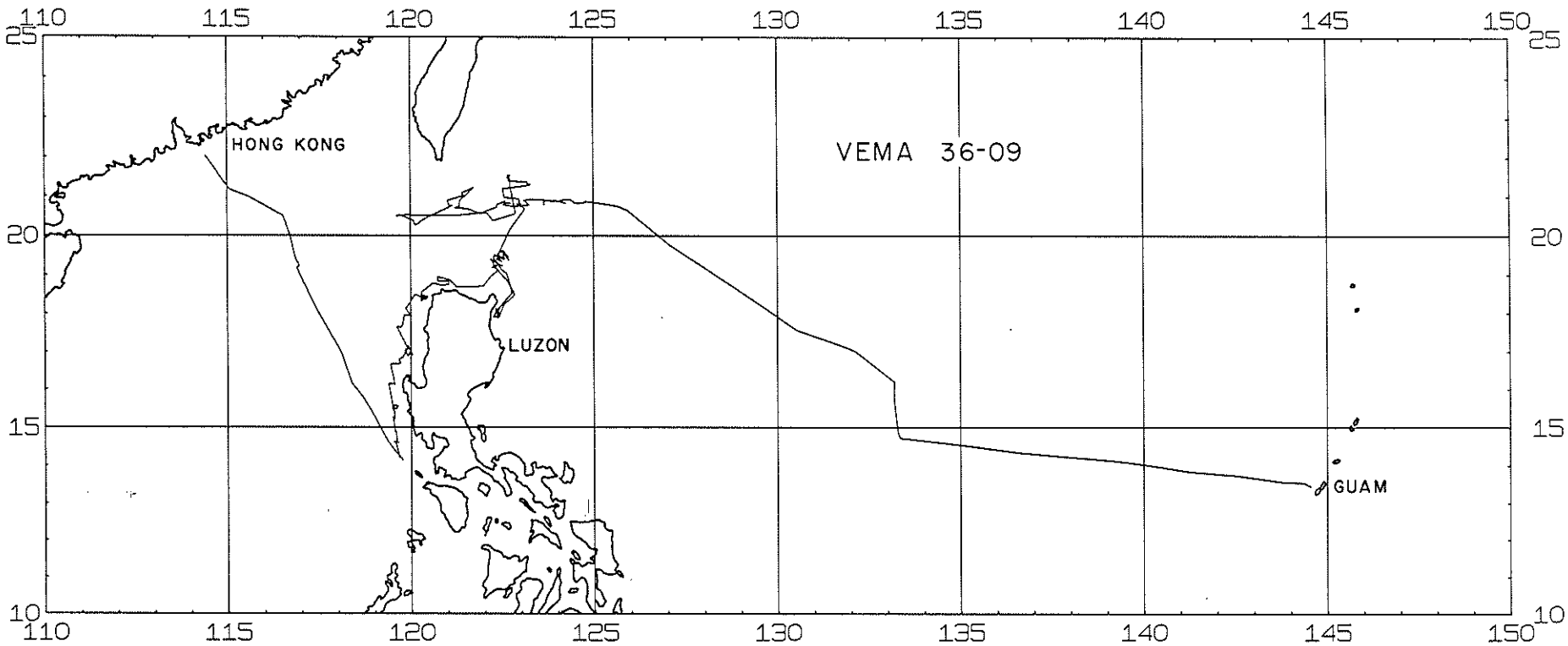
Ten heat flow-core stations were attempted in a north-south line in the West Luzon Trough between Manila Bay and Lingayen Gulf. Coring was difficult due to ubiquitous turbidites and several core pipes were bent. After two dredges were attempted in a canyon north of Lingayen Gulf (only mud was recovered), three more heat flow stations were added on the north end of the heat flow line. The heat flow lines crossed the intersection of the extinct South China Sea spreading center and the Manila Trench system. Shipboard reduction of the heat flow data shows no heat flow anomaly associated with this intersection.

A series of dredges were attempted in submarine canyons along the north Luzon margin. Mud was recovered at the NW corner of Luzon. Dredging of the Sierra Madre Mountains (∿17°59'N, 122°22'E) yielded limestone, siltstone and mudstone. Three dredges in the Cagayan Canyon (∿19°25'N, 122°30'E) yielded a wide range of igneous and sedimentary lithologies. We experienced intermittent

core winch problems during dredging and at the Cagayan Canyon site the satellite navigator failed (it was out for the rest of the cruise). Additional dredge hauls were attempted on the Gagua Ridge and a large number of igneous rock types were recovered.

The third phase of this cruise was a west to east heat flow traverse at approximately 20°45'N, extending from the South China Sea to the West Philippine Basin. Eleven stations were attempted. Poor navigation, difficulties in deck operations due to bad weather, and core winch problems were experienced at these sites. Rapid drifts of the ship caused by rough weather and strong currents interfered with the reception of heat flow data telemetered from the corehead to the surface. This data was also recorded on magnetic tape in the heat flow instrument and will have to be reduced at L-DGO.

The transit from the end of the heat flow line to Guam included a N-S crossing of the thickly sedimented SE portion of the Central Basin Fault. The ship arrived in Guam on 5 April 1980.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HONG KONG
LUZON
VEMA 36-09
GUAM

Cruise Report V-3609

Appendix 1 - Equipment Report

Cruise V 3609 was plagued by a series of equipment failures. Some of these failures were of a serious nature and made successful completion of the scientific program difficult. Although not all breakdowns of shipboard equipment can be anticipated, many problems can be prevented or delays caused by breakdowns can be minimized if adequate spare parts are on board, routine maintenance programs followed, and worn out equipment replaced or overhauled as necessary. Regretably, these things do not appear to be currently done on VEMA, and because of this we lost a considerable amount of ship's time.

Scientific Equipment

3.5 kHz PDR - Throughout the leg we had problems with this unit, ranging in severity from complete failure during dredge stations to continually noisy records. Only one of the recorders is operable, the other has severe mechanical problems which cannot be repaired on the ship with the existing complement of spare parts. Work done on the operating unit during our transit from Luzon to Guam resulted in substantial improvements in its performance, but if this unit fails again there are not spare parts on board to repair it (e.g. print amp.). The electronic components of the two PDR recorders are not completely interchangeable. An error in the documentation of the electronics was discovered which had been propagated for nine years and it was corrected.

3.5 kHz Transceiver - This unit worked well except for an occasional overload.

12 kHz Transceiver - This unit was used only in a receive mode for DHF stations, but worked well.

Profile (Recorders)

Unit A - TVG was operable only on one channel, and worked poorly.

Unit B - TVG was operable only on one channel. No times or dates were

printed due to problems with the logic module, but no operating spares were on the ship. There is also a mechanical problem with the drum rotation linkage which requires daily attention. Stripped linkage components cannot be repaired on the ship unless new parts are supplied.

Airgun (L-DGO) - We experienced a few routine O-ring failures. We lost 2 1/2 hrs. of ship time due to the failure of a high-pressure hose fitting, because there were no spares on board. Replacement fittings had to be constructed in the machine shop. The airgun crew has twice requested these parts from Lamont, but the spares have never arrived at the ship.

Eels (single channel) - We had repeated eel problems. When we arrived there were two eels on the ship, both of which failed during the leg. One active section had to be removed from each eel,and repairs were difficult because there was only one spare hydrophone on the ship (response of many of the existing hydrophones appears poor). The replacement amplifiers on shipboard did not function. We also suffered from breaking wires within the eels. The E.T.'s on the ship felt that this could be avoided if the eels were constructed with wire whose insulation did not become brittle when exposed to eel oil. In our transit from Luzon-to Guam a second active section was grafted onto one eel and record quality was much improved. New amps and twenty new hydrophones were ordered by radio and were delivered to the ship by R. Jarrard in Guam.

Magnetometer - This system functioned reasonably well; there was only one failure. The down time for repair work was longer than anticipated due to the size incompatibility between the maggie bottles and the PVC housing. The current status is that the magnetometer is working well and there is the ability to quickly replace the unit if necessary. The torroidal magnetometer did not work when we arrived at the ship. The E.T.'s told us that it will not work until a new amplifier is designed and constructed.

Gravimeter - This system was trouble-free.

Real-Time-Data Acquisition System - This system is not yet operable.

Navigational Equipment - The scientific value of the stations during the second half of this leg was severely degraded due to poor navigation. Most of the ship's navigational systems either failed or malfunctioned.

Bridge SATNAV (Magnavox) - Power supply failed halfway through the leg and could not be repaired on the ship.

Upper Lab SATNAV - This unit was not working. The oscillator from this unit had been removed to L-DGO for repair prior to this leg.

Loran -C - This unit was not on the ship. It had been removed for repair in Hong Kong.

Pit Log Speed Log - This unit operated erratically during the entire leg. It would occasionally display anomalously low speed values for a few hours at a time. This unit had been worked on in Hong Kong.

Main Radar - This system had intermittent malfunctions. The E.T.'s think the problem is in the power supply.

Deck Equipment

Core Winch - We lost at least 2 days of ship time due to torque-converter and air intake blower failures. Additional time was lost due to the slow rate of hauling in required by the jury-rigged repairs. This unit was removed in Guam for repair. The core wire is in good condition. We had to discard approx. 20 fathoms.

Port Hydrowinch - We tested this system and it appeared to work well. The CTD wire was run out to 2300 fathoms and was mechanically and electrically sound.

Starboard Hydrowinch - This system was tested and appeared to work well. The wire was run out to 2500 fathoms and was mechanically sound. There is a splice at 1900 fathoms.