

Lamont-Doherty Geological Observatory | Palisades, N.Y. 10964  
of Columbia University

Cable: LAMONTGEO

Telephone: Code 914, Elmwood 9-2900

Palisades New York State

TWX-710-576-2653

CRUISE REPORT

Ship Name: VEMA

Cruise No: V3613

Departure: June 28, 1980  
Date

from Guam  
Port

Arrival: July 30, 1980  
Date

at Manila  
Port

Days at Sea: 31 days  
(Count day of departure but  
not day of arrival in port)

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

Area of Operation: Eastern, northern and western margins of Luzon, Philippines, and the  
North Luzon Ridge

Program Description: The goals of the cruise were to: 1) investigate the tectonic pattern on the east and west margins of Luzon, 2) to map zones of past, present, and incipient subduction adjacent to Luzon and the North Luzon Ridge, and 3) to determine the structural connection (if any) of the Zambales ophiolites with the oceanic crust of the South China Sea Basin. The principle tool used was a twelve-channel multi-channel seismic (MCS) ~~crust~~ system.

Program supported by what contract: OCE 79 19069

Participants: (All L-DGO unless otherwise specified)

<u>Name</u>	<u>Title</u>
D.E. Hayes	Chief Scientist
S.D. Lewis	Asst. Scientist
R. Roessler	Elect. Tech.
A. Ferguson	Elect. Tech.
K. Hegarty	Grad. Research Asst.
W.C. Robinson	Elect. Engineer
W.J. Robinson	Computer Op.
A. Hazelman	A.G. Tech.
H.R. Smith	A.G. Tech.
S.K. Rokobuku	A.G. Tech.
P.L. Williams	Sci. Observer
E.C. Nacario	Sci. Observer

Phil. Bureau of Mines

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

## V3613 Cruise Narrative

The ship departed on schedule, leaving Guam on the morning of 28 June 1980. The scientific goals of the cruise were:

- 1) to investigate the tectonic patterns on both the east and west margins of Luzon
- 2) to map zones of past, present, and incipient subduction adjacent to Luzon and the N. Luzon Ridge and
- 3) to determine the structural connection (if any) of the Zambales ophiolites with the oceanic crust of the S. China Sea Basin.

The principal tool used was a twelve channel multi-channel seismic (MCS) system, complemented by standard underway magnetics, gravity and 3.5 kHz echo sounding. Cruise V3613 constituted the second leg of these investigations; V3609, a sampling leg, was the first.

The initial 6.5 days were spent on a direct transit from Guam to the work area, east of Luzon on the Benham Rise. During this transit the new MCS eel was deployed for tests.

Approximately 2400 n.m. of MCS data was successfully collected (see Figure 1). The cruise was complicated and compromised somewhat by the occurrence of three typhoons, IDA, JOE, and KIM in slightly more than a two week period. A total of about 7 days of MCS operational time was lost due to these storms and modifications to the proposed track were required. During the first storm the MCS streamer was left out and the electrical/towing cable suffered extensive chafing even though steps were taken to help prevent this. The cable was repaired in about 10 hrs. The MCS streamer was pulled in well before the arrival of the second typhoon.

The quality of the MCS data appears to be good to excellent, noisy only during periods before and after the storm. Much of the data was taken in moderately shallow water and requires processing for further evaluation. In many areas, sediments of 3 km or more thickness were encountered. There are dramatic differences in the along strike tectonic expression of the Manila Trench and Luzon Trough.

Fifty sonobuoys (~ 35 Fairfield SR76; 15 SSQ41) were deployed at regular intervals, many in the Luzon Trough area. Two interesting SB's shot along strike of the melange wedge revealed a consistent picture of sedimentary layers overlying a layer with typical layer 2 velocity (~5 km/s). One clear "mantle" refraction (8.1 km/s) was recorded on SB 165 along the base of the E. Luzon margin.

In spite of the difficulties associated with the typhoons, the cruise appears to have been highly successful with all major data collection goals attained.

Equipment Performance. The entire MCS system performed very well with only a few minor problems encountered. The compressors and guns were down for less than two hours the entire leg and the DFS IV gave only occasional minor problems with tape drives. The streamer was quiet but we had difficulty monitoring the depth because only two depth transducers were operative after mid-cruise and one of these did not always give consistent readings. The depth control birds appeared to function well, but there are not two complete sets of operable birds on board- there are 10 good birds. Three defective birds are being returned from Manila. The streamer tail buoy was a matter of constant concern. It is poorly designed and sometimes tows erratically (even underwater on one occasion). It is strongly recommended that a completely revamped tail buoy assembly be developed.

All underway systems performed well, although it is frustrating to still be unable to get a signal from the maggie along N-S courses at low latitude. The maggie is definitely adversely affected when towed too close to the big airguns. It performed well only when towed on the starboard boom and was hauled in at each major turn to port to avoid tangling with the airgun harnesses.

The gravity system performed well - a gyro failed about 6 days from Manila. It was replaced and there is still one spare gyro on board.

The 3.5 kHz PDR worked fine - the 12 kHz transceiver was repaired late in the

cruise, tested, but was not used further. The profilers and PDR recorders operated O.K. but continue to suffer from old age symptoms. A new profiler logic module sent to Guam was not operable. The bridge SATNAV functioned well. The large DECCA radar was down the entire cruise and the small backup unit was used after it was repaired at sea following totally ineffective service/repairs in Guam. The LORAN C system is operating well.

Personnel: There continues to be excellent cooperation and support between the ship's crew and the scientific crew. Their fine efforts deserve acknowledgement. There are no major personnel problems. Two non-L-DGO scientists participated (Nacario, PBM; Williams, unattached) in the cruise.

