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CRUISE REPORT

Ship Name: R.V. VEMA Cruise No: 3504

Departure: May 25, 1978 (Date) from Singapore (Port)

Arrival: June 2, 1978 (Date) at Manila, Philippines (Port)

Days at Sea: 8 Days Foreign Port: 2 (No. of days in arrival port)

Area of Operation: Sunda Shelf and China Basin

Program Description: Transit leg, 2 cores, 4 sonobuoys (3 on Sunda Shelf, 1 in China Basin). Magnetics, bathymetry, gravity, seismics data collected.

Participants: (All L-DGO unless otherwise specified)

J. LaBrecque	Chief Scientist
R. Gerard	Asst. Chief Scientist
M. Banuve	Coring O.S.
S. Lewis	Grad. Res. Asst.
D. Mossman	E.T.
C. Mrozowski	Grad. Res. Asst.
B. Ostrowski	E.T.
J. Schwartz	Core Describer
H. Smith	Airgun

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

CRUISE REPORT

Cruise 3504 of the R.V. Vema was ostensibly a transit leg to take the ship from Singapore, its port of overhaul to Manila, the Phillipines. Total cruising time was approximately 8 days from May 25 to June 2, 1978. Four experiments were carried out during the cruise on the Sunda Shelf and within the China Basin. In addition to the acquisition of bathymetric, (12 kc and 3.5 echo sounders), single channel seismics, magnetics, and gravity, Litton Industries Maxipulse Acoustic source was also placed aboard the vessel and tested during this leg. The following is a brief description of the additional experiments carried out during the cruise.

(1) Sonobuoys 25, 26, 27 were shot on the Sunda Shelf as part of a low frequency seismic wave attenuation experiment designed by R. Houtz. The sonobuoys were recorded on magnetic tape as was the recording system response to test signals. Sloping basement may have complicated the first two sonobuoys. The last buoy (#27) was apparently excellent.

(2) Two three-pipe (V35-5, V35-6) sediment cores were taken within the China Basin in an area of acoustically transparent sediments. Core #5 was atop a local bathymetric positive area while the other was within a nearby basin in areas designated by J. Damuth. Core samples were taken at 20 cm. intervals and hermetically sealed immediately after extrusion for later studies of the sediment bulk properties.

The local knolls are capped by acoustically transparent sediment which may be traced to underlie sequences of acoustically stratified sediments in the adjacent basins on seismic profiler records. 3.5 kc records indicate that some of the stratified sections of the basins may be expanded sequences of the adjacent knolls.

Emery and Ben Avraham (1972) concluded that the transparent sediments outcropping on the knolls and underlying the basins represented predeformational basement with syn-and-post deformational turbite sediments forming the striated basin infilling.

However, Ludwig et al. (in prep.) noted that the ages from cores of positive areas as well as seismic velocity data supported the conclusion that the transparent sediments were pelagic drape with perhaps terrigenous infilling.

The initial core description supports Ludwig et al. (in prep.). The core from the positive area consists largely of pelagic ooze with small amounts of volcanic ash (preliminary analysis). The basin sediments are somewhat grayer in color but generally similar in composition suggesting a greater volcanic ash content. Many layers of volcanic ash were also found within the basin cores. This suggests that the 3.5 kc reflecting striations were due to increased volcanic ash content or ash layering. The coarse fraction of the bottom sample was extremely small suggesting nepheloid type depusition rather than turbidite flow as the transport mechanism. No large-scale graded bedding was found. The contrast in basin reflector sequences, therefore, is probabl

derived from an increase in regional volcanic activity rather than large scale deformation. The heavier ash simply flows to the point of least gravitational potential within a nepheloid layer thereby filling in the upper basins. The basins therefore should provide an excellent area for regional volcanic stratigraphic studies.

(3) A north south magnetic line was run for Brian Taylor in the eastern China Basin in an attempt to extend eastward the magnetic lineation pattern.

(4) Prior to arrival in Manila a SSQ57 sonobuoy refraction profile (#28) was conducted in the East China Basin approximately 200 miles east of Manila. The sources were Maxi pulse charges fired at one minute intervals and recorded on magnetic tape. The profile revealed refraction arrivals at Moho velocities though the profile was unreversed.

The Vema was in excellent condition after leaving Singapore. The ship was very quiet and was able to consistently travel at 11 knot speeds. The living conditions aboard the ship were adequate to very good. The food was very good and always tasty. The crew was well desciplined and very efficient. It is strongly suggested, however, that an air conditioning system be installed in the scientific party quarters. This is the only remaining uncooled area aboard ship. The temperatures within these quarters reached 90^{o} consistently with very little fresh air circulation. Sleeping especially in upper bunks was virtually impossible.

Equipment aboard the vessel functioned well with some exceptions. A Sperry Doppler Speed Log was installed during the Singapore Yard Period. It was calibrated on a marked course in Singapore harbor and was proved accurate. The log functioned well during the cruise as did the overhauled satellite navigator system. The PDP-8S and old backup satellite receiver was also repaired and functioned well.

A good deal of noise was experienced on the 3.5 kz PDR The signal was predominantly in the 120 hz range and its source appeared to be located in the transducer array or associated cabling. We did not have sufficient time to locate the source of the problem and work is continuing.

The seismic data was quite good considering the 10-11 knot speeds which we were forced to do. It was found that significant improvement in the recordings could be obtained by bandpassing the eel signal within 5-100 hz prior to any stage of amplifcation to avoid noise generation due to signal distortion caused by unwanted out of band eel noise.

Some problems were experienced in maintaining magnetometer signal on north-south directions due to the directionality of the magnetometer sensor coil. The polarizing medium will be changed from water to kerosene in the upcoming leg to improve the signal strength.

I wish to thank Captain Henry Kohler and the ship's crew and scientific staff for making the cruise a successful scientific venture.

REFERENCES

Emery, K.O., Ben-Avraham, Z., 1972, Structure and stratigraphy of China Basin, American Association of Petroleum Geologists Bulletin, vol. 56, p. 839-859.

Ludwig, W.J., Kumar, N., and Houtz, R.E., in preparation, Profiler sonobuoy measurements in the South Sea Basin.