

CRUISE REPORT

Ship Name: CONRAD

Cruise No: 2202

Departure: January 16, 1979 from Manzanillo
Date Port

Arrival: February 18, 1979 at Manzanillo
Date Port

Days at Sea: 34 Days Foreign Port: 4 No. of days in arrival port

Area of Operation: Clipperton Fracture Zone - East Pacific Rise

Program Description:

ROSE Phase I

Participants: (All L-DGO unless otherwise specified)

John I. Ewing	Chief Scientist	WHOI	Ivars R. Bitte	OBS Tech.	
Graham M. Purdy	QBH Seismologist	WHOI	Carlos Gutierrez	MCS Tech.	
Carlton W. Grant	QBH Tech.	WHOI	Robert J. Leyden	Tech.	
Donald Koelsch	QBH Engineer	WHOI	Stuart P. Nichenko	OBS Tech.	
John B. Diebold	MCS Sci.		Charles Salcedo	E.T.	
Dwight Mossman	MCS Tech.		Martin W. Iltzsche	Aig Gun Engineer	
Timothy W. Barash	OBS Sci.	MIT	Gerald P. Dyer	QBH Tech.	MIT
Robert G. Bookbinder	OBS Engineer		Sean C. Solomon	OBS Seismologist	MIT
George R. Gunther	OBS Tech.				

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

CONRAD departed Manzanillo 16 January after recovery of harbor tested instruments. One of the main reasons for choosing Manzanillo harbor for shallow tests was to make direct contact with personnel at the Oceanographic Research Lab in that port who had been assisting in negotiations with the Mexican government. The ROSE operating area (Rivera fracture zone) lies within the 200 mile limit of Mexico. Though a favorable decision had been expected regarding cooperative work in this area none was received before departing Panama. The ROSE experiment involving eleven research groups with plans to deploy approximately 70 ocean bottom instruments using five ships with support and participation from several land groups depended ultimately on political approval. The decision by the participating scientists was that approval was imminent so all ships proceeded to the ROSE area to start deployment on 20 January. Final tests of OBS packages were conducted then deployment proceeded. Two instruments were deployed by CONRAD and several by other ships when the decision was made to leave Mexican waters.

The active phase or ROSE I area was changed to 11.5-13.5 North and 102° to 104.5° W. in the region of the Clipperton fracture zone. This decision proved to be a wise one for two main reasons. First, approval never was granted for the Rivera region and second, the active phase designed to study typical rise crust was easier to conduct in the seismically quieter Clipperton area.

Ocean bottom seismometers (OBS) and ocean bottom hydrophones (OBH) were deployed from the rise axis to 5 mil/yr old crust on each flank: four ships participated in the deployment-recovery of instruments and firing of shots for the active phase. The R/V CONRAD, carried besides the Lamont group, WHOI and MIT. The R/V KANA KEOKI from HIG hosted Oregon State University. DE STEIGUER which is a Norda ship carried Scripps and U.C. Santa Barbara instruments and personnel. The R/V THOMPSON from the University of Washington hosted the University of Texas geophysics group. The four ships deployed a total of 67 ocean

bottom instruments. The R/V HAYES from the Navy Underwater Sound Lab deployed a deep vertical hydrophone array for their water velocity study.

Explosives (Tetrytol and Tovex) provided the main noise source for the active phase although CONRAD did run one long East and West air gun line and KANA KEOKI did use maxipulse on one line. The plans called for the use of a total of 36.4 tons of explosives. CONRAD carried approximately 19 tons to the experiment and had 7 tons remaining aboard at the end of phase one. The largest charges were 1 ton fired at a two-hour schedule, floated at 300' depth. These were launched while underway at full speed floated by two empty 55-gallon drums.

The ocean bottom instruments were deployed in a pattern forming one main line parallel to the spreading direction and four branch lines along isochrons. Each line was shot twice; once with small charge (5 and 25 lb) at 5 kt, with an interval of 5 minutes, and again with large charges (200 and 500 lb) at 10 kt and 15 minutes. During this part of the experiment, CONRAD recorded Expanded Spread Profiles (ESP's) with her MCS system. KANA KEOKI and THOMPSON were equipped with Raydist and Mini-Ranger ranging transponders and also L-DGO-designed shot instant encoders. While these ships were shooting the mainline and the 3 principal branchlines, CONRAD recorded seven ESPs with separations of up to 155 km. Expedience required that the ESPs be recorded in a variety of ways:

- 1) shooting ship at 10 kt, CONRAD follows at 5 kt
- 2) shooting ship at 10 kt, CONRAD on reciprocal course at 5 kt
- 3) shooting at 5 kt, CONRAD on reciprocal course at 5 kt.

A record length of 39 seconds was used for all ESPs. A total of 435 shots were recorded.

The Clipperton fracture zone region had not been well surveyed prior to ROSE Phase I as the region was not the primary operating area. The area was surveyed as the experiment progressed with all ships conducting routine underway soundings between deployment and recovery phases. The magnetometer and gravity

equipment on CONRAD was used extensively during survey operations. Seismic reflection profiling was not used as a survey tool to avoid interfering with scheduled explosive shot lines.

Equipment

The gravity and sounding equipment worked satisfactorily. Some difficulty in recording magnetics was experienced for two reasons. The field is weak at these latitudes of the survey and the magnetometer cable is shorter than it should be. The Lab analog recorder required considerable attention by the watch to keep the records on scale. Although the short cable and weak field were factors the recorder should be thoroughly overhauled or replaced. A new magnetometer cable was put on CONRAD prior to C-2113 but it was parted by the MCS streamer during leg C-2114. Splice attempts including one tried during C-2202 were futile as this cable was probably flooded when it parted. The Hydro winch used for release tests worked satisfactorily and was chipped and painted after the tests. The trawl winch was not used but it appeared to need maintenance. The large air guns, compressors and engines received considerable preventive maintenance by Martin during the leg and should be ready for the next MCS leg. There is apparently at least one small leak in the streamer indicated by a slow leak after it was stored on the reel. This leak can undoubtedly be spotted and repaired during the next deployment. The streamer was balanced and towed well during C-2202. One tape drive for the DFS IV was down part time but caused no recording problems for the wide spaced shots of the ESP profiles.

The overall appearance of the CONRAD is excellent. The officers and crew apparently have worked diligently under Captain Olandor who sets an example of untiring effort for the ship and scientific parties.