

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

Cable: LAMONT, Palisades, New York State

Telephone: Code 914, Elmwood 9-2900

Twx: 710-576-2653

CRUISE REPORT

Ship Name: R/V CONRAD

Cruise No: C21-07

Departure: April 8, 1978 from Punta Arenas, Chile
Date Port

Arrival: May 7, 1978 at Valparaiso, Chile
Date Port

Days at Sea: 30 days Days Foreign Port: 3 days
No. of days in arrival port

Area of Operation: Chile Margin between 55° and 47°
S.E. Pacific Basin between 50° and 60° S, 95° and 80° W

Program Description:

Underway geophysical survey of Southern Chile margin and Southeast Pacific Basin.

Participants: (All L-DGO unless otherwise specified)

| | |
|-----------------|--------------------|
| Steven C. Cande | Chief Scientist |
| Blaine Hall | Co-Chief Scientist |
| D. Hutchinson | E.T. |
| R. Rottier | E.T. |
| W. Robertson | E.T. |
| M. Iltzche | Air gun |
| D. Keizer | Core bosun |
| C. Heitman | Chilean observer |
| V. Rodriguez | Chilean observer |
| E. Vera | Chilean observer |

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

CRUISE REPORT

C21-07 left Punta Arenas on April 8 and arrived in Valparaíso on May 7. The primary objectives of this cruise were to survey the Chile margin between 52° and 46°S , to trace the magnetic lineation pattern in the area of 50° to 60°S , 95° to 80°W , and to determine the gravity signature of the trench in the area of 35° to 40°S .

The work along the margin was carried out in two stages, separated by the work in the S.E. Pacific Basin. Altogether we made nine (9) crossings of the margin between 47° and 53°S and a long traverse of the Fuegian terrace between 53° and 55°S . The work along the margin was carried out at 5 1/2 knots with two large (460 cu.in.) air guns, plus gravity and magnetics. It was possible to trace basement on the Nasca plate to the trench axis on all of the crossings and on several crossings basement could be traced from 5 to 10 miles landward of the inner wall of the trench. Evidence was observed for what appears to be fairly recent deformation of the trench sediments on some profiles. In addition, on several crossings we observed sediment filled basins along the upper portions of the inner wall of the trench. From the magnetics data we were able to date the age of the crust at the trench axis as 15 m.y. at 50°S (anomaly SE) and 10 m.y. at 48°S (anomaly 5).

9 sonobuoys were shot along the margin both on the shelf and seaward of the trench axis. Generally the results from the sonobuoys were poor, which we believe was primarily due to the con-

sistently bad weather conditions we encountered along the margin.

The track in the S.E. Pacific basin was run at 10 knots with the small Lamont air gun. The data showed that the "curious bathymetric lineament" observed by Herron around 55°S is indeed a remarkable bathymetric feature that separates the (roughly) E.W. striking magnetic lineations to the north from N.S. striking anomalies 23 to 27 to the south. The anomalies to the south of the bathymetric feature appear to be the northward continuation of the Ellsworth anomalies observed off the Antarctic margin. The identification of anomalies 23 to 27, getting older to the west, should be an important piece of the puzzle in resolving the early Tertiary tectonic evolution of this area.

The underway geophysical systems all worked well except for a recurrent problem with the gravity system. The bearings on the gravity table were replaced while the ship was in port in Punta Arenas. Although this corrected a major problem with the gravity system the table off-level errors continued to be excessively large during heavy seas. The origin of this problem could not be determined. The gravity data collected during heavy seas is of questionable value. In addition, the gravity system was down for three (3) days during the middle of the cruise due to a failed torquer amplifier.

During the leg there were three Chilean observers onboard. One of them (E. Vera) became quite ill the second day out of port and had to be transferred at sea to a ship inbound to Punta Arenas.

STEVEN C. CANDE
Chief Scientist

