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

Cable: LAMONT, Palisades, New York State

Telephone: Code 914, Elmwood 9-2900

TWx: 710-876-2653

### Cruise Report

Ship name: R.V. Conrad  
Operating Institution: Lamont-Doherty Geological Observatory  
Clearance Country: Chile  
Dates: April 7, 1982 to May 9, 1982  
Port Calls: Valparaiso, Chile

Project Title: Ridge Crest Subduction in the southern Chile Margin

Senior Scientist: Dr. Steven C. Cande

#### Chilean Participants:

Ramon E. Monardes Montero  
Guillermo Alfaro Hanne  
Patricio Ocevedo Orienquiz  
Rosaline Fuenzalida Fuenzalida

#### Scientific Party:

Steven L. Hudson  
Dwight Mossman  
Colin I. Bateman  
David C. Roach  
Joseph M. Loubriel  
Robin B. Leslie  
Susan P. Coughlin  
Uri Ten-Brink

### Description of Scientific Program

A detailed marine geophysical survey was made of the Chile Trench in the area between 45°S and 48°S. The focus of the cruise was to study the collision zone where the Chile Ridge is subducted beneath the Chile Trench. Background information from previous cruises indicated that this area was very dynamic and that unusual processes involving the destruction and erosion of the inner trench wall might be recurring.

During the CONRAD cruise we collected nearly 5000 miles of seismic reflection data, using both high-resolution water guns as well as large air guns. The data were acquired on a 100 m long streamer and recorded on a single channel digital acquisition system. The location of the newly acquired seismic data is shown in figure 1. During the underway operations magnetics, gravity, and bathymetric data were also collected. The ship's position was determined by satellite navigation.

During the cruise we acquired 19 heat flow measurements on the inner wall of the Chile Trench. Together these measurements formed four transects of the inner wall. The locations of these transects are shown in figure 2. In addition 8 piston cores were collected and 5 seismic refraction lines using disposable sonobuoys were made during the cruise. The locations of these stations are also shown in figure 2.

The preliminary results of the seismic refraction reflection surveys indicate the collision zone is indeed very active. The rift valley of the Chile Ridge was traced for a distance of 50 km along the base of the trench inner wall before abruptly plunging beneath the inner wall. The spreading system is obviously still very active even though it is close to the trench. North of the collision zone we mapped deformational structures in the trench turbidite fill. South of the collision zone we mapped a large field of fold ridges paralleling the trench inner wall.

The heat flow measurements indicate that the trench inner wall is warmer than normal, particularly in the area of the collision zone. Here, very high values were found at the foot of the inner wall supporting our conclusion that the rift valley is still very active.

The initial data reduction should be finished by mid-October. We will be providing scientists in Chile (Guillermo Alfaro H.) core samples as soon as they are available. Bathymetric, magnetic, and gravity measurements will be sent to the Instituto Hidrografico de la Armada by late October. Copies of all the geophysical data will be sent to Sr. Eduardo Gonzales at ENAP when the data reduction is complete.



