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

Cable: LAMONTGEO **Telephone: Code**
914, 359-2900
Telephone Code 914, Elmwood 9-2900
TWX: 710-576-2653

RESEARCH CRUISE REPORT

SHIP NAME: ROBERT D. CONRAD

OPERATING INSTITUTION: Lamont-Doherty Geological Observatory of Columbia University

CLEARANCE COUNTRIES: Morocco

PROJECT TITLE: "Geophysical Investigations of the Moroccan Margin"

DATES: 17 May - 5 June, 1983

FOREIGN PARTICIPANTS: none

PORT CALLS: Funchal, Madeira

SENIOR SCIENTIST: Dr. Dennis E. Hayes

DESCRIPTION OF SCIENTIFIC PROGRAM: Multichannel seismic reflection profile survey of Moroccan continental margin

OBSERVATIONS AND SAMPLES: 1800 track miles of 48-channel, digitally recorded seismic profiles, 56 digitally recorded sonobuoy measurements, and underway magnetic, gravity, and 3.5 kHz echosounding measurements: all returned to Lamont-Doherty Geological Observatory.

Preliminary data reduction is expected to be completed in 3-4 months. Copies will be transmitted when available. Final data reduction is expected in 12-18 months. This will be transmitted when available.

NAME AND ADDRESS OF CONTACT TO WHOM INQUIRIES REGARDING CRUISE SHOULD BE MADE:

Dr. Dennis E. Hayes
Lamont-Doherty Geological Observatory
Palisades, New York 10964

(914) 359-2900

sent 6/28/83 to:

R/V Clearance Officer
OES/OFA/MST
U. S. Department of State
Washington, D. C., 20520

PARTICIPANTS: ROBERT D. CONRAD CRUISE 24-06
16 May - 3 June, 1983

1.	Dennis E. Hayes	Chief Scientist	Lamont-Doherty
2.	Carol Mountain	Scientist	" "
3.	Jenny Glasser	Scientist	" "
4.	David Divins	Scientist	Texas A & M
5.	James S. Holik	Scientist	" "
6.	Paul Matthias	Scientist	" "
7.	Joe Stennett	MCS Engineer	Lamont-Doherty
8.	Steve Hudson	Streamer Tech (Science Officer)	" "
9.	Jim Smith	Elect. Engineer	" "
10.	Kevin Little	Elect. Tech.	" "
11.	Danny Bolles	Asst. Gunner	" "
12.	Martin Iltzsche	Gunner	" "
13.	Ropatee Maiwiriwiri	Core Bosun	" "
14.	Harry Van Santford	Sr. Electronics T.	" "

CRUISE REPORT

CONRAD 24-06
16 May - 3 June, 1983

Dennis E. Hayes
Chief Scientist

CONRAD cruise C24-06 departed Funchal, Madeira approximately 1000 hours 17 May 1983 on the second part of a two-phase program to investigate the Continent-Ocean Boundary zone and the continental margin of Morocco between 30° and 34°N latitude. The deep seismic stratigraphy of the oldest oceanic crust and its relationship to the actual stratigraphy sampled during three previous legs of the Deep Sea Drilling Project were also targets of investigation. A third goal was to identify potential targets for future drilling that could help solve (with existing technology) important problems regarding the evolution of old passive margins.

We were fortunate to have fair weather and no major equipment problems. Our primary tools were 48-channel digital seismics and expendable sonobuoys, both utilizing four 466 cu in airguns. Some initial air gun problems (of varying types) were resolved during the first 2-3 days and more than 75% of the approximately 1800 track miles of MCS were collected with all four guns in operation. Good data were also obtained from 56 sonobuoys. Most sonobuoys were deployed in deep water where good wide-angle reflections and 3-5 separate refraction arrivals were typically recorded. Velocities of 4.5 - 5.5 km/s, characteristic of oceanic layer 2, were routinely observed. Refractions, representing velocities of 6.5 - 7.5 km/s, were also observed at many of the sonobuoy stations.

The oceanic basement was mapped as a continuous reflector from the older M-Sequence magnetic lineations to at least the westward edge of the mapped diapiric province. Several strike lines were run just seaward of the diapiric province. Sediment "thicknesses" vary along strike somewhat ranging from about 2.5 sec over basement highs to 3.5 sec over the lows. There is some suggestion that oceanic basement may dip eastward and extend slightly to the east below the diapiric province boundary. Several deeply incised canyons were crossed where the uppermost sedimentary section (up to 1.0 sec) is absent due to erosion or non-deposition.

The gravimeter, magnetometer and 3.5 kHz echo sounder operated without significant problems. One to two days of moderately high following seas lead to "noisy" (±5 mgal) gravity data during that period. The magnetic anomaly previously mapped near the western boundary o£ the diapiric province was not observed north of the Mazagan escarpment region. This and other contrasting geophysical characteristics indicate that an important along-strike structural discontinuity in the COB probably exists near latitude 33.5°N.

There were no personnel problems and both the scientific/technical staff and the ship's officers and crew did an outstanding job in helping us realize our cruise objectives. Nine sonobuoys were unsuccessful for various reasons. Only two of these sonobuoys appeared to have gotten tangled in the MCS streamer. Five FAIRFIELD long-range (79 mHz) commercial sonobuoys were deployed but gave only marginal to poor results. One FAIRFIELD buoy failed entirely after 25 min of deployment. The military

SSQ-57 sonobuoys consistently gave good results and could often be received out to ranges of 17-18 miles. About 15 hours of single-channel seismic data, using the water gun, were obtained along with 3.5 kHz, gravity, and magnetics during the short final transit leg to Funchal. The cruise ended approximately 1200 hours, 3 June 1983.

I extend my sincere thanks to all participants--and acknowledge another job very well done.

Dennis E. Hayes

Chief Scientist

Provisional Track Chart for C24-05 & 24-06