

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

Cable: LAMONT, Palisades, New York State

Telephone: Code R14, Elmwood 9-2900

TWx: 710-576-2453

CRUISE REPORT

Ship Name: ROBERT D. CONRAD

Cruise No: 21-14

Departure: 10 Sept. 1978 from Bergen, Norway
Date Port

Arrival: 10 Oct. 1978 at Bergen, Norway
Date Port

Days at Sea: 30 Days Foreign Port: 3
(Count day of departure but (No. of days in arrival po
not day of arrival in port) before next leg)

Area of Operation: Norwegian Sea

Program Description: 1) Two-ship reflection/refraction seismic experiments of the Norwegian Continental Shelf, Voring Plateau and Jan Mayen Ridge in co-operation with Norwegian Scientist and the R/V SVERDRUP.

2) Multichannel Seismic (MCS) study of the Norwegian Sea.

Program supported by what contract: NSF DPP78-05733

Participants: (All L-DGO unless otherwise specified)

| Name | Title |
|-------------------|---------------------|
| PETER BUHL | CHIEF SCIENTIST |
| JOHN DIEBOLD | Co-Chief Scientist |
| Nicholas Ludas | Air Gun Technician |
| Olav Eldholm | Norwegian Observer |
| Baard Johansen | Norwegian Observer |
| Carlos Gutierrez | MCS Technician |
| Daniel Hutchison | Gravity Technician |
| William Koczynski | E.T. |
| Karen Jacobs | E.T. |
| Ross Rottier | E.T. |
| John DiBernardo | Air Gun Technician |
| Charles Salcedo | E.T. MCS |
| Arnold Stein | E.T. MCS |
| Robert Suozzo | Computer Technician |
| John Mutter | MCS Observer |

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

CRUISE NARRATIVE

The scientific objective of the first half of the cruise was to determine the deep crustal structure at several places on the Norwegian Continental Shelf, Vøring Plateau and Jan Mayen Ridge using the ESP and COP seismic techniques developed at Lamont-Doherty, and previously used in the Western Pacific and Caribbean Sea. To accomplish this we entered into an agreement with Norwegian scientists, principally Olav Eldholm of the University of Oslo, and Eirik Sundvor of the University of Bergen. The Norwegians would provide a ship, the R/V SVERDRUP, and explosives, and act as a shooting ship. We would act as the receiving ship utilizing the CONRAD's multichannel digital seismic system to record the data. Both ships were outfitted with voice communications, shot-break radios and Raydist Ranging equipment provided by Lamont-Doherty.

At the start of two-ship operations, John Diebold and Charles Salcedo were on board the SVERDRUP to assist in the shooting and to operate the shot-break recorder and radio. Midway through the experiments Diebold returned to CONRAD and Salcedo returned at the end of the two-ship work.

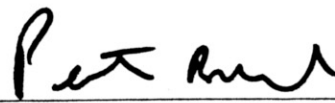
The five sites chosen for ESP and COP profiles were selected to sample different geological provinces. Selection was based on earlier geophysical work in the area and examination of sonobuoy and single channel seismic monitor records of the previous leg of CONRAD 21-13. ESP 1 was on the Outer Continental Shelf near the Faeroe Shetland Escarpment. ESP 2 was on the Outer Continental Shelf near the Vøring Plateau Escarpment; ESP 3 was on the Vøring Plateau; ESP 4 was on oceanic basement, and ESP 5 on the Jan Mayen Ridge south of Jan Mayen Island.

CRUISE NARRATIVE, Cont'd.

Table I lists the ESPs + COPs by line number and range. The track chart shows their locations by line number.

There were no real difficulties with the two-ship operations. The Raydist interface to the digital recording system occasionally did not work, so a backup hand recorded log had to be used during data processing. Weather was rough except during the two-ship profiles, including the rare appearance of a hurricane off the coast of Norway.

The second half of the cruise was devoted to MCS and Sonobuoy surveys of the Ridge system between Jan Mayen and Iceland and of the Iceland-Faeroe Ridge. Multichannel Lines 201 through 214 were recorded without interruption except for a brief hiatus between Lines 204 and 205. This gap represents time spent untangling an air gun and streamer cable snarl which resulted from a brief but total loss of ship's power. Lines 201, 205, 206, 207, 208 and 209 were zigzag crossings of the Jan Mayen Ridge, extending from the Norway Basin in the East to the Iceland Plateau in the West. Lines 202, 203 and 204 were run entirely on the Iceland Plateau. Lines 210, 211, 212 and 213 compose two complete crossings of the Iceland Faeroe Ridge. Line 214 transects the Faeroe Shetland Channel, and ends after crossing the Faeroe Shetland Escarpment. In the course of recording Lines 201-214, twenty military sonobuoys were deployed and the signals recorded on the DSF-IV auxiliary channels. The last 38 hours of the leg were spent recovering the MCS streamer and steaming to Bergen.


PETER BUHL


JOHN DIEBOLD

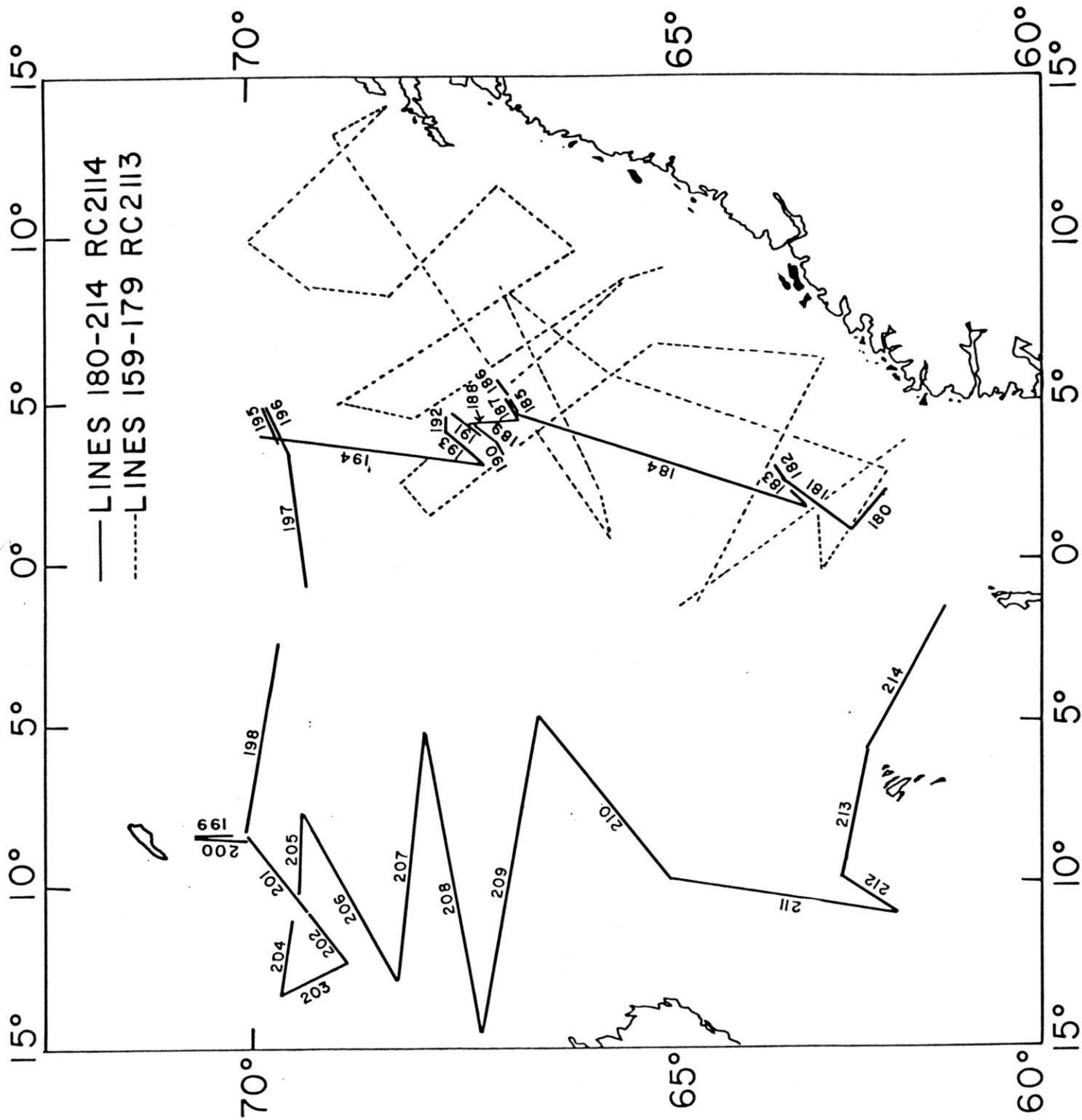


TABLE I

EXPANDING SPREAD PROFILES

| | <u>Maximum Range KM</u> | <u>Nautical Miles</u> |
|--------|-----------------------------|---------------------------|
| ESP 1 | 47.1 | 25.4 |
| ESP 2A | 12.3 | 6.6 |
| ESP 2 | 46.5 | 25.1 |
| ESP 3 | 56.1 | 30.3 |
| ESP 4 | 59.9 | 32.3 |
| ESP 5 | 50.5 | 27.3 |

CONSTANT OFFSET PROFILES

| | <u>Range KM</u> | <u>Naut. Miles</u> | <u>Profile Lgth KM</u> | <u>Naut. Miles</u> |
|-------|---------------------|------------------------|----------------------------|------------------------|
| COP 2 | 21.3 | 11.5 | 18.5 | 10.0 |
| COP 3 | 21.5 | 11.6 | 26.0 | 14.0 |
| COP 4 | 20.3 | 11.0 | 37.0 | 20.0 |
| COP 5 | 16.9 | 9.1 | 19.6 | 10.6 |