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CRUISE REPORT

L9-84-CP, Marshall Islands to Hawaii

by

W.C. Schwab

The U.S. Geological Survey (U.S.G.S.) R/V S.P. LEE (cruise I.D. L9-84-CP) left Majuro, Ratak Chain of the Marshall Islands on August 28, 1984 and reached Hawaii on September 15, 1984 via the Mid-Pacific Mountains (Fig. 1); a total of 20 days at sea. The scientific party along with their affiliations are listed on Table 1. The main objectives of the cruise were to study the distribution and composition of ferromanganese-oxide crusts in the Marshall Islands area and to retrieve a current meter/sediment trap mooring deployed on Horizon Guyot, Mid-Pacific Mountains, in October 1983 on the U.S.G.S. L5-83-HW cruise.

The navigation system used was an integrated satellite navigation-Loran C-dead reckoning system that was updated by radar when possible. A total of 5410 km of 12 kHz and 3.5 kHz seismic-reflection data, and 730 km of 80 in^3 to 148 in^3 airgun seismic-reflection data were collected (Fig. 1). The sampling equipment used and types of samples collected are listed on Table 2. A total of 23 stations were occupied collecting: 13 dredge hauls, on seamount, atoll, and island flanks of the Marshall Islands; 2 box cores from the sediment cap of a seamount in the north Marshall Islands; and the current meter mooring along with 8 gravity cores from the top of Horizon Guyot. Preliminary chemical analyses of ferromanganese-oxide crusts were conducted on board and are presented in Table 3.

The parent project for this cruise was the Marine Metallogenesis Project (U.S.G.S. - Office of Energy and Marine Geology, Menlo Park, CA). Partial funding was received from the U.S. Department of Interior, assistant secretary of Teritorial and International Affairs and the funding amount was $197,000.00.

Table 1 Scientific Party

Alan J. McClenaghan --- Ship's Captain (U.S.G.S., Menlo Park)

Bill Schwab --- Chief Scientist (U.S.G.S., Woods Hole)

Kevin O'Toole --- Mechanical Technician (U.S.G.S., Menlo Park)

Paul Wenberg --- Mechanical Technician (U.S.G.S., Menlo Park)

James Vaughan --- Electronic Technician (U.S.G.S., Menlo Park)

Rick Viall --- Electronic Technician (U.S.G.S., Menlo Park)

Joe Stagg --- Geologist (U.S.G.S., Menlo Park)

Bob Weldin --- Geologist (Bureau of Mines)

Tim Ling --- Geologist (U.S.G.S., Woods Hole)

Robert Rowland --- Geologist (U.S.G.S., Reston)

Henry Meyer --- Geologist (Purdue University)

Alice' Davis --- Geologist (U.S.G.S., Menlo Park)

Leda Beth Pickthorn --- Geologist (U.S.G.S. Menlo Park)

Janet Haggerty --- Geologist (University of Tulsa)

Joanne Thede --- Geologist (U.S.G.S., Menlo Park)

Chris Wilson --- Chief Navigator-Data Curator (U.S.G.S., Menlo Park)

Robin Bouse --- Navigator (U.S.G.S., Menlo Park)

Wendy Bohrson --- Navigator (U.S.G.S., Menlo Park)

Kaye Kinoshita --- Watch stander (U.S.G.S., Menlo Park)

Table 2 Station Operations

Station Number	Date of Occupation	Latitude	Longitude	Water Depth (m)	Sampling Device	Samples Collected
1 Majuro Atoll	J.D.210	07°15.0'N	171°00.5'E	2250-2230	Chain Dredge	10 kg volcanic breccia with thin Mn oxide crust
2 Majuro Atoll	J.D.210	07°14.1'N	171°0.3'E	1480-1500	Chain Dredge	250 kg poorly indurated limestone with thin Mn oxide crust
3 Majuro Atoll	J.D.210	07°15.5'N	170°59.1'E	2000-3100	Chain Dredge	1 kg basalt and limestone coquina
4 Unnamed Seamount	J.D.211	08°44.8'N	169°44.3'E	3550	Chain Dredge	4 kg volcanic breccia with phosphatized limestone matrix and rounded basalt cubbles
5 Unnamed Seamount	J.D.211	08°45.3'N	169°47.5'E	2900	Chain Dredge	150 kg volcanic breccia in phosphatized limestone matrix, angular pieces of basalt, and pieces of Mn oxide crust without substrate. Mn oxide crust up to 4 cm thick
6 Unnamed Seamount	J.D.212	08°47.3'N	169°43.8'E	-	Chain Dredge	No recovery Lost 4000 m of cable
7 Jemo Island	J.D.213	10°05.3'N	169°31.8'E	-	Chain Dredge	No recovery Lost 1200 m of cable
8 Jemo Island	J.D.213	10°05.1'N	169°36.6'E	1000-1680	Chain Dredge	2 kg limestone with thin Mn oxide coating
9 Jemo Island	J.D.213	10°02.2'N	169°34.1'E	-	Pipe Dredge	No recovery
10 Unnamed Seamount	J.D.214	11°01.2'N	170°10.6'E	1575-2000	Pipe Dredge	0.25 kg Mn oxide crust without substrate; crust about 3 cm thick
10 Unnamed Seamount	J.D.214	11°00.5'N	170°12.2'E	2000	Chain Dredge	1.0 kg of Mn oxide crust without substrate; about 2 cm thick
10 Unnamed Seamount	J.D.215	11°00.3'N	170°13.8'E	1800	Chain Dredge	0.6 kg of Mn oxide crust without substrate; about 2 cm thick
11 Unnamed Seamount	J.D.216	12°11.0'N	168°59.7'E	1300-1800	Chain Dredge	50 kg volcanic breccia with phosphatized chalk matrix, loose basalt pebbles, and Mn oxide crust (3 cm thick) without substrate
12 Unnamed Seamount	J.D.216	12°11.0'N	168°57.2'E	-	Chain Dredge Gravity Core	No recovery No recovery
13 Unnamed Seamount	J.D.217	13°54.3'N	167°37.6'E	1600	Chain Dredge	3 kg chalk with Mn oxide crust (ranging in thickness from 5 mm to 4 cm)
14 Unnamed Seamount	J.D.217	13°54.0'N	167°39.2'E	1600	Chain Dredge	50 kg volcanic breccia with phosphatized chalk matrix with Mn oxide crusts up to 6 cm thick
15 Unnamed Seamount	J.D.217	13°55.3'N	167°31.9'E	-	Chain Dredge	No recovery
16 Unnamed Seamount	J.D.218	13°55.7'N	167°26.8'E	1380	Box Core/ Bottom Camera	40 cm of penetration. Recovered a nannoplankton-foram ooze along with a bottom photo
17 Unnamed Seamount	J.D.218	13°54.8'N	167°35.6'E	1395	Box Core/ Bottom Camera	30 cm of penetration. Recovered a nannoplankton-foram ooze along with a bottom photo
18 Taongi Atoll	J.D.218	14°32.5'N	169°0.2'E	1700-2000	Chain Dredge	1.5 kg limstone coquina with thin Mn oxide coating
19 Horizon Guyot	J.D.225	19°26.8'N	168°48.5'W	1665	Mooring Recovery Gravity Core	Two current meter and two sediment traps 2 cores of nannoplankton-foram ooze, 260 cm and 196 cm long
20 Horizon Guyot	J.D.225	19°24.8'N	168°50.9'W	1607	Gravity Core	No recovery
21 Horizon Guyot	J.D.225	19°23.5'N	168°51.2'W	1564	Gravity Core	2 cores of nannoplankton-foram ooze, 271 cm and 330 cm long
22 Horizon Guyot	J.D.225	19°22.9'N	168°53.2'W	1532	Gravity Core	2 cores of nannoplankton-foram ooze, 286 cm and 220 cm long
23 Horizon Guyot	J.D.225	19°21.3'N	168°55.6'W	1500	Gravity Core	2 cores of nannoplankton-foram ooze, 220 cm and 285 cm long

Table 3 Chemical Analyses of Crusts (%)

Station #	Avg. Thickness	Mn	Fe	Cu	Co	Ni
1	0.1 cm	24.4	14.5	0.09	1.22	0.49
4	0.3 cm	21.6	17.0	0.08	0.81	0.31
5	2.0 cm	26.5	12.75	0.11	1.25	0.63
10	2.5 cm	22.5	15.8	0.10	0.66	0.47
10	2.0 cm	23.5	15.5	0.09	1.07	0.48
10	1.0 cm	25.5	12.5	0.12	0.99	0.59
11	3.0 cm	24.0	13.5	0.18	0.80	0.59
13	2.0 cm	22.0	15.5	0.11	0.74	0.44
14	3.0 cm	21.2	17.0	0.11	0.68	0.39

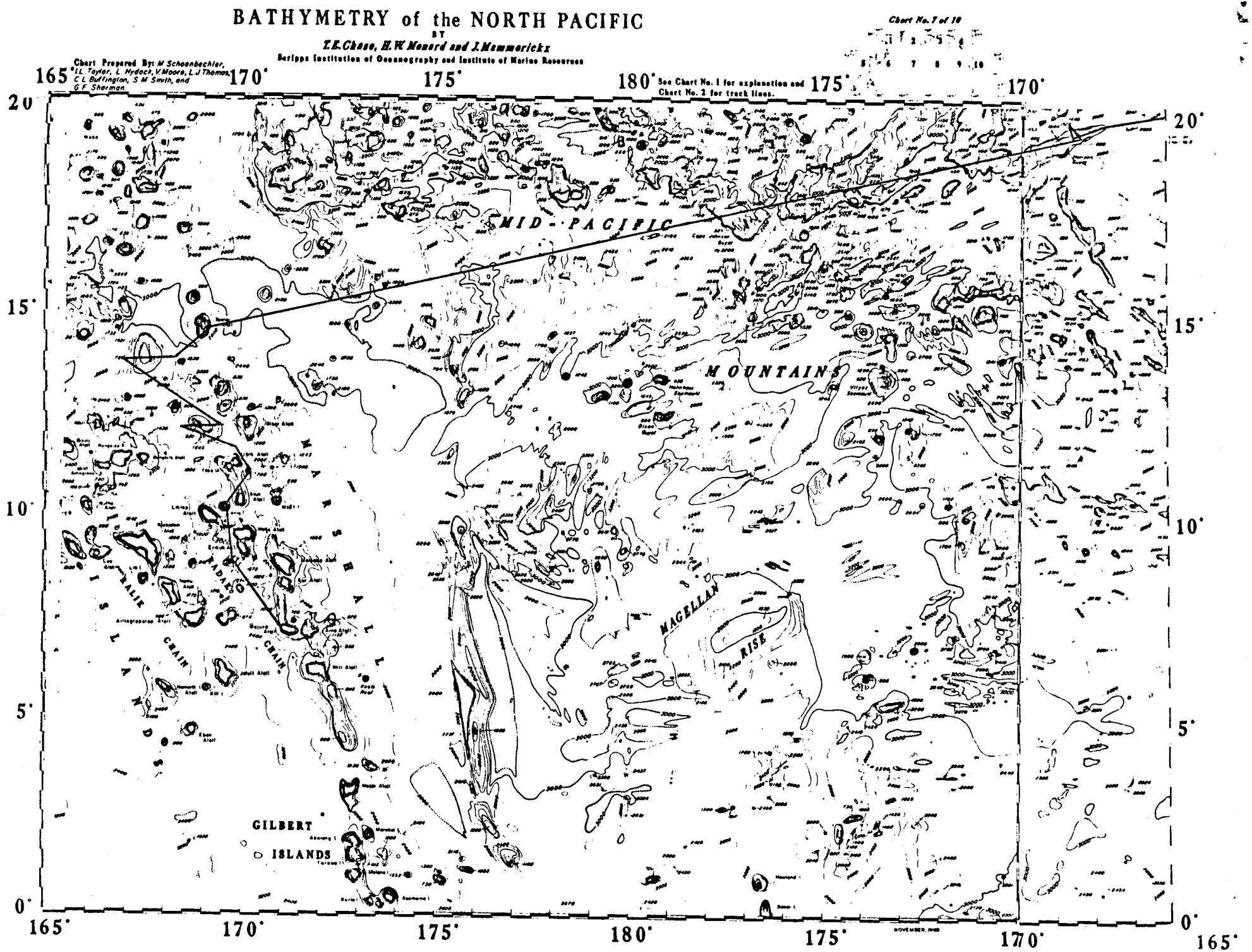
BATHYMETRY of the NORTH PACIFIC
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Chart Prepared By: M Schoenbechler, L.L. Taylor, L. Hydock, V. Moore, L.J. Thomas, C.L. Buffington, S.M. Smith, and G.F. Sherman
See Chart No. 1 for explanation and Chart No. 2 for track lines.
Chart No. 7 of 10
MID-PACIFIC
MOUNTAINS
MAGELLAN
RISE
MARSHALL
ISLANDS
RALIK
CHAIN
RATAK
CHAIN
GILBERT
ISLANDS
165°
170°
175°
180°
175°
170°
20°
15°
10°
5°
0°

FIGURE 1