80034

CRUISE REPORT

OCEANUS 90

November 24 - December 3, 1980

Bradford Butman
U.S. Geological Survey
Woods Hole, MA 02543

Vessel: OCEANUS
Cruise no.: OC90
Dates of operation: 1115 November 24 - 1620 December 3, 1980
Area of operation: Georges Bank, primarily Lydonia Canyon
Personnel:

Paul Howland, Master
Brad Butman, Chief scientist
John Larson, USGS
Frank Musialowski, USGS
Marlene Noble, USGS
Carol Parmenter, USGS
Rick Rendigs, USGS
Polly Shoukimas, USGS
Bill Strahle, USGS
Barry Allen, Lamont-Doherty Geological Observatory
Ivars Bitte, Lamont-Doherty Geological Observatory
Andy Eliason, Eliason Data Services
Linda Philbin, Woods Hole Oceanographic Institution

Objectives:

This cruise was primarily to deploy instrumented moorings in and around Lydonia Canyon for the Canyon Dynamics Experiment. The specific objectives were:

1. Deploy 10 subsurface moorings and one tripod;

2. Deploy two surface marker buoys;

3. Conduct hydrographic measurements (XBT, CTD, and suspended sediments) in and around Lydonia Canyon;

4. Recover tripod, surface mooring, and marker buoys at station GBK;

5. Conduct bathymetric surveys at mooring locations where required to fill in existing topography, especially canyon axis;

6. Recover tripod and surface buoys at station GBQ (Grassle sediment trap); and

7. Collect benthic grab samples at station GBQ.

Equipment: Northstar Loran-C
Gifft echo-sounder
XBT
Neil Brown Instrument Systems CTD and rosette sampler
AMF acoustic command system
Van Veen grab

Narrative:

Nov. 24 1115 Depart Woods Hole.
1300 Weather forecast of 40 mph SE. winds for pm.
1700 Weather forecast improved. Underway toward Lydonia Canyon.

Nov. 25	0015	Buoy loose on deck. Resecure.
	1630	Arrive station LCL.
	1745	Deploy tripod (mooring 205).
	2020	Start XBT section up canyon axis.
	0300	Winds 50 kn. XBT's blowing against ship; fantail dangerous.
	0330	Section terminated and fantail secured due to weather.
Nov. 26		Seas heavy and confused. Jog into seas.
		(Feed the fish and sleep.)
Nov. 27	1210	Arrive Station LCI
	1421	Deploy eastern marker buoy (buoy A)
	1600	Deploy western marker bouy (buoy T) with VACM (mooring 2151)
	1635	Arrive station LCJ
	1820	Deploy subsurface mooring at LCJ (mooring 216)
		Thanksgiving dinner.
	1930	Range to mooring and disable
	2130	Arrive station LCK
	2130	Start launch of mooring at LCK
	2325	Deploy subsurface mooring (217) at LCK
Nov. 28	0047	Start bathymetric survey around station LCH.
	0345	Terminate bathymetry.
	0450	Start XBT transect up canyon axis.
	0610	Terminate XBT transect (stas. 15-19).
		Start bathymetry around station LCB.
	0636	Terminate bathymetric survey.
		Start to deploy mooring 208 at LCB (First mooring with deep instrument package).
	1330	Mooring in water. Start tow to location.
	1445	Mooring 208 at LCB away. Interrogate and disable.
	1505	Underway to LCN.
	1625	Start bathymetry at LCN. Seas building.
	1655	Seas too rough to deploy. Terminate work. Jog into seas.
Nov. 29	0800	Seas still moderate and confused.
	1210	Arrive SE. of LCN.
	1330	Start mooring deployment (220)
	1420	Mooring deployed. Start tow into position.
	1649	Mooring 220 away.
		Range to mooring to determine position, and disable.
	1740	Underway to Station LCM.
	1915	Arrive station LCM.
		Setup to launch subsurface mooring 219.
	2226	Deploy mooring 219.
		Range to mooring to determine position and disable.
	2300	Enable release for 3rd range; mooring released on command 2! (Good Grief).
Nov. 30	0015	Recover mooring 219.
	0032	Underway to station LCE.
	0135	Start bathymetry at LCE.
	0345	End bathymetry at LCE.
	0700	Start setup for mooring LCL.
	1100	Towing mooring 218 into position.

Tow line parted approximately .5 miles from surface buoys.
1240 Range to mooring to determine position and disable.
(Decided not to reset) Underway to station LCA.
1415 Arrive station LCA.
1553 Start launch of subsurface mooring 207.
1650 Anchor in position and ready to steam to launch position.
1725 Anchor away.
Underway to north to start N.-S. XBT section.
2000 Start XBT section.

Dec. 1 0120 Complete XBT section.
Underway to station LCK to do bathymetry.
0240 Arrive LCK, Start bathymetry.
0345 End bathymetry at LCK. Underway to LCH.
0600 Arrive station LCH and prepare mooring.
Seas calmer. Decided to leave deep instrument package off mooring to speed deployment.
Positioning of long mooring difficult in axis.
Will deploy deep package in January.
0838 Start streaming mooring 214.
0952 Mooring streamed. Start tow to location.
1106 Anchor away.
Range to LCH. Ranges not consistent, probably due to canyon geometry.
Decide to deploy other moorings during good weather and return to LCH later to complete ranging.
1215 Underway to LCE.
1330 Arrive station LCE. Prepare subsurface mooring 211.
1520 Start stringing subsurface mooring 211.
1735 Deep tripod deployed. Start tow of mooring into position.
1911 Anchor away for mooring 211. (Positioning of instruments in canyon axis takes a great deal of time; 1-2 hours required to tow instruments into position).
Range to determine position and disable.
2000 Underway to station LCI.
2100 Arrive LCI. Prepare mooring 215.
2235 Deep instrument package deployed. Start tow into position.

Dec. 2 0014 Deploy mooring 215
Range to mooring and disable. Underway to LCH to finish locating mooring 214.
0128 Completed ranging to LCH.
Ranges still confusing.
Underway to GBA.
0440 Arrive GBA.
Eight Van Veen grab samples.
Underway to GBK.
0600 Arrive GBK. Buoys moved from locations (.3 mi.)
Range to tripod (mooring 195) to determine exact position.
0800 Move gear to 01 deck and prepare to recover surface buoys.
0955 Recover surface buoy C with surface VACM (mooring 1961).
Prepare to drag for tripod (mooring 195).
Rewind all trawl wire to remove loose wraps.
1300 Start to drag for tripod.
1530 Tripod hooked and on deck (OK!)

Quite an operation to unravel and get on deck.
Decide to leave two remaining surface buoys (E and B)
and return to LCM to deploy last canyon dynamics mooring.
(The mooring that had released on command 2 at station LCM).

1609 Start cross-shelf XBT section from GBK to LCM.
1825 Complete XBT section. Set up mooring.
1945 Start launch of subsurface mooring 219.
2020 Start tow of mooring into position.
2050 Mooring 219 away.
Range to mooring and disable.
Underway to GBQ.

Dec. 3 0630 Arrive GBQ.
Winds 40 mph, seas 10-15′ and building.
Captain determines too rough to recover tripod.
Underway to Woods Hole.
1600 Arrive Woods Hole.

Cruise summary and highlights

All moorings were deployed as planned on OC90 with the exception of one deep instrument package in the canyon axis. The deployments were completed despite quite poor weather conditions and the absence of the Bosn who couldn′t make the trip at the last minute. This put a strain on Captain and 1st mate, one of whom was on deck at all times during deployments. The remaining deep instrument package will be deployed in January 1981 on the hydrographic cruise. The new near-bottom instrument packages were somewhat difficult to launch and required moderate weather. Placing the moorings in the canyon axis was also difficult; both towing the moorings cross-axis and up-axis prior to launching was tried. For short axis moorings (300 m), steaming across-axis was adequate. For deeper axis moorings, an up-axis tow, bouncing from wall to wall seemed most successful. Detailed site surveys are a must for this launch method. The large volume of mooring equipment required a great deal of time to shift around the deck as it was launched.

We were successful in recovering the tripod at GBK which we had failed to recover in October on OC88 when the recovery line fouled and parted. In the interest of time, the two surface buoys at K were left to be recovered in January.

The weather was too rough at station GBQ to recover Grassle′s tripod or the two surface buoys. Those will be recovered in January. Unfortunately, the delay will make the larvae trap results less then desirable.

One release at LCM released on the enable command, requiring us to set the mooring twice (fortunately we had one spare anchor). This release problem has happened several times before, but has baffled AMF; we haven′t been able to reproduce the problem in the lab and suspect it is a shallow water acoustic problem.

Because of the severe weather and the time required to launch the moorings, no CTD-suspended matter observations were made. Two axis, 1 cross-slope, and 1 cross-shelf XBT sections were made.

Tabulated information

Moorings deployed: 10 subsurface
1 tripod
1 surface

Sta.	Mooring	Latitude	Longitude	Mooring	Inst.
LCA	207	40°24.2'N	67°44.6'W	SS	1V,2ST
LCB	208	40°31.6'N	67°42.8'W	SS	2V,1DT,3ST
LCE	211	40°25.4'N	67°39.9'W	SS	3V,1DT,3ST
LCH	214	40°17.6'N	67°39.5'W	SS	4V,2ST
LCI	215	40°22.9'N	67°32.9'W	SS,S	4V,1DT,2ST
LCJ	216	40°21.2'N	67°32.0'W	SS	3V,1ST
LCK	217	40°16.3'N	67°47.0'W	SS	2V,1ST
LCL	218	40°31.7'N	67°36.5'W	SS	2V,2ST
LCM	219	40°29.5'N	67°48.2'W	SS	1V,2ST
LCN	220	40°21.4'N	67°40.4'W	SS	2V
LCL	205	40°32.3'N	67°36.8'W	Tripod	

Moorings recovered: 2

GBK	195	41°02.1'N	67°33.9'W	Tripod
GBK	196	41°01.9'N	67°34.0'W	Surface (buoy C)

Surface buoys

Deployed: 2
Recovered: 1 (C)

Days at sea: 10
CTD stations: 0
XBT stations: 37
Surface salinity: 35
Bathymetry (12 kHz) surveys:

Sta. LCB	28 Nov.	0610-0636
Sta. LCE	30 Nov.	0140-0340
Sta. LCH	28 Nov.	0100-0345
Sta. LCK	1 Dec.	0240-0345
Sta. LCN	28 Nov.	1625-1825

OCEANUS 90 HYDROGRAPHIC STATION LIST

Sta	Depth	Latitude	Longitude	XBT	SS	CTD	Date	Time
1	74	40°39.85'	67°39.46'	✓	✓		11/25/80	2020
2	97	40°35.7'	67°37.3'	✓	✓		11/25/80	2055
3	135	40°30.79'	67°34.66'	✓	✓		11/25/80	2128
4	140	40°28.14'	67°33.34'	✓	✓		11/25/80	2145
5	163	40°25.68'	67°31.95'	✓	✓		11/25/80	2205
6	280	40°23.24'	67°30.85'	✓	✓		11/25/80	2218
7	865	40°20.74'	67°29.79'	✓	✓		11/25/80	2235
8	1335	40°16.50'	67°28.95'	✓			11/25/80	2307
9	1550	40°15.08'	67°37.98'	✓	✓		11/26/80	0003
10	1200	40°19.18'	67°40.32'	✓	✓		11/26/80	0045
11	1050	40°20.43'	67°41.00'	✓	✓		11/26/80	0057
12	700	40°23.43'	67°39.94'	✓	✓		11/26/80	0122
13	BADXBT	40°25.95'	67°39.52'	✓	✓		11/26/80	0146
14	BADXBT	40°28.02'	67°40.90'	✓	✓		11/26/80	0250
15	675	40°26.00'	67°89.48'	✓	✓		11/28/80	0455
16	400	40°27.97'	67°40.98'	✓	✓		11/28/80	0500
17	350	40°30.03'	67°42.51'	✓	✓		11/28/80	0520
18	215	40°32.04'	67°43.22'	✓	✓		11/28/80	0530
19	105	40°34.02'	67°43.82'	✓	✓		11/28/80	0540
20	940	40°21.35'	67°40.27'	✓			11/29/80	1751
21	79	40°39.80'	67°47.01'	✓	✓		11/30/80	2200
22	85	40°36.48'	67°45.27'	✓			11/30/80	2220
23	106	40°33.94'	67°43.69'	✓	✓		11/30/80	1039
24	220	40°31.94'	67°43.16'	✓	✓		11/30/80	1054
25	335	40°29.96'	67°42.63'	✓	✓		11/30/80	2308
26	380	40°28.04'	67°41.23'	✓	✓		11/30/80	2325
27	565	40°73.2'	67°39.31'	✓	✓		11/30/80	2344
28	740	40°23.51'	67°39.77'	✓	✓		12/1/80	0003
29	1100	40°20.03'	67°40.74'	✓	✓		12/1/80	0031
30	1165	40°19.15'	67°40.34'	✓	✓		12/1/80	0038
31	1630	40°14.96'	67°37.76'	✓	✓		12/1/80	0116
31a	70	40°56.07'	67°36.49'	✓	✓		12/2/80	1609
32	70	40°50.60'	67°38.57'	✓	✓		12/2/80	1635
33	73	40°45.06'	67°41.53'	✓	✓		12/2/80	1700
34	75	40°41.17'	67°44.06'	✓	✓		12/2/80	1727
35	83	40°36.64'	67°45.82'	✓	✓		12/2/80	1747
36	100	40°33.23'	67°47.46'	✓	✓		12/2/80	1803
37	117	40°29.6'	67°48.5'	✓	✓		12/2/80	1825

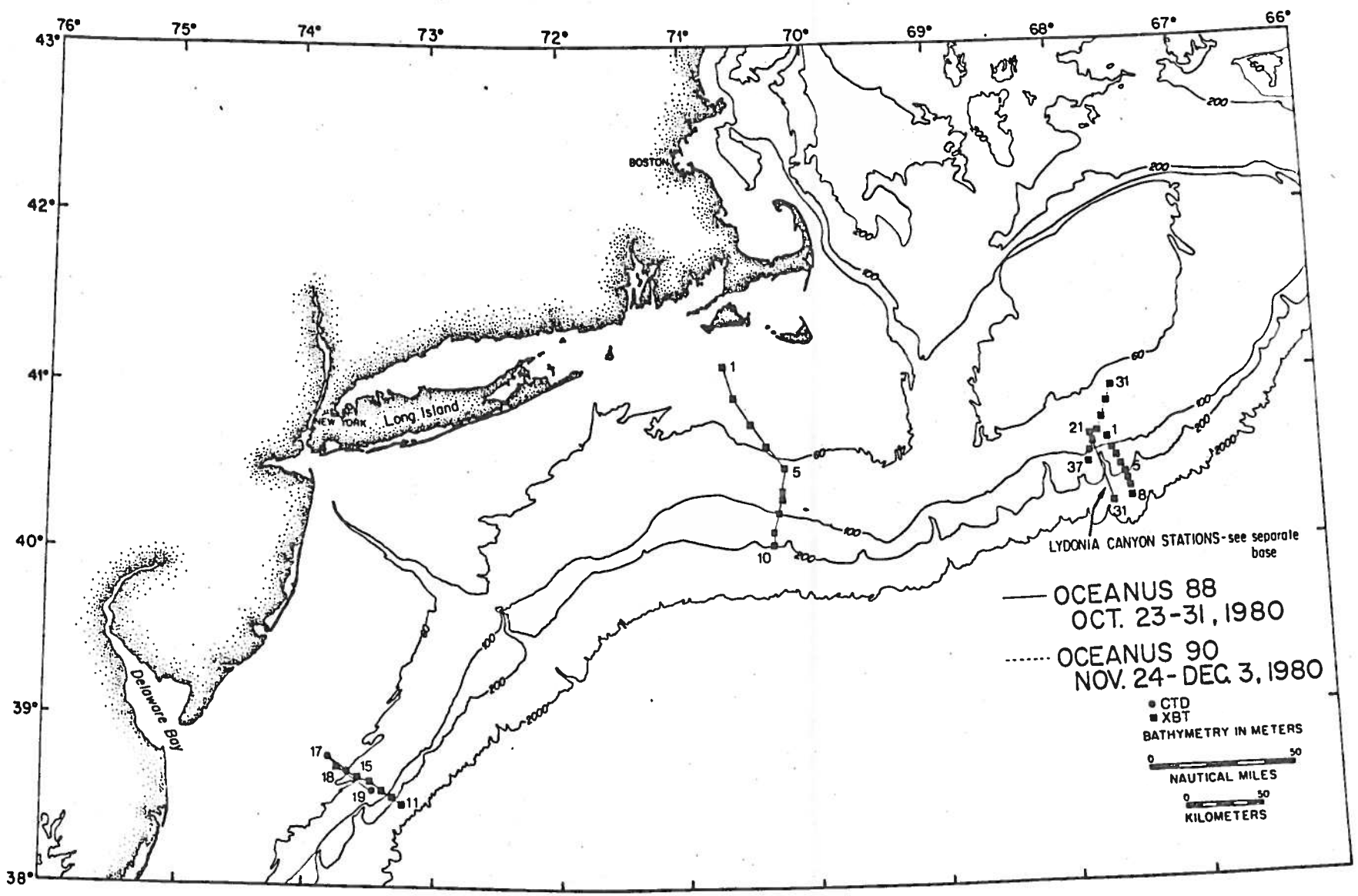

Figure 1a. Hydrographic sections, OC 88 and OC 90.

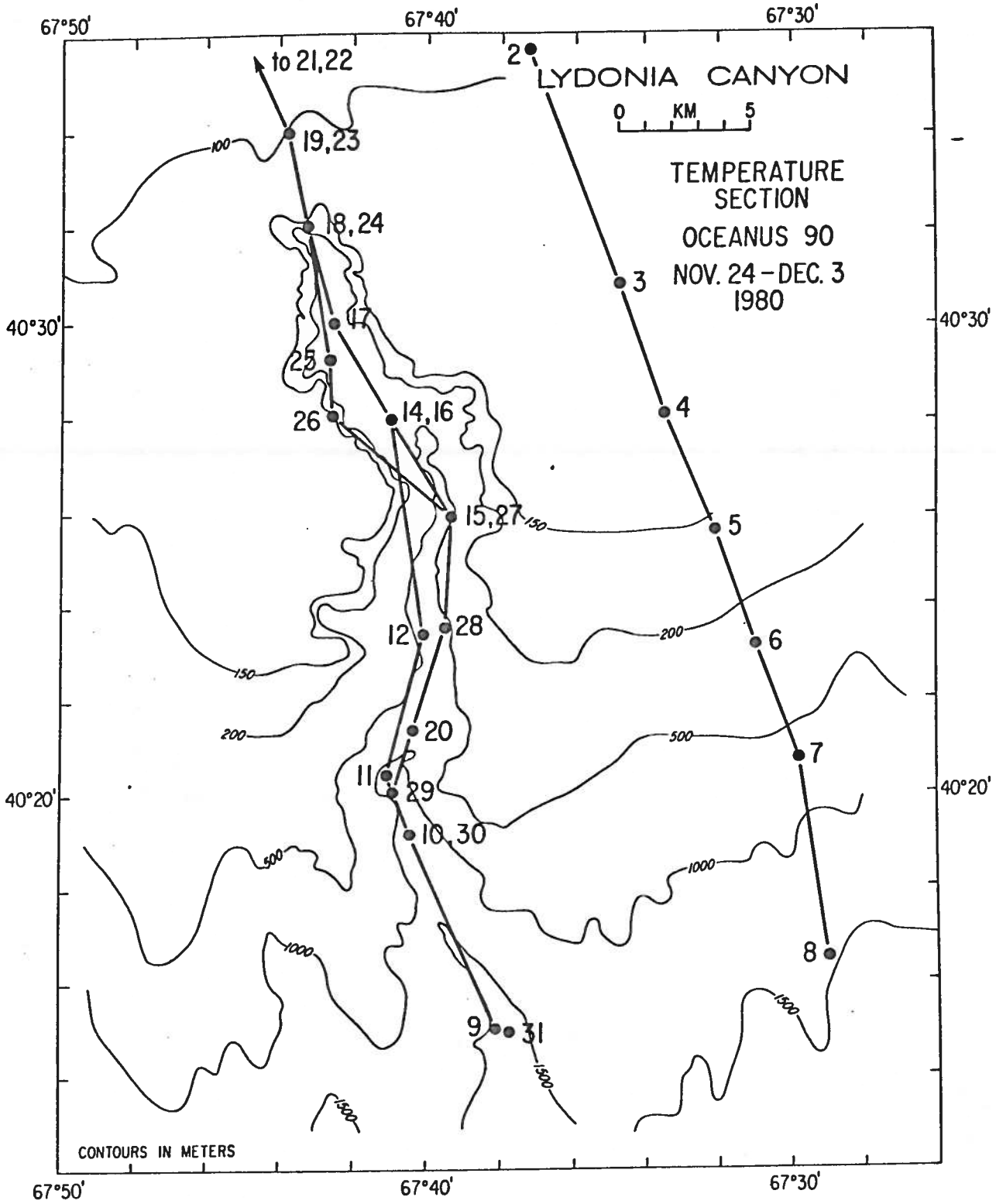

Figure 1b. XBT sections in Lydonia Canyon, OC 90.

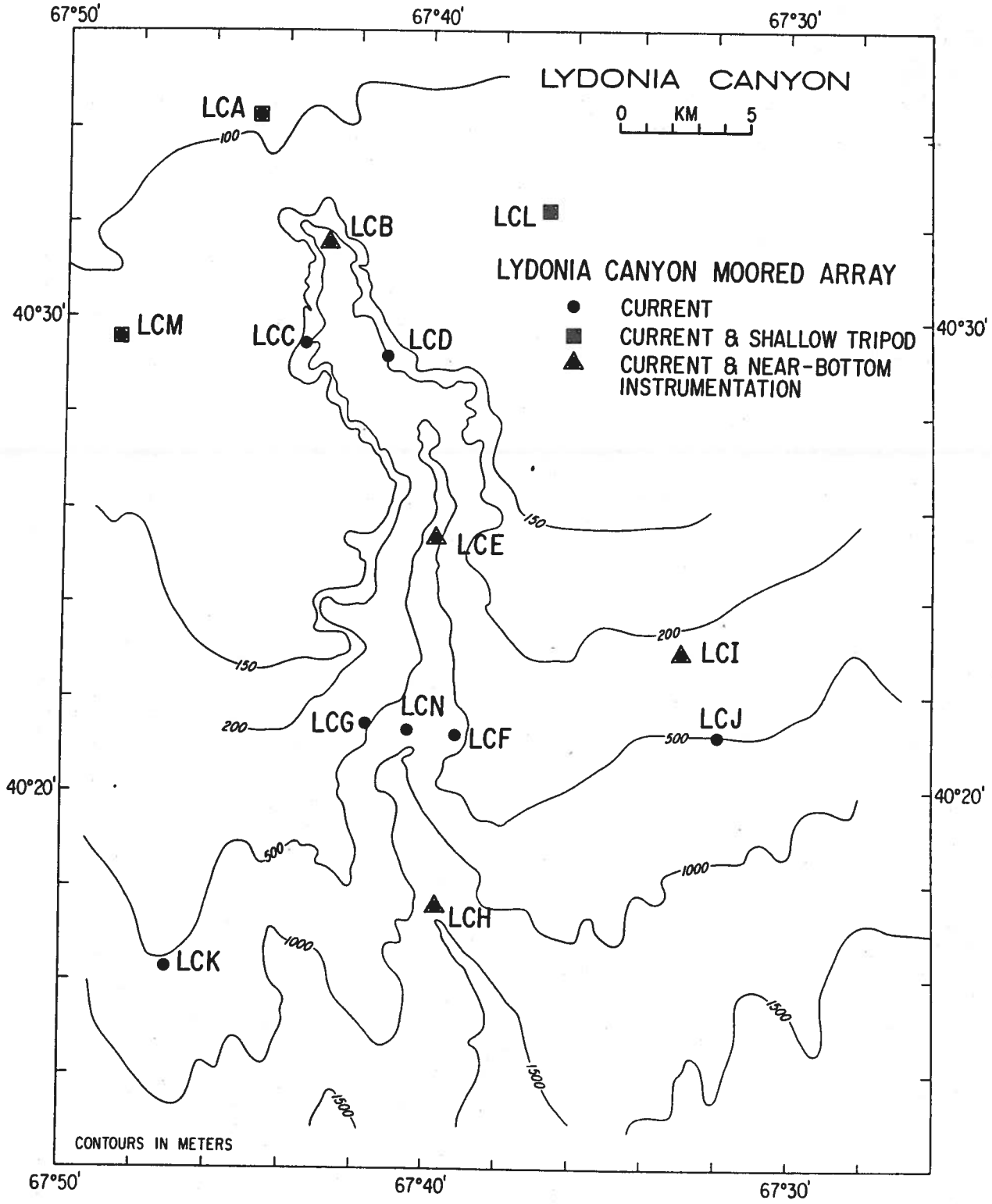

Figure 2. Lydonia Canyon mooring locations. (Moorings deployed at stations LCA, LCB, LCE, LCH, LCI, LCJ, LCK, LCL, LCM, and LCN on OC 90.)

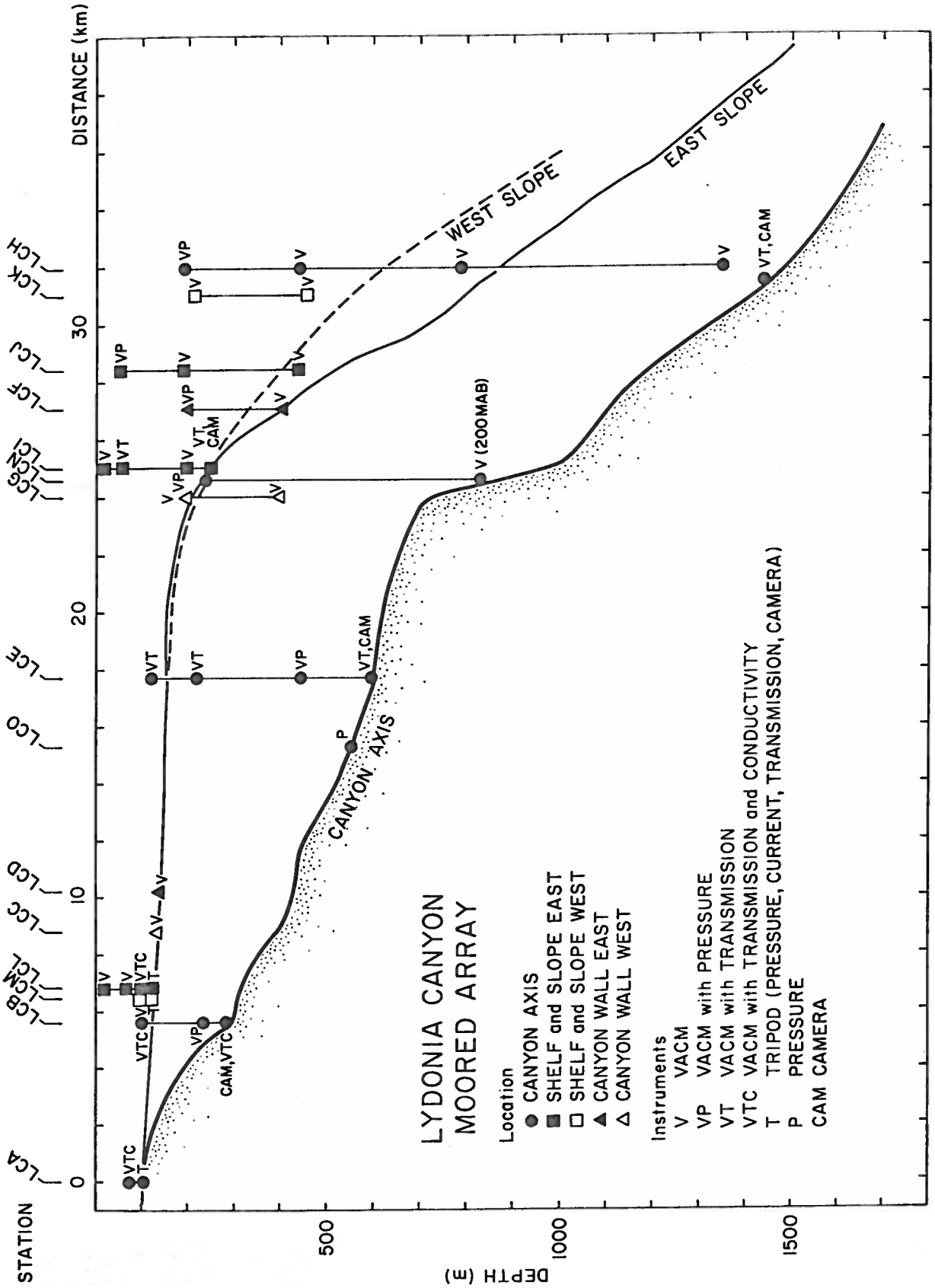

Figure 3a. Cross section of Lydonia Canyon showing instrument locations.

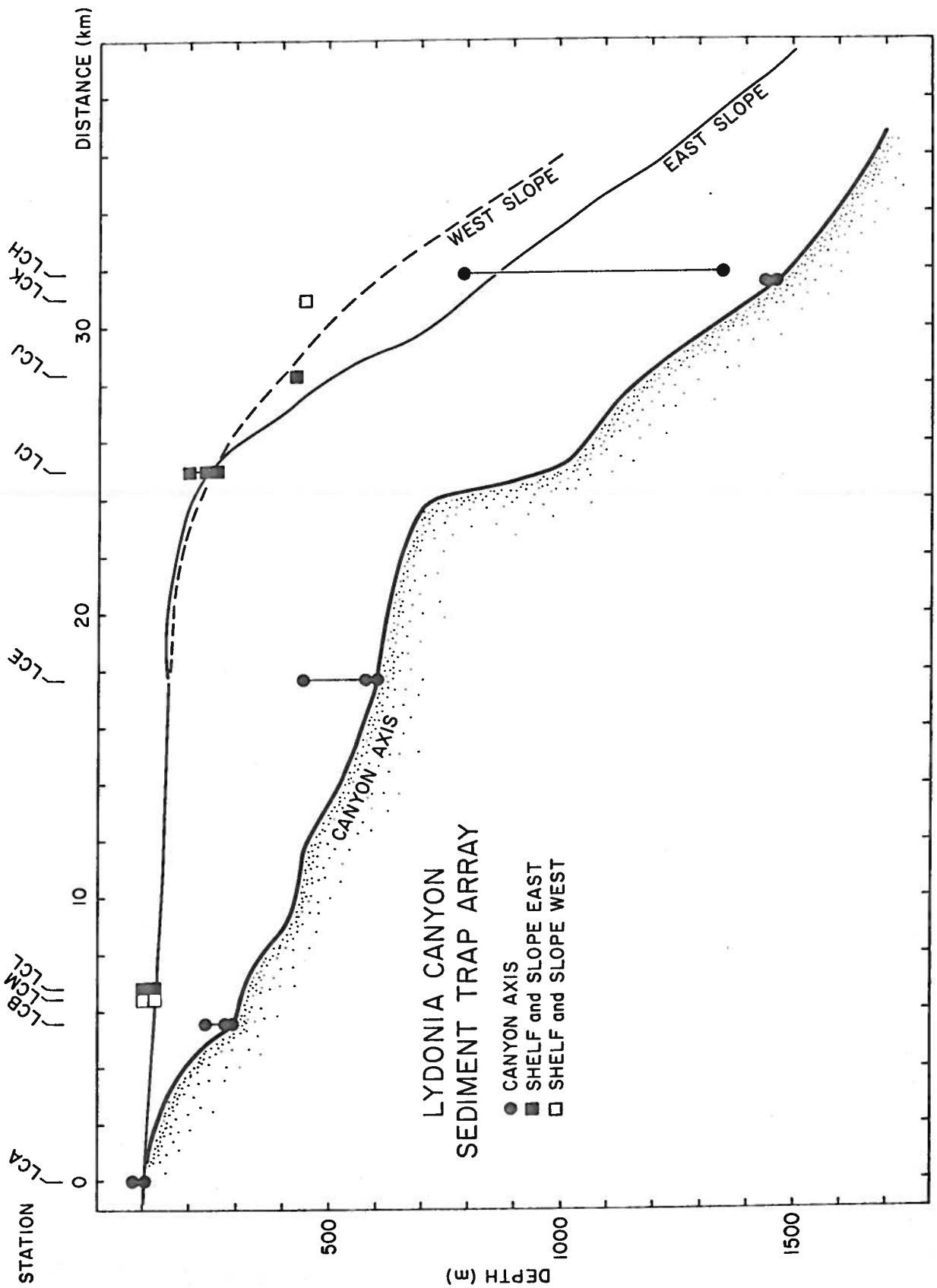

Figure 3b. Cross section of Lydonia Canyon showing sediment trap locations.

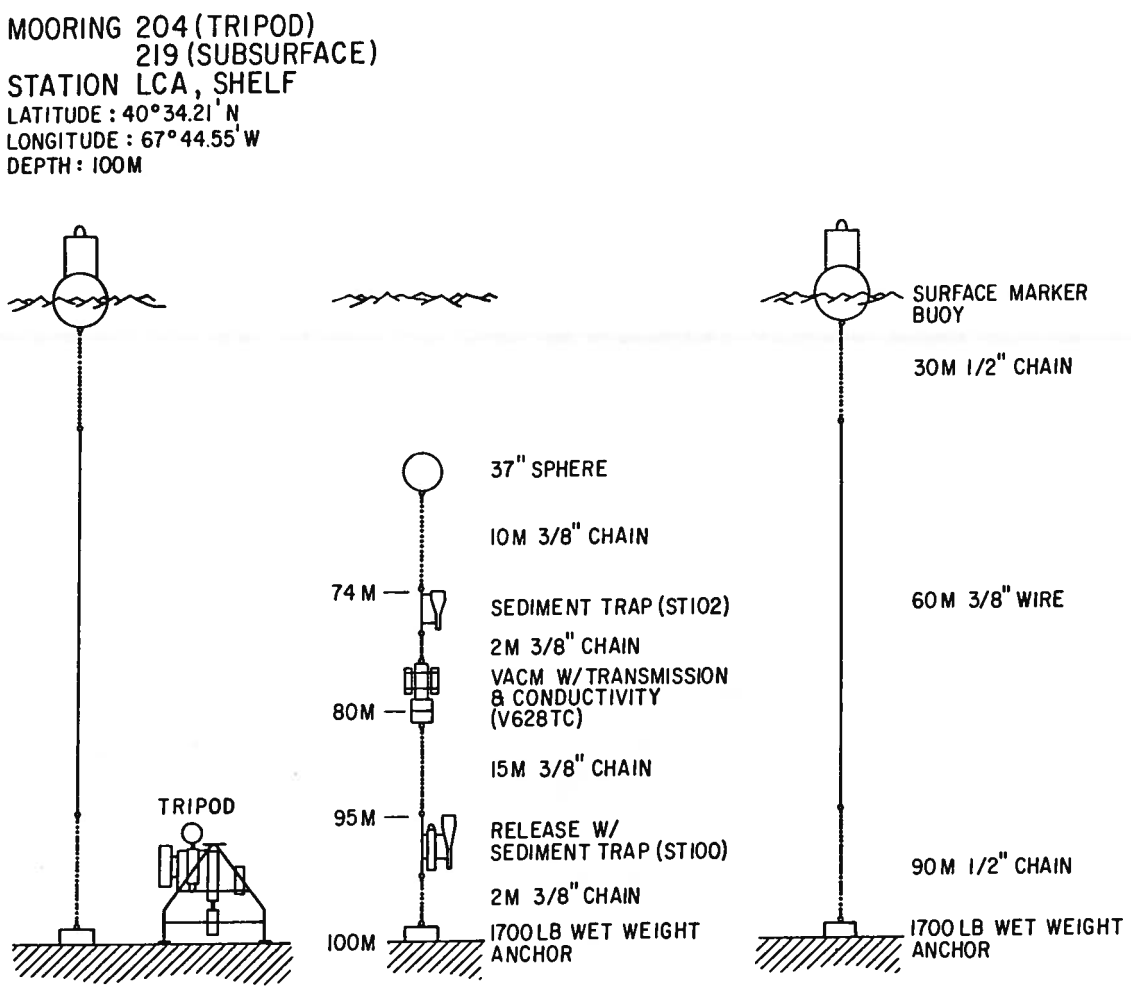

Figure 4a. Schematic of Lydonia Canyon moorings: moorings at station LCA.

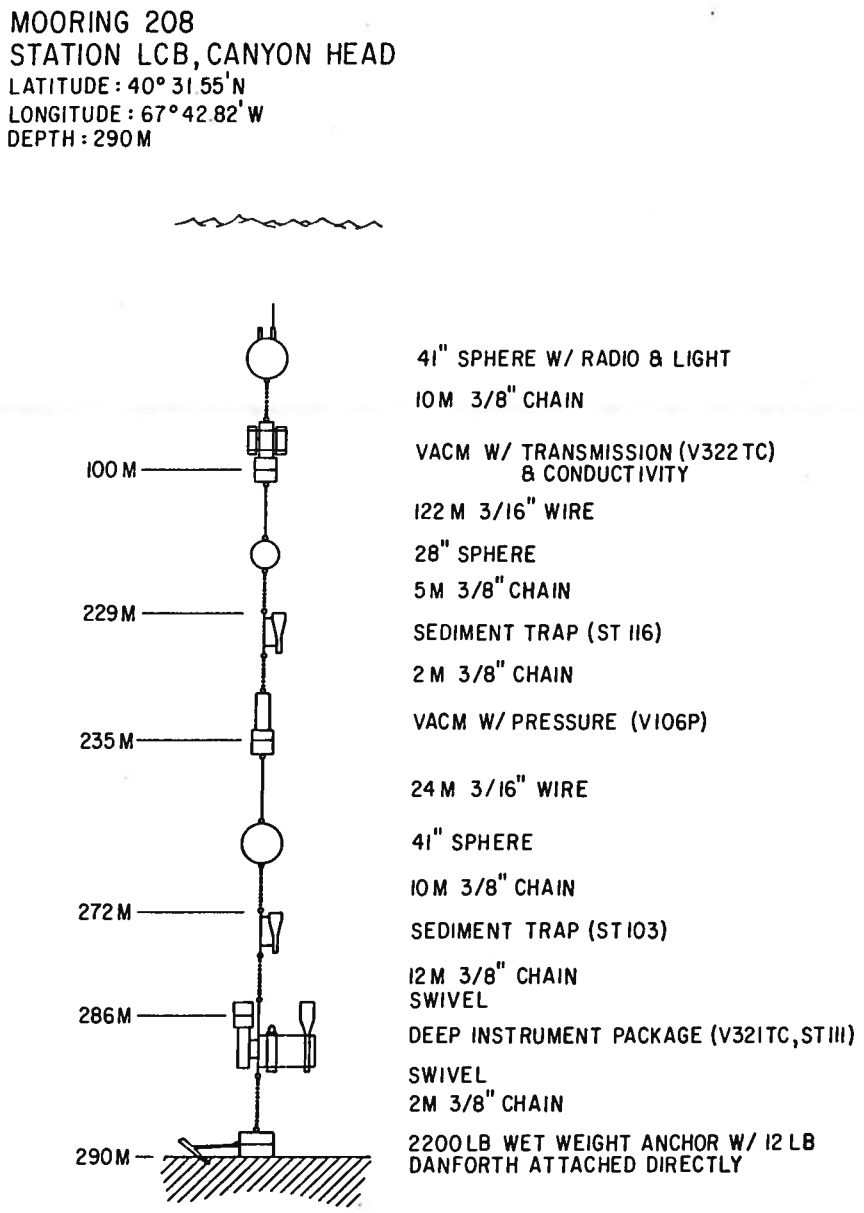

Figure 4b. Schematic of Lydonia Canyon moorings: mooring at station LCB.

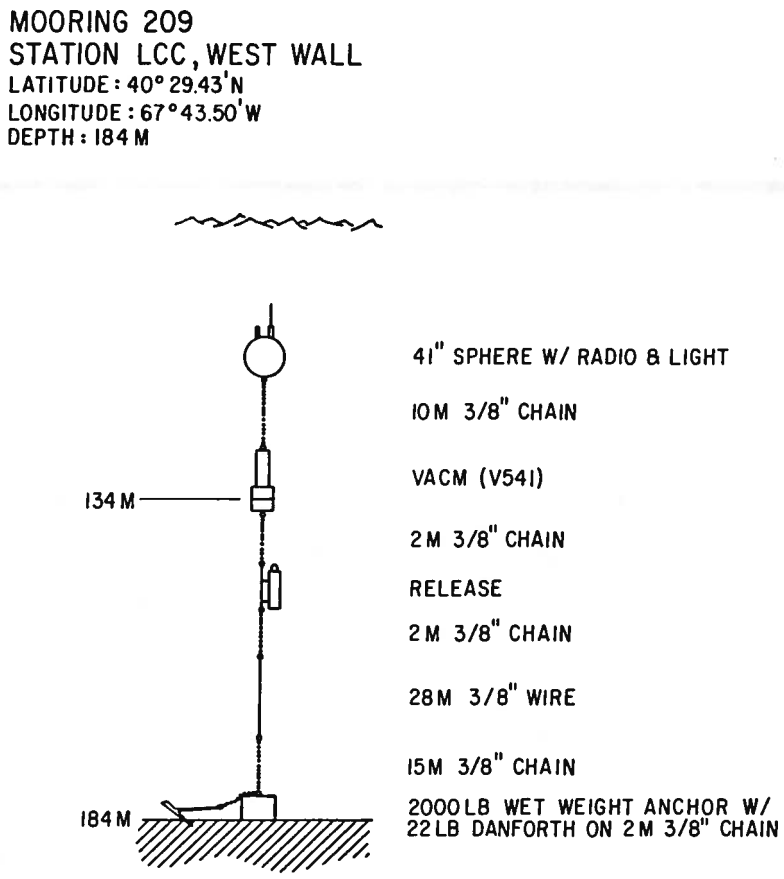

Figure 4c. Schematic of Lydonia Canyon moorings: mooring at station LCC.

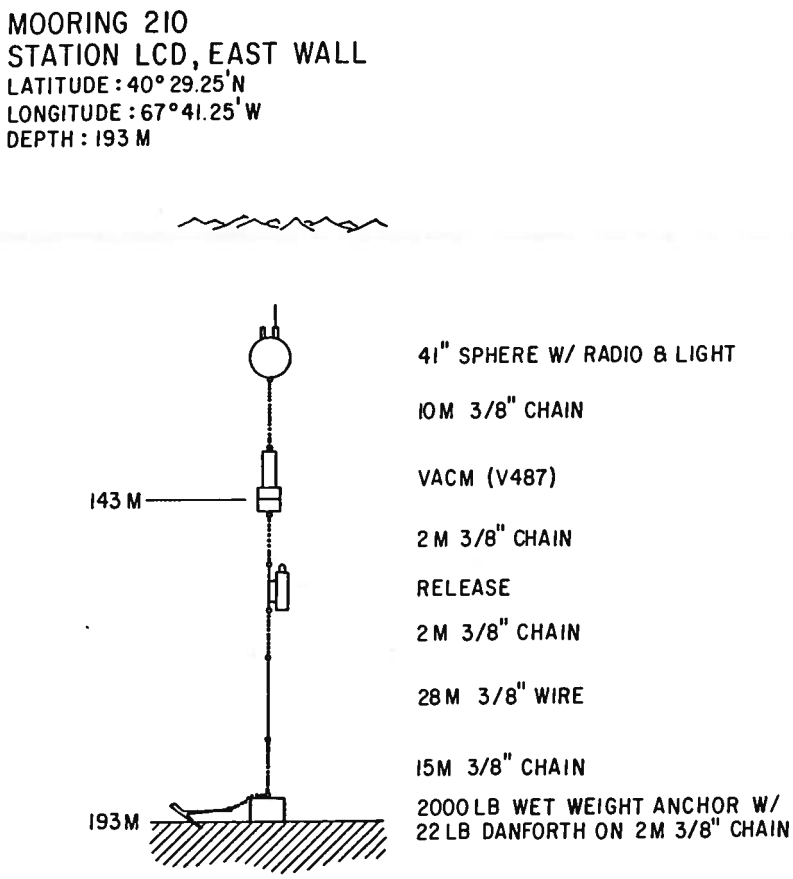

Figure 4d. Schematic of Lydonia Canyon moorings: mooring at station LCD.

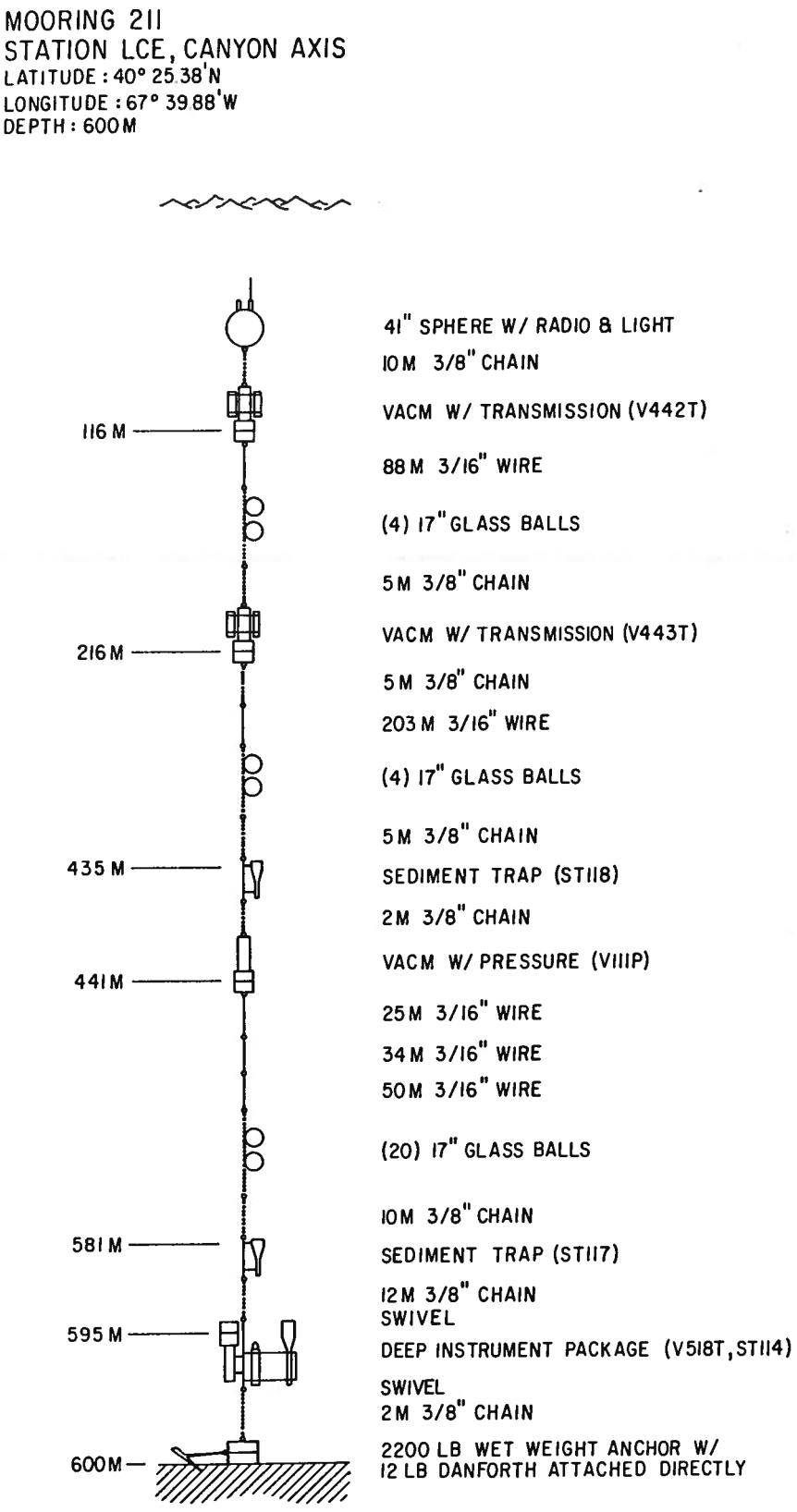

Figure 4e. Schematic of Lydonia Canyon moorings: mooring at station LCE.

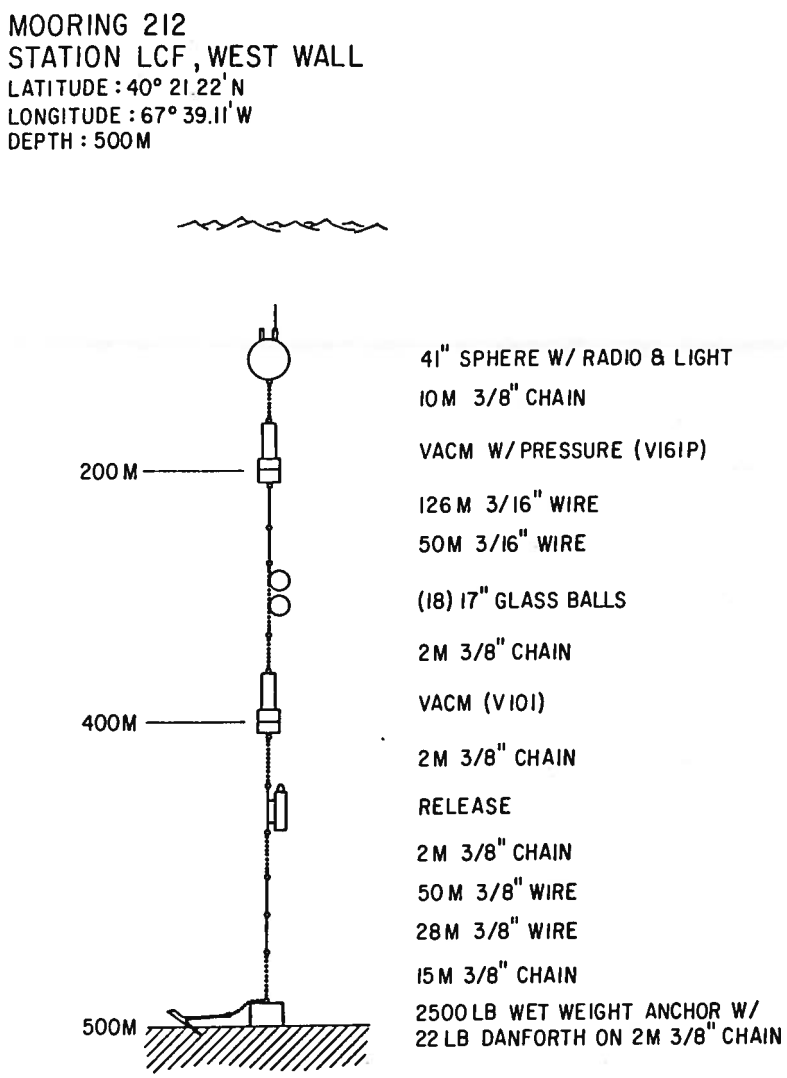

Figure 4f. Schematic of Lydonia Canyon moorings: mooring at station LCF.

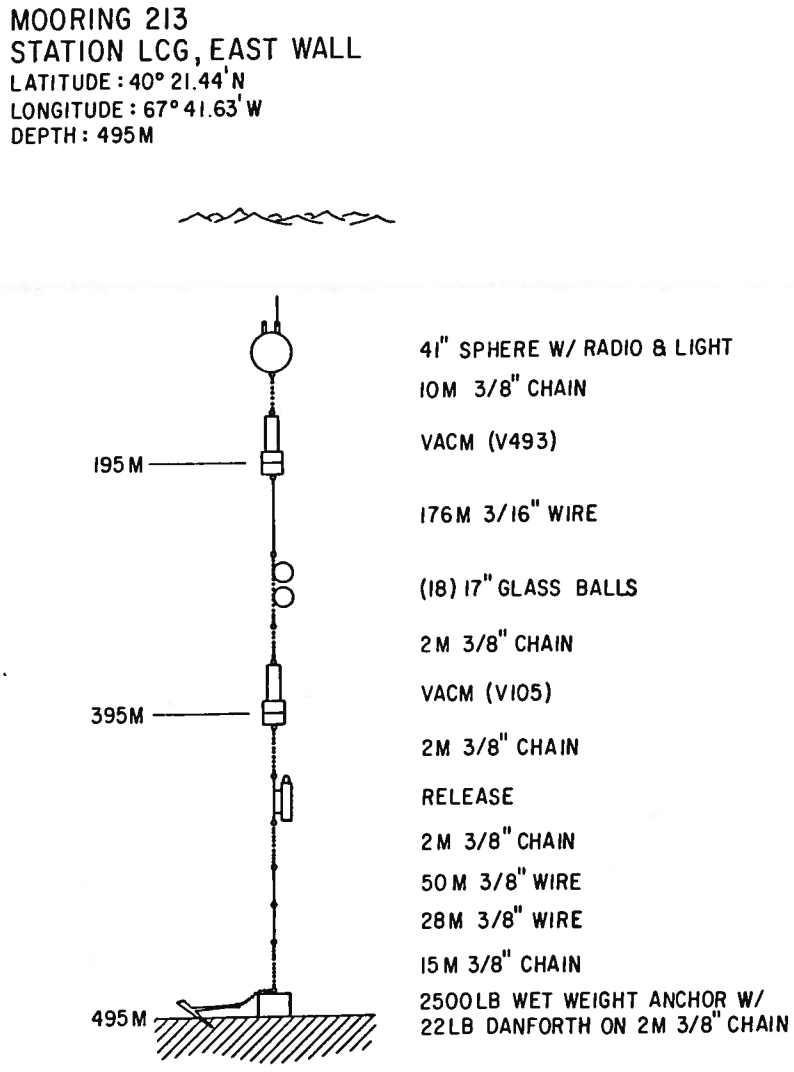

Figure 4g. Schematic of Lydonia Canyon moorings: mooring at station LCG.

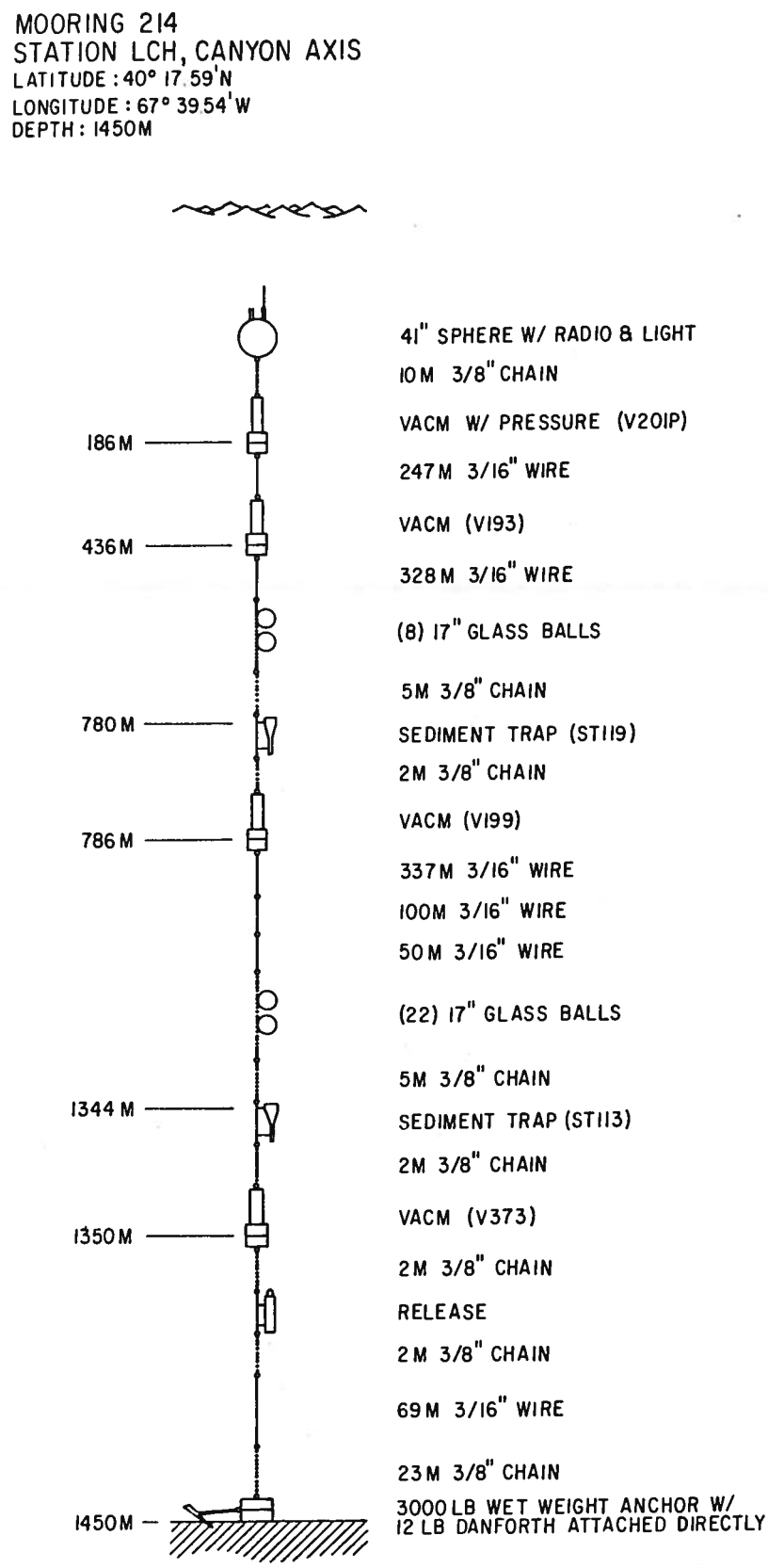

Figure 4h. Schematic of Lydonia Canyon moorings: mooring at station LCH.

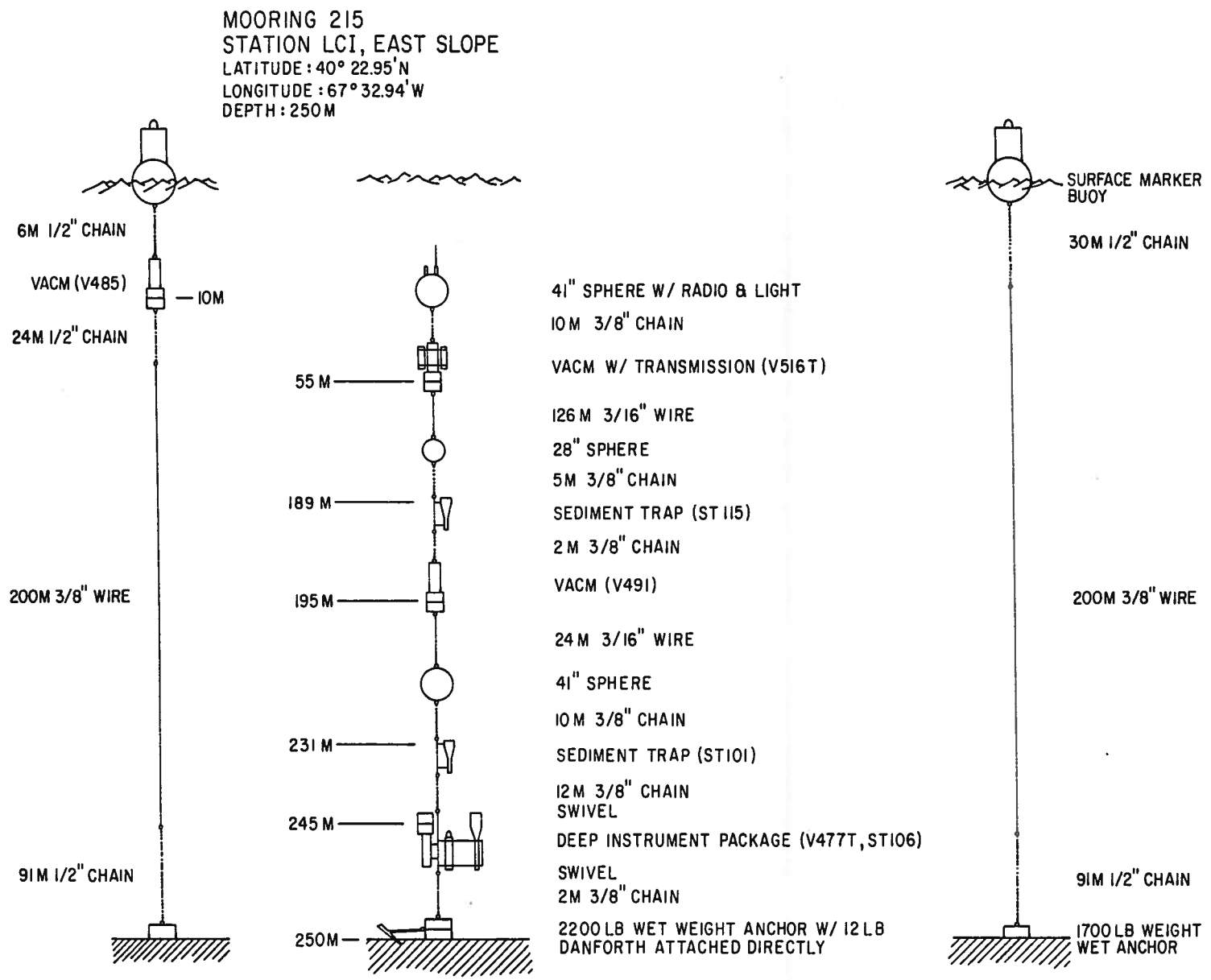

Figure 4i. Schematic of Lydonia Canyon moorings: moorings at station LCI.

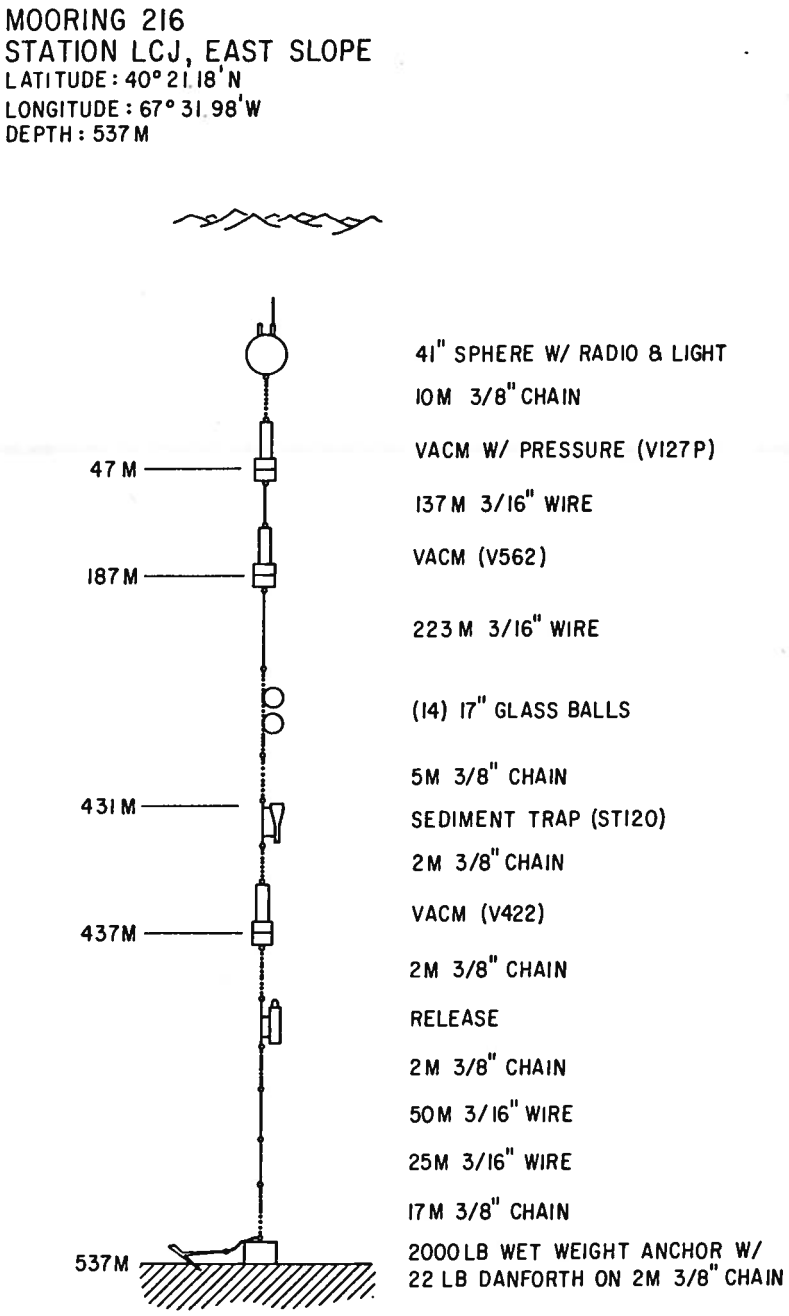

Figure 4j. Schematic of Lydonia Canyon moorings: mooring at station LCJ.

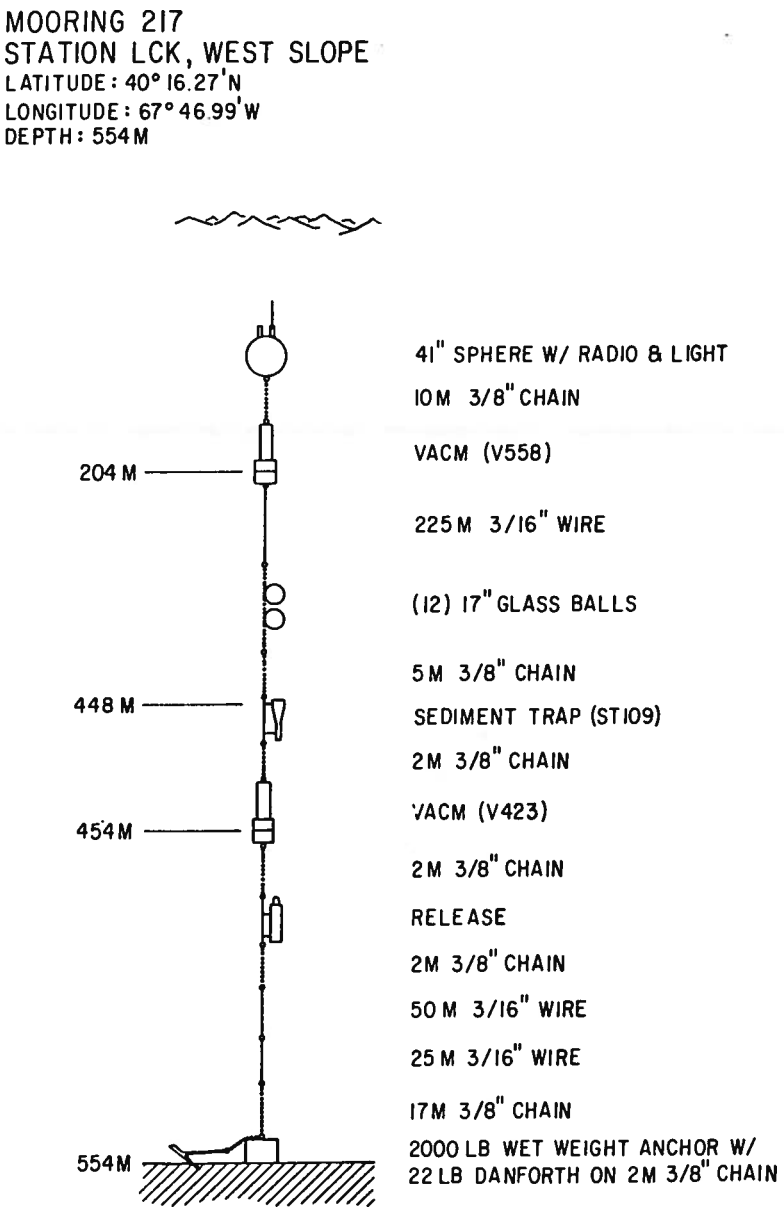

Figure 4k. Schematic of Lydonia Canyon moorings: mooring at station LCK.

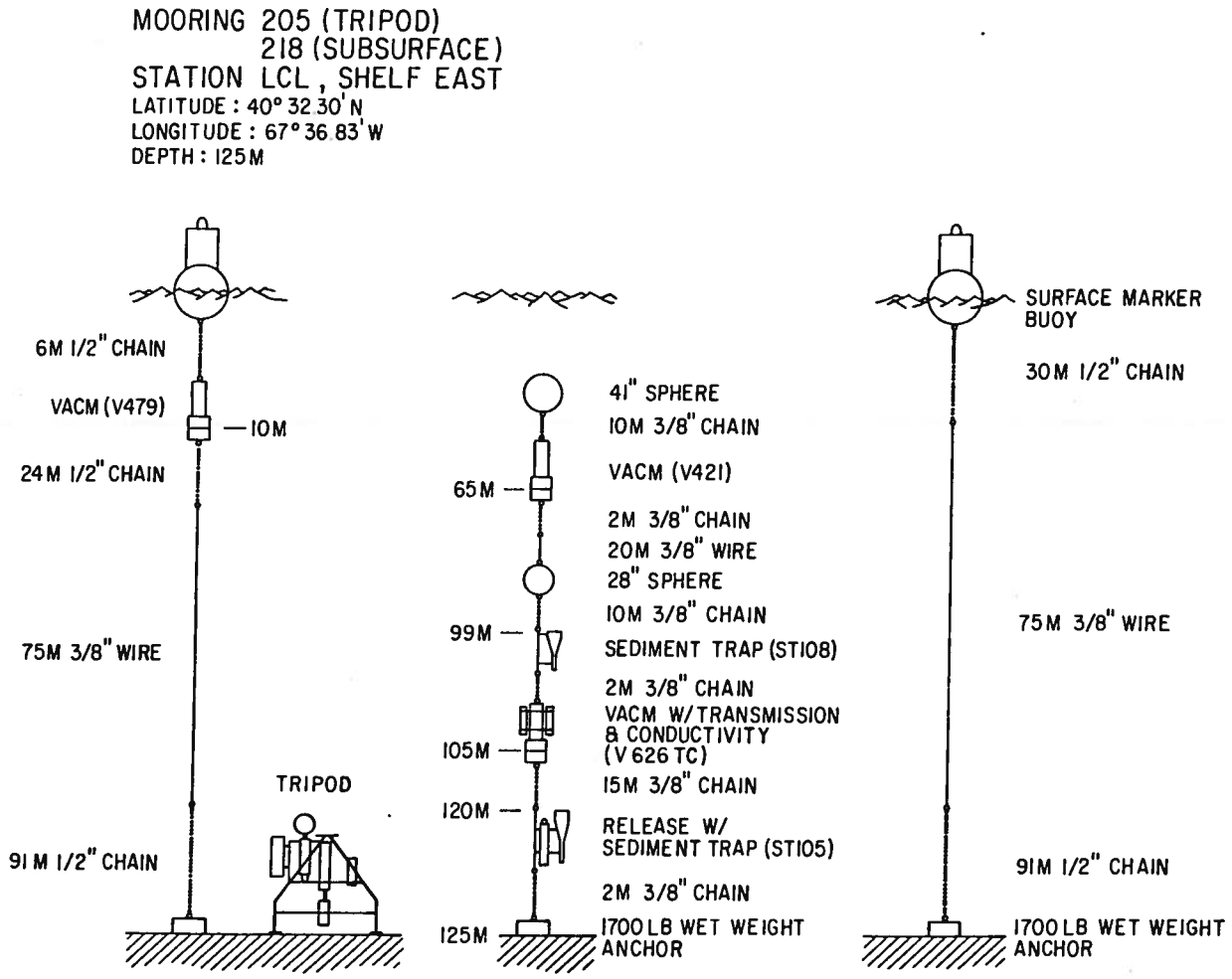

Figure 41. Schematic of Lydonia Canyon moorings: moorings at station LCL.

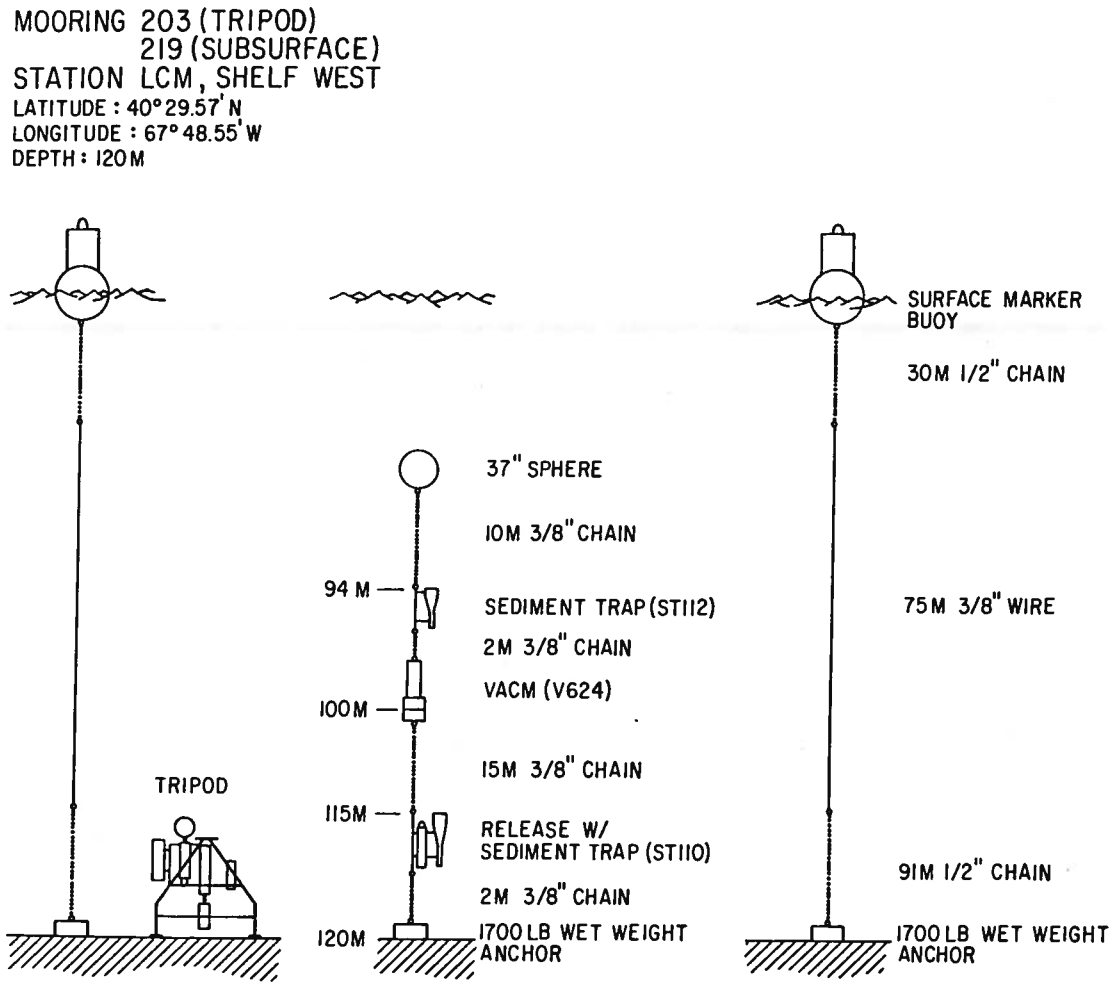

Figure 4m. Schematic of Lydonia Canyon moorings: moorings at station LCM.

MOORING 220
STATION LCN, CANYON AXIS
LATITUDE: 40°21.28' N
LONGITUDE: 67°40.55' W
DEPTH: 1030 M

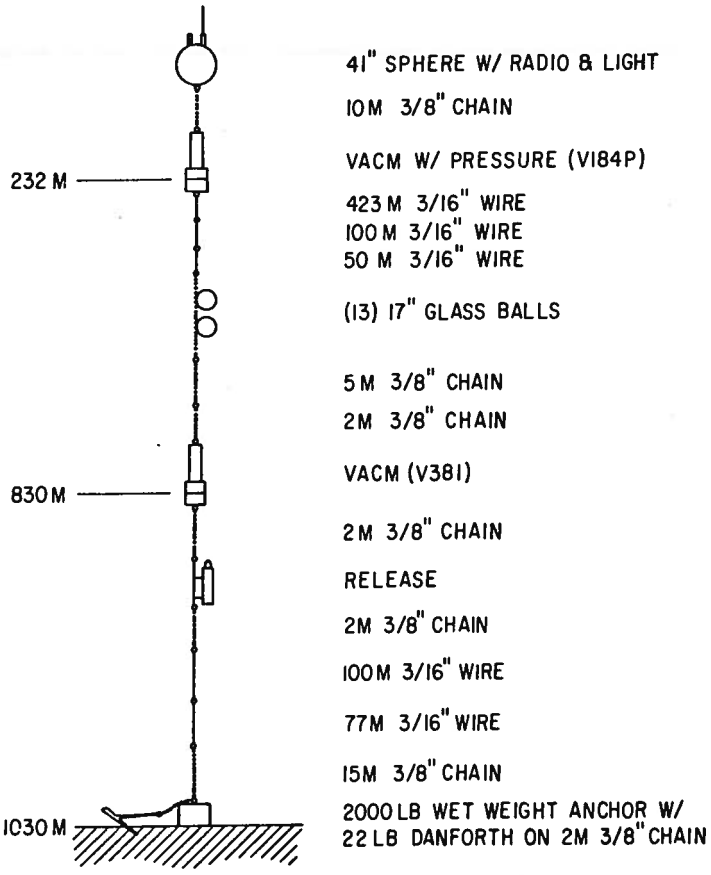

Figure 4n. Schematic of Lydonia Canyon moorings: mooring at station LCN.

Appendix I

Bridge Log

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	MONDAY NOV 24, 1980
	1118	CAST	OFF	ALL LINES			
	1128	DEPARTURE		WH #1 & #2			1/C/S VINYARD SOUND
	1311	1811	VB	DEVIL'S	BR BUOY #29 Ø		090° @ 0.8 MI & C/C 180° @ 6.5 KTS
	1344	1844	RA	GAY HEAD Ø 040° @		-3.0 AND	SHIP IS HOVE TO
	1450	1950	VERT. SEXTANT ∠	2.6 MI	DIST.	TO GAY HEAD LT HSE	
	1600	2100	RA		41-18.8	70-52.5'	
	1626	2126	SAT	530/3	41 19.249	70 - 52.477	
	1710	2210	RA		41-19.7	70-52.5'	1710 S/C 180S, 200RPM
	1747	2247	RA		41-12.2	70-52.8	4/C 151°G.
	1800	2300	LC		41-10.0	70-57.3	
	1828	2328	SAT	20°/3	41-05.095	70-48.256	
	1900	2400	LC		40-59.6	70-44.2	

Vessel OCEANUS

Cruise 1-79

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			N	W	NOV 24 NOV '80
	1918	0018	LC		40-56.5	70- 41.9	1918 C/S AHEAD
							1928 C/S 200 RPM
	1948	0048	LC		40- 52.8	70- 39.1	1948 O/S AHEAD
							1952 C/S 200 RPM
	2100	0200	LC		40 40.9	70-30.1	
	2228	0328	LC		40-27.2	70-20.1	C/C 090·6
	2329	0429	LC		40-27.9	70 06.5	170 RPM

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	TUES NOV 25, 1980
	0000	0400	LC		40 28 33	69.59 33	0010 C/C 100°
							0015 DECK INSPECTION
	0245	0745	LC		40 26.67	69.56.17	0020 ALL STOP - RESECU
							BUOYS AND AT 0245
	0300	0800	LC		40.26.56	69.53.60	ALL IS SECURE S/C 095°
							- 8.8 KTS
	0400	0900	LC		40-26.2	69-42.2	
	0408	0908	SAT	52°/3	40-26.030	69-40.319	
	0500	1000	LC		40-25.4	69-30.8	C/C 090G.
	0554	1054	SAT	27°/4	40-24.626	69-21.063	
	0600	1100	LC		40-24.8	69-19.9	C/C 085G
	0626	1126	SAT	19°/3	40-25.187	69-15.320	
	0700	1200	LC		40-25.6	69-08.6	
	0805	1305	LC		40-26.9	68-57.3	Van Co/spots
	0955				40-26.97	68-51.65	S/C 085°G (a 150RPM

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	TUES NOV 25, 1980
	1100	1600	LC		40 29.77	68 39.93	
	1200	1700	LC		40.31.57	68.29.04	1210 C/C 093° g
	1300	1800	LC		40.32.18	68.17.46	1300 C/C 098° g
	1400	1900	LC		40.31.06	68.05.87	1400 C/C 083° g
	1500	2000	LC		40 31.71	67.54.10	1500 C/C 080° g
	1530	2030	SDS	6°/8	40-32,084	67-48,242	
	1600	2100	LC		40-32.3	67-42.9	C/C 087° G
	1628	2128	LC		40-32,2	67-37.6	V'S CLO/DY SIA "L"
							PREPARE TRIPOD FOR LOWER
	1736	2236	SDS	9°/2	40-32,845	67-37,191	
	1742	2242	LC		40-32.3	67-36.8	TRIPOD ON BOTTOM
	1850	2350	LC		40-32.33	67-36.52	S/C 339.6 @ 6.0 KN
							1930 C/C 350
	2000	0100	LC		40-38.27	67-39.34	
	2015	0115			40-39.83	67 39.8	C/C 155.6
							2034 - 150 RPM

Vessel OCEANUS

Cruise

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			N	W	Nov. 25, 1980
	2100	0200			40-35.0	68-36.75	160 RPM · c/c 15[illegible]
	2200	0300			40-26.15	68-32.22	
	2301	0401			40-16.77	68-28.16	c/c 257.6 (Batter[illegible]
							2315 c/c 262.6

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	LED NOV 26 1980
	0005	0505	LC	XBT	40.15.0	67.37.8	0005 C/C 333°T
							0042 C/C 331°T
	0042	0542	LC	XBT	40.19.0	67.40.2	
	0058	0558	LC	XBT	40 20.5	67.41.0	C/C 009°T
	0122	0522	LC	XBT	40 23.5	67 39.7	0122 C/C 007°T
	0146	0646	LC	XBT	40.26.0	67.39.0	0146 TURN IS DELAYED
							MAINTAIN CS & SPD-TRAF
	0254	0754	LC	XBT	40.28.0	67.41.0	E@ 0223 C/C 283-
							RESUME XBT'S
							0254 C/C 330°T
							0320 XBT RUN
							SUSPENDED HVY WX
	0408	0908	LC		40-29.3	67-42.5	
	0444	0944	SAT		40-28.592	67-44.056	
	0500	1000	LC		40-28.3	67-44.0	
	~~0600~~ 0600	1100	LC		40-26.8	67-45.9	
	0700	1205	LC		40-25.8	67-47.9	

Vessel OCEANUS

Cruise

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			N	W	Nov-26, 1980
	0817	1317			40 24.9	68 50.7	
	1200	1700	LC		40 25.6	67 59.4	
	1500	2000	LC		40 24.8	68 01.0	1600 JOGGING CONTINUES
	1630	2130	LC		40 - 24	68 - 02.8	
	1630	2130	SAT	24°/3	40- 23.918	68- 02.728	
	+6						
	1800	2300	LC		40- 22.8	68- 05.1	
	2100	0200	LC		40-21.33	68-11.38	C/C 090° - steering, cu

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	THANKSGIVING DAY 198
	0000	0500	LC		40 18.99	67.58.49	
	0100	0600	LC		40.18.45	67.53.83	0100 UNABLE TO MAINTAIN COURSE C/C
	0200	0700	LC		40.17.62	67.48.79	101° D S/A
	0300	0800	LC		40.17.03	67.44.40	0310
	0342	0842	SAT	41°/3	40-15.984	67-40.605'	
	0400	0900	LC		40 - 15.7	67 - 39	C/C 100G.
	0500	1000	LC		40-14.9	67 - 32.9	
	0600	1100	LC		40-14.3	67 - 27.6	
	0700	1200	LC		40 -13.5	67 - 21.7	C/C 330G D S/A
	0800	1300	LC		40 15.25	67 - 21.20	
	1100				40 20.44	67 22.44	C/C 290 · G

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	LS	GMT			NORTH	WEST	THANKSGIVING DAY 1980
	1200	1700	LC		40 22.28	67 31.01	1705 ARRIVE STA' I
	1421	1921	LC		40 23.00	67 32.86	1421 ANCHOR AWAY BUOY "A AT STATION "I"
	1502	1902	LC		40 22.81	67 33.13	1502 ANCHOR AWAY BUOY "I" AT STA "I"
	1730	2130	LC		40-19.0	67-30.6	S/C 335°, D/S A.
	1743	2143					CMC MOORING LAUNCH
	1919	2319	LC		40-21.2	67- 32.0	ANCHOR AWAY
	1933	0033					H.T. RANGING ON MOORING
	1940						V 4/5
	1946	0046	LC		40- 21.9	67- 31.9	H.T.
	2008	0108	LC		40 21.63	67-32.13	- Var Co/opds
	2048		LC		40-18.0	67-40.4	
	2134	0234	LC		40-13.9	67-46.91	Cmc launch & sub surf.
	2300	0400	LC		40-15.13	67-46.99	mooring "K"
	0124	0424	LC		40-16.30	67 47.00	Anchor aweigh - H-T

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	FRIDAY NOV 28, 1980
	0000	0500	LC		40.16.33	67 46.28	
	0046	0546	LC		40.16.0	67.40.0	0046 CME SURVEY
							C/C 091° - INST PROBS
	0126	0626	LL		40.16.0	67.40 0	0126 RE COMMENCE
							SURVEY V/C AS
							PER MAIN LAB
	0348	0848	LC		40.19.34	67.39.06	0348 END SURVEY-H
	0414	0914	LC		40 19.5	67-39	S/C 355 G 160 RPM
							CMC XMT RUN
	0455	0955	LC		40-26	67- 39.5	S/C 335 G.
	0520	1020	LC		40-30	67- 42.6	S/C 345 G.
	0531	1031	LC		40-32	67-43.2	
	0543	1043	LC		40- 34	67- 43.8	FIN XMT RUN
	0548	1048	LC				V/S ON BATHY SURVEY
	0637	1137	LC		40-31.4	67-42.1	FIN SURVEY H.
	0830	1330	LC		40.30.37	67.43.67	

Vessel OCEANUS

Cruise #80

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+4	GMT			N	W	
	1030	15:30	LC		40-30.47	67-43-44	Var C/spds
	1054				40-31.08	67-45.52	Launch Start Posit
							for Tripod Mooring
	1137				40 31.4	67 44.91	

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	FRIDAY NOV 28, 198
	1208	1708	LC		40.31.39	67.44.51	
	1447	1947	LC		40.31.55	67.42.82	1447 1700 IN CANYON "B" MOORING #208 ANCHD OVER EAT 1454 H.T.
	1508	2008	LC		40-30.79	67.43.24	~ RANGING ON INSTS'. 1508 S/C 164° -165 RPM 1509 C/C 161°
	1625	2125	LC		40- 20.9	67- 39.4	C/C 295 T, C/S 4 KN.
	1648	2148	LC		40- 21.4	67- 40.8	C/C 115 T. @ 3 KN
	1838	2338	LC		40.20.8	67-39.5	Jogging into area
	2345	0445	LC		40.19.2	67-27.5	

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	SAT NOV 29 1980
	0000	0500	LC		40.18.91	67 27.29	0008 C/C 170° G
	0100	0600	LC		40.17.46	67.25.84	0220 C/C 175° G
	0200	0700	LC		40.15.72	67.23.92	0230 WINDS SHIFT → WLY 0235 C/C 186
	0300	0800	LC		40 13 52	67.22.12	0335 C/C 225° G
							0345 C/C 245° G
	0400	0900	LC		40-11.8	67- 22	
	0436	0936	SAT	34°/3	40 - 11.242	67 - 22.907	
	0555	1055	LC		40- 10.9	67- 25.3	C/C 320 G.
							0645 C/C 190 G.
	0700	1200	LC		40 - 12	67- 26.2	
	0908	1408	LC		40.07.22	67-24.6	S/C 320°C @ 6 kt
	1108				40 31.96	67 36.66	
					?		

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	SAT NOV 29, 1980
	1200	1700	LC		40·20.09	67.39.47	
	1330	1830	LC		40.20.83	67.40.36	1330 CME MOORING DEPLOYMENT
	1646	2146	LC		40-21.28	67-40.35	ANCHOR OVER THE SIDE
	1710	2210					V's RANGING ON MOORING
				→	40-21.7	67-40.6	S/C 325°S, 150 RPM
	1743	2243	LC				
	1800	2300	LC		40-23.5	67-42.4	
	1810	2310					V's AT SITE 'M'
	2227	0327	LC		40-29.48	67 48.25	Anchor aweigh E. Buoy @ 075°- .11 mi
	0500	0900			40-26.5	67-36.9	

Vessel OCEANUS

Cruise 90

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LORAN LOG

Date	Time +5	Sta. GMT	+/-.	Reading	Latitude NORTH	Longitude WEST	Remarks SUNDAY NOV 30 1980
	0000	0500	LC		40·29.31	67 47.72	
	0204	0704	LC		40·26.0	67.40.4	CME SURVEY V/C
	0343	0743	LC		40·24.38	67.40.93	END SURVEY
							0400 S/C 022G, @ 4 KTS.
	0300	1000	LC		40-26.5	67-36.9	
	0555	1055	LC		40- 31.9	67- 36.2	V/S AT SITE 'L'
	0840				40·31.96	67-34.63	Cme streaming Sub Surf.
	1108	1608	LC		40·31.96	67·36.66	anchor away
	1858	2358	LC		40- 33.1	67- 43.9	

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	SUNDAY NOV 30, 1980
	1412	1912	LC		40.34.21	67.44.21	H.T. STATION "A"
							PREPARE MOORING #207
?	1725	2225	LC		40-34.2	67-44.5	LET GO ANCHOR
	1730	2230					VCS RANGING ON MOORING
	1958	0058			40-29.5	67 41	S/C 350 G. 140 RPM
	2110	0210	LC		40-36.28	67 46.34	
	2152				40-39.98	67-47.0	C/C 160-G Cmu XBT
	2240				40-33.77	67 43.65	C/C 168-G
	2303				40-30.6	67-42.88	C/C 161
	2308				40 30.0	67 42.64	C/C 15
	2344				40-26.0	67-39.35	C/C ~~185~~ 190

Vessel OCEANUS

Cruise 90

LORAN LOG

Date	Time	Sta.	+/-.	Reading	Latitude	Longitude	Remarks
	+5	GMT			NORTH	WEST	MONDAY DECEMBER 1
	0000	0500	LC		40·23.89	67 39.61	
	0028	0528	LC	XBT	40·23.55	67.40.9	0028 C/C 158°g
	0116	0616	LC	XBT	40·15.1	67.37.75	END XBT RUN C/C 342°g 0132 C/C 349
	0145	0645	LC		40.16.65	67.37.90	H.T. SCIENCE CHANGE PLANS ~ 0152 C/C 273
	0235	0735	LC		40.17.09	67.45.04	0235 C/C 253°g CME SURVEY V/C
	0350	0850	LC		40.17.75	67.44.73	0350 END SURVEY S/C 106°g
	0456	0956	LC		40-17	67-39	HOVE TO, PREPARE TO LAUNCH SOME SORT OF SCIENCE MOORING
	0806	1306	LC		40-17.22	67-38.47	
	0833		LC		40-17.74	67-37.47	CME launch
	0936		LC		40-18.16	67-38.43	
	1106	1606	LC		40-17.59	67-39.59	Anchor Away