

P.O.L.

RRS CHALLENGER

CRUISE 85

**25 OCTOBER 1991
TO
12 NOVEMBER 1991**

CURRENT PROFILES

NORTHERN NORTH SEA

CRUISE REPORT NO. 15

1993

PROUDMAN OCEANOGRAPHIC LABORATORY

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northern North Sea

Principal Scientist

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1993

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ABSTRACT The objectives of this cruise were:- 1. To deploy 5 additional moorings to the array previously deployed on cruise 84/91. 2. To recover and redeploy 8 moorings from the array. 3. To deploy and recover 4 drogued buoys and search/recover one missing from cruise 84/91. 4. To carry out CTD/SEASOAR and ADCP survey within a box from 58°N to 61°N and 01°W to 0.3°E. 5. To make detailed depth and sea-bed survey by grab and photographic dips in the vicinity of the moorings. 6. To recover all moorings at the conclusion of the experiment.		
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OBJECTIVES AND PLAN

Cruise 85/91 followed on from cruise 84/91, in which an array of 20 moorings were set at 9 sites (A - I) in the vicinity of 59° 40'N, 01° 00'E, see Figure 1. During the period between the cruises, 3 of these moorings were recovered by fishermen at stations H and F.

The cruise objectives were:-

1. To deploy 5 additional moorings to the array.
2. To recover and re-deploy 8 moorings from the array.
3. To deploy and recover 4 drogued drifting buoys and search/recover one missing from cruise 84/91.
4. To carry out CTD/SEASOAR and ADCP survey within a box from 58°N to 61°N and from 01°W to 03°E.
5. To make detailed depth and sea-bed survey by grab and photographic dips in the vicinity of the moorings.
6. To recover all moorings at the conclusion of the experiment.

The equipment employed on each of the moorings is given in Table 2. Other major items of equipment used were as follows:-

CTD

Sensors - temperature, conductivity, pressure, fluorescence, transmittance, dissolved oxygen, upwelling and downwelling irradiance.

Rosette - two 101 Niskin bottles fitted with electronic thermometers.

CTD calibration/check - temperature and salinity only.

Thermosalinograph

Calibration of temperature and salinity sensors against CTD surface measurements.

SeaSoar

Sensors - temperature, conductivity, pressure.

Calibration/checks against pre- and post-deployment CTD profiles.

Ship ADCP

150 KHz, 4 beam, hull mounted.

Set-up - twenty 8m bins, blanking interval 4m, 5 min sampling interval,

error velocity check 0.75m s^{-1} .

The data from this equipment were all logged by the shipborne computer system - the thermosalinograph and the ADCP were logged continuously from the beginning to the end of the cruise, as were total irradiance, water depth and the navigation data (derived from the main chain Decca, Satnav and GPS).

NARRATIVE

Challenger sailed from Greenock at 11.50 GMT on 25 October after completing its annual refit and dry-docking. The route north was via the Minch, Cape Wrath and north of the Shetlands taking advantage of a following sea from the south, see Figure 2. The ship's ADCP was switched on at 14.00 GMT on the 25 October and the thermosalinograph at 08.00 GMT on the 26 October.

The ship arrived in the vicinity of ST A at 05.30 GMT on the 28 October and, after inspecting the moorings, the STABLE rig was deployed on site AB2 at 08.25 GMT followed by the VAESAT buoy on site AJ at 09.26 GMT. Moving to sites AA2 and GA both ADCP rigs were successfully recovered at 10.44 GMT and 14.10 GMT respectively, but the surface CM rig at site AF2 could not be found so a replacement rig (AF3) was deployed at 16.02 GMT with the two S4 CM's set to fast sampling. A similar surface CM mooring from DML, with two S4 CM's also set to fast sample mode, was deployed on site AH2 at 16.56 GMT, Tables 1 and 2 give further details. CTD casts 170 and 171 were taken to the south of site A at 18.28 GMT and 19.59 GMT respectively, see Table 3.

The following morning, after replacement of battery and tape, the ADCP was re-deployed on site AA3 at 11.30 GMT in deteriorating weather conditions. The ship then moved north to site IA2 and the ADCP was located at 15.00 GMT, followed by the pop-up CM rig at 15.25 GMT. However, after a long search the surface CM mooring at site IB2 could not be found, and with the weather too rough to make any recoveries the ship left site I and headed back to site A overnight at slow speed into a southerly gale.

Bad weather continued for the next two days, 30/31 October, with winds of 35-40 knots gusting to 50 knots at times and large seas. The ship remained hove to at site A and the various moorings inspected from time to time to check position and performance. However, the Waverider at site AC2 could not be located during this period. By the morning of 1 November the wind had died down to about 25 knots, after being as high as 60 knots during the night. Although the sea was still high the rigs at sites AH2 and AF3 were both successfully recovered by 11.00 GMT and 11.40 GMT respectively. CTD cast 172 was taken at site A then Challenger moved north again to site I at 12.20 GMT.

On arrival at site IA2 the ADCP was recovered at 14-16 GMT, showing signs of trawler damage, followed by CTD cast 173 at 14.40 GMT before the ship moved to site H and CTD cast 174 was taken at 20.30 GMT, shortly after arrival. Large seas and winds of 20-25 knots during the night prevented further CTD casts. However, by 07.30 GMT the following morning, 2 November, the wind had moderated to 15 knots so the ADCP at site HA2 was recovered by 08.43 GMT followed by CTD cast 175 at 09.45 GMT en route to site A, where a surface rig with two S4 CM and two VMCM was deployed at site AF4 by 11.27 GMT. Still at site A, CTD cast 176 was taken at 12.15 GMT, then the DML surface mooring, with two S4 CM's set to normal sampling, was re-deployed at site AH3 by 13.34 GMT and, finally, grab sample A/85 at 14.55 GMT completed this visit to site A.

A CTD survey section to the east of site A as far as 3°E was started at 16.05 GMT with cast 177 and continued at 2 hourly intervals until cast 181 at 00.01 GMT on the 3 November, followed by a course change to the north-west, then cast 182 to 186 on a westerly course before returning south to site CA for cast 187 at 10.30 GMT. The temperature profile from this cast showed that the surface mixed layer extended down to 76m, so it was decided to recover the thermistor moorings at sites CA and BA which were only in the mixed layer. So mooring CA and BA were both recovered successfully, in spite of strong winds, at 11.44 GMT and 13.51 GMT respectively. A second CTD survey section to the west of site A and out to 1°W started at 15.10 GMT with cast 188 on site D and cast 189 on site H at 18.05 GMT, and every 2 hours thereafter. By 02.30 GMT the following morning, 4 November, cast 193 completed this section but the weather was now too bad to continue the survey further. With winds of 40-45 knots the ship headed for shelter in Brassey Sound and remained there until 18.00 GMT the following

afternoon, 5 November, when the wind had moderated to allow the CTD survey to continue along a track towards site A with casts 194 to 199.

Site A was re-occupied at 04.00 GMT, 6 November, and at first light with the expected lull in the weather the STABLE rig at site AB2 was successfully recovered at 07.30 GMT followed by the ETA rig on site AF4 at 08.59 GMT. An attempt to recover the DML rig at site AH3 was unsuccessful due to the strengthening wind restricting manoeuvrability of the ship. By 11.00 GMT all the remaining rigs at this site had been inspected and accounted for, except the Waverider, but with the wind speed back up to 35-40 knots further recovery attempts had to be abandoned for the day. A CTD section to the north of site A to 60° 30'N was started with cast 200 at 18.00 GMT followed by 201 on site I at 20.15 GMT. However, during casts 202 and 203 the CTD began to malfunction so the survey section was abandoned and the ship returned to site IC for grab sample I/85 taken at 06.45 GMT on the 7 November.

At first light an attempt was made to recover the pop-up CM mooring at site IC, but the acoustic release failed to operate and after one hour the attempt was aborted at 07.50 GMT in favour of better prospects at site A. On arrival the DML rig at site AH3 was successfully recovered by 09.53 GMT, quickly followed by the ADCP on site AA3, the thermistor rig on site AE and the RDI-ADCP on site AK at 10.15, 11.23 and 11.50 GMT respectively. Although the wind remained strong all day, 20-30 knots, three more rigs were successfully recovered in the afternoon, the thermistor rig on site EA, the pop-up CM rig on site AG and the VAESAT rig on site AI at 13.40, 14.45 and 15.49 GMT respectively. After adjustments the CTD was tested on cast 204 at 18.30 GMT but remained defective and so could not be used. Sea-bed camera dips to photograph bed-forms started at 18.45 GMT and continued in rough seas with wind speeds of 35-40 knots until 20.30 GMT, when the ship left site A and moved to site IC to have another attempt at the reluctant release. Transmissions started at 22.00 GMT with a range of 2000m and continued at closing ranges of 1000 and 500m. It was not until 01.30 GMT on the 8 November that the release finally operated at a range of 180m and the pop-up CM mooring surfaced. The release transponder on the rig was tracked on the Simrad echo sounder, which had to be adapted for this task, (see Appendix 2 for further details) until first light when the rig was sighted and successfully recovered by 07.28 GMT. The ship then made for site DA arriving at 09.45 GMT and hove to in rough seas. By 11.24 GMT the weather had improved slightly

with winds of 25-30 knots so recovery of the thermistor rig started in marginal conditions and was completed by 11.45 GMT. In similar conditions, and with courage in both hands, the VAESAT rig at site AJ and the met buoy at site AD were also recovered successfully at 14.20 and 15.49 GMT respectively, although not without difficulty. At site AF2 the sub-surface buoy part of the ETA mooring with its surface pellet float was all that remained of this rig, the surface toroid and S4 current meters having gone missing previously. Since good weather was required to attempt a recovery of this damaged rig it was decided to abandon it and not take the risk of tangling the lines in the ship's propeller.

The ship moved to site H to take grab samples at 19.50 GMT, but the weather proved too rough to allow the grab to be deployed correctly which persisted in pre-triggering. Further tests of the CTD showed that it was still defective and so with no possibility of any more useful work or improvement in the weather the ship left the area at 20.20 GMT and headed for Troon. The ship's ADCP and thermosalinograph were both switched off at 10.27 GMT on the 11 November and the ship docked at Troon at 10.00 GMT on the 12 November.

CONCLUSIONS

The main objectives of the cruise programme, items 1, 2 and 6 were achieved in the main, but the remainder, items 3, 4 and 5 were only partially successful.

1. The 5 additional moorings to the array were successfully deployed together with 8 moorings recovered and re-deployed to supplement the array, Tables 1 and 2.
2. A total of 35 CTD profiles were obtained before the system failed towards the end of the cruise. Grab samples were taken at sites A and I plus sea-bed photographs in black/white and colour at site A. Table 3, Figure 1.
3. The ship ADCP system, surface monitoring system and echo sounder operated throughout the cruise period with only minor interruptions to data collection, Figure 2.
4. None of the drogued drifting buoys could be launched due to the high risk of tangling the drogue in the ship's propeller in the heavy seas, as had happened on the previous cruise. Similarly, the SEASOAR and other surveys were restricted by the limited navigation of the ship in the prevailing winds and the added risk to the equipment.
5. By the final retrieval of the mooring array a total of 21 successful mooring recoveries had been made during the cruise, with 3 moorings having been recovered previously by fishing trawlers and returned to POL from sites FA, HB and HC. Equipment from sites AC2 and AF2 was later returned from Norway resulting in further data retrieval in both cases, but the surface mooring at site IB2 was not found and is presumed lost to trawling.

Table 1. Times and positions of rig deployments and recoveries.

<u>Rig</u>	<u>Instrument</u>	<u>Latitude</u> <u>N</u>	<u>Longitude</u> <u>E</u>	<u>Depth</u> <u>(m)</u>	<u>Deployed</u>	<u>Recovered</u>
AA2	ADCP	59 39.66	00 59.85	120	10:20 14/9	10:44 28/10
AA3	ADCP	59 39.64	01 00.01	120	11:30 29/9	10:15 7/11
AB2	STABLE (POP-UP)	59 39.99	00 59.48	119	08:25 28/10	07:30 6/11
AC2	Waverider	59 39.74	01 00.13		17:46 13/9	Returned from Norway
AD	Met. buoy	59 40.15	00 59.30	119	10:04 06/9	15:49 8/11
AE	Thermistor	59 39.87	01 00.24		08:51 08/9	11:23 7/11
AF2	Surface CM	59 39.86	01 00.99	118	13:46 15/9	Buoy and top S4 CM returned from Norway
AF3	Surface CM	59 40.03	01 00.95	118	16:02 28/9	11:40 1/11
AF4	Surface CM	59 40.06	01 00.99	118	11:27 2/11	08:59 6/11
AG	Pop-up CM	59 40.13	00 59.82		15:40 06/9	14:45 7/11
AH2	Surface CM	59 39.12	01 00.75	118	16:56 28/9	11:00 1/11 (DML rig)
AH3	Surface CM	59 39.57	01 00.86	118	13:34 2/11	09:53 7/11 (DML rig)
AI	VAESAT	59 40.03	01 00.34	118	13:00 06/9	15:49 7/11
AJ	VAESAT	59 40.29	01 00.76	118	09:26 28/10	14:20 8/11
AK	RDI-ADCP	59 39.92	00 59.84	119	13:35 06/9	11:50 7/11
BA	Thermistor	59 39.82	00 58.63	120	10:36 08/9	13:51 3/11
CA	Thermistor	59 40.36	01 00.10	119	12:54 08/9	11:44 3/11
DA	Thermistor	59 40.00	00 54.00	119	15:36 08/9	11:45 8/11
EA	Thermistor	59 42.95	00 59.73	118	13:53 08/9	13:40 7/11
FA	ADCP	59 39.95	00 49.16	122	14:58 14/9	Trawled and Returned to POL
GA	ADCP	59 45.51	01 00.00	120	19:38 14/9	14:10 28/10
HA2	ADCP	59 39.98	00 32.48	130	14:00 14/9	08:43 2/11

Table 1 (ctd)

<u>Rig</u>	<u>Instrument</u>	<u>Latitude</u> <u>N</u>	<u>Longitude</u> <u>E</u>	<u>Depth</u> <u>(m)</u>	<u>Deployed</u>	<u>Recovered</u>
HB	Surface CM	59 39.96	00 32.95		14:28 07/9	Trawled 15/9 and Returned to POL
HC	Pop-up CM	59 40.01	00 32.66	129	15:47 07/9	Trawled 15/9 and Returned to POL
IA2	ADCP	59 53.58	01 00.31	117	18:24 14/9	14:16 1/11
IB2	Surface CM	59 53.43	01 01.05	115	09:12 16/9	Lost
IC	Pop-up CM	59 53.55	01 00.07	116	09:32 07/9	07:28 8/11

Table 2. Equipment on moorings.

<u>Rig</u>	<u>Mooring</u>	<u>Equipment</u>
AA2	ADCP	POLDOP 6; Frame 18; Compass 4; WLR 444; Benthos release 6A.
AA3	ADCP	POLDOP 6; Frame 18; Compass 4; Benthos release 6A.
AB	STABLE (Pop-up)	Benthos releases 2A and 5B.
AC	Waverider	
AD	Met. buoy	Wind speed & direction; atmospheric pressure; air and sea temperature; solar radiation; relative humidity.
AE	Thermistor	Spar 1; Logger 7; 75m chain 1904, 16-91m below the sea surface.
AF2	Surface cm (ETA)	32" subsurface 28; Toroid 1; Benthos beacon 4. Current meters - S4 1644, S4 1307 at 5, 15m below the sea surface.
AF3	Surface cm (ETA)	32" subsurface 1; Toroid 3; Benthos beacon 3. Argos beacon 1451. Current meters - S4 1113, S4 1119 at 5, 15m below the sea surface.
AF4	Surface cm (ETA)	32" subsurface 1; Toroid 3; Argos beacon 1451; Benthos beacon 3. Current meters - S4 1113, VMCM 604, VMCM 704, S4 1119 at 4, 7, 12, 20m below the sea surface.
AG	Pop-up cm	40" subsurface 81; Benthos release 063. Current meters - S4 1261, RCM7 9632, RCM8 9680, RCM4 7570 at 92, 75, 50, 10m above the sea bed.
AH2	Surface cm (DML)	32" subsurface 9. Current meters - S4 716, S4 715 at 2, 4m below the sea surface.
AH3	Surface cm (DML)	32" subsurface 9. Current meters - S4 1112, S4 1117 at 2, 4m below sea surface.
AI	VAESAT	32" subsurface 81. EM sensor at 2m.
AJ	VAESAT	32" subsurface 50. EM sensor at 1m, 1 MHz ADCP head at ½m.
AK	RDI-ADCP	Oceano release 1408. 150 KHz head at 2m above sea bed.
BA	Thermistor	Spar 4; Logger 9; 40m chain 1612, 22-62m below the sea surface.
CA	Thermistor	Spar 5; Logger 11; 50m chain 1756, 22-72m below the sea surface.
DA	Thermistor	Spar 2; Logger 10; 75m chain 1903, 16-91m below the sea surface.
EA	Thermistor	Spar 3; Logger 8; 75m chain 1905, 16-91 below the sea surface.

Table 2 (ctd).

<u>Rig</u>	<u>Mooring</u>	<u>Equipment</u>
FA	ADCP	POLDOP 3; Frame 5; Compass 5; Benthos release 2B.
GA	ADCP	POLDOP 7; Frame 23; Compass 2; Benthos release 3B.
HA2	ADCP	POLDOP 9; Frame 15; Compass 3; WLR 1038; Benthos release 5A.
HB	Surface cm (ETA)	32" subsurface 1; Toroid 3; Argos beacon 6252; Benthos beacon 3. Current meters - S4 1196, S4 1113 at 5, 15m below the sea surface.
HC	Pop-up cm	40" subsurface 79; Benthos release 8A. Current meters - S4 1119, RCM7 9631, RCM7 9633, RCM4 3277 at 102, 75, 50, 10m above the sea bed.
IA2	ADCP	POLDOP 1; Frame 20; Compass 6; WLR 445; Benthos release 4A.
IB2	Surface cm (ETA)	32" subsurface 6; Toroid 2. Current meters - S4 1258, S4 1263 at 5, 15m below the sea surface.
IC	Pop-up cm	40" subsurface 17; Benthos release 082. Current meters - S4 1264, RCM7 9959, RCM8 9652, RCM4 568 at 85, 70, 50, 10m below the sea surface.

Notes:

1. Moorings, see
Appendix 1

ADCPs and STABLE are pop-up sea bed frames.

Waverider, Met. buoy, Thermistor chain and Pop-up current meter moorings are single point moorings.

Surface current meter and VAESAT moorings consist of a surface buoy tethered to a moored subsurface buoy; current meters are mounted or suspended beneath the surface buoy.

2. Current meters (cm)

InterOcean S4, EG&G VMCM, Aanderaa RCM4, RCM7, RCM8.

3. Thermistor chains

Seadata loggers and Aanderaa chains.

4. Pressure recorders

Aanderaa WLR.

5. Surface buoys

6m spar; 2m diameter toroid.

6. Subsurface buoys

32" and 40" diameter hollow steel spheres.

Table 3. RRS Challenger cruise 85 CTD stations

<u>CTD</u>	<u>Date</u>	<u>Time</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Station</u>
170	28.10.91	18:28:00	59.656681	1.025167	ST A
171	28.10.91	19:59:00	59.658443	1.021577	ST A
172	01.11.91	12:05:00	59.665227	1.023966	ST A
173	01.11.91	14:30:00	59.894484	1.004158	ST I
174	01.11.91	20:28:00	59.658210	0.545360	ST H
175	02.11.91	09:53:00	59.659228	0.765778	
176	02.11.91	12:13:00	59.681431	1.063523	ST A
177	02.11.91	16:13:00	59.668060	1.245898	
178	02.11.91	18:09:00	59.691791	1.733682	
179	02.11.91	20:35:00	59.659076	2.246298	
180	02.11.91	22:10:00	59.669250	2.643619	
181	03.11.91	00:09:00	59.672818	3.133144	
182	03.11.91	02:06:00	59.782523	2.767616	
183	03.11.91	04:06:00	59.782240	2.334462	
184	03.11.91	06:13:00	59.781237	1.776480	
185	03.11.91	08:15:00	59.777281	1.244806	
186	03.11.91	09:30:00	59.777131	0.995776	
187	03.11.91	10:35:00	59.673131	0.994951	ST C
188	03.11.91	15:11:00	59.663756	0.896342	ST D
189	03.11.91	18:02:00	59.665817	0.546856	ST H
190	03.11.91	20:22:00	59.656945	0.238323	
191	03.11.91	22:07:00	59.665814	-0.056126	
192	04.11.91	00:11:00	59.666427	-0.459084	
193	04.11.91	02:29:00	59.665493	-1.013665	
194	05.11.91	18:39:00	60.051132	-0.996585	
195	05.11.91	20:10:00	59.984944	-0.650588	
196	05.11.91	22:13:00	59.878639	-0.183185	
197	06.11.91	00:08:00	59.791462	0.263395	
198	06.11.91	02:02:00	59.722535	0.603893	
199	06.11.91	03:35:00	59.666839	0.889739	ST A
200	06.11.91	18:07:00	59.696981	1.071831	ST A
201	06.11.91	20:12:00	59.872597	0.997154	ST I
202	06.11.91	22:08:00	60.026373	0.998611	
203	07.11.91	00:06:00	60.181175	0.999300	
204	07.11.91	18:24:00	59.659435	0.972377	ST A

GRAB SAMPLES

02.11.91	14:55:00	A/85	ST A
07.11.91	06:45:00	I/85	ST I

SEA-BED PHOTOGRAPHS

07.11.91	18:55:00 to 19:02:00	30 x Black/White	ST A
07.11.91	19:54:00 to 20:20:00	30 x Colour/Transparencies	ST A

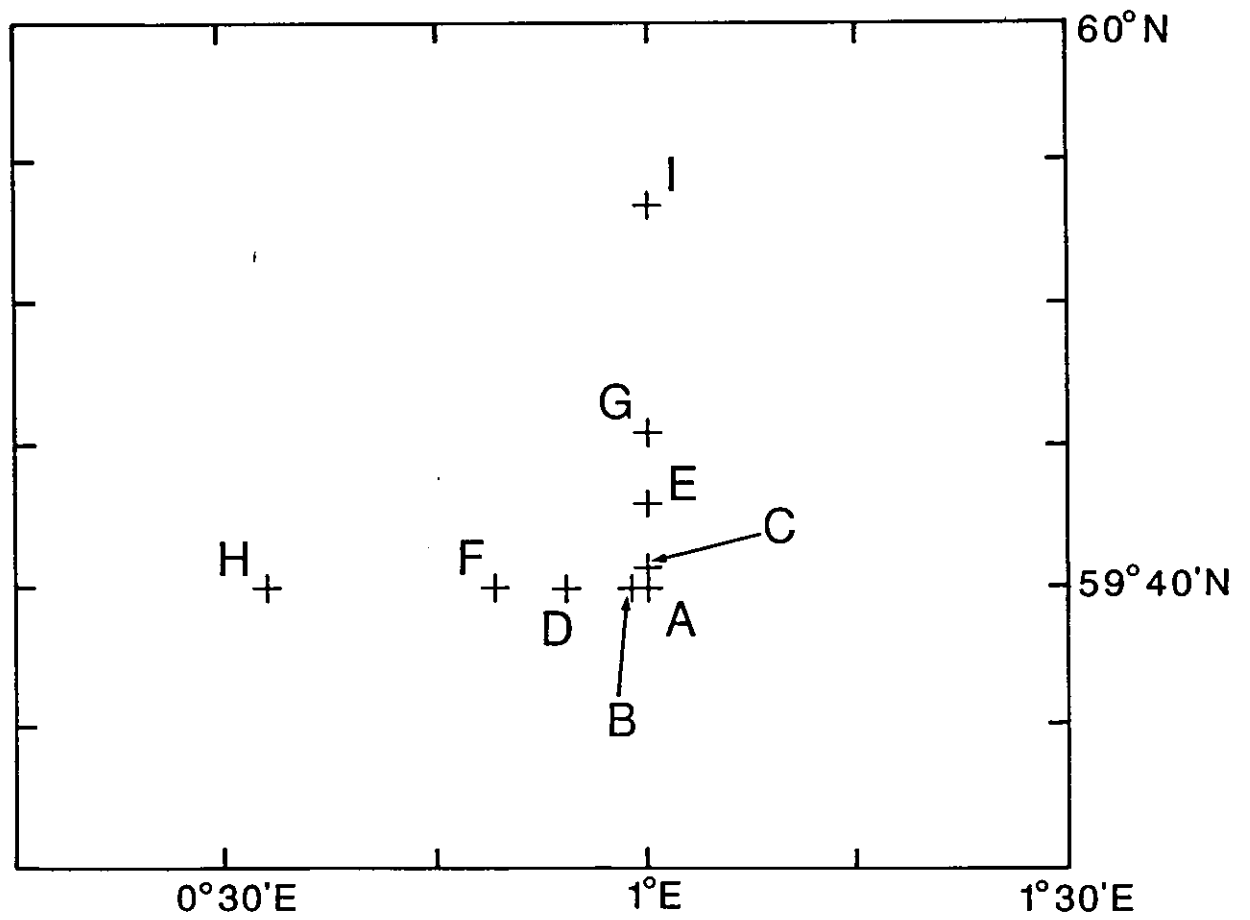


Figure 1. Map of mooring sites.

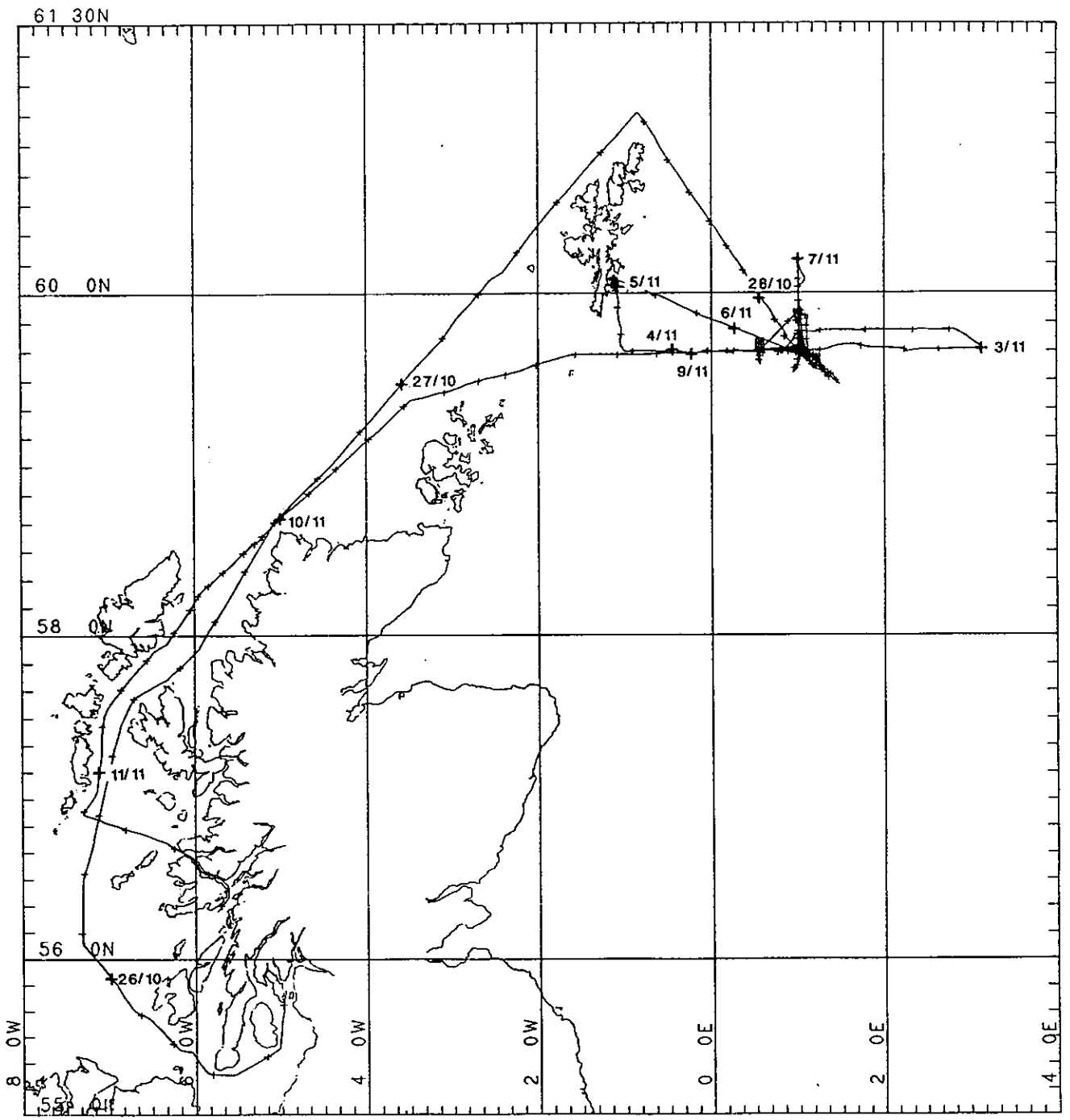


Figure 2. Cruise track.

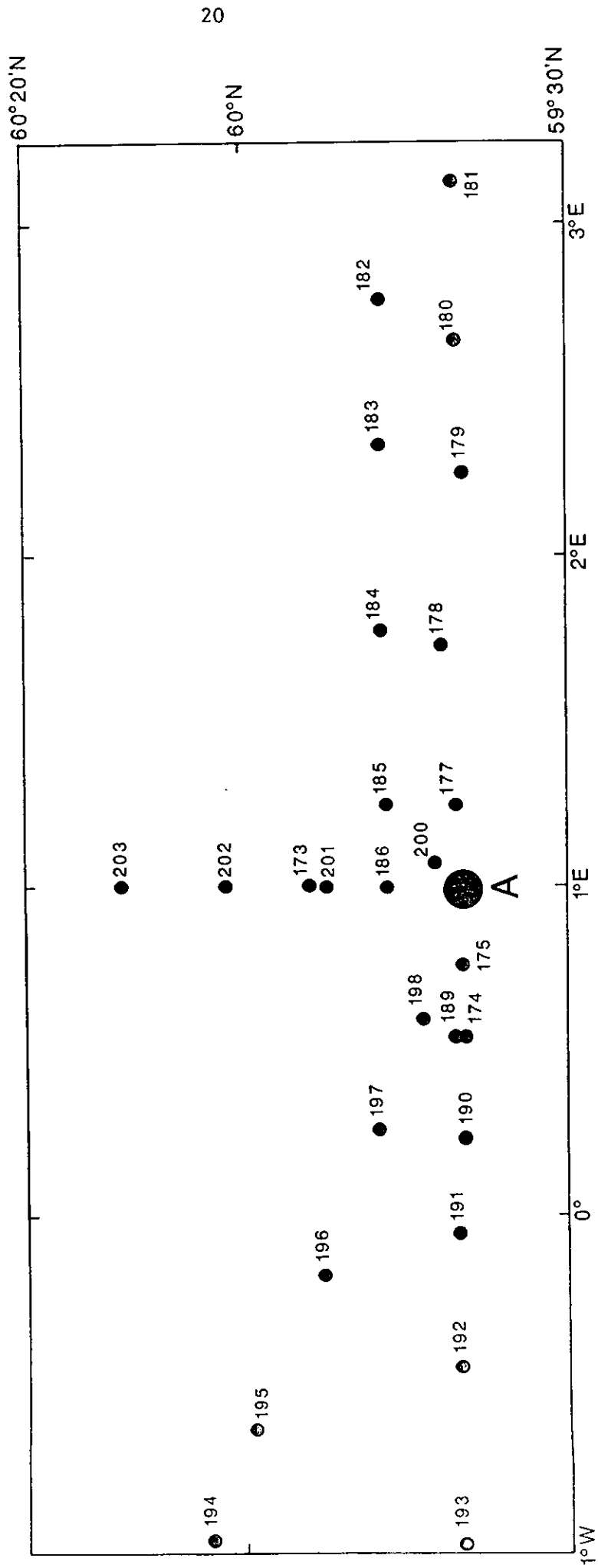


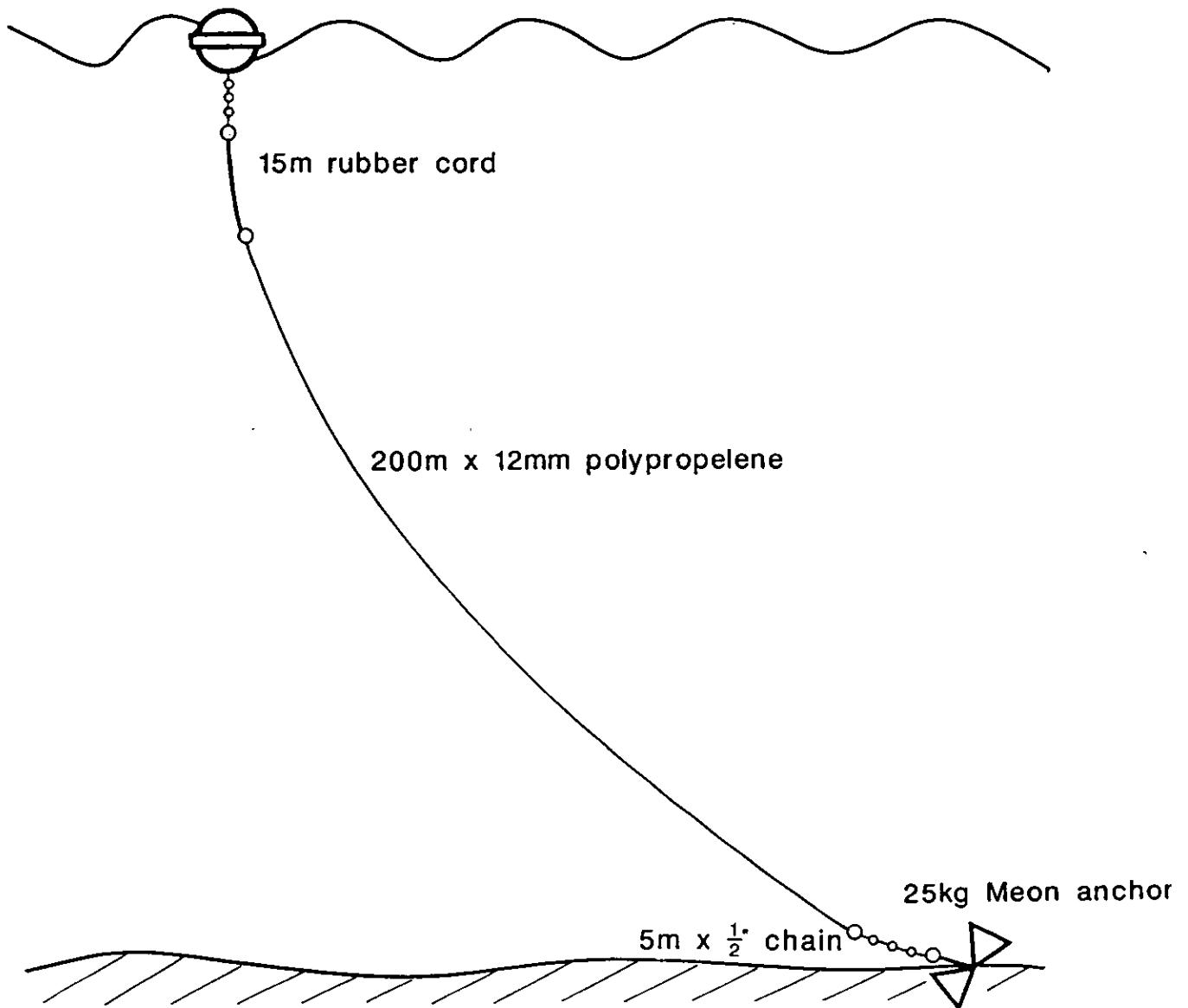
Figure 3. Plot of CTD positions.

APPENDIX 1

MOORING SCHEMATICS

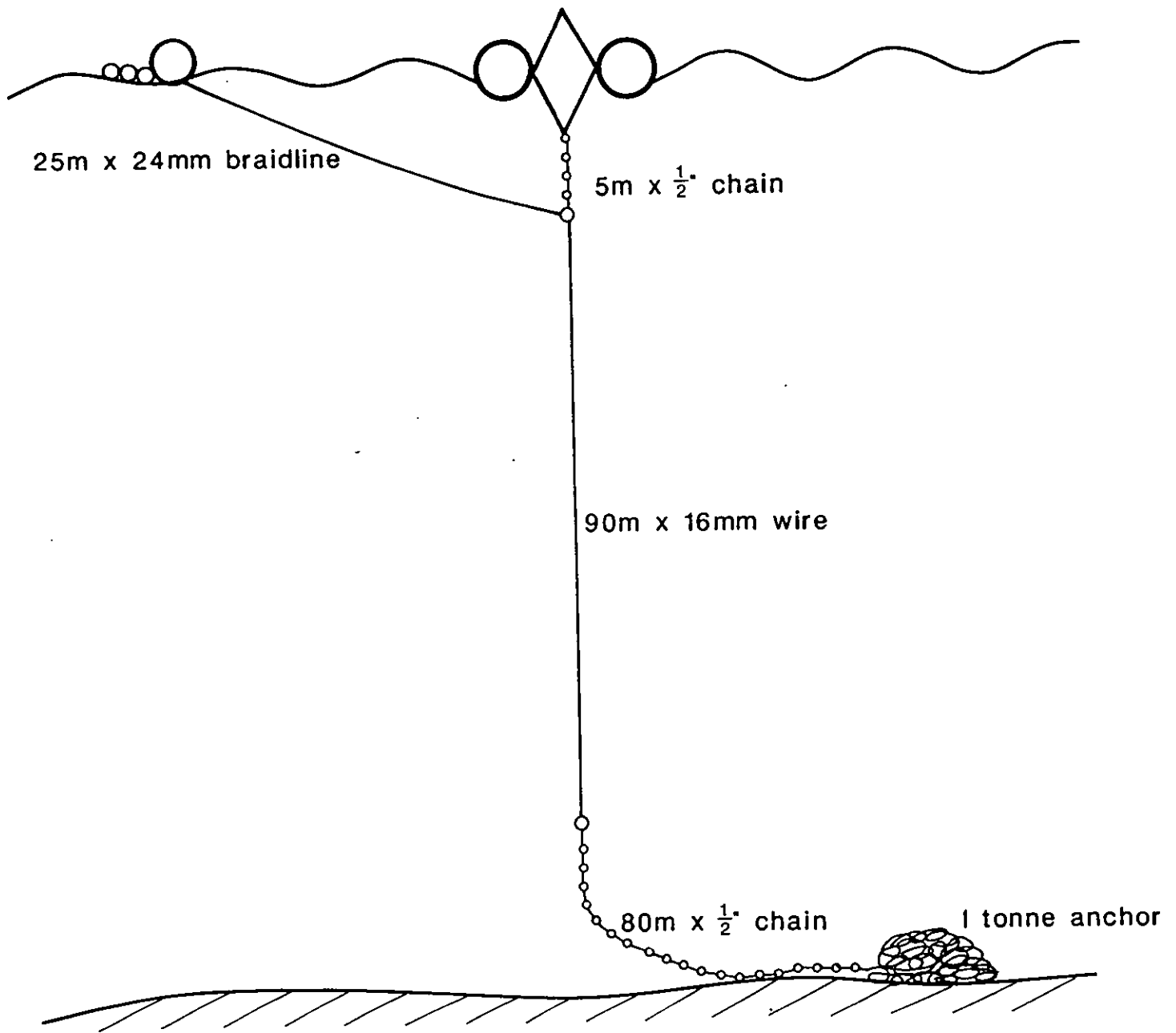
AC

Waverider



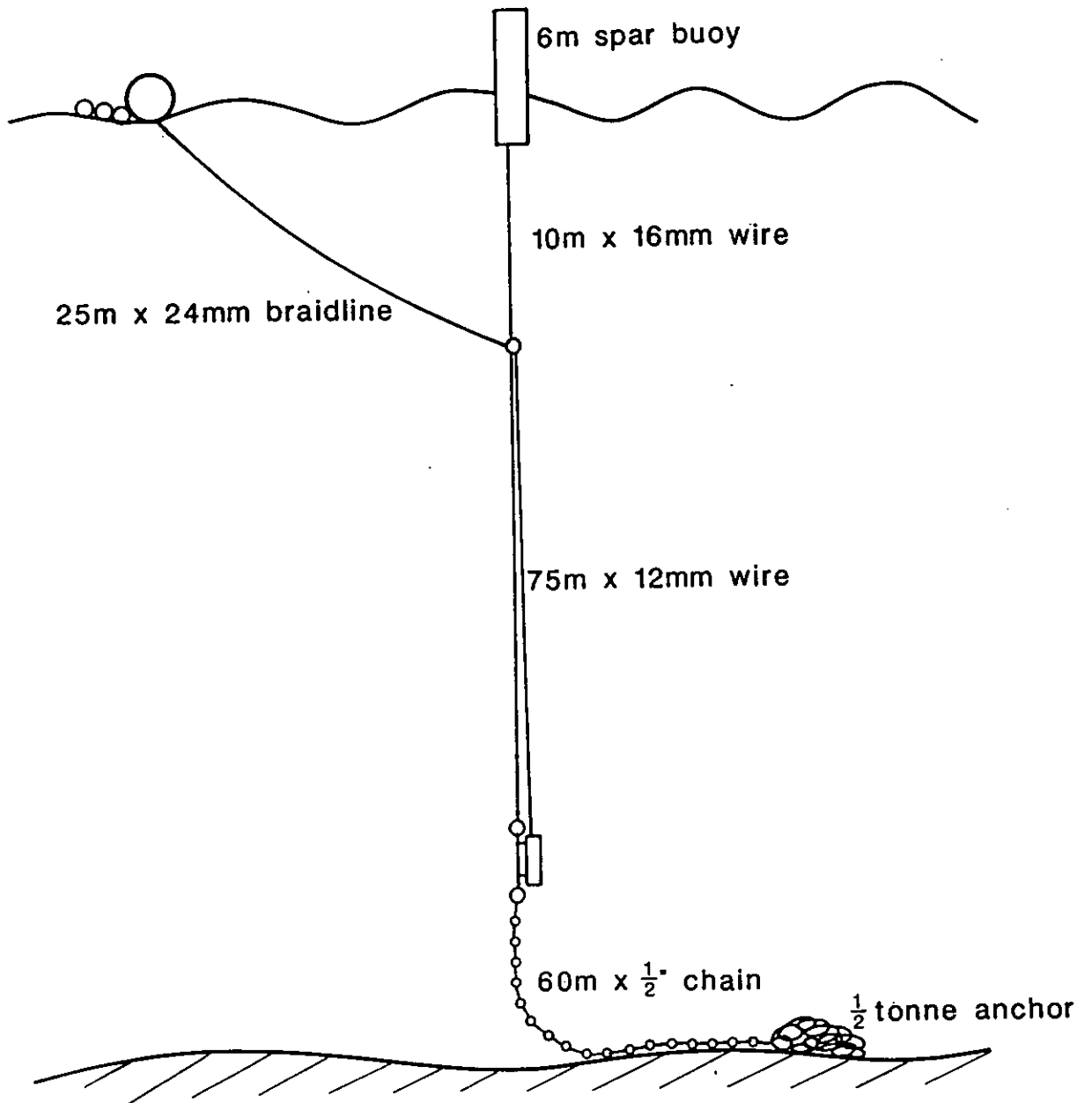
AD

Met. Buoy



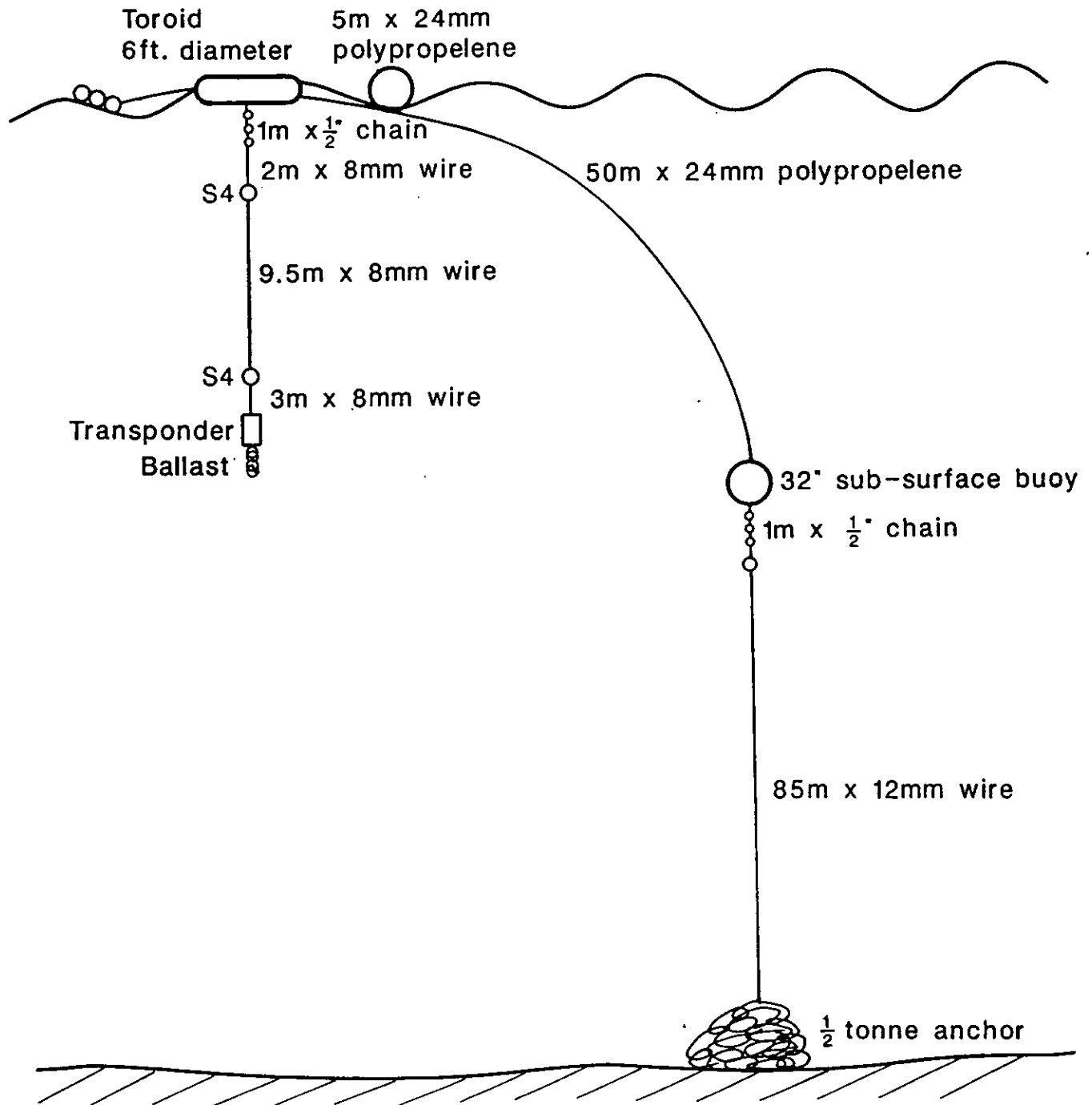
AE

Thermistor Chain



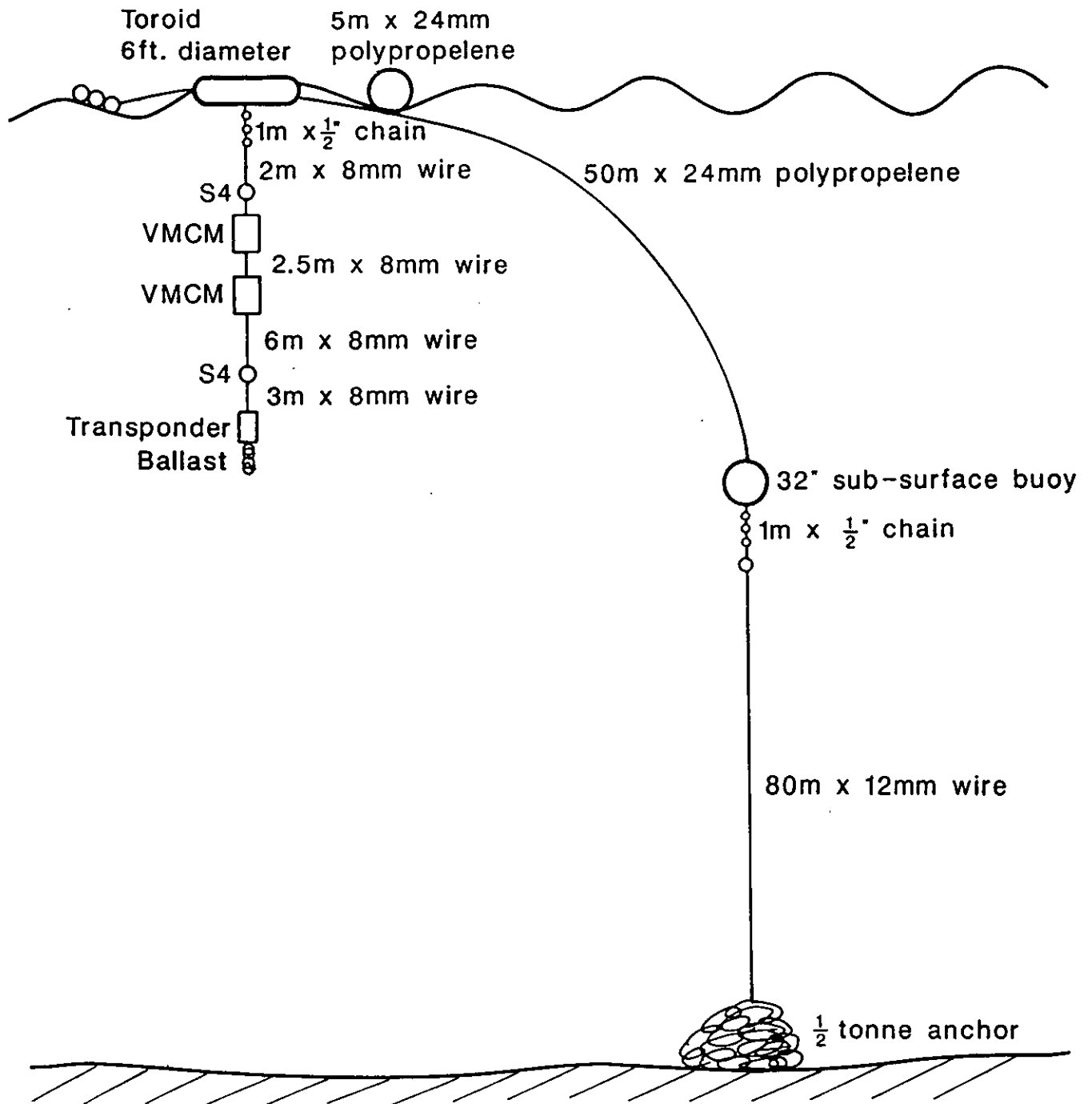
AF

Surface Current Meter (ETA)



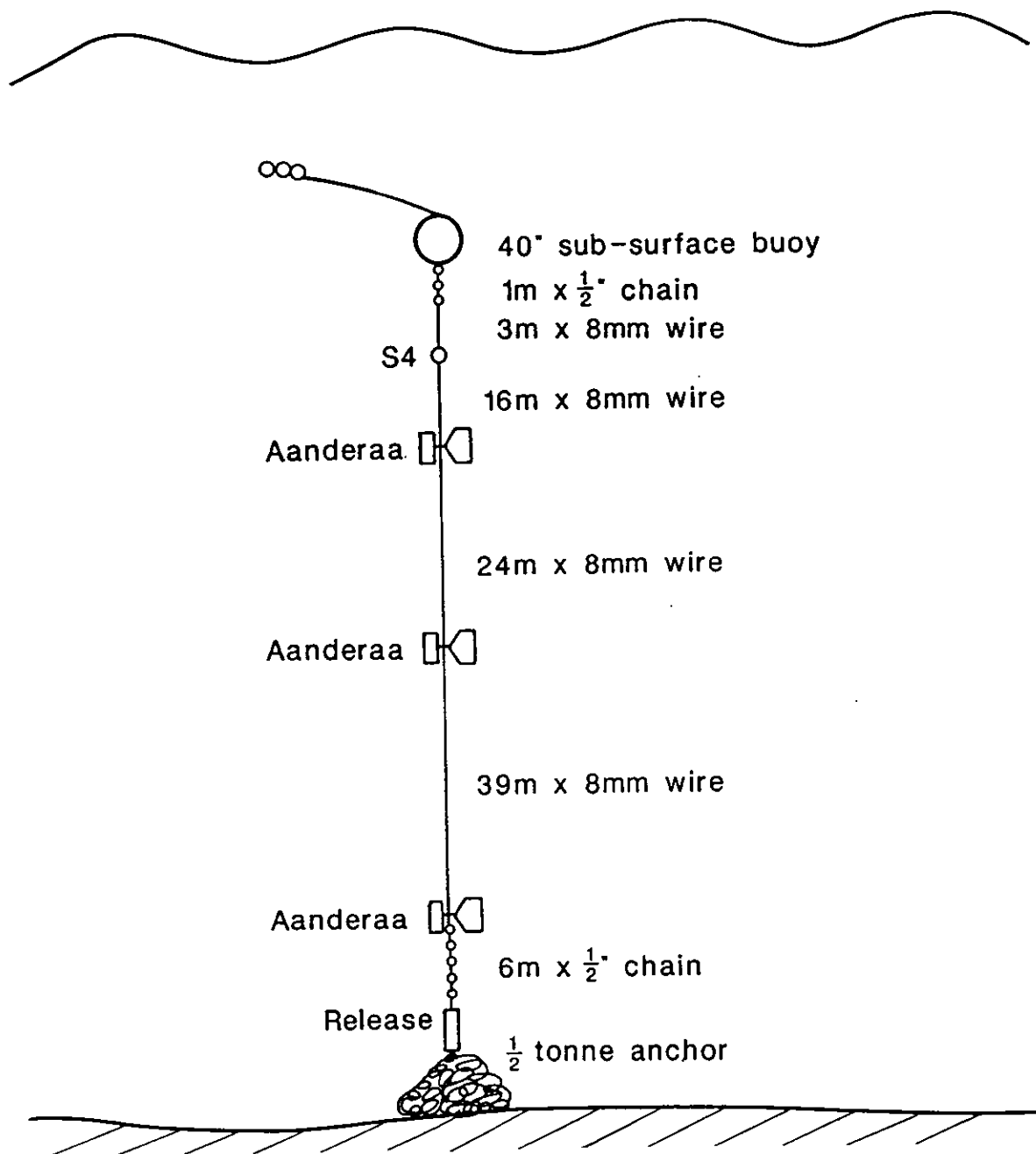
AF

Surface Current Meter (ETA)



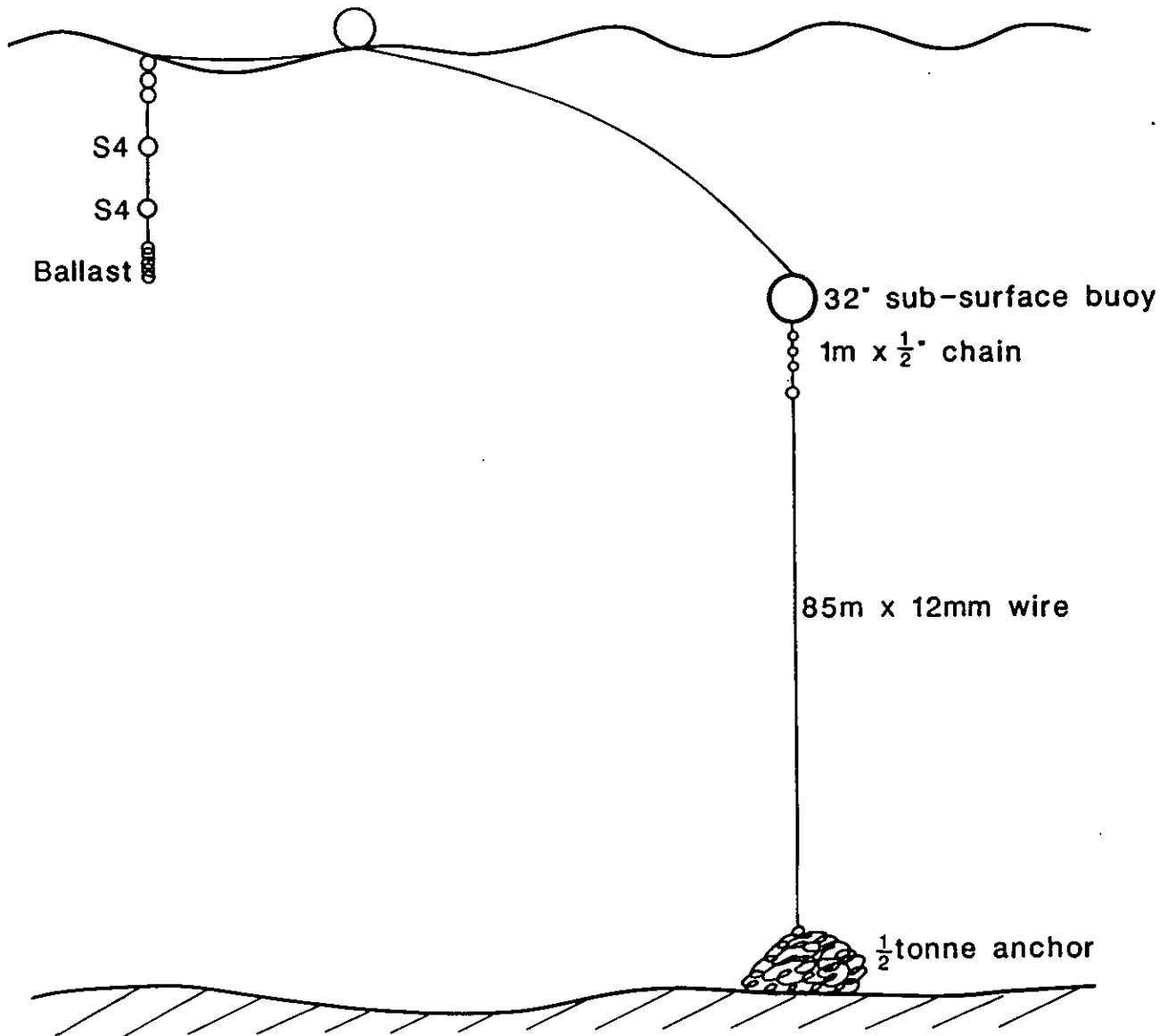
AG

Pop-up Current Meter



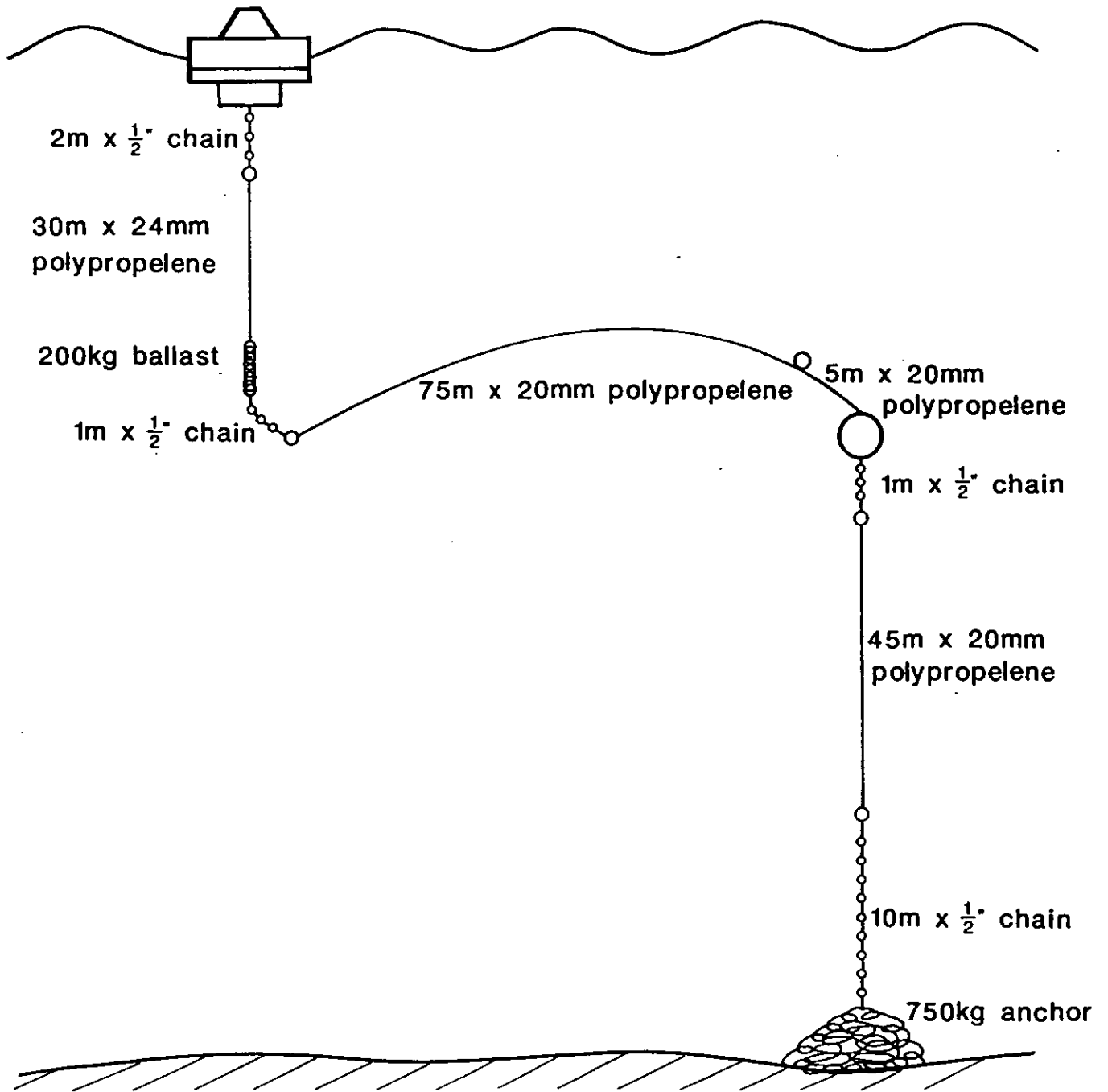
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Surface Current Meter (DML)



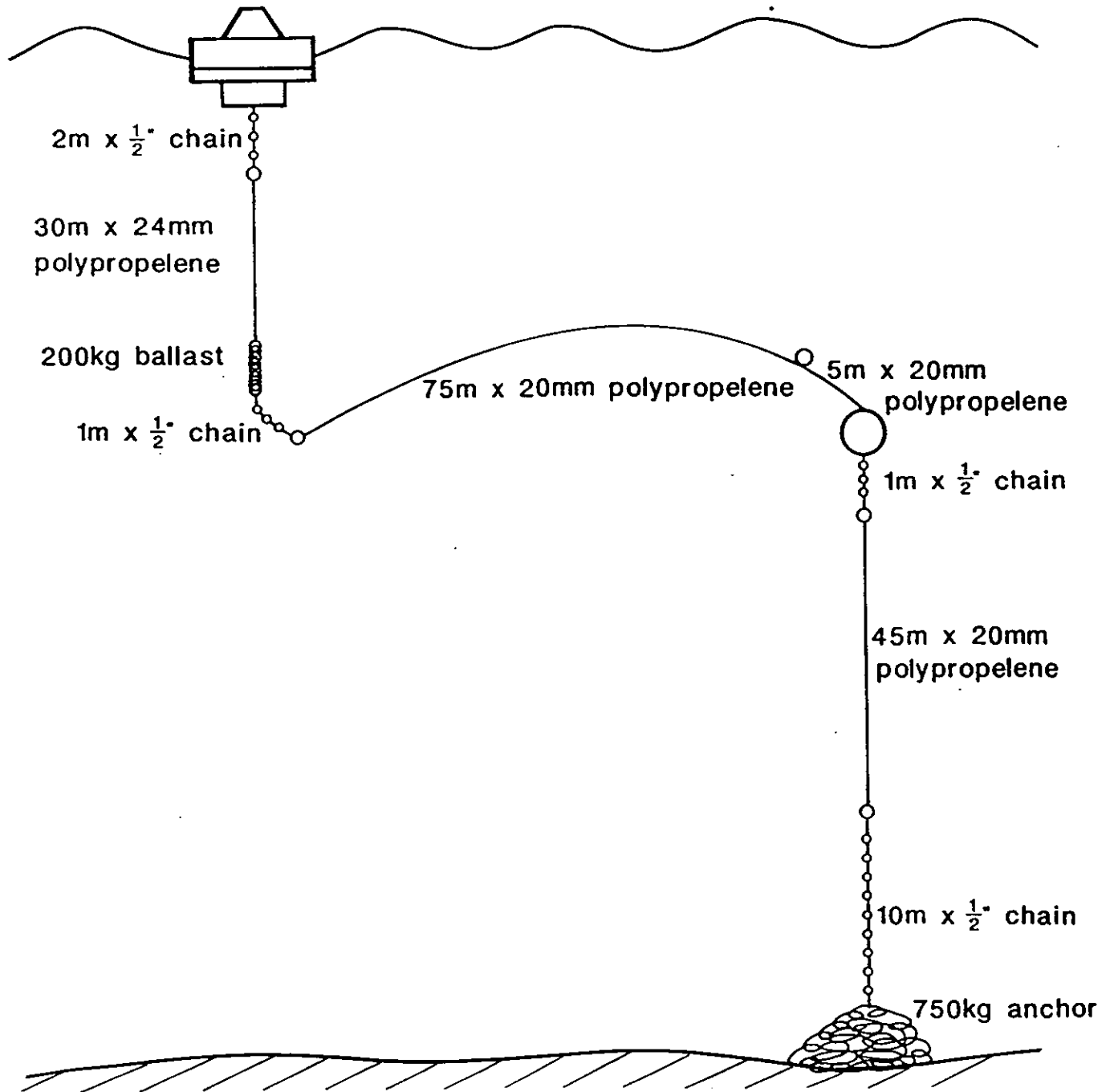
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VAESAT



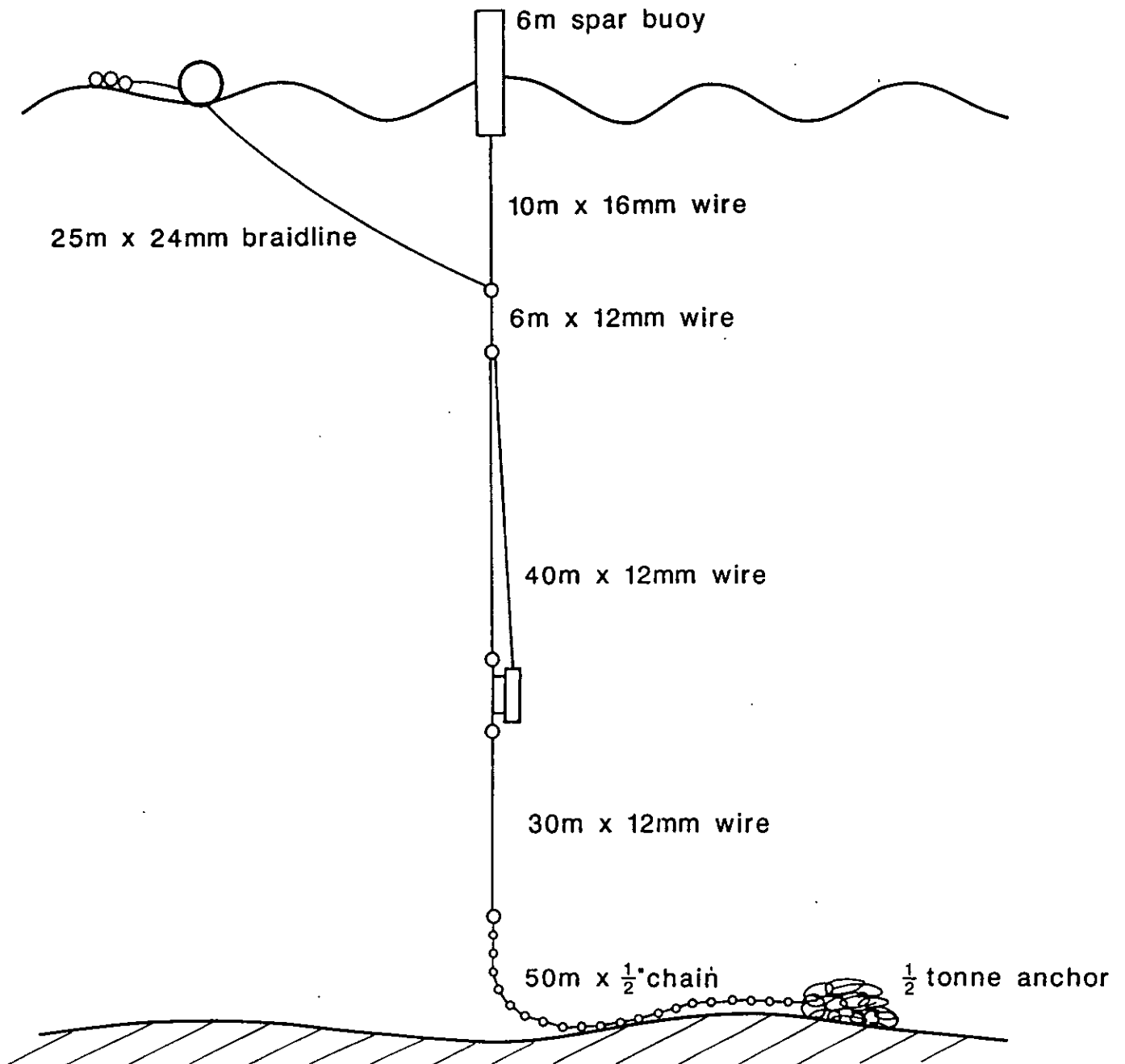
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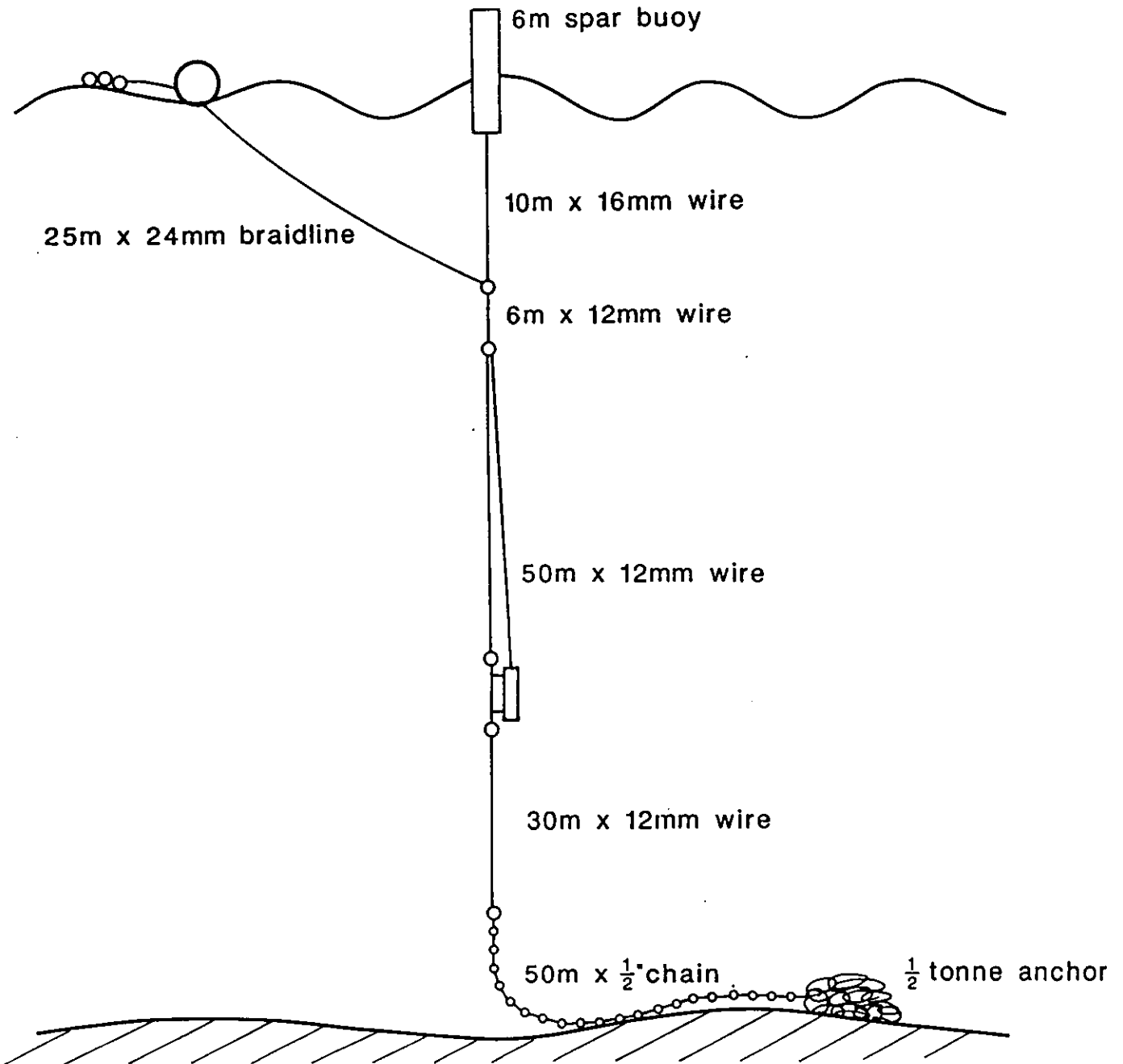
BA

Thermistor Chain



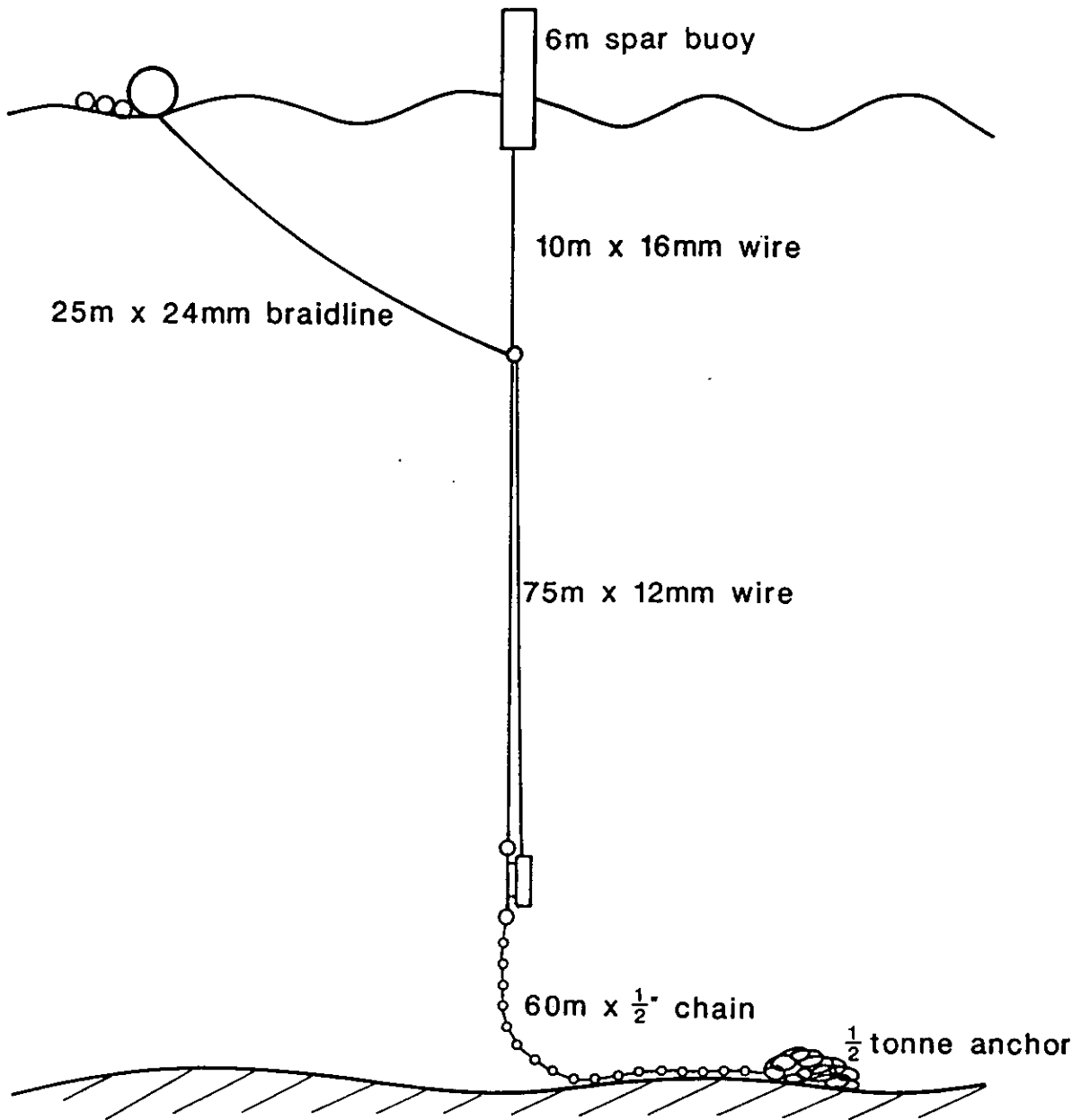
CA

Thermistor Chain



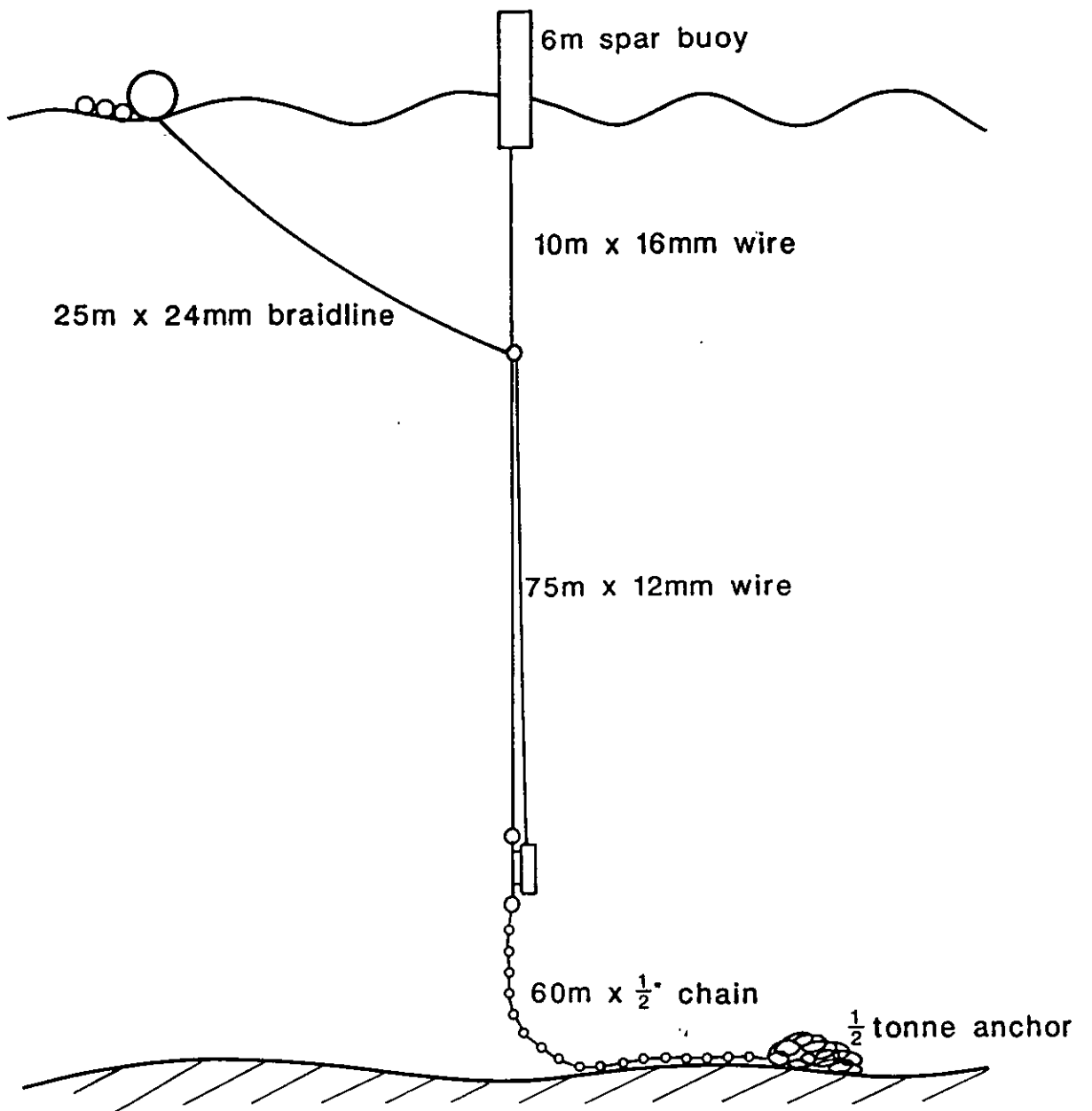
DA

Thermistor Chain



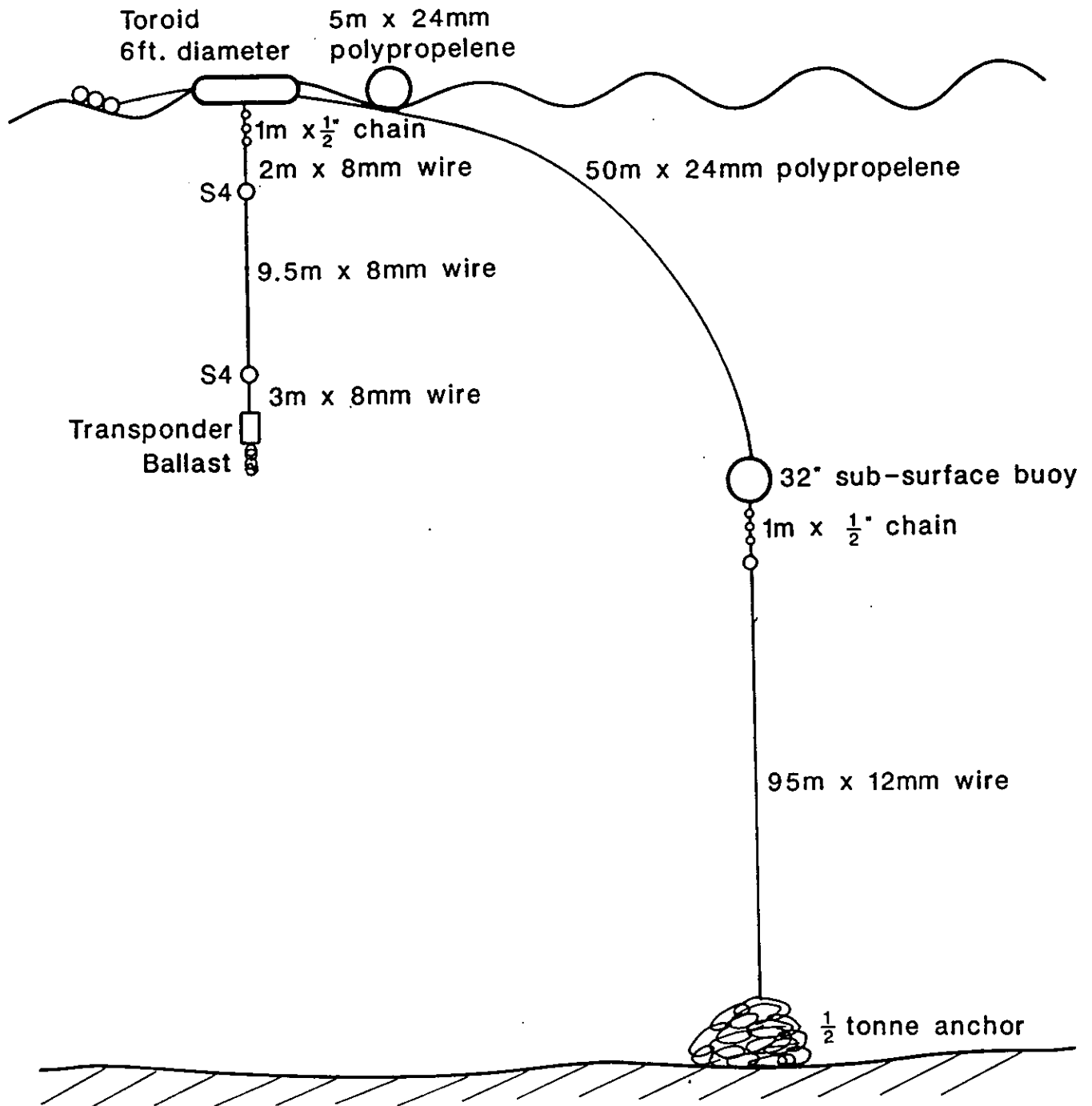
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Thermistor Chain



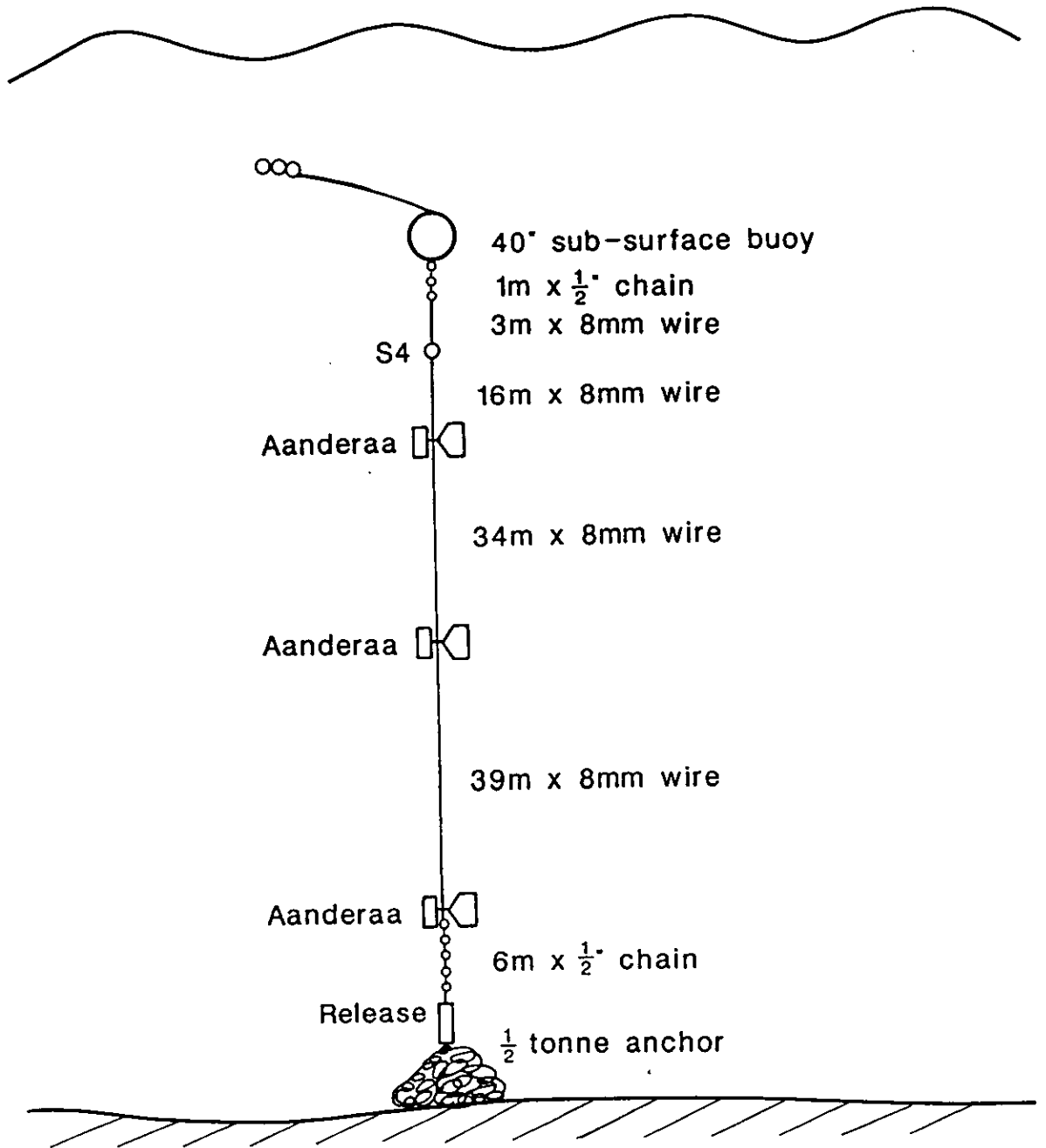
HB

Surface Current Meter (ETA)



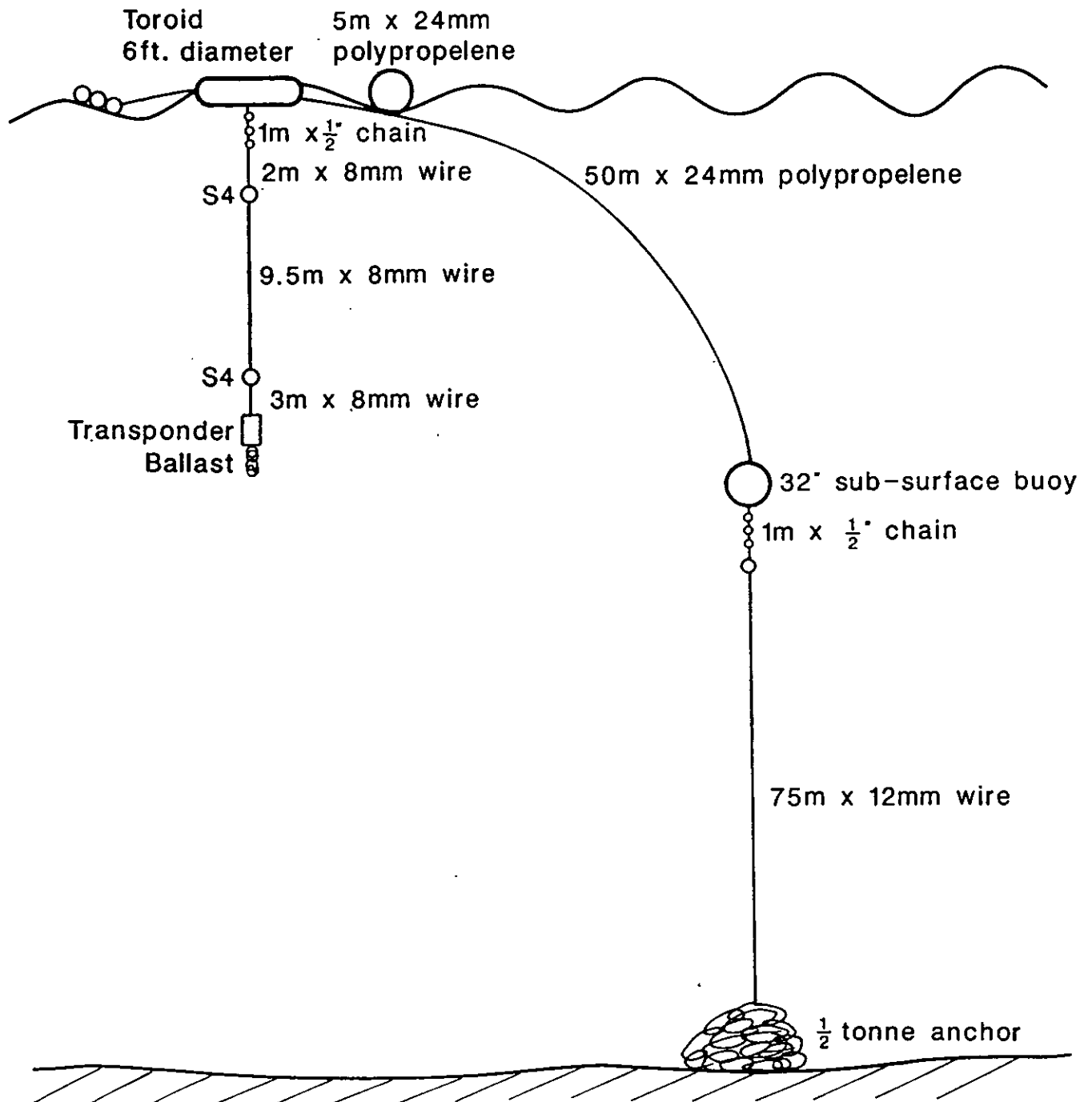
HC

Pop-up Current Meter



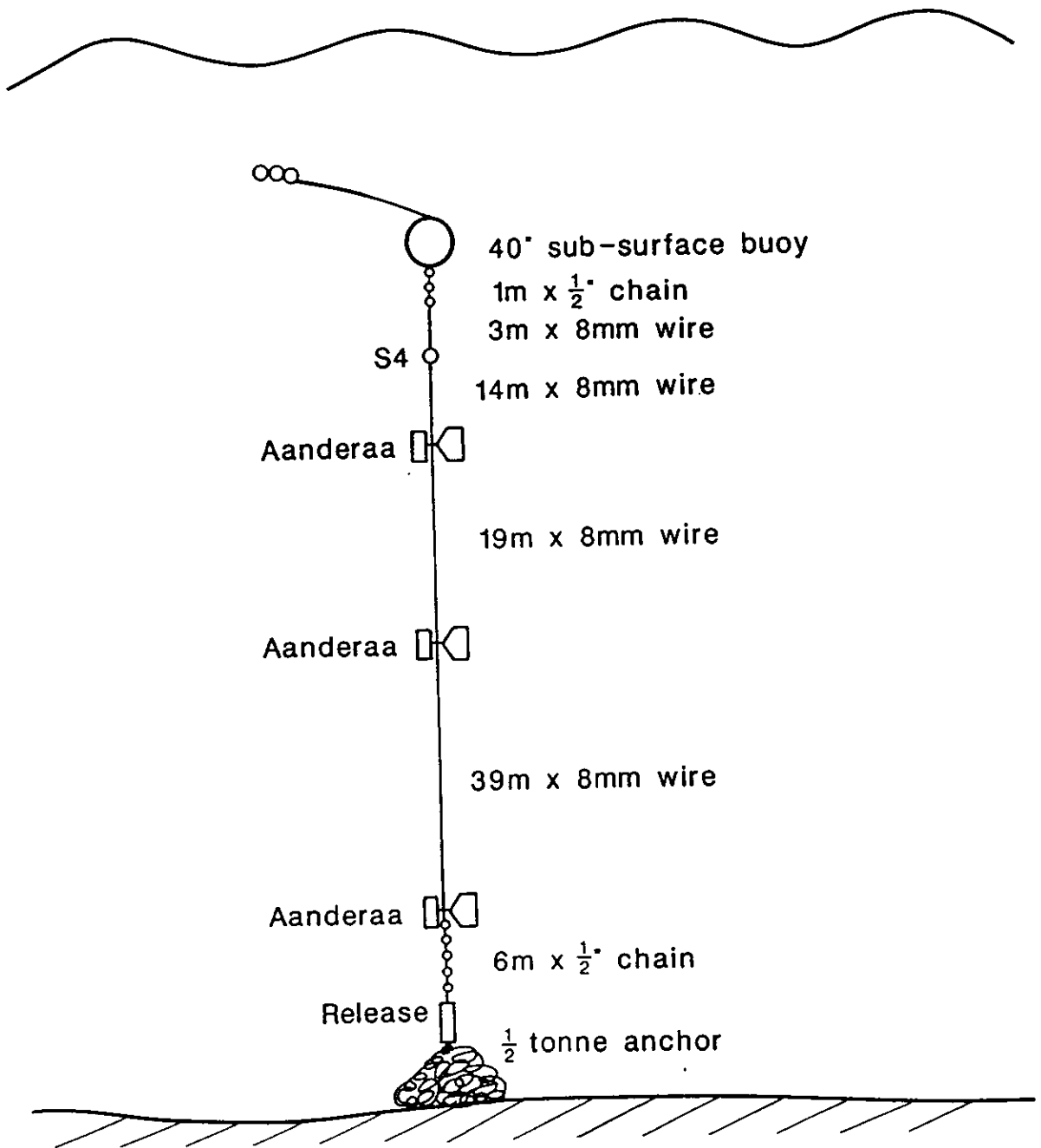
IB

Surface Current Meter (ETA)



IC

Pop-up Current Meter



Acoustics tests on Benthos Type 866A release units.

Challenger 84 and 85.

1. Challenger cruises 84 & 85/91 took place in the northern North Sea. Nominal position of central station was 59° 40'N 01° 00'E, off Lerwick. Water depth approx. 114m.
2. Acoustics tested:- Benthos Model 866A release transponder.
 - a) SNo. 063, supplied June 1990.
Release code changed from 3B to 3C on 29/8/91 to avoid interference with another unit on the same channel. Enable code 3D disconnected on 1/5/91.
Battery check 29/8/91.
 - b) SNo. 081, supplied 2 September 1991.
Release code 1C
Enable 1D
 - c) SNo. 082, supplied 2 September 1991
Release code 2C
Enable code 2D
3. Wire test, 6 September 1991 on CHL 84:-
All 3 units were wire tested from Challenger at 80m depth in 114m of water using the type 210-TDU deck units SNo. 007 and 070 and the overside dunk transducer. Two units responded to their release codes and operated the release function although it required several transmissions to achieve this.
The third unit, SNo. 081, failed to accept its release code and would not operate the release mechanism, even after 3 wire test dips and repeated transmissions.
The transpond function operated normally for all 3 units with good repeatability both for bench test and the wire test.
4. Deployment:- 6 September 1991
SNo. 063 was subsequently deployed at station AG on a sub-surface CM mooring and SNo. 082 on a similar mooring at station IC.
SNo. 081, which failed the wire test, was not deployed and eventually returned to Benthos via the agent (MK Services) for investigation. No fault could be found with the unit when put through all the usual tests at the factory but it was eventually decided to

change the release code from 1C to 1A since this gave marginally better results. The unit was returned to POL and is awaiting further testing, may be on CHL 87.

5. Recovery:-

Station IC; SNo. 082 was enabled on code 2D at a range of 492m on the 29/10/91 without difficulty via the ship's single element hull transducer, and transpond ranging up to 1000m and more was achieved.

A recovery attempt was made on the 7/11/91 after successfully re-enabling SNo. 082 at a range of 2,500m. But, after repeated transmissions of the release code (2C) at ranges between 250m and 1000m (Hull Tx) the release failed to operate and the exercise was abandoned after 1 hour.

A second recovery attempt was made during the following night with the release code (2C) transmitted on the overside dunk transducer, starting at a range of 2,500m and closing at 500m intervals towards the site but without success. Eventually the release did operate when the ship passed directly over the mooring at a range of 180m (depth \approx 115m) and transmitting on the hull transducer. The total time for this attempt was about 4 hours with another 5 hours spent tracking the mooring until daylight when it was successfully recovered.

Station AG:- SNo. 063 was interrogated on many occasions during the several days that the ship was at this site and gave ranges well in excess of 1000m when transponding via the hull transducer. On the 7/11/91 the mooring was successfully recovered after transmission of the release code, 3C, on the hull transducer at a range of about 300m. The release unit did not respond to the first transmission but took several attempts over about 10 mins before it would activate.

6) Comments:-

- a) The performance of the type 866A release units on both CHL 84 and 85 falls short of what we require and is at variance with our experience of the type XT 600 10" dia. spherical units, where 8 recoveries of our 250 KHz ADCP systems were carried out with instant response to release commands.
- b) Based on this performance it is unwise to make any more purchases of the type 866A units - we came too close to losing our mooring at ST IC. This puts us in a difficult position as regards mooring release acoustics for the future, as we don't appear to have progressed much beyond the old CR 200 performance.
- c) Some progress was made on CHL 84 and 85 in getting the deck equipment to

track and display the sea units position relative to the ship. The new Simrad Echo sounder, EA500, was used as a display unit and an external trigger pulse used to synchronise this with the Benthos deck unit to give a transpond repetition rate of about 4 sec. Tracking ranges of up to 700m were obtained which allowed the free floating mooring at ST IC to be tracked through the night. Further work is needed to make a working system, maybe on CHL 87 or 88A.

- e) It has been suggested that the Benthos deck unit can be improved to give better communication with the sea units by installing a factory modification. I don't know that this would be the answer to our problems with the 866A units since we already have good communications with the XT 600 units using the same deck equipment.

A. J. HARRISON, POL