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INTERNAL DOCUMENT
191

Deployment of Current Meter Moorings on the West-Shetland Slope

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Commercial in Confidence

NATURAL ENVIRONMENT RESEARCH COUNCIL
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STRATEGIC CURRENT MEASUREMENTS IN THE FAEROE-SHETLAND CHANNEL

Initial report October 1983

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DEPLOYMENT OF CURRENT METER MOORINGS ON THE WEST-SHETLAND SLOPE

Six subsurface moorings were deployed on the continental slope N-W of the Shetlands on September 2nd 1983. Details of the mooring design, instrument characteristics and relationship of the observation site to the oceanographic features of the Faroe-Shetland Channel are given in the document.

Mooring design

The moorings are of a type used successfully for long term (1 year) deployments in waters north and west of the UK. The design of one of the moorings is shown in fig. 1. The buoyancy is provided by a 1.3m dia. steel sphere giving a net lift of 700 kg. The buoyancy on all moorings lies in the depth range 80-90m. Below the buoy a 1m length of $\frac{1}{2}$" long link chain and a swivel connects into the wire section of the moorings. The line used is a hard black polythene jacketed 6mm dia 6 x 17 construction wire rope manufactured by British Ropes Ltd. Terminations are swaged steel eyes bushed to fit $\frac{1}{2}$" galvanised steel shackles. All shackle pins are seized with galvanised wire. The current meters are Aanderaa RCM 5 units employing the following modifications.

(a) Top and bottom end caps are manufactured from Inconel.

(b) Bushed link plates are incorporated in the upper and lower ends of the swivel bar.

(c) The deep current meters have a second, limited range temperature channel giving a resolution of $0.003^{o}C$ and a similar long term stability. All current meters have a channel measuring temperature to a resolution of $0.025^{o}C$.

(d) The uppermost instrument on each mooring has a 0-1000 psi pressure transducer to measure mooring "knock down".

(e) Some instruments have conductivity sensors.

The lower end of the mooring also has a swivel between the instrumented section and the acoustic release and anchor.

The acoustic release is of IOS manufacture of a design proven over the past 10 years. It was a 10 KHz carrier frequency modulated at a frequency in the range 250-450 Hz with a 320 Hz channel on all releases in an interrogation mode. The anchor is detached by the detonation of either of two independent pyrotechnic release devices. The anchor is a 600 or 700 kg clump of scrap ships anchor chain and is supplemented by a 15 or 20 kg Bruce anchor.

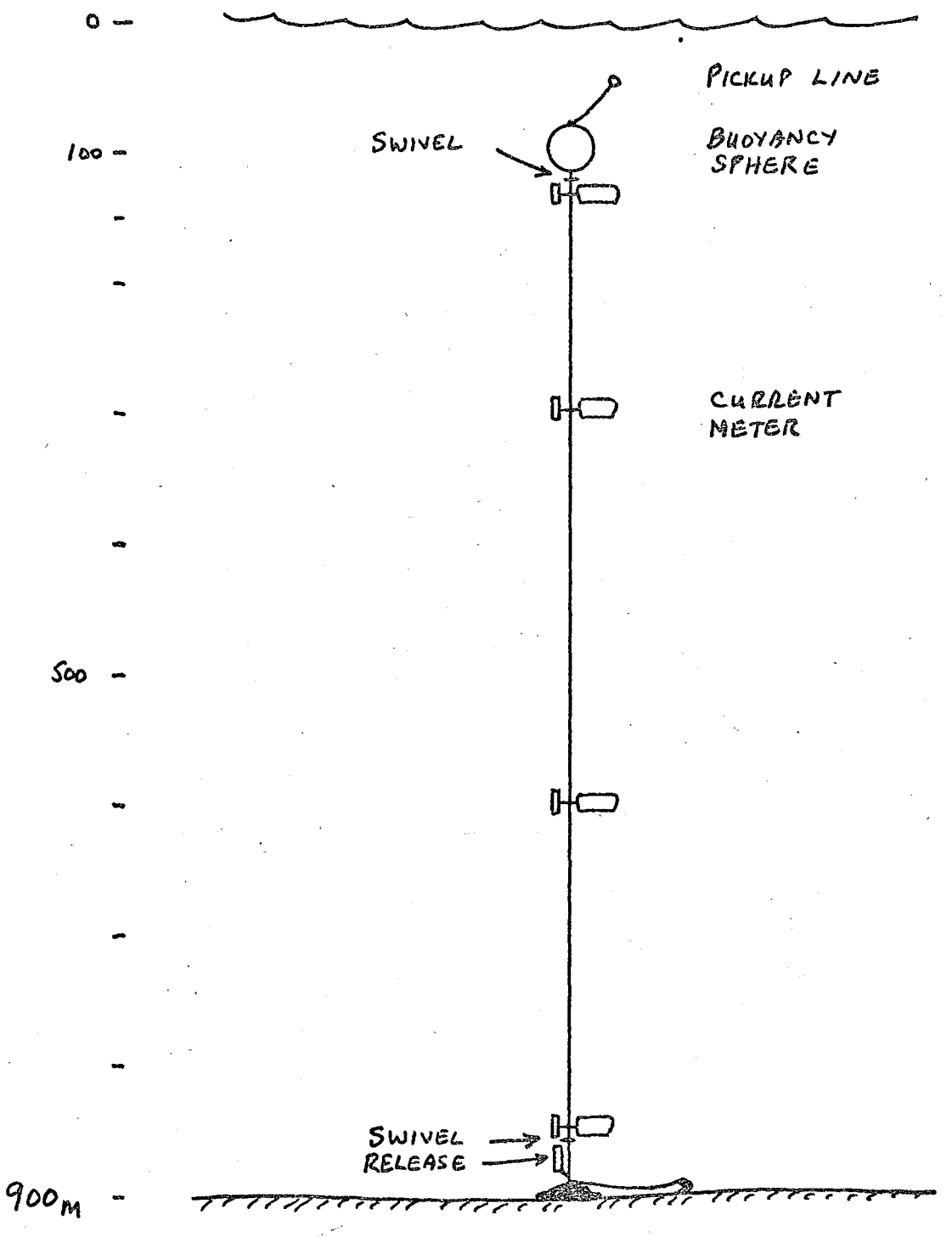
Deployment

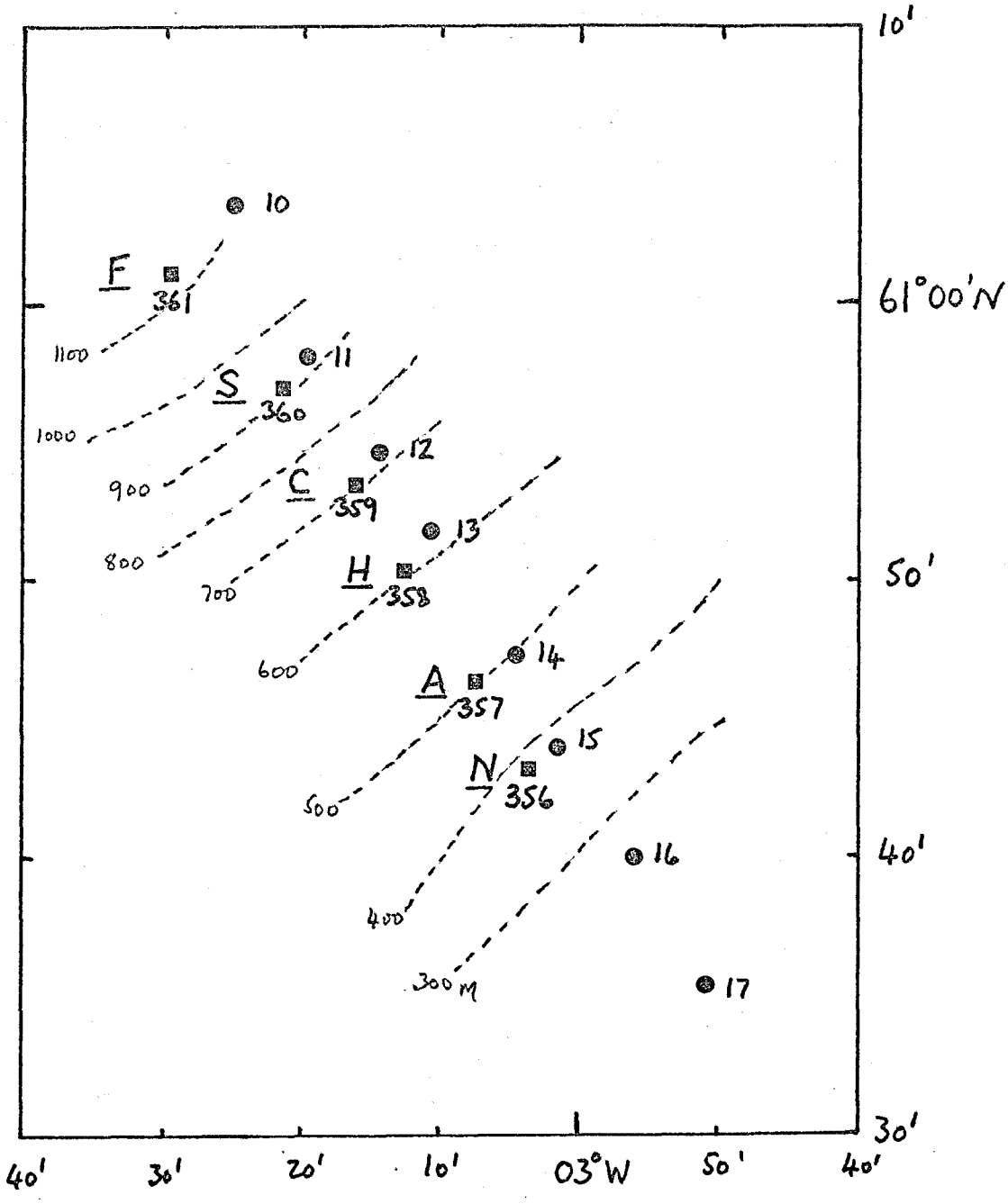
After an initial echo sounding survey to determine the local trend of the isobaths the moorings were deployed in positions where the depths were close to 400, 500, 600, 700, 900 and 1100m. Table 1 gives the positions, depths, instrument depths and time at which the mooring reached the sea bed. Navigation was by means of Decca 6C chain Red and Green lines crossed with a LORAN C Norwegian chain line. These were plotted on $\frac{1}{2}" \equiv$ 1nm charts and the positions converted to geographical coordinates. All instruments were set for a 1 hr sample interval.

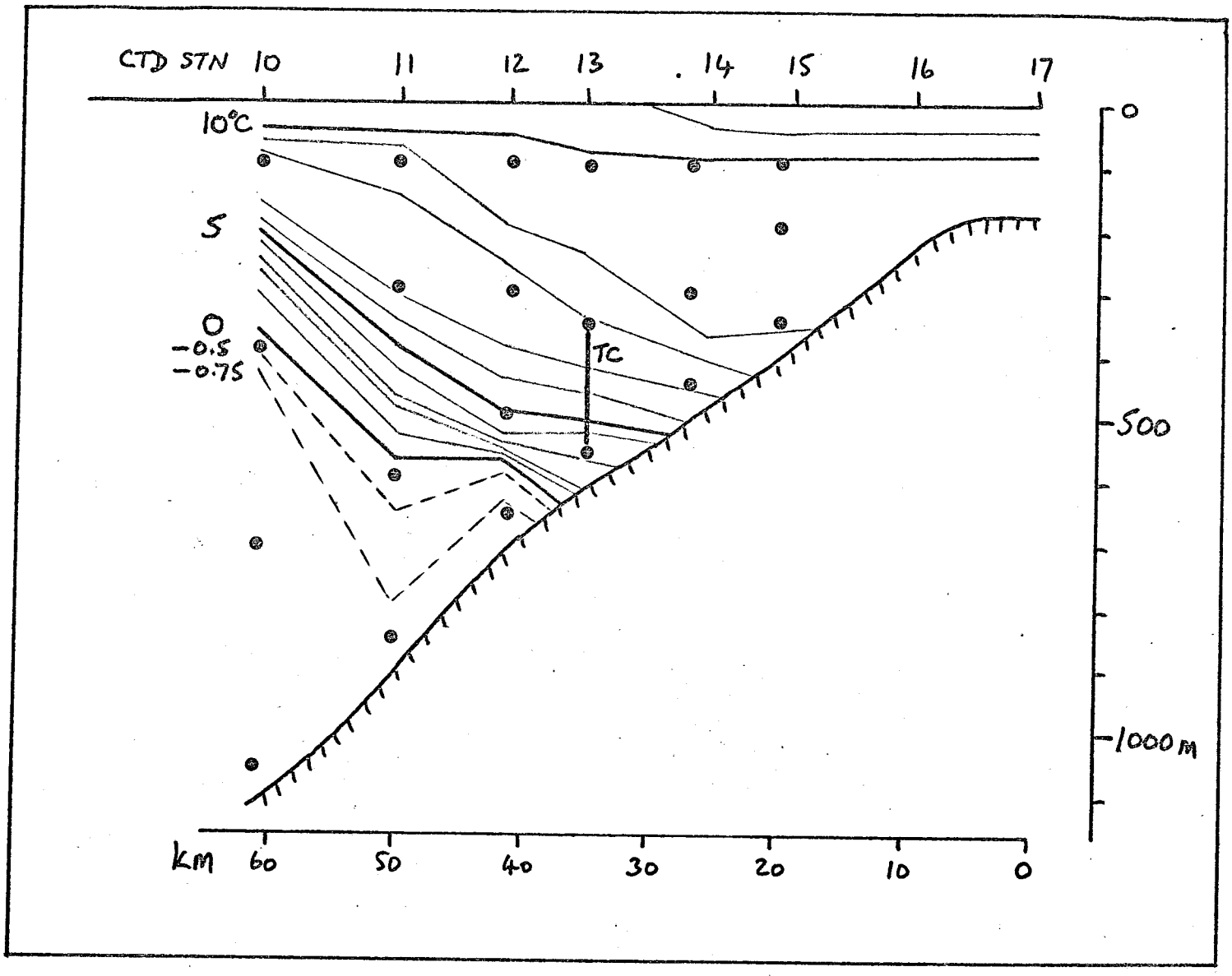
Relation to oceanographic conditions

On the 7th/8th September a CTD section was worked close to the moorings in order to define the temperature/salinity structure of the water column on the current meter section.

The positions of the moorings, the CTD stations and the details of the local bottom topography are shown in fig. 2. Fig. 3 shows the temperature structure across the current meter section (as determined from the CTD data) together with the positions of the instruments. A thermistor chain carrying 11 sensors spread over a 200m depth interval was incorporated in the 600m mooring in order to monitor the long term changes in the positions of the interface between the upper Atlantic water and the deep cold Norwegian Sea outflow.


0
100
500
900 M
PICKUP LINE
SWIVEL
BUOYANCY SPHERE
CURRENT METER
SWIVEL
RELEASE


10'
61°00'N
50'
40'
30'
40'
30'
20'
10'
03°W
50'
40'
10
11
12
13
14
15
16
17
F
361
S
360
C
359
H
358
A
357
N
356
1100
1000
900
800
700
600
500
400
300 M


CTD STN 10
11
12
13
14
15
16
17
10°C
5
0
-0.5
-0.75
TC
0
500
1000 m
km 60
50
40
30
20
10
0

IOS Mooring No	Designation	Lat N	Long W	Water Depth m	Time in Place	Instruments, depths and additional sensors (P=pressure, F=reduced temperature, C=Conductivity)			
356	N	60°43'.2	03°03'.4	398	0738 z 2-IX-83	Aa 3622 94m P	Aa 420 195m F	Aa 1662 347m F	
357	A	60°46'.4	03°07'.2	502	0907z 2-IX-83	Aa 3725 99m P	Aa 156 300m F	Aa 155 451m F	
358	H	60°50'.4	03°12'.5	605	1118z 2-IX-83	Aa 2107 101m P,C	Aa 3727 353m C	TC 795 354-554m	Aa 3726 555m C
359	C	60°53'.3	03°16'.3	697	1333z 2-IX-83	Aa 280 92m P	Aa 421 294m F	Aa 1260 496m F	Aa 1259 645m F
360	S	60°56'.9	03°21'.4	899	1557z 2-IX-83	Aa 469 93m P	Aa 3728 294m F	Aa 2452 595m F	Aa 1078 847m F
361	F	61°01'.1	03°29'.5	1103	1829z 2-IX-83	Aa 6222 98m P	Aa 3630 399m	Aa 6221 700m F	Aa 6224 1051m F