RRS "FREDERICK RUSSELL" - CRUISE 82/11 - 2-13 AUGUST 1982

Cruise Report

1. Personnel

A.G. Davies	MBA, Plymouth
Q. Espey	Southampton University
J. Driver	MBA, Plymouth
R.P. Harris	MBA, Plymouth (Principal Scientist)
R.N. Head	MBA, Plymouth
L. Mavin	MBA, Plymouth
D. Purdie	Southampton University
P.R.G. Tranter	MBA, Plymouth

2. Itinerary

The attached charts show the ship's track and station positions. The ship left Plymouth at 1715 h, 2 August and returned 1100 h on 13 August. A port call was made to Brest, 1200-2300 h, 7 August.

Details of station positions are given in Table 1.

The original programme was modified to investigate the Gyrodinium bloom in the main working area to the south of the Lizard.

3. Work completed

(a) Hydrography - continuous measurements of temperature, salinity, chlorophyll fluorescence, inorganic nutrients (NO_3, NO_2, NH_3, Si), dissolved oxygen and surface irradiance were maintained throughout the cruise, both for surface waters while steaming and for pump profiles (2-60 m) at each station. More than 400 chlorophyll a and phaeopigment measurements were made to calibrate the fluorometer records. A number of vertical light profiles were made in conjunction with phytoplankton experiments.

(b) Phytoplankton - standing stock measurements were made in terms of both chlorophyll a (see above) and, at each station particulate organic carbon and nitrogen. Preserved samples (Lugols solution) were collected for cell counts and determination of cell carbon. Daily ^{14}C primary production and oxygen experiments were completed using phytoplankton from a wide range of hydrographic regimes. This experimental programme involved both in situ and deck incubations to investigate the nutrient status of these populations and the role of the nanophytoplankton in total production.

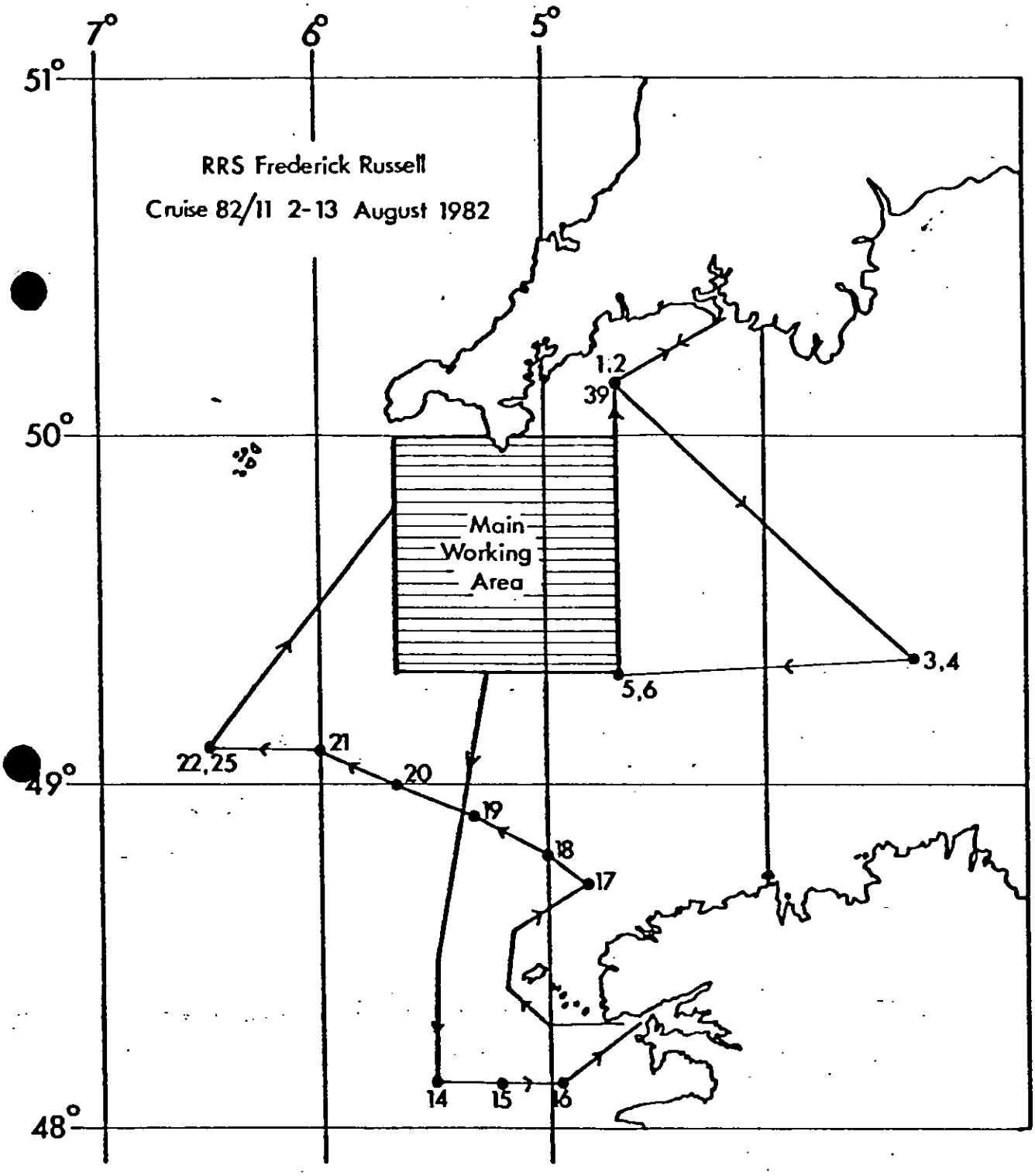
(c) Zooplankton - zooplankton samples, taken with the Flygt pump and WP2 nets, were obtained at each station to investigate vertical distribution and vertical migration in relation to observed fluorescence profiles. Sub-samples were frozen for carbon and nitrogen analysis, a total of over 250 samples being collected.
Within the Gyrodinium bloom diurnal series of samples were obtained for fluorescence analysis of copepod gut contents. In association with this work 56 experiments were performed to estimate feeding by Calanus on natural particulate material using Coulter Counter, CHN, and chlorophyll as independent estimates of feeding rate.
Preliminary measurements were made of zooplankton respiration using 21 polycarbonate incubation bottles with up to 25 animals (Calanus) per bottle.

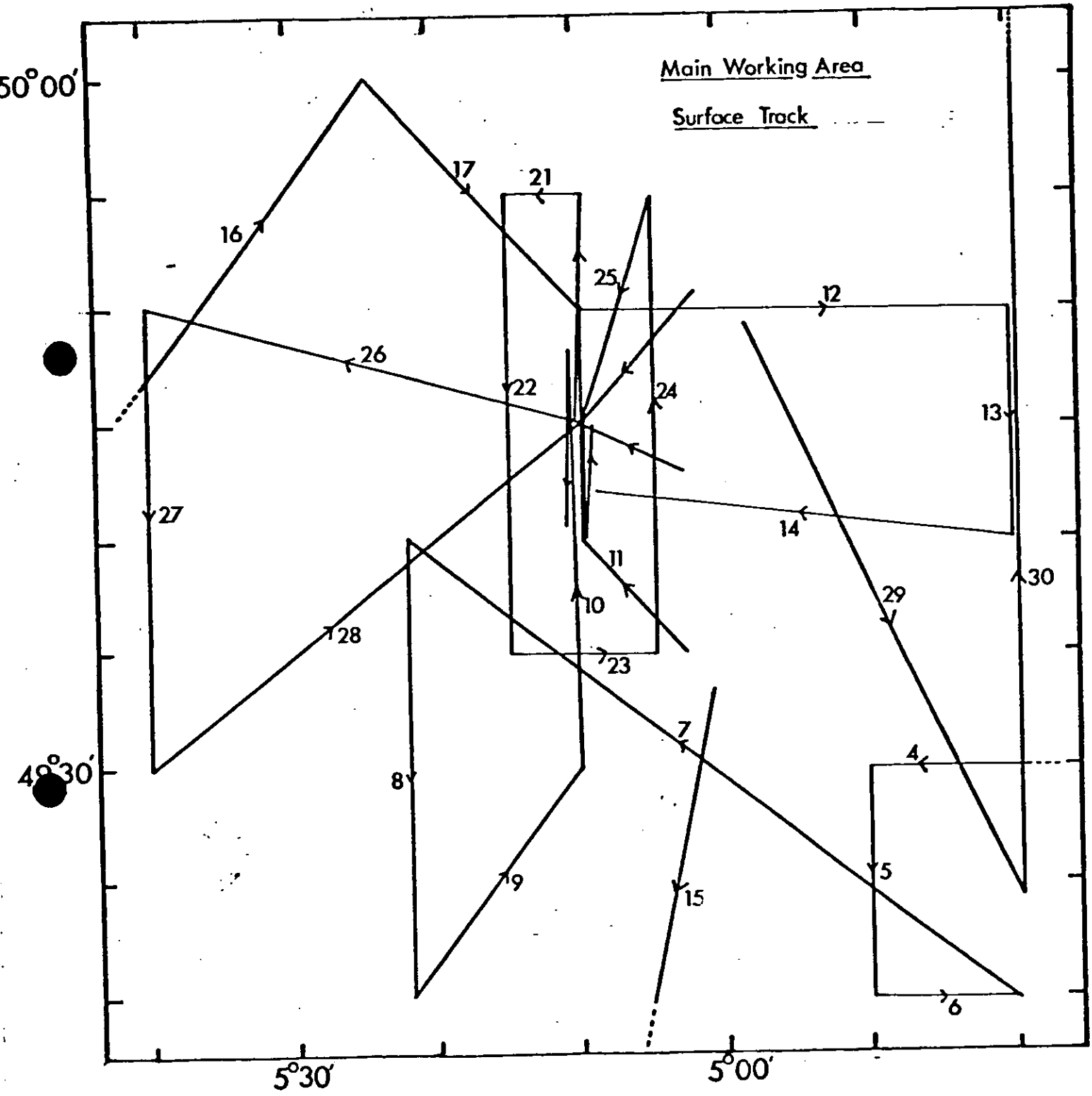
(d) Oxygen measurements - determinations were made on discrete samples taken at various depths using a 30 or 5 litre Niskin. Water samples were obtained at the three main stations of M, F and E5.
'In situ' total day and light-day incubation experiments were conducted on water samples from each station thus obtaining an estimate of total day net production and respiration. Incubations were made in both glass and polycarbonate bottles.
Several respiration bottle comparison experiments were carried out following on from results of the previous cruise in May 1982.
Glass, Polystyrene and Polycarbonate bottles were compared.

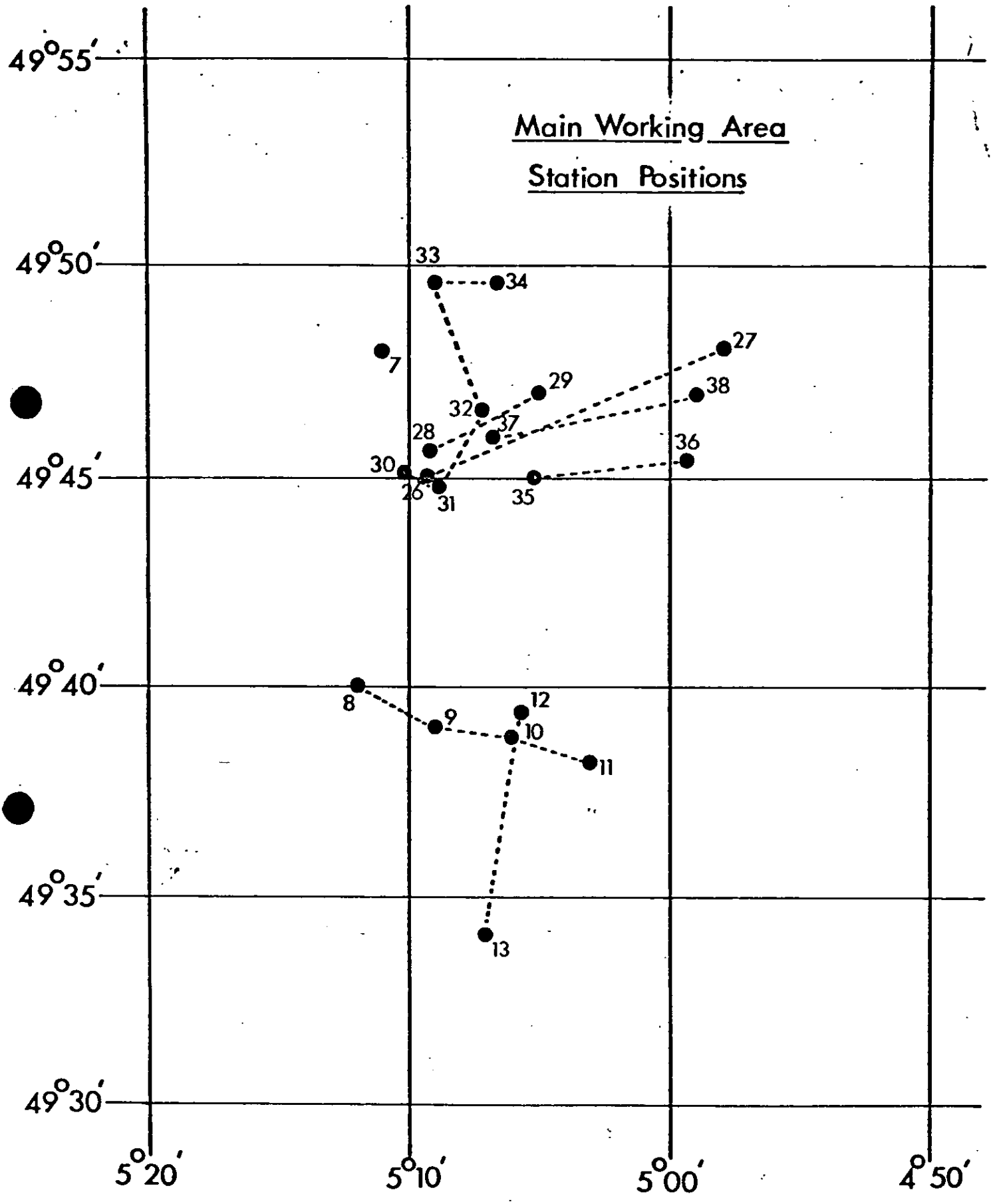
(e) Absorptive bubble separation experiments - Absorptive bubble separation experiments to study the possible foam fractionation/froth flotation extraction of trace metals from sea water, in both natural and artificial systems were carried out in a continuous mode immediately after sampling, using a foam tower from the Southampton University Oceanography Department. The use of the continuous mode enabled volumes of between 25 l and 44 l to be processed (this volume is, in fact, only limited by the size of the storage container), thereby providing a larger possible mass of metals and organics to analyse.

4. Miscellaneous notes

(a) Initial malfunctioning and eventual failure of the satellite navigation system made detailed work within the main working area difficult. These position fixing problems were compounded by difficulties with routine use of the Decca read-out in the Main Lab.


7°
6°
5°
51°
50°
49°
48°
RRS Frederick Russell
Cruise 82/11 2-13 August 1982
Main
Working
Area
1,2
39
3,4
5,6
22,25
21
20
19
18
17
14
15
16


Main Working Area
Surface Track
50°00'
49°30'
5°30'
5°00'
16
17
21
25
12
26
22
24
13
27
14
11
30
10
29
28
23
7
4
8
5
9
15
6


Main Working Area
Station Positions
49°55′
49°50′
49°45′
49°40′
49°35′
49°30′
5°20′
5°10′
5°00′
4°50′
33
34
7
27
29
38
32
37
28
36
30
26
31
35
8
12
9
10
11
13

STATION POSITIONS - RRS FREDERICK RUSSELL

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Station	Profiles	N	W
A1	1,2	50°10'	4°40'
M	3,4	49°23'	3°20'
F	5,6	49°20'	4°40'
F82	7	49°48'	5°11'
"	8	49°40'	5°12'
"	9	49°39'	5°09'
"	10	49°39'	5°06'
"	11	49°38'	5°03'
"	12	49°39'	5°06'
"	13	49°34'	5°07'
1	14	48°08'	5°30'
2	15	48°08'	5°13'
3	16	48°08'	4°58'
O28	17	48°43'	4°49'
O27	18	48°48'	5°00'
O26B	19	48°54'	5°21'
O26A	20	49°00'	5°40'
O25	21	49°06'	6°00'
E5	22-25	49°06'	6°30'
F82	26	49°45'	5°09'
"	27	49°48'	4°58'
"	28	49°46'	5°09'
"	29	49°47'	5°05'
"	30	49°45'	5°10'
"	31	49°45'	5°09'
"	32	49°47'	5°07'
"	33	49°49'	5°09'
"	34	49°49'	5°07'
"	35	49°45'	5°05'
"	36	49°46'	4°59'
"	37	49°46'	5°07'
"	38	49°47'	4°59'
A1	39	50°10'	4°40'