SMBA, Dunstaffrage Marine Research Laboratory.

Cruise Report: RRS CHALLENGER. Cruise 15/1976.

Duration: 1200 h 7 October - 0730 16 October 1976. All times B.S.T.

Locality: Rockall Channel $56\frac{1}{2}^{\circ}$ - $59\frac{1}{2}^{\circ}$ N.

Staff:

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Aims:-

Cruise 15/1976 of R.R.S. Challenger had the objectives of continuing the SMBA programme of work in the waters between Scotland and Rockall and of continuing the preliminary observations (started on Challenger Cruise 12/1976), to assess the suitability of the deep-water area to the north-west of Anton Dohrn Seamount for the Joint Air-Sea Interaction Projects (JASIN) of summer 1977 and summer 1978. To carry out the JASIN work, a party from the Institute of Oceanographic Sciences, (I.O.S.), Wormley, joined the cruise to recover deep moorings laid on Cruise 12/1976, and to continue to make detailed observations of the uppermost structure of the water-column in the area of interest. The detailed aims were as follows:-

1. To re-lay the SMBA current meter mooring in 57°N, 9°W with the object of continuing observations at this point until mid-December 1976.

2. To work the Anton Dohrn seamount hydrographic section.

3. To recover two I.O.S. deep moorings.

4. To drag for the third I.O.S. mooring, lost on cruise 12/1976.

5. To calibrate the 2-component E.M. log.

6. To take continuous surface temperature and salinity traces using a pumped system with an S.T.D. in a bucket.

7. T. and S. profiling with the batfish, CTD, STD and XBT's mainly in the area between the IOS moorings J.1 and J.2.

8. To take 50 litre surface water samples at standard positions on the Scottish continental shelf for 137 Cs analysis by the Fisheries Radiobiological Laboratory, Lowestoft.

Narrative:

The cruise starting time was delayed for 24 hours due to poor weather and further delayed by a fault in the engine room. We finally sailed at 1200 hrs on 7th October and started stations at 0500 on the 8th. These were carried on until station R where the SMBA mooring was recovered minus the surface buoy. We then left station R and continued with the Anton Dohrn section doing three more stations and then returning to station R at 0930 on the 9th where the SMBA mooring was relayed. This was completed by 1200 and we set off again on the Anton Dohrn section. Unfortunately the weather became inclement and the ship hove to for 3 hours but then continued on the section, completing station C at 1800 hrs on 10th October. From station R to C continuous surface temperature and salinity records were obtained from the TSD in a bucket supplied with water from the normal deck supply. Surface T & S records were also obtained from the Moorey fish which was towed alongside throughout the cruise. From station C course was set for IOS mooring J.2 doing surface T and S recording, XBT's and the Batfish on the way. Unfortunately, the hydraulics of the Batfish did not work and so it was towed at a fixed depth, and after 17 dips the XBT recorder failed. We arrived at the buoy mooring J.2 at 0530 11th October, and Mr Wallace and his team located it, popped it up at first light, and recovered it by 0925. Course was then set for IOS mooring J.1, doing surface T and S and Batfish on the way, and on arriving at 1720 hrs, the mooring was located, popped up and recovered by 1920 hrs. We then headed for station F to attempt to recover the sunken IOS mooring. On passage surface T and S records were taken and the Batfish deployed.

On arriving at the mooring site, at 0530 hrs on the 12th, the pinger was switched on, and the main warp, with 2000 metres of old warp with grapnels every 200 metres, on its end was layed on the bottom round the pinger position, in an overlapping loop and pulled tight and recovered. This was unsuccessful and since it was 1900 hrs by the time it was aboard, no further grappling was undertaken. By this time the engine room were having problems with one of the diesel heads, and so vertical TSD casts were ruled out to reduce the load on the diesel, and we therefore decided to spend the night doing a surface T and S survey. This was done on a leg to the North of the mooring, returning to the mooring at 0600 on the 13th. The pinger position was fixed and paying out commenced at 0830 hrs. Again a loop was layed around the pinger and hauled in. This was fully recovered by 1540 hrs, again with no success. The night was spent doing a surface T and S survey back and forth across a front, detected the previous night, returning to the mooring at 0800 hrs on the 14th. This time the grappling line was layed on a roughly hyperbolic curve to one side of the mooring and hauling done whilst steaming to try and drag the grapnels through the pinger position, rather than across it. We finished hauling in at 1700 hrs with no success and so the receovery attempt was abdandoned. An attempted CTD dip to 400 metres at this time had to be abandoned also, due to the intermittant nature of the signal up the conducting-cored hydrographic cable. This pointed to a cable fault, and explained the spiking occuring on the TSD records. Course was then set at 1800 hrs for Ardrossan doing echo-sounding and surface T and S on passage. At 030 hrs on the 15th the echo-sounding was ceased and at 1930 hrs we altered course to go up the

sound of Islay intending to use the CTD in the bucket going up and reverting to the TSD coming back down the same course to get an intercomparison between the two instruments. Unfortunately, the CTD did not work in the bucket, due to the cable, and so both legs were undertaken with the TSD. When this was completed, course was resumed for Ardrossan with T and S observations ending at 0300 hrs on the 16th. We docked at 0730 hrs.

Results:

Aim 1) The long-term shelf-edge current meter mooring.

This mooring was successfully relayed for recovery on cruise 17/1976. Both meters appear to have functioned correctly.

Aim 2) The Anton Dohrn Seamount Section.

This was satisfactorily worked up to station C at which point it was ceased in order to arrive at the first IOS deep mooring at first light. Spiking occured on the salinity record of the TSD and appeared to get worse as the section proceeded. Whilst this spiking interfered with the digital recording the analogue trace could be followed.

Aim 3) Recovery of two I.O.S. deep moorings.

Both of these were efficiently recovered in daylight of 11th October.

Aim 4) Dragging for the sunken I.O.S. mooring.

This was not successful. Future recovery attempts might be facilitated by replacing the pinger with a transponder giving a better relative position fix.

Aim 5) Calibration of E.M. Log.

It was proposed to calibrate this using the radar reflector on the spar buoy of the shelf mooring as a reference. Unfortunately this had disappeared and by the time the replacement had been laid there was insufficient time to carry out the calibration.

Aim 6) Continuous surface temperature and salinity.

This was carried out in two ways. Firstly, with the TSD in a bucket on deck using the normal pumped deck supply since the pipe from the non-toxic supply would not supply sufficient volumes. (The bucket system requires up to 200 litres per minute.) The pipe from the non-toxic supply pump should be increased to $1\frac{1}{2}$" bore and should then be satisfactory. Problems were also encountered due to the flow regime in the bucket but these should be overcome by building a suitable outlet for the hose. Secondly, the Moorey fish was deployed throughout the cruise and functioned well.

Aim 7) T and S profiling with the TSD, CTD, Batfish and XBT's.

As the Batfish hydraulics did not function it was deployed at fixed depths between stations C - J2 - J1 - F. Once grappling had started the Batfish was not used since they both required the same auxilliary winch. Thus, Batfish surveying was somewhat limited. As described, the XBT recorder failed to trigger after 17 dips and we were unable to fix it due to the circuit diagrams being incomplete. Also, trouble was encountered in launching the XBT's from the present position - the wire fouling the ship's side in the wind and the probe tumbling in the air - both aggrevated by the height of the launching position above the waterline. As discussed after the cruise, a position one deck down on the starboard side would be

preferable.

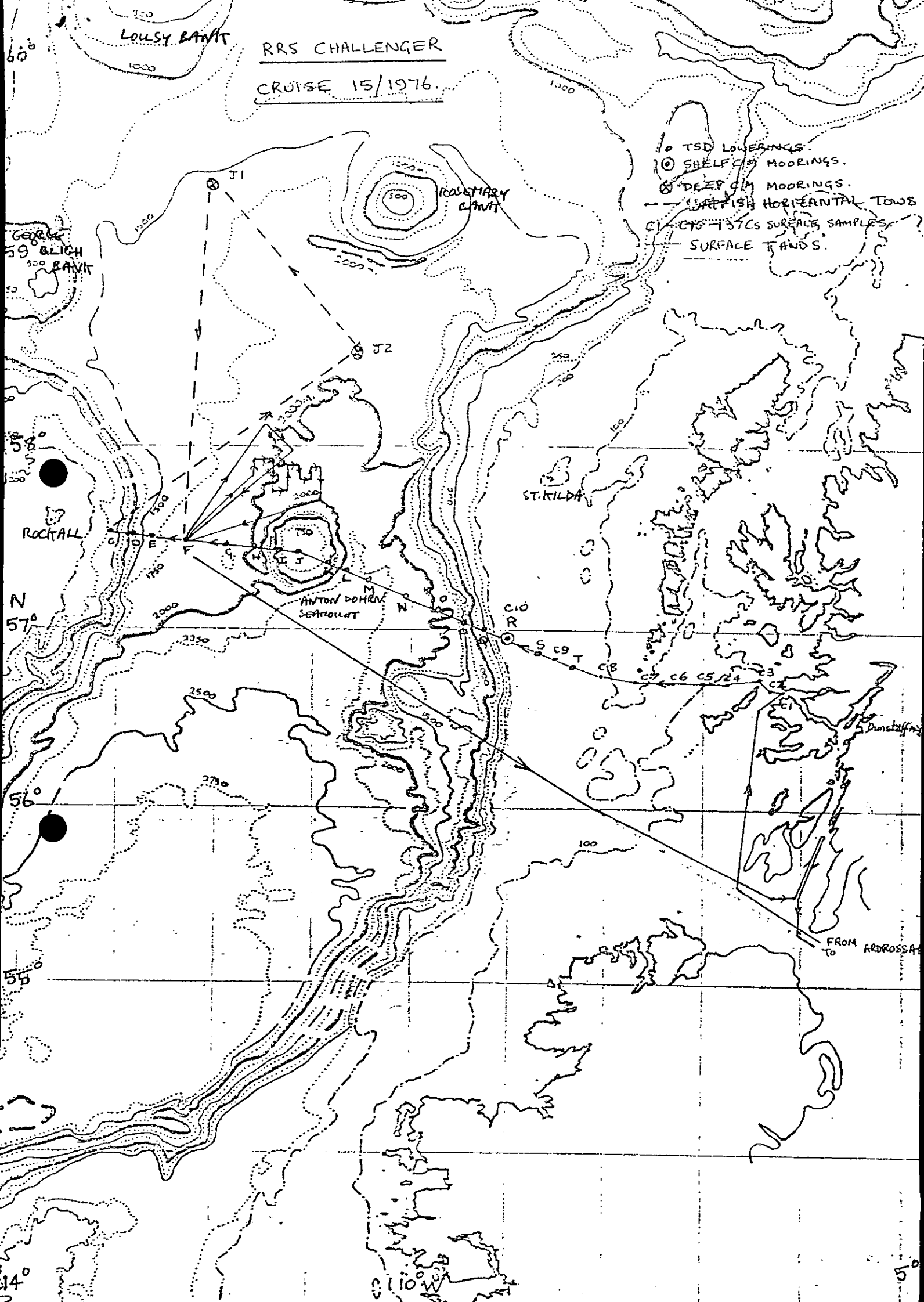
The TSD wire is now very much in need of replacement and this should be regarded as a priority requirement. The spiking on the TSD record due to this is almost intolerable and the use of the CTD is impossible.

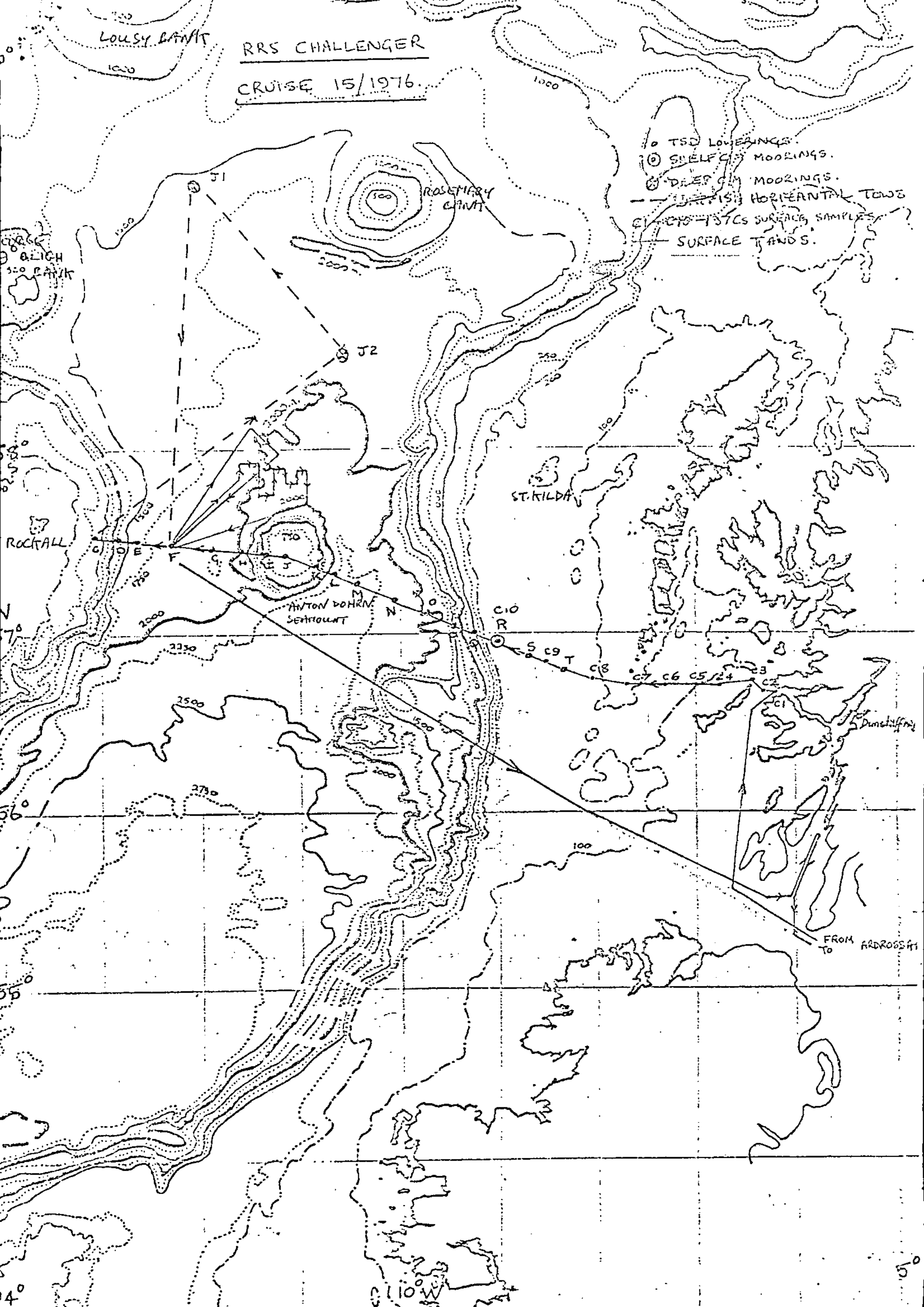
Aim 8) Radiocaesium samples.

50 Litre surface samples were satisfactorily collected at the ten standard stations.

R. Bowers.

1st November 1976.


RRS CHALLENGER
CRUISE 15/1976.
TSD LOWERINGS.
SHELF C/M MOORINGS.
DEEP C/M MOORINGS.
HORIZONTAL TOWS
SURFACE SAMPLES.
SURFACE TANDS.
LOUSY BANK
ROSEMARY BANK
GEORGE BLIGH BANK
ROCKALL
ST. KILDA
ANTON DOHRN SEAMOUNT
J1
J2
C10
FROM
TO


RRS CHALLENGER
CRUISE 15/1976.
LOUSY BANK
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TSD LOWERINGS.
SHELF C/M MOORINGS.
DEEP C/M MOORINGS.
SURFACE T AND S.
FROM
TO
ARDROSSAN
Dunstaffnage
J1
J2
C10
R
S
C9
T
C8
C7
C6
C5/C4
C3
C2
C1
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1000
2000
2500
2750
250
100
500
58°
57°
56°
55°
54°
10°W
5°