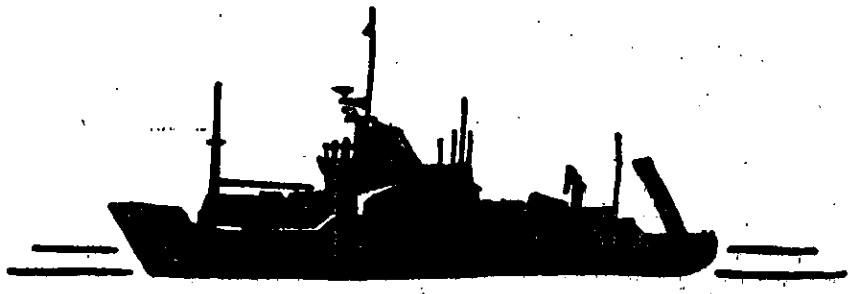
Scottish Marine Biological Association

Dunstaffnage Marine Research Laboratory



CRUISE REPORT

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DUNSTAFFNAGE MARINE LABORATORY

OBAN, ARGYLL, SCOTLAND

CRUISE REPORT

R.V. LOUGH FOYLE

Cruise 1/1989

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Duration of cruise: 0530 h 5 May - 2020 h 11 May 1989.
All times GMT.

Locality: Scottish continental shelf, Rockall Channel and North Channel.

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Aims:

1) To collect large volume water samples and CTD profiles upon the standard section between the Sound of Mull and the shelf-edge.

2) To service the SMBA current meter mooring in the Tiree Passage.

3) To work the CTD stations of the Anton Dohrn Seamount section between the shelf-edge and Rockall.

4) To work other CTD sections in the North Channel approaches as time and weather permit.

Narrative: LOUGH FOYLE berthed at Dunstaffnage at 0515 h 4 May and the day was spent mobilising the scientific equipment. On the following morning the ship sailed from the Dunstaffnage pontoon at 0530 h 5 May and steamed to the Tiree Passage to service the current meter mooring. This was successfully raised between 0920 and 0938 h, and new wires were wound on for the redeployment, which took place at 1039 to 1050 h. The CTD and radiocaesium sampling stations between Ardmore Point, Sound of Mull, and the shelf-edge in 57°N, 9°W were worked between 1158 h 5 May and 0455 h 6 May in fine, quiet weather with little swell. Continuing fine weather enabled the completion of the seventeen deep stations of the Anton Dohrn Seamount section by 1100 h 7 May, and after a brief examination of Rockall the ship returned southwestwards, surface sampling and stopping en route to make a CTD lowering at station L of the former Malin Head-Rockall section. Shelf-edge stations F to C of the same line were worked during 0300 - 0802 h 8 May and were followed by the shelf CTD section leading in from the west to Islay.

Somewhat fresher force 5-6 northwesterly winds during the evening of 8 May suggested the working of the outer sections before any further deterioration of the weather, and accordingly the sections between Islay and Skerryvore and across the Firth of Lorne were worked overnight. However, during the passage south to Lough Foyle the weather fined and the section to Loch Indaal, Islay was completed at 1823 h 9 May in excellent conditions. A section across the entrance to the Sound of Jura was worked on the same evening, and the section from Red Bay to the Mull of Kintyre between 0100 and 0324 h 10 May. In continuing fine weather stations were worked to Corsewall Point, and the Larne-Stranraer midway surface radiocaesium sample collected.

Between 0959 and 1305 h the section from Donaghadee to Portpatrick was worked, followed by a line of stations across the sill of the Firth of Clyde and another immediately to the north of the sill. Upon completion of this at 2316 h course was set for the Tiree Passage.

A moderate swell was encountered en route to the position of a current meter mooring lost in January off Coll, but the west to northwesterly wind was light when dragging began at 1200 h 11 May. The sub-surface float, current meters and anchor clump of the mooring were clearly seen upon the Atlas colour echosounder, but a number of tows failed to retrieve any parts of the equipment, which lay in a difficult position amongst rough topography.

Strong easterly winds were forecast during the afternoon and it was decided to finish dragging at 1530 h and proceed to Dunstaffnage in case these should make entry difficult on the following morning. LOUGH FOYLE berthed at the Dunstaffnage pontoon at 2020 h. Gear was landed the following morning and the ship sailed for Belfast at 1900 h 12 May.

Results:

Aim 1) Large volume water samples for radiocaesium analysis were collected at the surface, mid-water and near-bottom at ten standard positions between Ardmore Point, Sound of Mull and the shelf-edge west of Barra during 5-6 May. CTD profiles were collected at these and three additional stations upon the line. A surface radiocaesium sample was collected between Stranraer and Larne on 10 May.

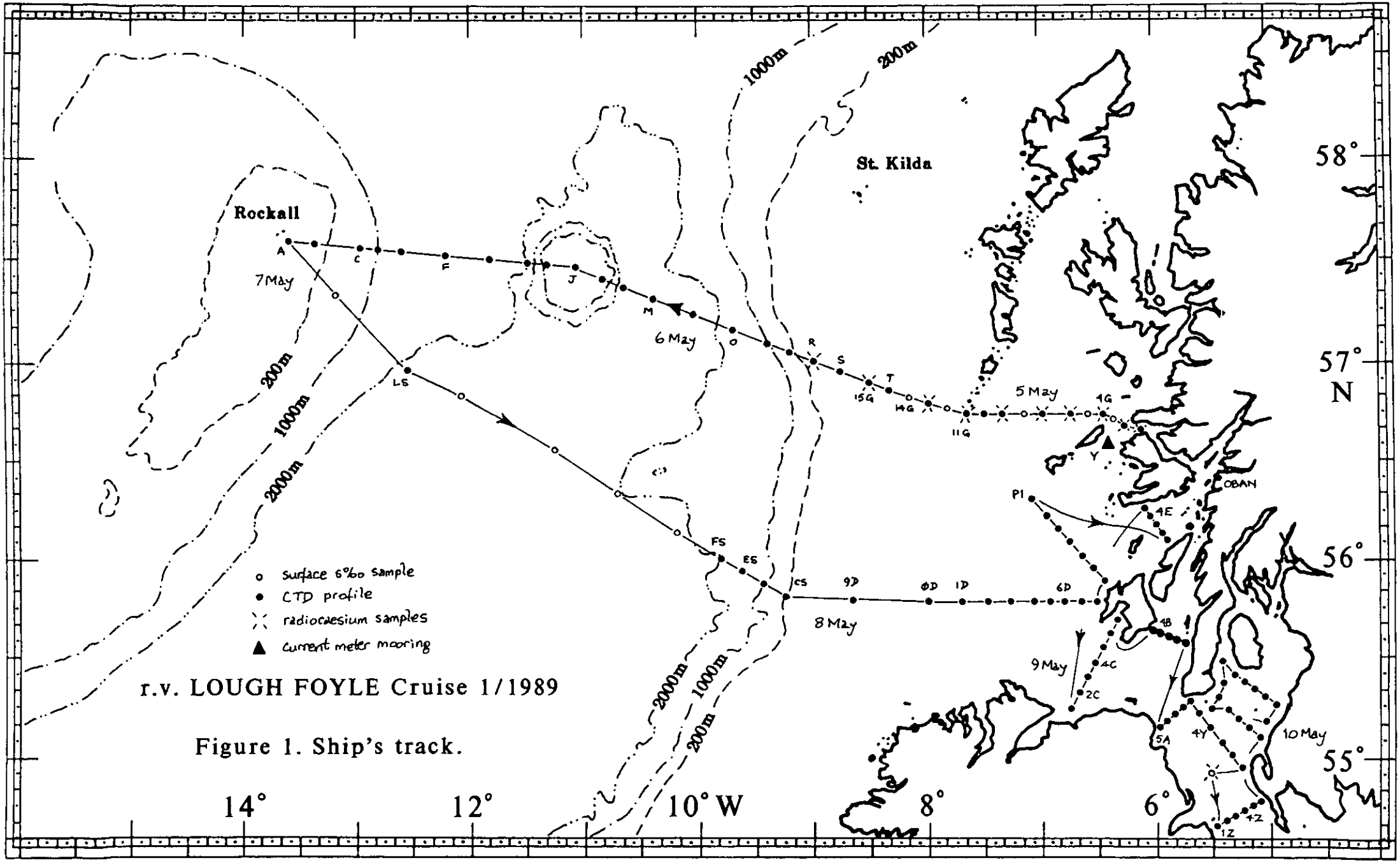
Aim 2) The Tiree Passage current meter mooring laid from DISCOVERY on 22 January was successfully retrieved on 5 May and a replacement mooring laid on the same day. As described above, the current meters detached from the marker spar in January were observed upon the LOUGH FOYLE's echo-sounder to be intact and upright, but attempts to recover them were unsuccessful.

Aim 3) The eighteen stations of the Anton Dohrn Seamount CTD section were completed between 0433 h 6 May and 1100 h 7 May. Spiking from the conductivity circuits became noticeable from station J, and a broken internal support was found upon opening up the instrument at station F. Replacement of this cured the worst of the problem, though a degree of spiking sometimes occurred in particular depth ranges and was possibly related to the unlaying of turns at either end of the winch barrel.

Midwater temperature-salinity discontinuities were found westwards from the seamount, and pronounced doming centered upon station H of the isotherms, isohalines and isopyknals (Figure 2) had the appearance of a cold-core eddy. However, the 27.4 sigma-t isopyknal rose from 800 m depth at the seamount to break the surface at Rockall, and examination of the temperature-salinity characteristics of the water within the 27.4 - 27.5 band strongly suggests that the section may have captured the phenomenon of 'cascading' - a katabatic flow from the bank into the interior of the Rockall Channel - for the first time with CTD data. A station worked about 30 n.mls south of station E on the return passage eastwards showed warm saline water extending to a greater depth than at any point upon the northern section, emphasizing the anomalous conditions observed between Anton Dohrn Seamount and Rockall.

Table 1. Sections worked during Cruise 1/1989

Stations	CTD disc/ dip nos.	Location	Dates, 1989	Observations
1G - 16G	119/001-013	Sd. of Mull - shelf-edge	5 - 6 May	Surface S‰; Cs surface and sub-surface (1, 2, 4, 6, 7, 9, 11, 13, 15, 16)
Q, P	119/014-015	Anton Dohrn Seamount section	6 - 7 May	CTD
O, N	120/016-017			
M, L	121/018-019			
K-H	122/020-023			
G, F	123/024-025			
E-A	124/026-030			
LS, FS	125/031-032	Rockall - Malin Head	7 - 8 May	CTD
ES-CS	126/033-035			
9D, ØD-8D	126/036-045	West of Islay	8 May	CTD
P7-P1	126/046-052	Islay - Skerryvore	8 - 9 May	CTD
1E-5E	126/053-057	Firth of Lorne	9 May	CTD
1C-5C	126/058-062	Lough Foyle - Loch Indaal	9 May	CTD
6C-7C	119/063-064			
5B-1B	119/065-069	Islay - Gigha	9 May	CTD
5A-2A	121/070-073	Antrim - Kintyre	10 May	CTD
1A	122/074			
5Y-1Y	122/075-079	Sanda - Corsewell	10 May	CTD
LS	-	Larne-Stranraer midway	10 May	Surface S‰, surface Cs
1Z-3Z	122/080-083	Copeland - Portpatrick	10 May	CTD
4Z-6Z	123/084-086			
AB9-AB5A	123/087-091	Firth of Clyde sill	10 May	CTD
AB15-AB22	120/092-100	North of Clyde sill	10 May	CTD
AB10	120/101			



r.v. LOUGH FOYLE Cruise 1/1989

Figure 1. Ship's track.

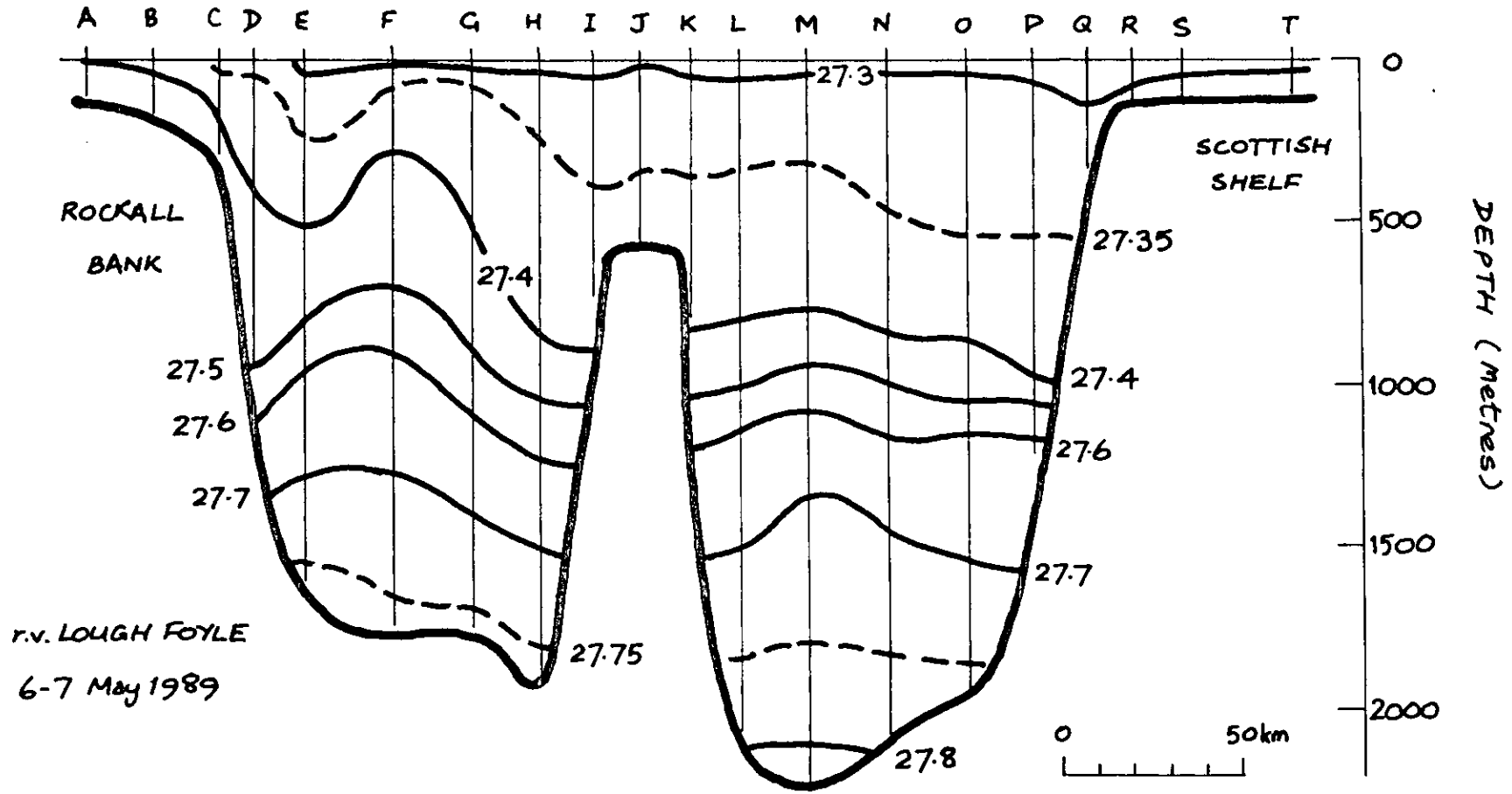


Figure 2. Anton Dohrn Seamount section : Density (σ_t).

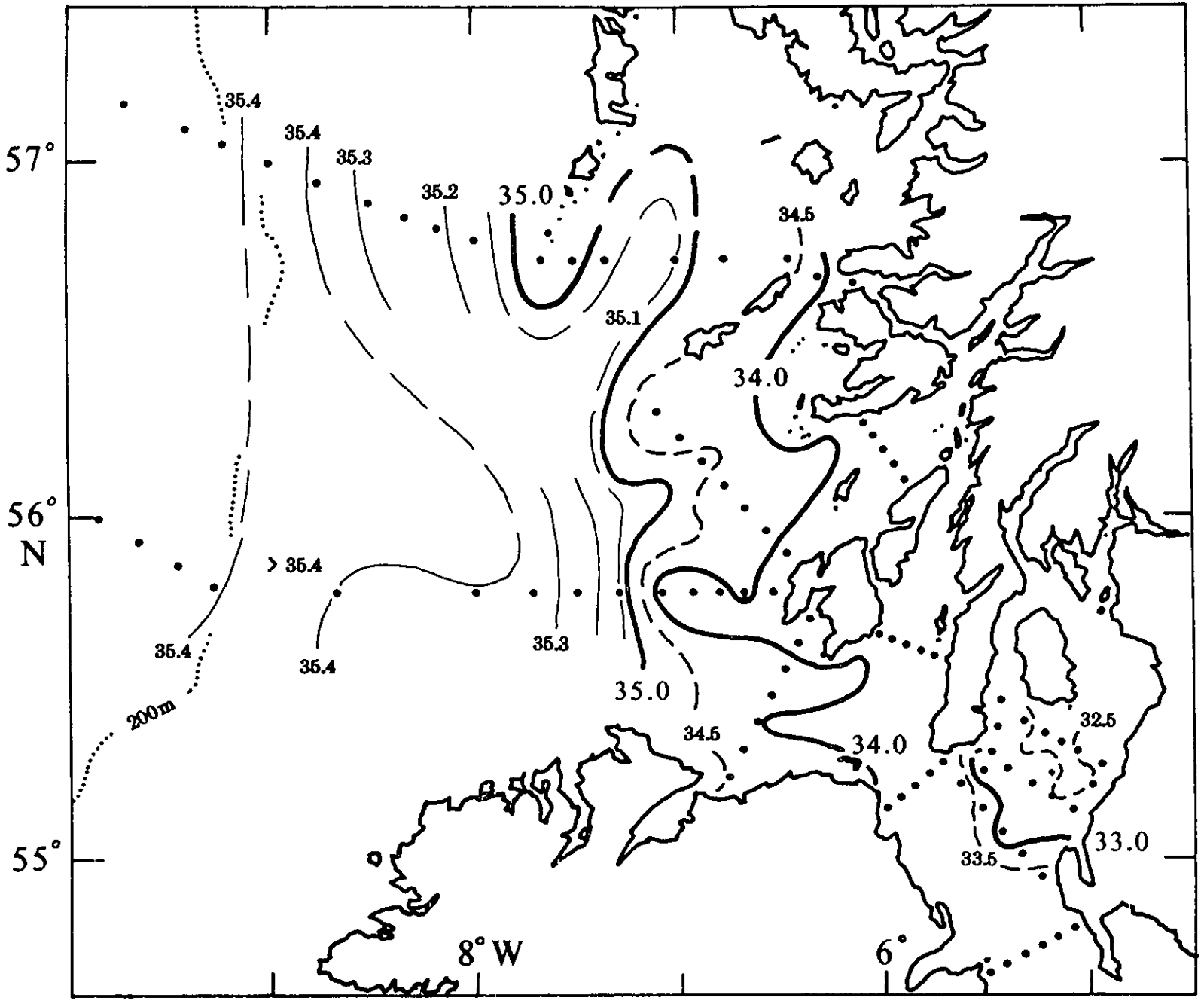


Figure 3. Surface salinity x 10^3 , 5-10 May 1989.