

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1985 RESEARCH VESSEL PROGRAMME

REPORT : RV CIROLANA : CRUISE 6

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF:

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DURATION:

24 June-23 July

LOCALITY:

North Sea, Norwegian Sea, Barents Sea, Shetlands, Orkneys, Hebrides,
West of Ireland, Celtic Sea and English Channel.

AIMS

- 1) To continue the examination of the distribution of Caesium-137 in distant Northern Seas and British Isles coastal waters for estimates of the inventories in each sea area to be made. The estimates obtained will be used to validate the MAFF box model.
- 2) To continue the examination of the distribution of Strontium-90, Caesium-134, Plutonium-238 and 239+240 and Americium-241 in seawater.
- 3) To determine the suspended load in seawater in each locality.

NARRATIVE:

CIROLANA left Lowestoft on the afternoon tide of 24 June and proceeded northwards working a line of stations from the North Sea along the Norwegian coast to a position off North Norway at 71°00'N and 30°00'E (Fig 1). A grid of stations was then worked at intervals of 0.5° of latitude and 5.0° of longitude to 15°E. The original plan had been to work a similar scale grid over the entire Barents Sea area as far east and north as ice conditions would allow. Unfortunately permission was not given by the USSR for sampling seawater east of 30°E. Almost all the stations worked had been sampled on CIROLANA 7/81. At 80 stations, between station 12 at 58°00'N, 04°00'E and station 92 at 71°00'N 15°00'E, 50 litres of surface water were collected, filtered and the filtrate (< 0.22µm) was processed on board for later analysis of ¹³⁷Cs and ¹³⁴Cs. At 5 stations 400 litres of surface seawater were collected, filtered and the filtrate and particulate (> 0.22µm) were initially prepared on board for later analysis of ²³⁸Pu, ²³⁹⁺²⁴⁰Pu and ²⁴¹Am and at one station for ²³⁷Np. All 5 samples were collected separately from the ships clean salt water supply by pumping directly from a hose lowered over the ship side. Comparisons were made at one station by both Methods of collection. In addition at 4 stations a further 50 litres of surface seawater were collected and retained for ⁹⁰Sr analysis. At 43 stations seawater at depth was obtained with the rosette array with either 6 or 8 x 30 litre Niskin bottles. The CTD was run at all these stations and plots of salinity and temperature were obtained by the use of the Hewlett Packard Computer. In addition print outs of temperature, salinity, in situ density, sigma_t and potential temperature were

obtained for each depth sampled. At depths less than 500m 3 positions in the water column, in addition to the surface, were sampled. Between 500m and 1000m depth stations 4 positions in the water column were sampled and at 5 points in water depths greater than 1000m. All samples will be analysed for radiocaesium and for relationships, if any, with depth, salinity and temperature and for comparison with data obtained in July 1981. Ice was encountered (Fig 1) at the northern end of the 30°E line at a position 76°10'N some 40 miles south of the position reached on CIROLANA 7/81. Progress to the next station at 27°30'E was slow with much sea ice encountered with small 'bergs'. There was some difficulty in finding a way through but a station was finally worked just south of 76°N. CIROLANA then had to steam to 75°40'N in order to find a passage through to 25°E where a station was worked at 75°24'N, again further south than in July 1981. Dense fog in the Bear Island area, persisted all day on 4 July and no attempt was made to sample north of 76°N on the 20°E line. Fortunately the fog cleared when a station was worked off the South Cape of Spitzbergen at 76°30'N, 15°00'E. CIROLANA then steamed south to complete the grid between Norway and Spitzbergen at 1330 on 6 July.

A line of stations was then sampled down the Norwegian coast, offshore of the north going line, to a position 30 miles North of Orkney. A grid of stations was then worked from the 10 July-21 July off the Orkneys, Shetlands, Hebrides and west of Ireland, almost all the time in strong to gale force winds. The programme was completed by sampling a line of stations through the Celtic Sea, English Channel and the southern North Sea. From the position 71°00'N, 15°00'E a further 110 stations were worked, 56 at depth, for radio caesium analyses, 9 stations for transuranic analyses and 10 for ⁹⁰Sr.

RESULTS

All the 100 stations worked at depth were by use of the Munro davit with the rosette array. The new method of recovery has certainly improved the safety of return of the equipment on board. Damage was sustained to 1 Niskin bottle only over the entire cruise although for the second part of the cruise strong winds persisted for most of the time. Plots of temperature and salinity were available on the 'downcast' and the "stats" program provided means and standard deviations of temperature, salinity and density for each depth worked. First inspection of the data (Figs 2 and 3) showed similar surface temperatures and salinities at some stations when compared with 1981 but no distinct relationship seems apparent at the moment. At a station on a bank to the north of Bear Island, very cold water of approximately -0.4°C persisted from surface to bottom when compared with 0.5°C in 1981.

Temperatures of approximately -1.0°C and salinity 35.00 ‰ were observed at a number of stations at 1000m depth on the line worked back to Orkney but with temperatures of greater than 5°C at similar depth on the southern side of the Wyville Thomson ridge.

All aims were achieved but with some slight modifications and additions to the original proposed programme.

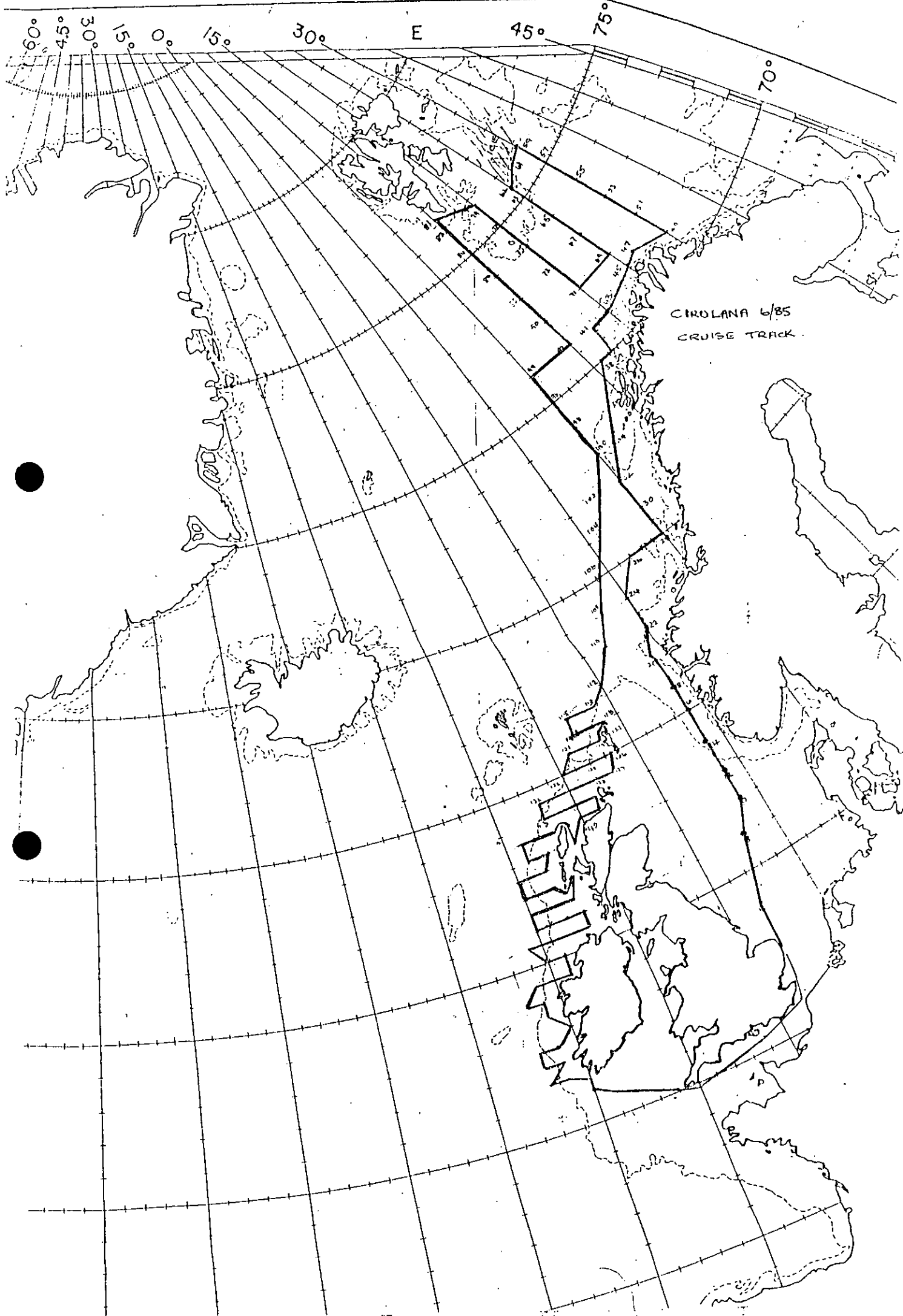
D F Jefferies
23 July 1985

SEEN IN DRAFT: J R French Master
P Mackay

INITIALLED: H W H

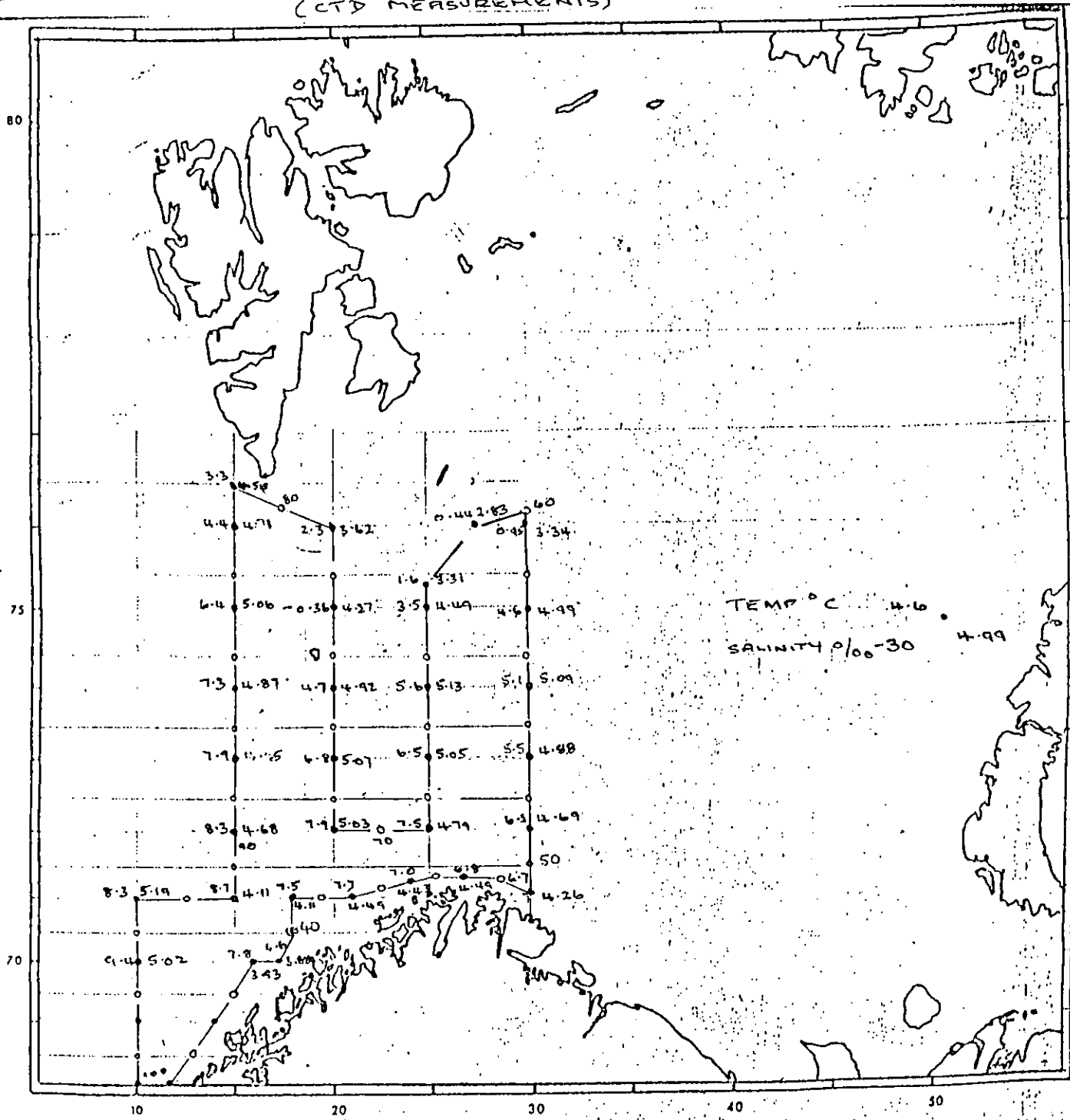
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CAROLANA 6/85
CRUISE TRACK

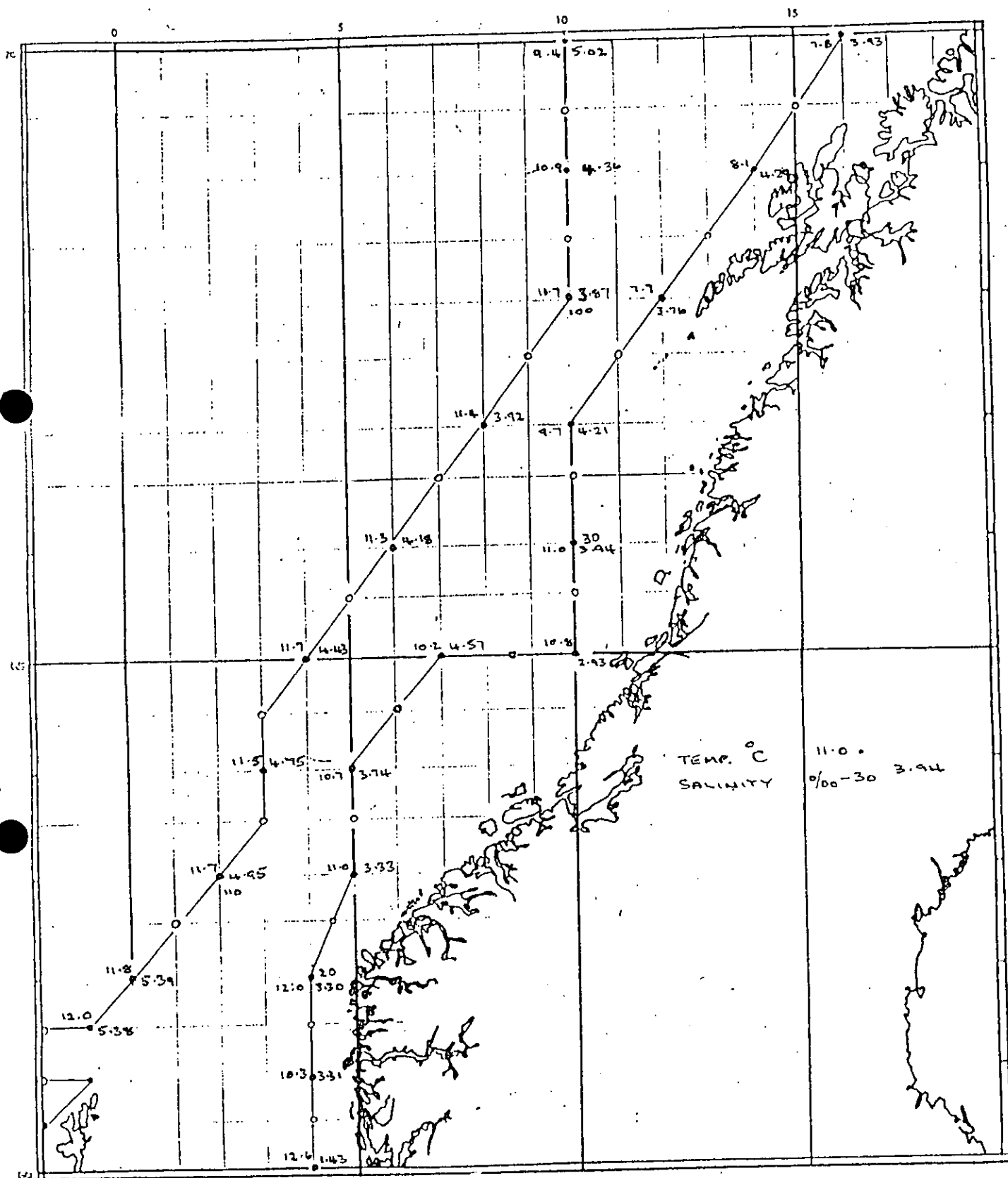
FIG 2. SURFACE TEMPERATURE AND SALINITY (CTD MEASUREMENTS)



R.V. CIROLANA 6/85

Track
 ○ Surface Station
 ● Depth Station

FIG 3. SURFACE TEMPERATURE AND SALINITY
(CTD MEASUREMENTS)



RY CIROLANA 6/85

Track
 ○ Surface Station
 ● Depth Station

TEMP. °C
 SALINITY ‰-30 3.94