

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

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REPORT: RV CIROLANA: CRUISE 5
(PROVISIONAL: Not to be quoted without prior reference to the author)

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8-19 May

19 May - 5 June

8 May - 5 June

DURATION

Left Grimsby 1915 h 8 May
Arrived Grimsby 0550 h 5 June
All times are Greenwich Mean Time

LOCALITY

The waters surrounding the British Isles and especially the North Sea and Irish Sea.

AIMS

1. To continue the examination of the distribution of strontium-90, caesium-134, caesium-137, plutonium-238, plutonium-239/240 and americium-241 in sea water.
2. To determine the suspended load and particle size distribution in sea water and to measure the chlorophyll-A content at selected stations.
3. To collect cores from the bed of the Irish Sea and its approaches.
4. To record the caesium-137 concentration in sea water using a gamma-radiation probe.
5. To investigate the redox potential, pH, phosphate, iron and manganese content in interstitial waters and their variation with depth in the sea bed.
6. To continue the work on determination of the oxidation states of plutonium in sea water, sediments and interstitial waters.
7. To complete work on the shipboard concentration technique for the determination of total plutonium in sea water.

8. To measure concentrations of polonium-210, strontium-90 and radium-226 in seawater using a shipboard concentration technique and to collect a few plankton samples for subsequent analysis for polonium-210.

NARRATIVE

(a) First part of cruise: 8-19 May.

On leaving Grimsby CIROLANA set an easterly course and commenced the grid of stations covering the southern North Sea. These were sampled as planned for various radionuclides and suspended load. This procedure was followed as the ship proceeded down the English Channel. By the afternoon of 11 May work in these areas had been completed and the ship then proceeded across the mouth of the British Channel working stations for radionuclides and suspended load as before and also taking a seabed core in an area of muddy bottom at $51^{\circ}03'N$, $06^{\circ}15'W$. The work was continued proceeding up St Georges Channel and included a line of stations at which suspended load particle size distribution, chlorophyll-A and temperature were measured in addition to the usual parameters. This line extended across the Channel at $53^{\circ}N$.

Starting on May 12 a more intensive series of stations was worked in the northern Irish Sea. This included 39 stations at which sea bed cores were obtained. The positions of these were chosen to supplement those sampled during the earlier cruises in October 1977 and January 1978, and also cores taken in coastal areas. A total of some 75 cores has been collected over the period autumn 1977 to spring 1978 for use in determining the distribution of radionuclides in bed sediments of the Irish Sea.

On the evening of 17 May a line of stations was worked for suspended load, particle size distribution, Chlorophyll-A and temperature and some hauls were then made using a 1 metre net to obtain plankton. The samples obtained will be analysed for radionuclide content.

Three longer stations were worked at which bed cores were obtained for extraction of interstitial water. Then samples will be analysed to determine the Pu^{+6}/Pu^{+4} ratio. Redox potential and pH were also measured down a core from the same station for comparison. A fourth station was attempted for similar work but it proved to be impossible to extract sufficient interstitial water because of the coarser nature of the sediment.

(b) Second part of cruise: 19 May - 5 June.

After transfer of the appropriate staff off Workington by MV SOLWAY PROTECTOR, CIROLANA left the Irish Sea via the North Channel and commenced work on the sampling grid to the north-west of the British Isles. The procedure followed the original plan closely; most of the samples were of seawater and suspended particulate material, with the water being initially processed on board, as appropriate, for subsequent measurement of the radio caesium, plutonium, americium, strontium-90, radium-226, and polonium-210 as well as the plutonium IV/VI ratio. In addition coring was attempted at 6 stations in the area of the northern approach to the Irish Sea and the resultant samples included one core of 74 cm depth obtained using the 10 cm gravity corer.

On the morning of 27 May the ship passed Fair Isle and commenced working the northern North Sea up to $62^{\circ}N$. Despite dense fog off the Danish coast on 2-3 June, only 5 stations were abandoned and after a few hours delay the grid was resumed and the remaining stations completed.

On 2 June the continuous recording gamma-radiation probe was dismantled having been on background measurements for stability for the previous 14 days.

Taking both parts of the cruise a total of 280 stations was worked.

RESULTS

1. A grid of stations covering the North Sea, the English Channel, the Irish Sea and north western coastal waters of the British Isles has been worked for various radionuclides, suspended load and salinity.
2. Seabed cores have been obtained at 44 stations, all but 5 of which were in the northern Irish Sea.
3. Suspended load particle size distribution, chlorophyll-A and temperature were measured across transects from Ireland to North Wales and from the Isle of Man to Cumbria.
4. A gamma radiation probe was used to produce a continuous record of caesium-137 concentrations in the waters of the Irish Sea and the stability of this probe has been measured.
5. Redox potential and pH have been measured in interstitial waters of three cores, and samples of interstitial water obtained for measurement of $\text{Pu}^{+6}/\text{Pu}^{+4}$ ratio, phosphate, iron and manganese content. The Redox potentials correspond to oxidising conditions throughout the top 30cm of the bed.
6. Samples of plankton were collected in the eastern Irish Sea.

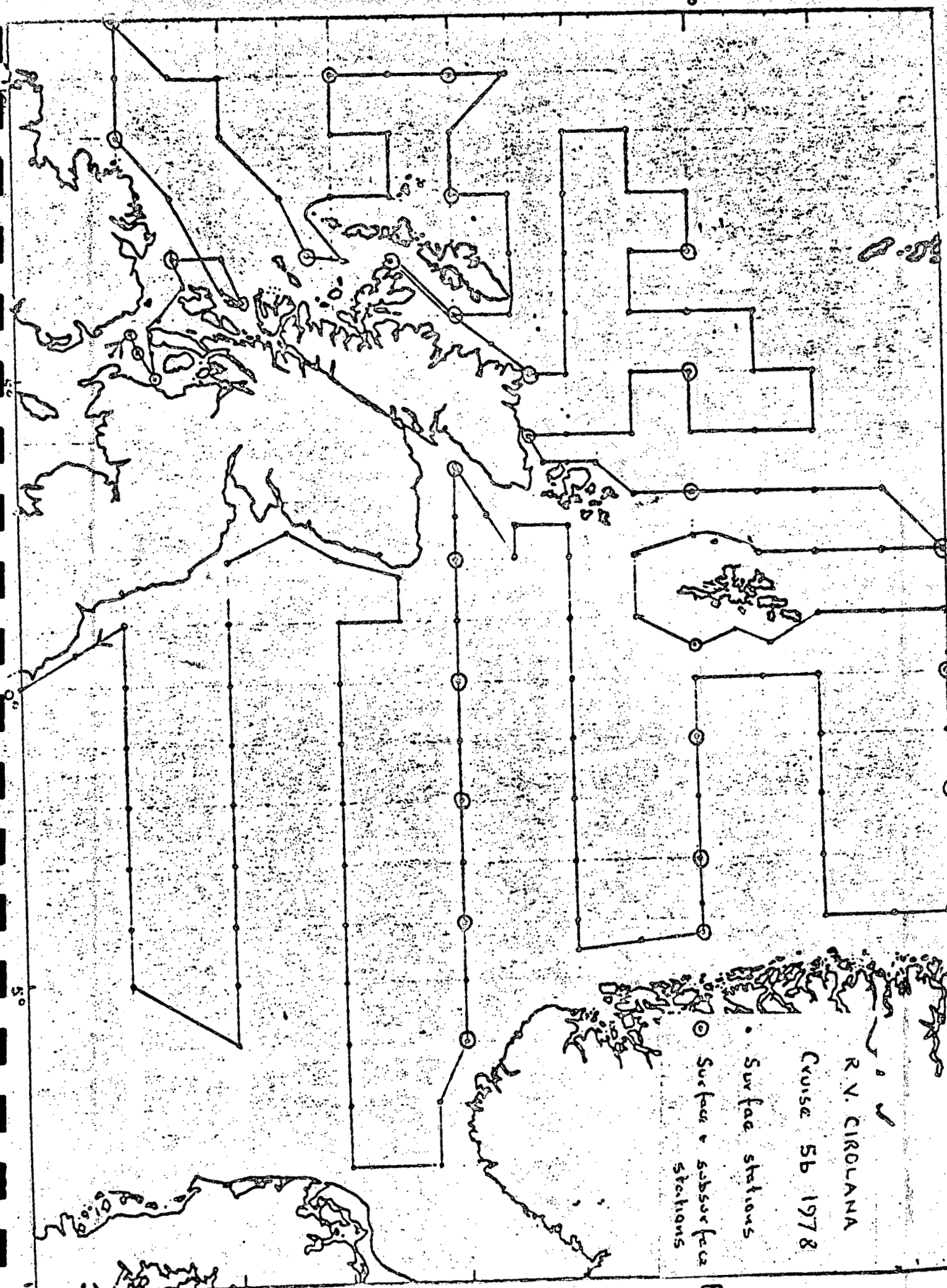
J W Talbot
J W R Dutton
15 June 1978

SEEN IN DRAFT: R A Taylor - Master
E W Pearson - Fishing Skipper

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R. V. CIROLANA

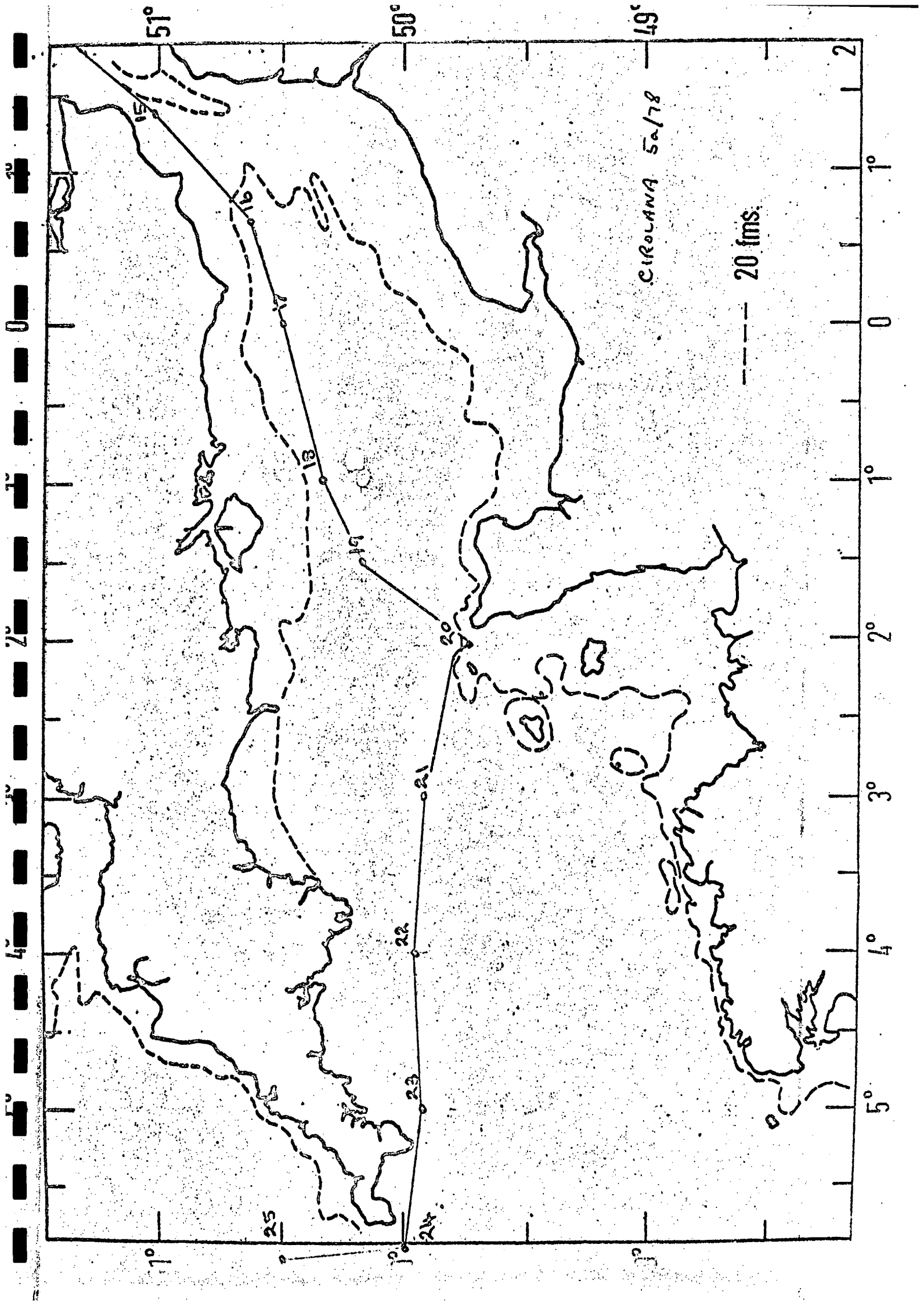
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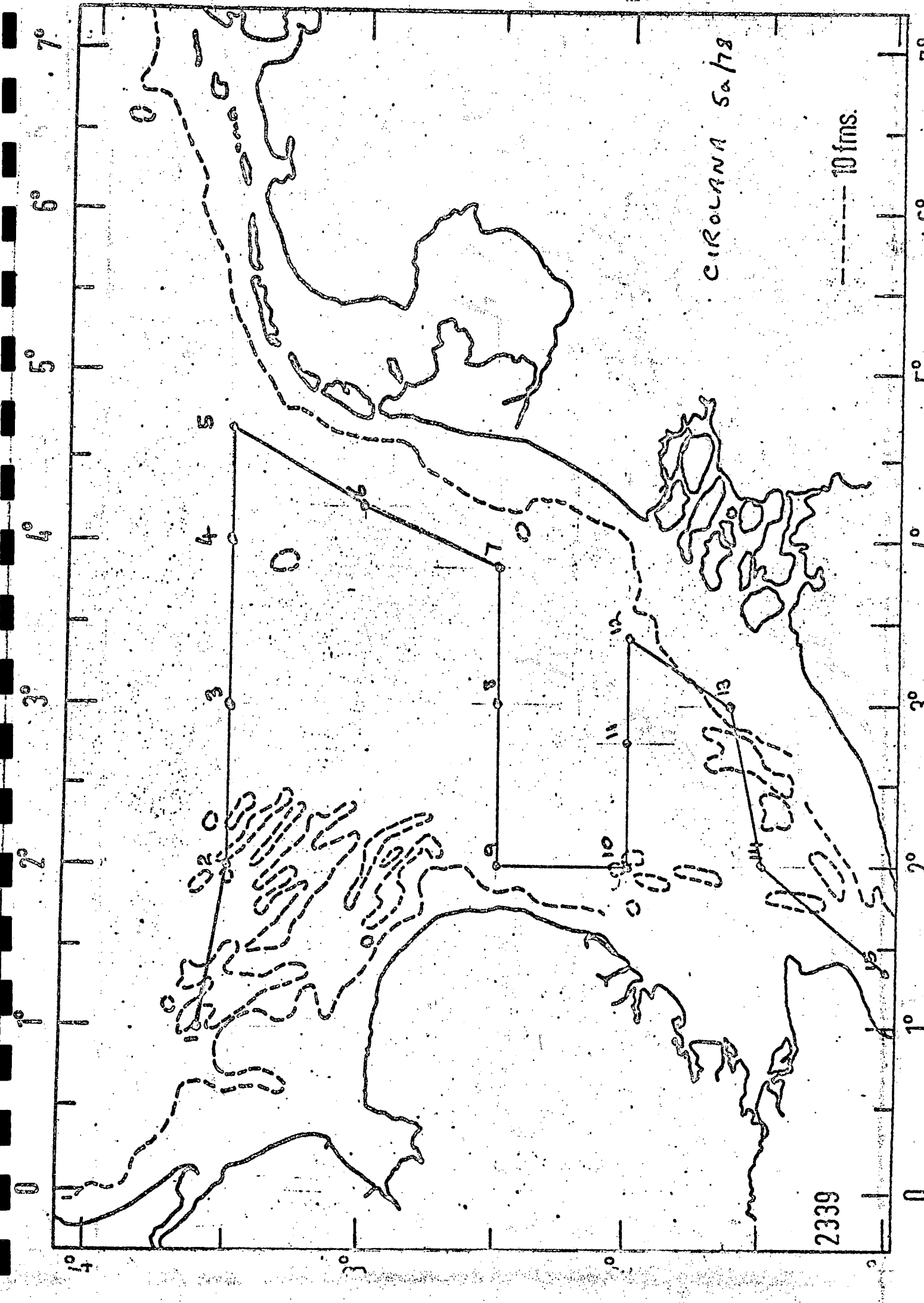
• Surface stations

⊙ Surface & subsurface stations

60

50





7°

6°

5°

4°

3°

55°

55

54°

54

53°

53

52°

52

51°

51

CIROLANA 5a/78

