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FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1976 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 6A

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

STAFF

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DURATION

Left Grimsby 1500 h 25 May
Arrived Grimsby 0715 h 14 June

LOCALITY

North Sea and approaches

AIMS

FRL

1. To continue the examination of the distribution of caesium-137 in sea water of the North Sea and approach area between Dover and 60°N for project RANOSP, a joint FRL and DHI programme.
2. To collect sea water at selected stations for the examination of plutonium-238 and plutonium-239+240.
3. To measure the concentrations of inorganic and total mercury in sea water.
4. To collect seawater samples for selected trace metal analyses.
5. To collect sea water for the measurement of the total suspended load where mercury and other trace metal analyses are made.

DHI

1. To collect seawater samples for the measurement of particulate iron and for the examination of the composition and distribution of the suspended load in the North Sea.
2. To collect samples of surface seabed sediment for the measurement of selected heavy metals.

NARRATIVE

RV CIROLANA sailed from Grimsby on the afternoon tide of 25 May and sampling commenced on a grid of stations (see chart) at 1700 h 25 May. At all stations 50 litre samples of sea water were collected from CIROLANA's 'clean' saltwater supply, filtered and processed on board through ion-exchange columns for the selective extraction of the caesium radionuclides. At 10 stations samples were obtained at depth, using 30 litre NISKIN bottles for the examination of the relationship of radio caesium concentrations with depth from the surface layer. At 6 stations up to 200 litre samples were collected, filtered, acidified and retained for analysis for plutonium in both the 'soluble' and 'particulate' phases.

At 135 selected stations on the grid concentrations of inorganic and total mercury in sea water were measured on board using the FRL-developed 'gold trap' method. In addition, at 157 stations 2 x 1 litre surface seawater samples were retained frozen following filtration. Both the soluble and particulate phases will be analysed for zinc, copper, nickel and cadmium, and in addition the particulate will be analysed for iron. The total weight of suspended load will also be determined.

DHI collected sea water at 150 stations on the grid, both at surface and near the bottom. The surface sample was taken 3 m below the surface using a 12 litre NISKIN bottle and the bottom sample was obtained by the use of a DHI water bottle triggered to operate as soon as the 'pen' touched the bottom. Seawater samples at all stations were filtered for the measurement of the suspended load. Comparisons will be made with the results obtained from sampling 3 m below the surface and those obtained by FRL using bucket sampling of the surface water. At all stations concentrations of particulate iron, in both surface and bottom water, were measured on board. Samples of the surface layer of the sea bed at selected stations were obtained using a NERC Day Grab.

Problems in regard to the steering of the ship occurred commencing on 5 June. The steering failed on automatic and 'in hand' steering was put into operation. There were intermittent failures and steering on 'secondary' commenced on 7 June. Steering problems were again experienced on 9 June and the ship's speed reduced to 10 knots for a trial period. Speed was then increased to 12 knots on two engines and steering was satisfactory until another malfunction occurred on the evening of 12 June. The decision was taken to reduce speed to 10 knots again, omit the stations in the Channel, where there was also poor visibility, and to work the remaining grid of stations back to Grimsby where RV CIROLANA docked at 0715 h 14 June. The opportunity was taken, during the cruise, to rendezvous with RV GAUSS (DHI) at position 55°00'N 6°30'E at 1900 h 9 June. Some of the DHI frozen samples and also a DHI wave rider buoy, picked up and taken to Grimsby prior to the start of Cruise 6a, were transferred to GAUSS for return to Hamburg. Four German scientists, lead by Dr D Schmidt, came on board CIROLANA and were shown the laboratories and other facilities and FRL methods of sampling and analysis for radioactivity and trace metals. Two members of FRL staff visited GAUSS but unfortunately further exchanges were impossible because of freshening winds and sea conditions and each group returned on board at 2100 h.

RESULTS

All aims of each group were achieved. Sea water was sampled and processed for the determination of radiocaesium from 202 stations out of a proposed 207 stations. One station only was omitted from the proposed DHI sampling programme.

Measurements of the concentration of inorganic mercury in sea water demonstrated that at all stations, other than one off the Humber, the levels were less than 10 ng.l^{-1}. Some contamination occurred in the analysis of total mercury during the early part of the cruise due to mercury being leached from some of the glassware.

Measurements of particulate iron in sea water demonstrated that, in general, concentrations in the bottom water were higher than in the surface water. The highest levels obtained were found in an area of the German Bight, near Helgoland, an inshore area north of the Rhine estuary, in the Moray Firth and in an area off the east coast of England, with the highest value found at a position some 9 miles east of Lowestoft.

D F Jefferies

21 June 1976

SEEN IN DRAFT T H Finn
W J Saxby

INITIALLED AJL

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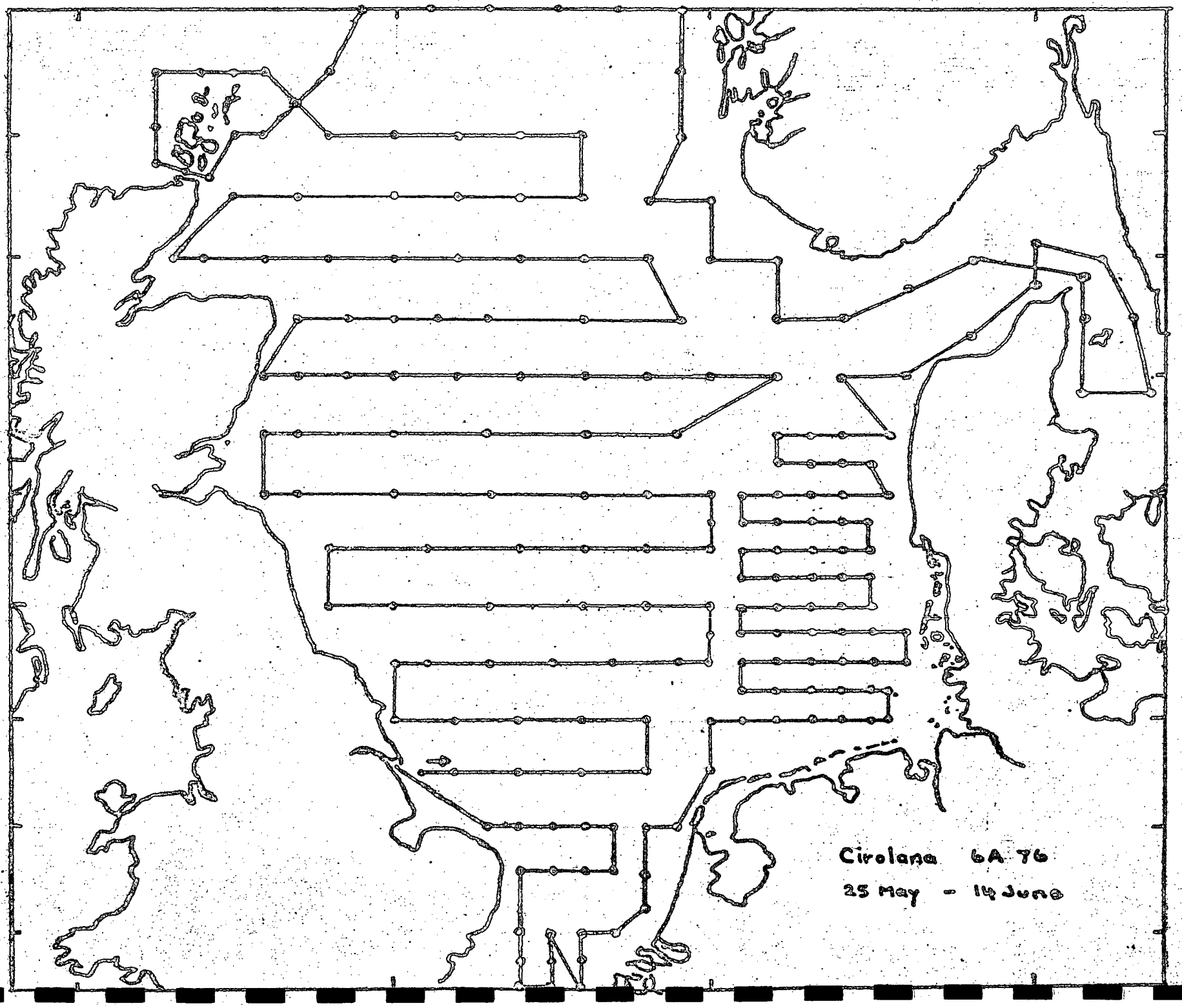
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25 May - 14 June