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

1988 RESEARCH VESSEL PROGRAMME

REPORT : RV CIROLANA : CRUISE 5

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DURATION :

Left Lowestoft 1015h 19 May
Arrived Lowestoft 0412h 8 June
(All times are Greenwich Mean Time)

LOCATION :

North Sea, English Channel and Irish Sea

AIMS :

1. To conduct a detailed study of Liverpool Bay, the Outer Mersey Estuary and Morecambe Bay for dissolved and total mercury in seawater.
2. To collect and analyse samples of seawater for dissolved and total mercury from the Humber, Tees and Tyne estuaries.
3. To collect and analyse for dissolved and total mercury from offshore and coastal areas. This will include sampling at the ICES reference station at 60°30'N 5°00'W.
4. To conduct a bilateral intercomparison exercise for mercury in seawater between MAFF and IFREMER. This will include both sampling and analysis.
5. To collect samples of seawater for the analysis of trace metals other than mercury, particularly zinc, from the ICES reference station and other selected sites not sampled during the ICES Baseline Survey of 1985-7.
6. To collect surface sediment samples from the vicinity of the Ravenspurn gas field development, approximately 30 miles east of Flamborough Head.
7. To carry out a study of the dispersion of the oily water discharge plume from the Texaco oil field, 70 miles north-east of Aberdeen, using a towed fluorimeter.
8. To collect samples of seawater, suspended particulate material and surface

sediment for analysis of various trace organics, including organochlorine pesticides, chlorobiphenyls, coprostanol, nonyl phenols, phenol and hydrocarbons.

9. To collect samples of surface sediment along a transect in Liverpool Bay for analysis of methyl mercury.

NARRATIVE :

CIROLANA left Lowestoft at 1015h on 19 May and sampling in the Wash and the approaches to the Humber took place between 1725h and 2200h. On 20 May a 13 hour anchor station was occupied off Grimsby with the ships' Searider being used to sample from 5 inshore stations. CIROLANA then sailed to the Ravenspurn gas field off Flamborough Head where surface sediment samples were collected from 28 stations on 21 May between 0822h and 1440h before continuing to anchor off Tees Bay. On 22 and 23 May 13h anchor stations were worked off the Tees and the Tyne respectively and the Searider was again used to sample from 5 stations within each of the estuaries themselves. CIROLANA then steamed north to the Tartan oilfield, 1 water sample being collected en route, where work with the "Aquatracka" began at 1126h on 24 May. Because of problems with position-fixing this was abandoned at 1230h after two passes of the platform and CIROLANA proceeded northwest towards the ICES reference station, passing between the Orkneys and Shetlands. On passage 2 further water samples were taken. At the reference station water samples were taken using both the buoy surface sampler and by means of the hydrowire from depths between 100 and 950m, sample collection beginning at 0920h and ending at 1607h on 25 May.

In continuing good weather CIROLANA next sailed south for the North Channel, passing outside the Hebrides, with water samples being collected from 4 stations on the way. A transect of 4 stations was worked across the North Channel on 27 May between 0425h and 0655h, and CIROLANA continued into the Eastern Irish Sea where water samples were taken from 28 stations north, east and south of the Isle of Man between 0752h on 27 May and 1035h on 29 May. Surface sediments were also collected from the 8 stations along a transect from the Isle of Man to the mouth of the Ribble. CIROLANA then proceeded to Holyhead where the exchange of personnel was made at 1200h.

On leaving Holyhead a further 6 water stations were worked between Anglesey and the Burbo Flats, ending at 2035h. During the next 5 days and in calm weather 5 13h anchor stations were occupied, off the Queen's Channel, by the Burbo Flats, and adjacent to the sewage sludge and the two dredged spoil disposal grounds. On three of these occasions the Searider was again used to sample from 13 inshore stations in the Dee and Mersey estuaries and on the Burbo Flats and the Formby Sands. After completion of the anchor stations at 1930h on 3 June CIROLANA sailed northwest to the Irish coast off Dundalk Bay and then south, sampling also off Dublin Bay, Arklow and Carnsore Point, before crossing the Celtic Sea and rounding Land's End. In all 8 stations were sampled during this part of the cruise. Two further stations were worked south of Land's End and off Dodman Point at 0330h and 0715h on 5 June, before water samples were taken in Plymouth Sound from both CIROLANA and the Searider between 0900h and 0930h. During the afternoon of 5 June water samples were also taken in this manner from Dartmouth, Teignmouth and Exmouth; 3 from the ship and 9 from the Searider. CIROLANA then proceeded to Portland where sampling took place at 1855h.

Early the next morning sampling began off the Needles at 0508h (6 June) in a

flat calm, and a passage of the Solent begun in which 6 stations were worked by 1000h, and ending by the Nab Tower. Between then and 0835h on 7 June samples were taken along two transects across the English Channel and from the Baie de Seine. Further samples were collected off Beachy Head and Dungeness at 1020h and 1245h, and in the outer Thames Estuary from the vicinity of the Barrow Deep, where sampling was completed at 2145h. CIROLANA then proceeded to Lowestoft, docking at 0412h on 8 June.

RESULTS :

Because of the excellent weather prevailing throughout this cruise the majority of the aims were successfully completed. Aim 7, however, was unsuccessful for reasons outlined below.

Aim 1. Samples were taken from 5 13h anchor stations and 41 other stations in this area. Preliminary results from samples analysed at sea (see Figures 1 and 2 which indicate the distribution of dissolved reactive and total mercury respectively) show high concentrations to be confined to the south and southeast of the survey area. Comparability with results from the north of the area from CIROLANA 4a/87 was good.

Aim 2. This was successfully completed with a 13h anchor station and 5 other stations sampled at each site.

Aim 3. This was successfully accomplished. 69 stations being sampled, and a depth profile being obtained from the surface to 950m depth at the reference station.

Aim 4. Samples were taken for intercomparison purposes from 16 stations in the English Channel. No analyses were carried out at sea.

Aim 5. A total of 74 samples were collected for analysis of zinc and 20 for other metals, particularly lead, cadmium and copper.

Aim 6. All 28 planned surface sediment samples were collected from around the Ravenspurn gas field, although position fixing using the Decca Navigator system proved to be a problem in this area and the majority of stations were placed using range and bearing from the ship's radar.

Aim 7. As with Aim 6, position fixing using Decca proved impractical in this area and the survey was begun using radar ranging from the platform. After 2 passes had been completed the discharge plume had been located and work was beginning in earnest when we were requested to turn off the ship's 3cm radar as it was interfering with the position fixing of a diving support vessel working the area, which was referenced to a beacon on the Tartan alpha platform. It would have been acceptable for us to use 10cm radar, but as CIROLANA does not have this the survey had to be abandoned.

Aim 8. Successfully completed, with 125 samples being collected for the analysis of coprostanol and nonylphenols, 120 for a set of trace organic contaminants, 7 for phenol and 8 for organochlorine pesticides and chlorobiphenyls.

Aim 9. 8 samples of surface sediment were collected along a transect from the Isle of Man to the mouth of the Ribble for methyl mercury analysis.

In all 230 sets of seawater samples were taken for mercury analysis (reactive and total dissolved, total unfiltered). Of these 135, 133 and 31 respectively were analysed on board during the cruise, a total of 309 analyses.

R J Law
13 June 1988

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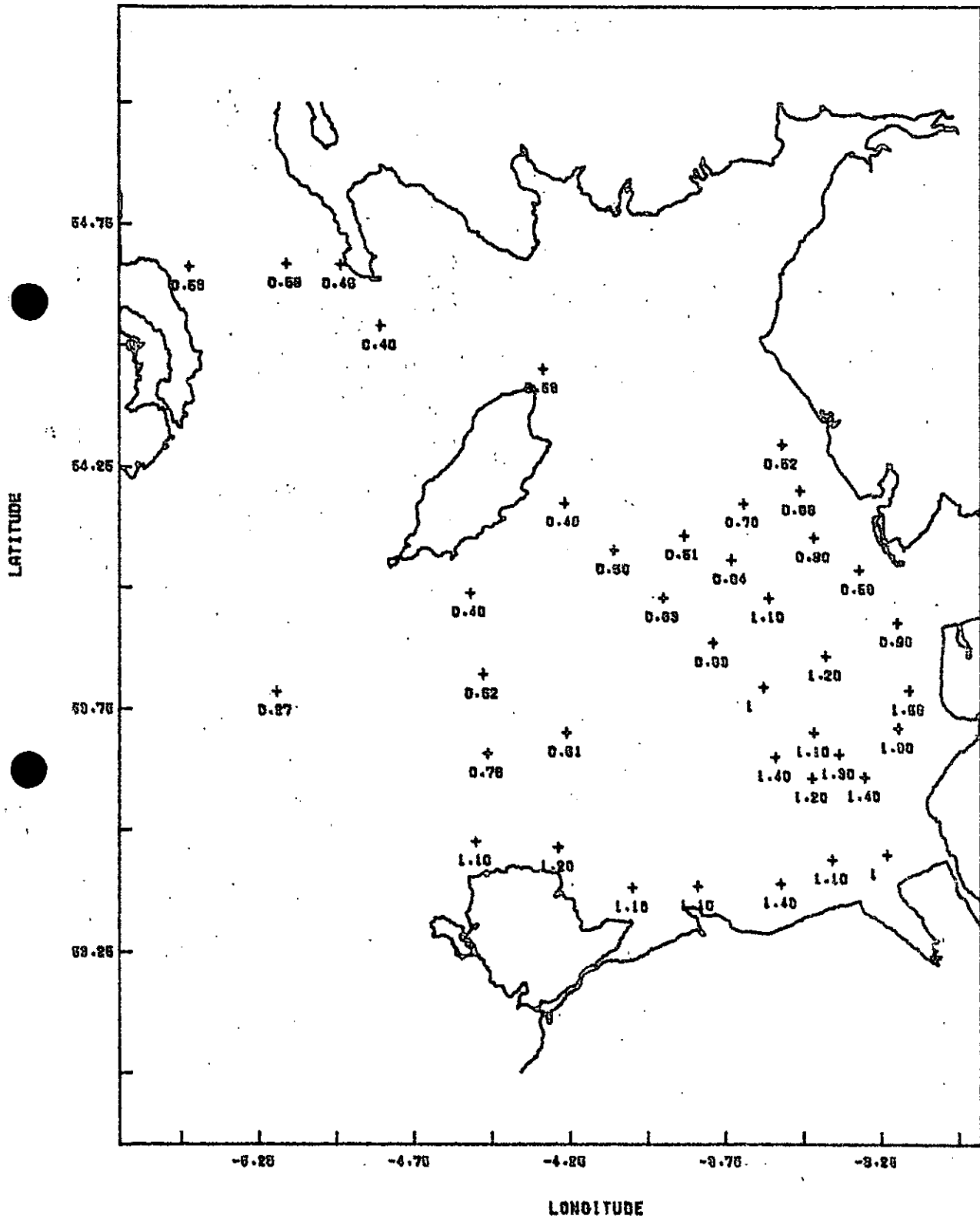
C M G van den Berg (University of Liverpool)

D R Bedborough (Department of Energy)

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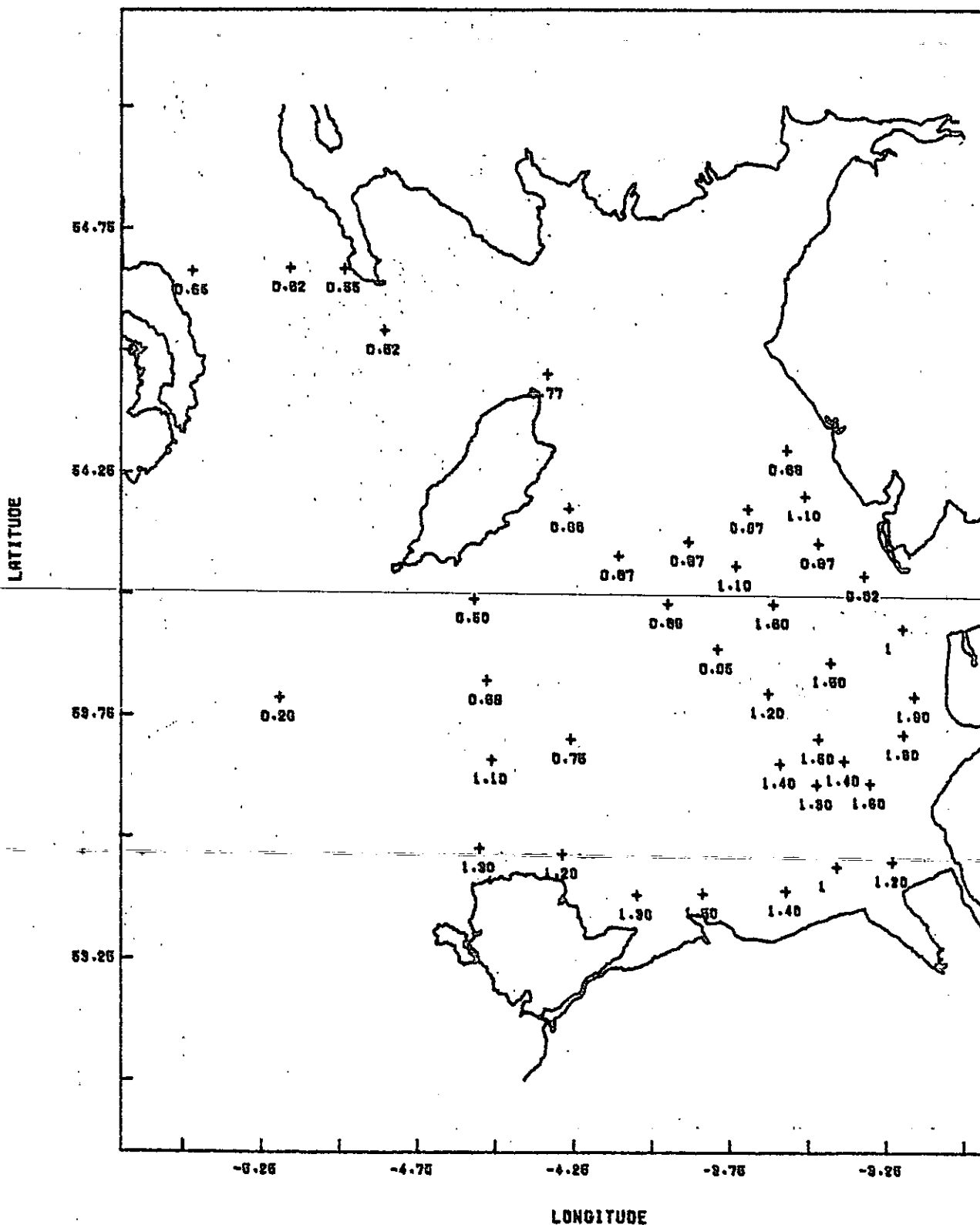
DISSOLVED MERCURY IN THE EASTERN IRISH SEA

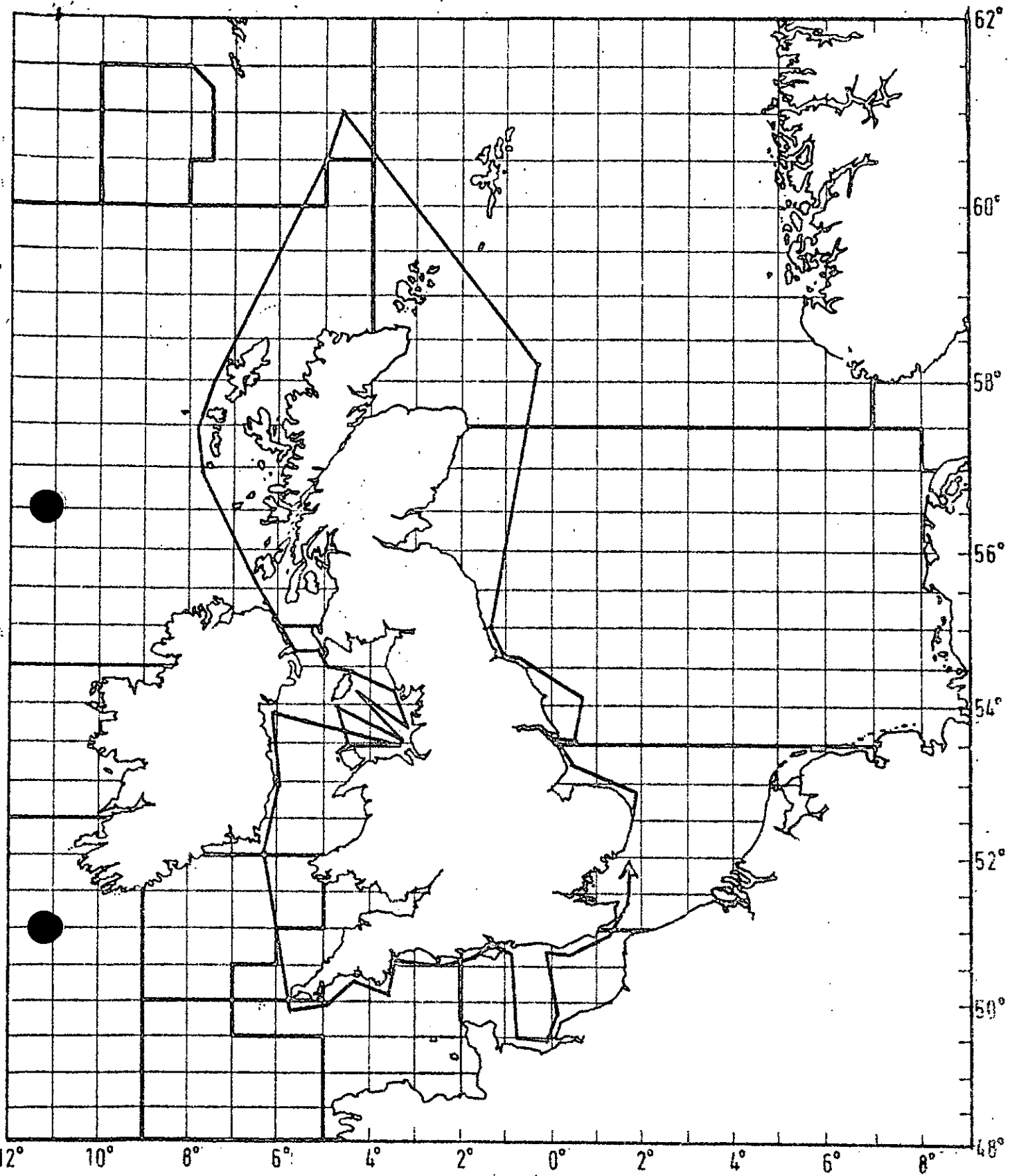
SHOWING :
 STATION POSITION
 DATA VALUES REPRESENTING : REACTIVE MERCURY
 COASTLINE



DISSOLVED MERCURY IN THE EASTERN IRISH SEA

SHOWING :
 STATION POSITION
 DATA VALUES REPRESENTING : TOTAL MERCURY
 CONCENTRATION





CIROLANA 5/88
19 MAY TO 8 JUNE 1988
CRUISE TRACK