

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

1990 RESEARCH VESSEL PROGRAMME

REPORT: RV ARANDA

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

STAFF from British Institutions

E Gmitrowicz       )  
D Kirkwood        )  
M Fulcher         )  
J Read             )   MAFF

A Watson           )  
M Liddicoat        )  
T Haine             )   Plymouth Marine Laboratory (PML)

M Krysell - University of East Anglia (UEA)

DURATION

Departed Reykjavik 0900h 9 July 1990  
Arrived Reykjavik 2200h 18 July 1990  
All Times Greenwich Mean Time

LOCALITY

The Denmark Strait

AIMS

1. To recover 5 moorings from the Greenland continental slope south of Dohrn Bank (The Dohrn Bank section, Fig 1).
2. To deploy 7 current meter moorings on a section between 63°39.9'N 32° 58.2'W and 64°56.9'N 34°22.2'W, previously surveyed during the TTO (the "TTO" section, (Fig 1).
3. To carry out CTD casts and to collect water samples throughout the water column for determination of Freon-11, Freon-12, Freon-113 and silicate concentrations at stations south of, north of and within the Denmark Strait.

NARRATIVE

J Read and E Gmitrowicz arrived in Reykjavik in the early hours of Friday 6 July, the last working day before the Finnish Research Vessel ARANDA departed Reykjavik en route to the Denmark Strait and the last opportunity to ensure that the scientific equipment had cleared customs and was ready for loading onto the ARANDA. Our agents in Reykjavik had taken no action and it was only our visit that spurred them into completing the formalities. The container was delivered to the ARANDA on 8 July.

The other British members of the party arrived in Reykjavik in the late afternoon of 7 July. The ship departed Reykjavik at 0900h on Monday 9 July and en route to the Dohrn Bank current meter section the CTD and mooring recovery equipment were set up while the Freon group ran tests on their analysis equipment. The Finnish nutrient chemist was not on board due to a last minute problem in Finland and P Malkki, the SIC, asked D Kirkwood if he could take charge of nutrient analyses required. During the cruises to this area in 1988 and 1989 we found silicate to

be the best nutrient for characterizing the various water masses. D Kirkwood therefore concentrated his efforts on silicate analyses, the results of which appear to be of high quality.

We arrived at the deepest mooring on the Dohrn Bank section at 0600h on the 10th and by 1630h all five moorings had been recovered via the stern A-frame. Six CTD stations, including two casts with the MAFF CTD/Rossette Sampler, along the same section were then completed.

The MAFF acoustic releases (a/r) to be deployed on the moorings on the TTO section were tested pm 11 July. Of the eight releases tested, six passed. The tight schedule of the ship prevented any attempt to repair and retest the malfunctioning a/r's and so only six of the proposed seven mooring were laid. Mooring deployment on the TTO section began at 0845h 12 July, and was successfully completed by 2030h. Seven CTD casts were completed along this section. Two of these were intended to collect water for Freon analysis using the MAFF CTD/rossette package. The first of these two stations at 1304h 13 July in 1980 metres of water passed without event. The second at 0038h 14 July in 2750 metres of water resulted in the loss of the MAFF underwater unit at 76m on the way down (see Appendix A for details).

The ship now steamed to the Denmark Strait sill region across which twelve closely spaced (4nmi) CTD stations were worked. On the deepest station of this section samples for Freon analysis were taken using 1.7L and 5L GO-FLOW bottles mounted on the Finnish CTD/rossette sampler. Three bottles were fired at each depth to try to identify the extent of contamination from the small volume bottles. Repeatability between samples was poor making interpretation of the data difficult. Two further Freon stations were completed in the Denmark Strait, one on the sill and one north of the sill. On these occasions samples were collected at six depths by multiple bottle casts using the single 50L GO-FLOW bottle carried on the ARANDA. The data from these casts were of a high quality, though the sample collection was very time consuming.

## RESULTS

1. All five moorings on the Dohrn Bank section were recovered with little difficulty and provide an 80% good data return.
2. Six of the proposed seven moorings were deployed. The mooring likely to spend least time in the overflowing Denmark Strait water, the inshore mooring, was not laid.
3. Three successful CTD/Freon stations were completed with the MAFF CTD/rossette sampler before loss of the underwater equipment. Two further stations using samples from a 50L bottle casts on the hydro-wire were also successful.
4. Samples of marine air were collected and analysed for Freons. Apart from data collected on previous CIROLANA cruises, marine air Freon concentrations have not been measured at these latitudes.
5. Silicate concentrations were determined at all CTD stations and will aid in labelling water masses overflowing through the Denmark Strait.

This very successful cruise was due in large part to the scientists, officers and crew of the RV ARANDA who were at all times helpful and friendly. We are indebted to Pentti Malkki for allowing us so much valuable ship time to complete our work. S-A Malmberg's expert knowledge of and enthusiasm for the water masses of Iceland and Greenland made the cruise a more interesting and rewarding experience. The time and effort put in by J Briem in arranging storage and supply of equipment for the cruise is, once again, gratefully acknowledged.

A DFR mooring (8908) which was not recovered on the March 1990 cruise of the Icelandic RV BJARNI SAEMUNDSSON, in which the DFR participated, was recovered in August 1990 by Icelandic scientists. Again we are most grateful for the help of S-A Malmberg and his group at the Institute of Marine Research, Reykjavik.

E Gmitrowicz  
31 July 1990

INITIALLED: CP

DISTRIBUTION:

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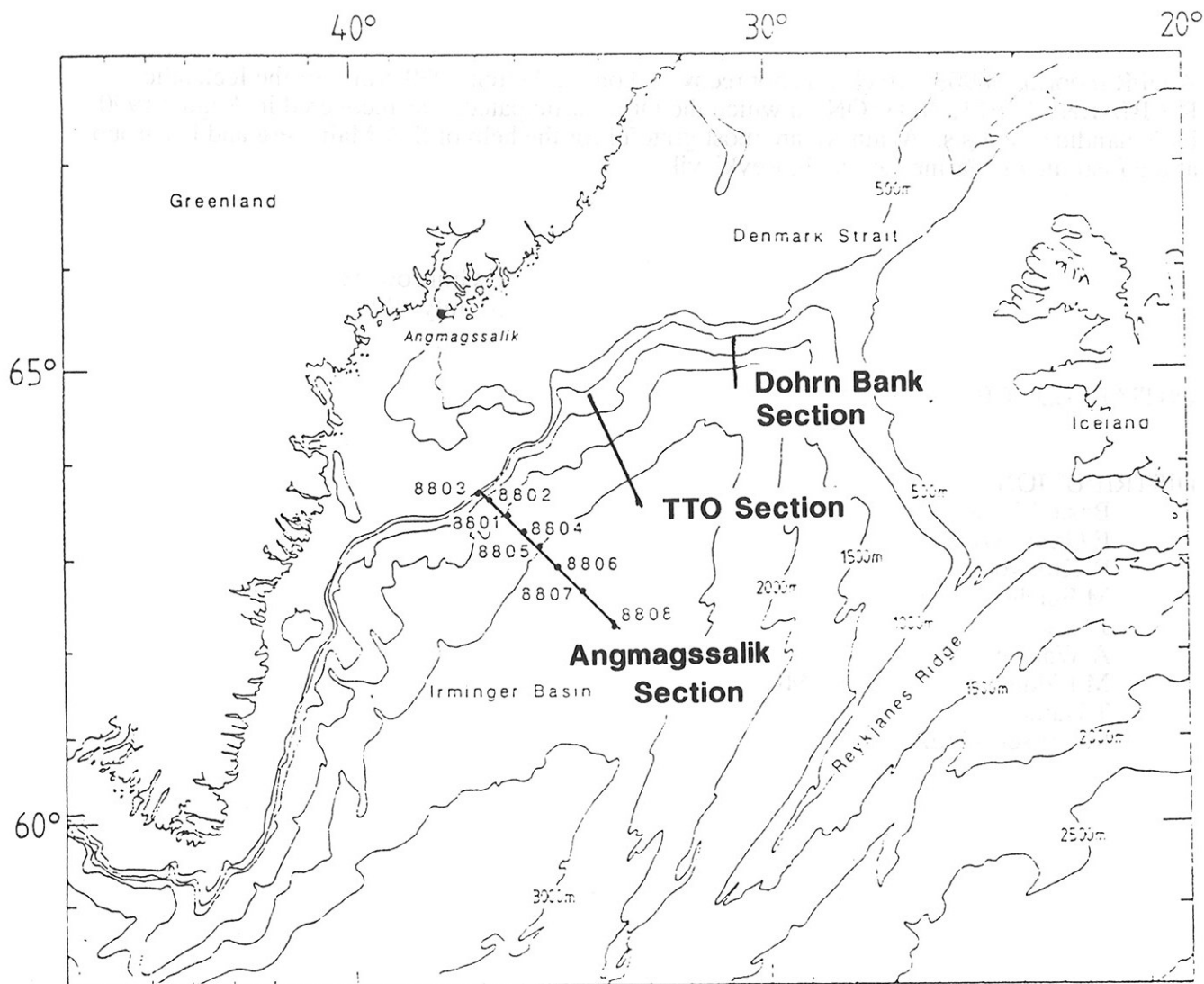


Figure 1 Location of the long-term MAFF current meter array off Angmagssalik, East Greenland. Mooring identifiers are shown for the 1988-89 deployment.