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RV *Dana* (Danish Institute for Fisheries and Marine Research)

Cruise 3/96 **(Marine Laboratory Aberdeen cruise 2096H)**

Collaborative cruise between Danish Fisheries Research Institute (DFU) and SOAEFD Marine Laboratory, Aberdeen.

EU MAST III project: Trans-Atlantic Study of *Calanus* (TASC)

REPORT

12-29 March 1996

Personnel

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M Heath	SOAEFD
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P Bloher	Seabirds at Sea Team

Objectives

1. To determine the distribution, development and physiological states of *Calanus finmarchicus* in relation to the oceanographic features of the northern North Sea, Norwegian Coastal Current and Faroe Plateau.

2. To collect measurements of primary production and copepod egg production.

Narrative

Dana sailed from Copenhagen on 12 March and arrived in Aberdeen for loading of SOAEFD equipment on 15 March. The vessel sailed on the evening of 15 March and commenced sampling at a position 100 miles northeast of Aberdeen. Over the following 10 days, 68 sites were sampled forming a grid covering the northern North Sea, northwest shelf and part of the Faroe-Shetland Channel. Vertical CTD and towed ARIES deployments were carried out on every station, whilst at approximately half of the locations additional measurements of *Calanus* egg production rate, faecal pellet production, respiration and ingestion rates were

carried out together with measurements of primary production. The vessel returned to Aberdeen late on 26 March to unload SOAEFD equipment and then made the return passage to Denmark, carrying out CTD and plankton sampling with a Gulf III sampler at a further 11 stations en-route (Fig. 1). The vessel docked in Hirtshals at 0000 hours 29 March 1996.

Exceptionally good weather conditions during the cruise resulted in no lost time due to weather. All the sampling equipment performed well, only minor technical problems being encountered.

Results

The ARIES sampler was used to collect plankton from 20 m thick depth layers through the water column at each station. The mesh size of the collecting net was 200 microns. In addition, integrating nets of 200 and 68 micron mesh were mounted on the sampler together with an Optical Plankton Counter (OPC) and a water sampling rosette.

Calanus finmarchicus was mainly confined to the surface waters of the northeastern North Sea and the deep waters in the Faroe-Shetland Channel. Few *Calanus* were caught in the northwestern North Sea, and a high proportion of the animals in this area were probably *Calanus helgolandicus*. Contrary to expectations, few stage V *Calanus* were found in the North Sea in depths shallower than 300 m. In these areas the population was dominated by stage VI females in an advanced state of maturity. Phytoplankton bloom conditions were encountered in the Norwegian Coastal Current, and this was the only area where high egg production and faecal pellet production was measured. Low but significant egg production rates were measured all along the shelf edge, but no egg production was found in the North Sea waters.

Stage V *Calanus* were found in high concentrations at depths of 400-700 m off the shelf edge. Few stage VI females were present at these depths, but significant numbers of males were caught. Juvenile *Calanus* were widespread in low numbers throughout the surface waters, but nowhere in very high numbers.

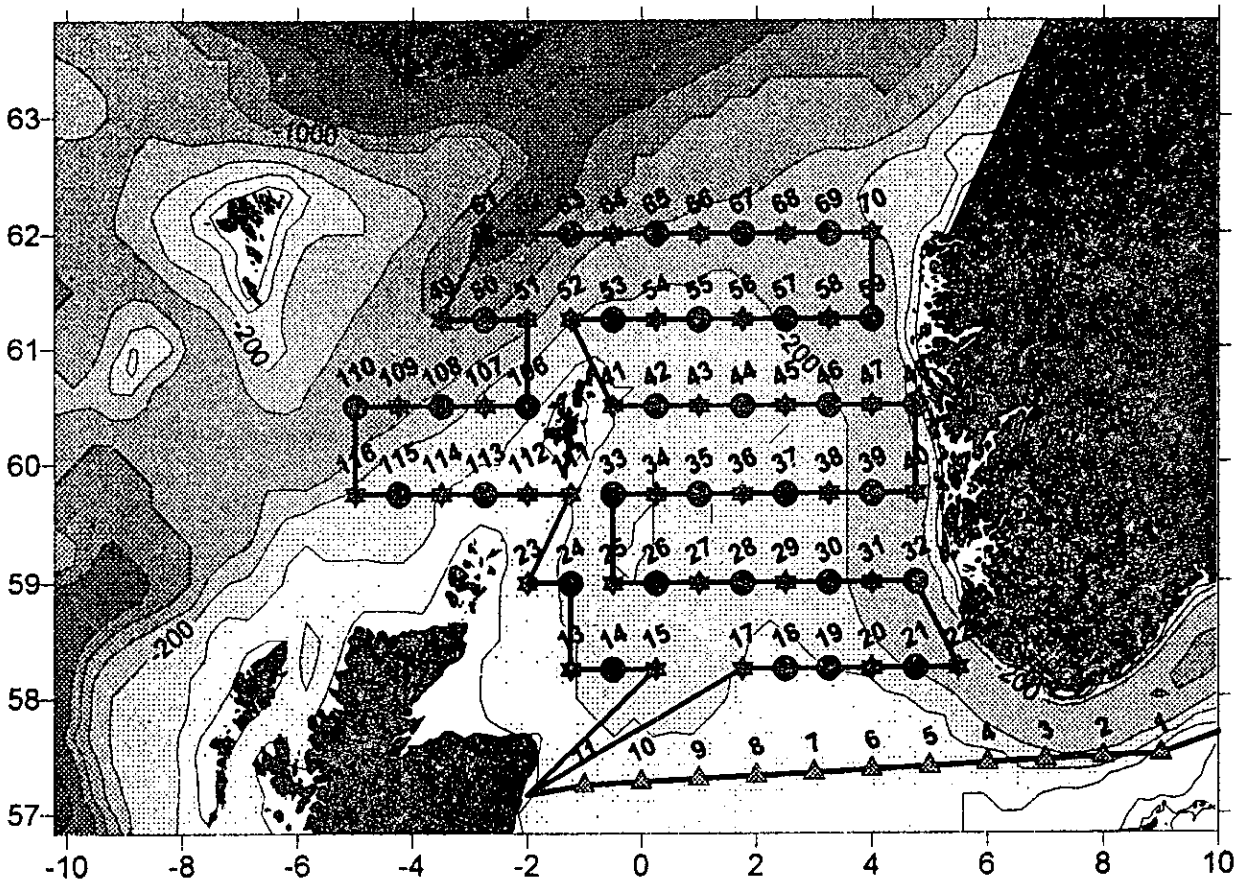
Data from the Optical Plankton Counter which was mounted on the ARIES sampler (Fig. 2) showed that particles in the size range of stage VI *Calanus* (>1.8 mm equivalent spherical diameter) were confined mainly to the northeastern North Sea. Few particles in this range were caught on the western shelf or in the northwestern North Sea. Smaller particles (which probably comprised a wide range of species) were distributed differently, with high concentrations in the northwestern North Sea.

The preliminary analysis of *Calanus* stage composition and distribution carried out at sea suggests a rather different pattern to that sampled at around the same time of year in 1992 (*Scotia* 3/92). In particular, few stage V animals were present in 1996, whereas in 1992 the population was dominated by stage V and VI copepods. However, the concentrations of stage V animals in the deep waters off the shelf edge in 1996 were similar to those measured in the winter months, suggesting that either the emergence from diapause has been later in 1996, or that the pattern of maturation with depth is different.

M Heath
4 April 1996

Figure 1

Dana 3/96 TASC survey 15-29 March 1996



●ARIES and CTD only

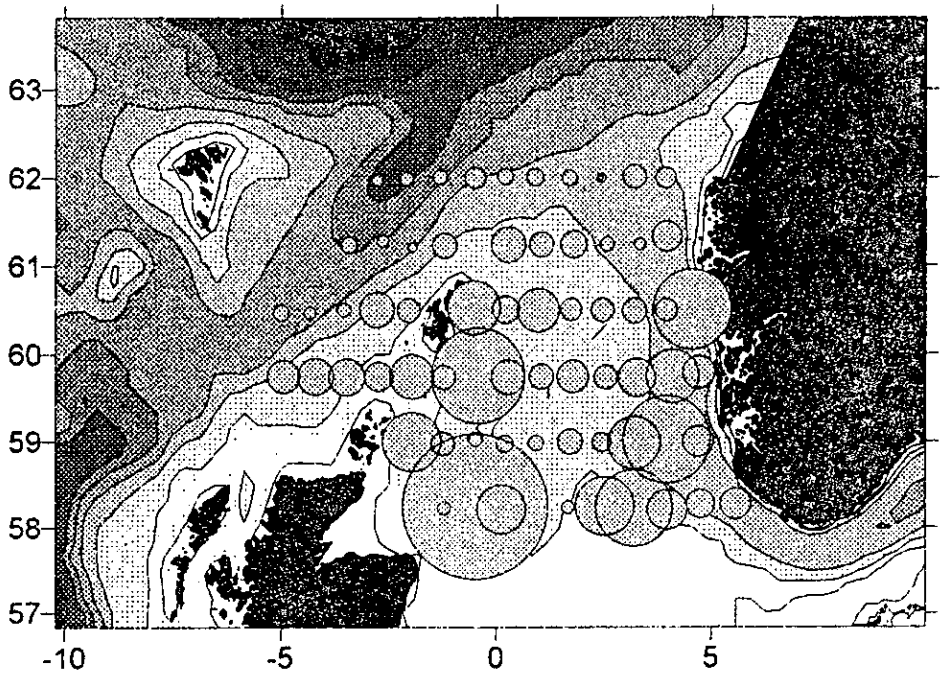
✱ARIES, CTD, Calanus egg production and primary production

▲Gulf III and CTD only

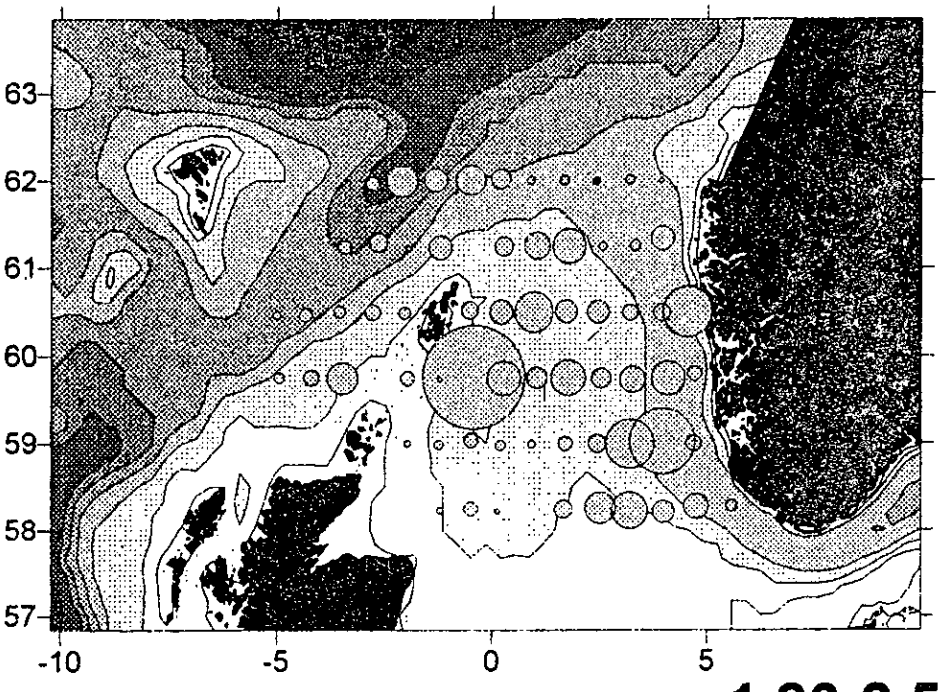
Figure 2

Dana 3/96 TASC cruise

Optical Plankton Counter results.
Particles/m^2integrated over the upper 200m



0.90-1.82mm ESD



1.86-2.50mm ESD