



**Ministry of Food, Agriculture and Fisheries  
Danish Institute for Fisheries Research**

## **Cruise report**

### **Dana Cruise 06 2002 Doggerbanke**

**Department** HØK  
**Projectleader** Andy Visser  
**Projectno** 3015  
**Cruisearea** Centrale-østlige Nordsø  
**Cruiseleader** Andy Visser

**Port of departure** Hirtshals - 06-08-2002

**Port of arrival** Hirtshals - 15-08-2002

#### **Crew**

Andy Visser, HØK, 6/8-15/8  
Thomas Kiørboe, HØK, 6/8-15/8  
Sigrun Jónasdóttir, HØK, 6/8-15/8  
Hjalte Parner, HØK, 6/8-15/8  
Alice Christoffersen, HØK, 6/8-15/8  
Mogens Busse, HØK, 6/8-15/8  
Louise Poulsen, HØK, 6/8-15/8  
Marja Koski, HØK, 6/8-15/8  
Mogens Rokkjær, ITT, 6/8-15/8  
Steen Silberg, ITT, 6/8-15/8  
Katherine Richardson, AU, 6/8-15/8  
Trung Nguyen, AU, 6/8-15/8  
Sune Mikkelsen, AU, 6/8-15/8  
Inge Buss, AU, 6/8-15/8

#### **Objectives**

There were three specific objectives to the cruise:

1. To observe the subsurface chlorophyll maximum adjacent to the Dogger Bank, sample its phytoplankton composition, and measure its geographic extent, fluorescence characteristics, 1 $\alpha$  production and its related subsurface oxygen surplus.
2. To sample the zooplankton population associated with the Dogger Bank chlorophyll maximum and measure associated grazing rates and 2 $\alpha$  production.
3. To measure the vertical flux of particulate organic matter from the surface to the bottom of the water column, the production of faecal pellets, and estimate the degradation rate of particulate matter.

#### **Progress**

Objectives 1 & 2 were conducted along 5 transects of 140 km to 160 km long running perpendicular to the Dogger Bank. Stations were 10 nm apart in north of the Bank, and

spacing was reduced to 5 m on the flanks, and top of the Bank. In addition to CTD deployments, stations also included Zooplankton Nets and Fast Tracker profiles. Water samples were collected for salt, oxygen and chlorophyll calibration as well as for nutrient, plankton and primary production analysis.

Objective 3 involved the deployment of a drifting buoy to which a string of sediment traps were attached. The buoy was serviced daily, and two 24 hour sampling periods were conducted at the buoy. During these 24 hour observations, the buoy was serviced every 6 hours and the zooplankton vertical distribution sampled every 6 hours. In addition CTD casts were conducted every 3 hours. The net drift of the buoy was less than 20 km, so that redeployment was not needed.

Throughout the cruise, the weather was calm. This meant that buoy handling was relatively straight forward, and the turn around time was fast. The crew of Dana were very efficient in this operation.

### **Achievements**

The cruise gathered a comprehensive array of biological and physical parameters. In all, 292 instrument deployments of one kind or the other were made during the cruise. Water samples for calibration include 96 chlorophyll, 48 salt and 63 oxygen, and for future analysis: 273 nitrate/nitrite, 273 phosphate, 40 zooplankton samples, 120 sediment traps and 88 phytoplankton samples. In addition, incubations for 58 primary production estimates were made. Copepod egg production and grazing incubations were also performed, and samples for copepod gut fluorescence and plankton lipid (fatty acid) and dioxin content were also taken.

The water column north of the Dogger Bank is strongly stratified at this time of year. Figure 1 show the temperature structure along Transect 5 of the cruise with surface temperatures approaching 20°C while near bottom temperatures are below 7 °C. The thermocline is located at 35 m depth. There is a strong maximum of chlorophyll associated with the thermocline as indicated by fluorescence along transect 5 (Figure 2). At the same time, an oxygen maximum is observed (Figure 3) showing that the chlorophyll maximum is an expression of new production. Unlike previous years, the maximum is well north of the Bank, with little to observe over the Bank itself. We interpret this as a pulsing at the spring-neap tidal period. Close to the Bank, new mixed water (nutrient rich) has only just been injected into the thermocline, and plankton has had insufficient time to react. The maximum observed further north is the pulse originating from 2 weeks earlier. This interpretation is supported by Fast Tracker profiles which show an "aging" of the plankton in proceeding northward of the Bank.

While much analysis is still to be done, we now have a comprehensive set of observations linking summertime subsurface primary production in the North Sea to higher trophic levels.

### **Comments**

New zooplankton nets: the old VP loppe nets are becoming worn and need to be replaced.

The fish lab was not clean after the previous cruise, and there were fish scales on the conveyor belt as well as the elevator doors.

Water bottles on the rosette presented some problems not sealing completely. Normally this poses no great problem, except in the case where oxygen is to be measured.

The winch speed on the CTD should be no faster than 15m/min going down.

The oxygen sensor probably needs servicing. It gave very different readings going up as it did going down.

Some of the software associated with CTD files should be developed and provided on board. Two specific programs that would speed up operations are:

1. A program to read and compile selected bottle parameters at selected stations. This will allow for efficient calibration checks on fluorescence (chlorophyll) and oxygen (and potentially conductivity) during the cruise at the time the analyses are done.
2. A program to pack selected converted parameters at selected stations into a single file that can be read directly into surfer. In this way, transects can be readily analysed underway.

Much of the algorithms to perform these tasks exists already. The task is to provide a suitable user interface.

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