APPLICATION FOR A RESEARCH CRUISE WITHIN A COASTAL STATE's FISHERY LIMITS

United Kingdom

A. GENERAL

1.	**NAME OF RESEARCH SHIP**	DANA	**CRUISE NO. 04/2006**
2.	**DATES OF CRUISE**	**FROM 06.06.2006**	**TO 21.06.2006**
3.	**OPERATING AUTHORITY**	Danish Institute for Fisheries Research P.O.Box 101 DK-9850 Hirtshals Telephone: 98944500 Telex: 67765 dfhh dk Fax: 33963260 E-mail: fbi@dfu.min.dk	
4.	**OWNER** (**if different for para.3**)	Ministry of Food, Agriculture and Fisheries Holbergsgade 2, DK-1057 Copenhagen K	
5.	**PARTICULARS OF SHIP**	**NAME**	DANA
		NATIONALITY	Danish
		OVERALL LENGTH (metres)	80 metres
		MAXIMUM DRAUGHT (metres)	6.3 metres
		NET TONNAGE	669.53 t
		METHOD OF PROPULSION	Steam Turbine/Diesel/Diesel Electric
		CALL SIGN	OXBH
		REGISTERED PORT & NUMBER (if reg. fishing vessel)	Hirtshals
6.	**CREW**	**NAME OF MASTER**	Frode Larsen
		NUMBER OF CREW	28
7.	**SCIENTIFIC PERSONNEL**	**NAME AND ADDRESS OF SCIENTIST IN CHARGE**	**Alexander Kempf** Olbersweg 24 22767 Hamburg
		TEL/TELEX/FAX NO	040/42838-6611
		NUMBER OF SCIENTISTS	10 - 13

8. **GEOGRAPHICAL AREA IN WHICH SHIP WILL OPERATE** (with reference in Latitude and Longitude):
Dogger Bank, kleine Fischerbank: 06.20E – 00.00E; 57.10N – 55.00N

9. **BRIEF DESCRIPTION OF PURPOSE OF CRUISE**:
The cruise will be conducted as student education cruise and within the framework of the research projects „GLOBEC, Germany "Trophic Interactions between Zooplankton and Fish under the Influence of Physical Processes " and BECAUSE "Critical Interactions BEtween Species and their Implications for a PreCAUtionary FiSheries Management in a variableEnvironment - a Modelling Approach".
This cruise will investigate the distribution of sprat (*Sprattus sprattus*) spawn in the North Sea and how larval and predator aggregations at hydrographic frontal systems in the North Sea impact the recruitment success of commercially important species (e.g. *Gadus morhua*).

10. **DATES AND NAMES OF INTENDED PORTS OF CALL**: None

11. **ANY SPECIAL REQUIREMENTS AT PORTS OF CALL**: None

B. DETAIL

1. **NAME OF RESEARCH SHIP** DANA **CRUISE NO. 04/2006**

2. **DATES OF CRUISE** **FROM 06.06.2006** **TO 21.06.2006**

3. **PURPOSE OF RESEARCH AND GENERAL OPERATIONAL METHODE**

The cruise will be conducted as student education cruise and within the framework of the research projects: „GLOBEC, BMBF - funded, Germany, "Trophic Interactions between Zooplankton and Fish under the Influence of Physical Processes " and BECAUSE "Critical Interactions BEtween Species and their Implications for a PreCAUtionary FiSheries Management in a variableEnvironment – a Modelling Approach"
This cruise will investigate how predator aggregations in hydrographic frontal systems in the North Sea impact the recruitment success of sprat (*Sprattus sprattus*) and other commercial important species (e.g. Gadus morhua). The cruise will also determine centres of sprat spawning areas.

The following objectives will be addressed during the cruise:

- Determine the location of centres of the sprat spawning areas in the Southern North Sea (samples from Bongo and Multi-net)

- Identify hydrographic factors determining the sprat spawning areas (CTD measurements)

- Quantify differences in condition factors of fish larvae and juvenile fish inside and outside of frontal areas (samples from Young-fish trawl or MIK-Trawl))

- Quantify differences in top down effects (predation mortality) on fish larvae and juvenile fish inside and outside of frontal areas (Hydroacoustics (Simrad EK 600) and ground truth hauls with demersal and pelagic fishing gears, stomach sampling)

4. **PLEASE ATTACH CHART showing, at the appropriate scale the geographical area of the intended work, the areas to be fished, positions of intended stations, tracks of survey lines, positions of moored/seabed equipment etc.:**

Due to the very nature of the objectives of the cruise, i.e., to assess how hydrographic frontal systems in the North Sea impact the recruitment success of sprat and other commercial important species, the exact sampling stations will be determined in real time in dependence on the hydrographic (frontal) properties along the transects.
All stations will be along the following transects:

1st transect:		
From:	57° 10' N	006° 20' E
To:	55° 00' N	000° 00' E

2nd transect:		
From:	55° 00' N	000° 00' E
To:	55° 00' N	001° 00' E

3rd transect:		
From:	55° 00' N	001° 00' E
To:	56° 00' N	006° 20' E

4th transect:		
From:	56° 00' N	006° 20' E
To:	57° 10' N	006° 20' E

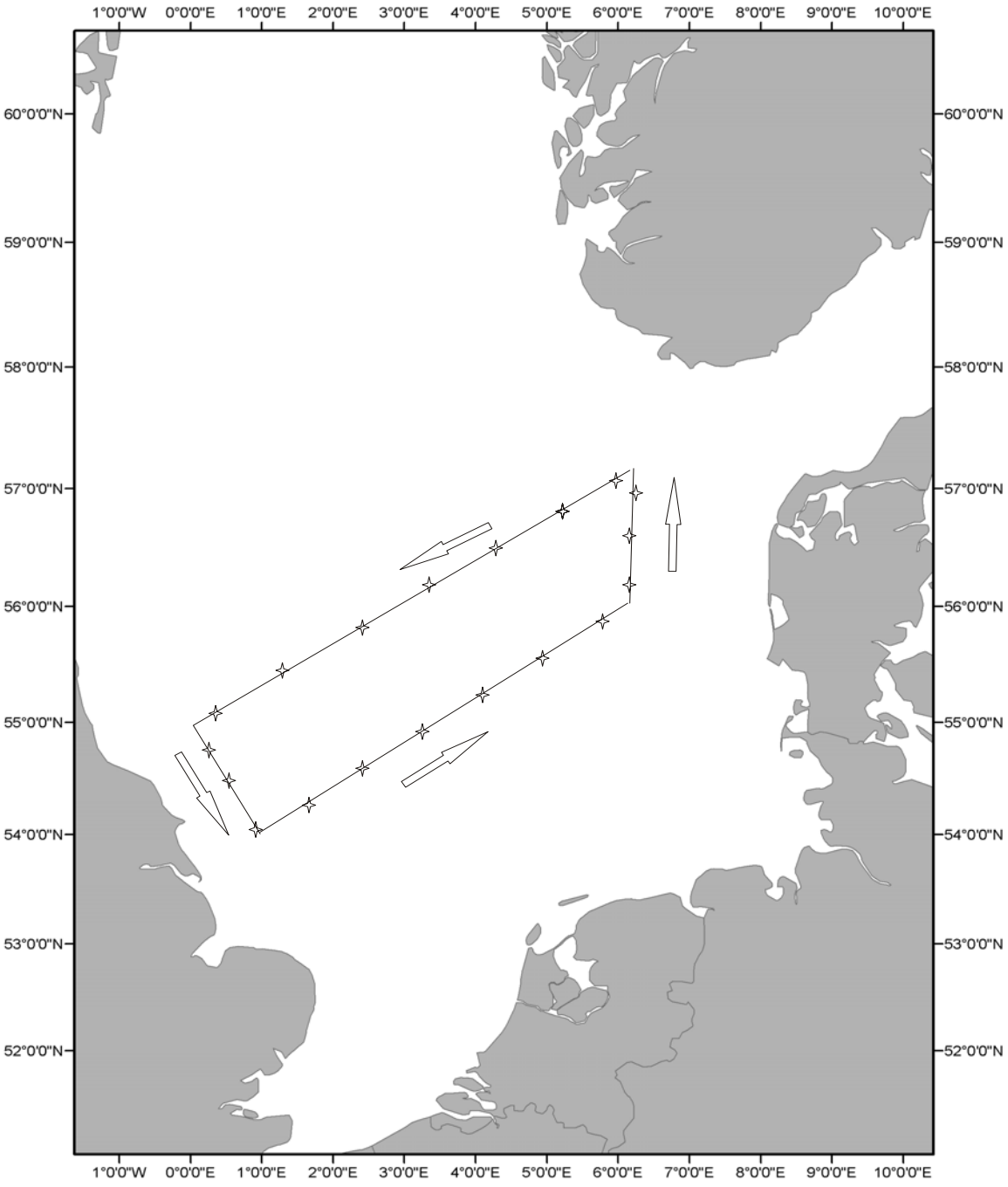

Fig. 1. Chart of the area of investigation as well as fishery and hydroacoustic tracks.

5a. **TYPES OF SAMPLES REQUIRED e.g. Geological/water/plankton/fish. If fishing gear is to be used please indicate what fish stocks will be worked, the maximum quantity required of each species/stock and the quantity of fish to be retained on board:**

CTD

Hydroacoustics (Simrad EK 600)

Fishing gear samples: herring, sprat, sandeel, cod, whiting, haddock, grey gurnard, horse mackerel. Stomach samples will be taken for all species

(Ichthyo-)plankton samples

5b. **METHODS BY WHICH SAMPLES WILL BE OBTAINED (e.g. dredging/coring/drilling/fishing etc.)**

Along the transects (see Fig. 1) CTD, hydroaccoustics and ground truth hauls (demersal and pelagic) will be applied to determine the density and species composition of predator fields in frontal and non-frontal areas. In parallel, a Young fish-trawl or MIK-Trawl (2 meters in diameter, equipped with a 1000 µm net) will be utilized to determine the (ichthyo)- plankton density and composition. While stomach samples will be taken from predators inside the ground truth hauls and deep freezed, also a Bongo (60 cm in diameter, equipped with two 335 µm nets) or Multi-net (5x opening-closing net, 0.5m^2, 300 µm) will be used to determine the densitiy of sprat spawn along the transects.

6a. **DETAILS OF MOORED EQUIPMENT:**

Dates:	**Laying**	**Recovery**	**Description**	**Latitude**	**Longitude**

None

6b. **FULL DESCRIPTION FOR ALL FISHING GEAR TO BE USED (e.g. bottom trawl, mesh size, attachments etc.):**

Demersal Trawls:

EXPO-Trawl (16 mm in the codend)

GOV/GOV rockhopper

Pelagic Trawls:

Fotö Trawl (16 mm in the codend)

7. ANY HAZARDOUS MATERIALS e.g. chemicals/explosives/gases/radioactives etc)

(use seperate sheet if necessary) None

(a) TYPE OF TRADE NAME

(b) CHEMICAL CONTENT (& FORMULA)

(c) IMO IMDG CODE Reference & UN Number

(d) QUANTITY & METHODS OF STOWAGE ON BOARD

(e) IF EXPLOSIVES give date(s) of detonation

- **Method of detonation**
- **Position of detonation**
- **Frequency of detonation**
- **Depth of detonation**
- **Size of explosive charge in Kgs**

8. PLEASE SET OUT DETAILS OF:

(a) ANY RELEVANT PREVIOUS/FUTURE CRUISES:

Previous GLOBEC-GERMANY cruises:
Alkor cruises: 235, 236, 237,
Heincke cruises: 203, 211
Dana cruises: 08/2004

(b) ANY PREVIOUSLY PUBLISHED RESEARCH DATA RELATING TO THE PROPOSED CRUISE: (Attach separate sheet if necessary)

(please see attached separate reference sheet)

9. NAMES AND ADDRESSES OF SCIENTISTS IN COASTAL STATE(S) IN WHOSE WATERS THE PROPOSED CRUISE TAKES PLACE WITH WHOM PREVIOUS CONTACT HAS BEEN MADE:

1) Svein A. Iversen
Institute of Marine Research Bergen
Nordnes 1870 5817 Bergen
Norway
svein.iversen@imr.no

2) John Pinnegar
Centre for Environment, Fisheries and Aquaculture Science
Lowestoft Laboratory, Pakefield Road, Lowestoft, Suffolk, NR33 OHT
UK
j.k.pinnegar@cefas.co.uk

3) Fritz Köster
DIFRES
Charlottenlund Castle. DK-2920 Charlottenlund
Denmark
fwk@dfu.min.dk

4) Axel Temming
Institut for Hydrobiology and Fisheries Scienece
Olbersweg 24, 22767 Hamburg
Germany
atemming@uni-hamburg.de

5) Mark Dickey-Collas
Netherlands Institute for Fisheries
PO Box 68, 1970 AB Ijmuiden
The Netherlands
Mark.dickeycollas@wur.nl

10. STATE:

(a) WHETHER VISITS TO THE SHIP IN PORT BY COASTAL STATE SCIENTISTS WILL BE ACCEPTABLE:

YES

(b) WHETHER IT WILL BE ACCEPTABLE TO CARRY ON BOARD AN OBSERVER FOR ANY PART OF THE CRUISE:

YES

(If 'yes' please indicate possible dates and ports of embarkation/disembarkation)

by special arrangement.

(c) WHEN RESEARCH DATA FROM THE INTENDED CRUISE IS LIKELY TO BE MADE AVAILABLE TO THE COASTAL STATE AUTHORITIES AND BY WHAT MEANS:

The final-report for the GLOBEC and BECAUSE project will be available in the course of 2007.

If the report will not be available whitin 12 months of the cruise, please set out, an explanation for the delay indicating when the report will be available.

12. **SCIENTIFIC EQUIPMENT**

COASTAL STATE: United Kingdom
PORT CALL: none

Complete the following table – separate copy for each coastal state

DATES: 08.06.2006 – 16.06.2006

Indicate 'yes' or 'no' other than for fishing gear when the total hours of fishing in each zone should be indicated

LIST SCIENTIFIC WORK BY FUNCTION **e.g. :** **Magnetometry** **Gravity diving** **Seismics** **Bathymetry** **Seabed sampling** **Trawling** **Echo sounding** **Water sampling** **U/W TV** **Moored instruments** **Towed instruments**	**Water Column**	**Fisheries Research within fishing limits**	**Research concerning Continental shelf out of Coastal State's margin**	**DISTANCE FROM COAST**		
				Whitin 12 NM	**Between 3-12 NM**	**Between 12 and 200 NM**
CTD	Surface-Bottom			No	No	Yes
Hydro Accoustics	Surface - Bottom			No	No	Yes
Demersal Trawl	demersal			No	No	24 h
Pelagic Trawl	pelagic			No	No	24 h
Young fish trawl	5 m above seafloor			No	No	Yes
MIK-Trawl	5 m above seafloor			No	No	Yes
Multi-net	5 m above seafloor			No	No	Yes
Doppel-Bongo	5 m above seafloor			No	No	Yes

Nina Holm…… **Dated:** 22.03…… **2006**….

(**On behalf of the Principal Scientist**)

NB IF ANY DETAILS ARE MATERIALLY CHANGED REGARDING DATES/AREA OF OPERATION AFTER THIS FORM HAS BEEN SUBMITTED THE COASTAL STATE AUTHORITIES MUST BE NOTIFIED IMMEDIATELY.

References:

Peer reviewed papers

Floeter, J., Temming, A.: Explaining diet composition of North Sea cod (*Gadus morhua* L.): Prey size preference vs. prey availability. Accepted to be published in Canadian JFAS.

Floeter, J., Kempf, A., Vinther, M., C. Schrum, A. Temming 2005: Grey gurnard (Eutrigla gurnadus (L.)) in the North Sea: an emerging key predator ? Can J.Fish.Aquat.Sci., 62/8: 1853-1864.

Heath, M.R. 2005. Changes in the structure and function of the North Sea fish foodweb, 1973 -2000, and the impacts of fishing and climate. *ICES* Journal of Marine Science. Vol. **62**, no. 5, 847-868.

HINRICHSEN, H.-H., J.O. SCHMIDT, C. PETEREIT and C. MÖLLMANN: Survival probability of Baltic larval cod in relation to spatial overlap patterns with their prey obtained from drift model studies. ICES J. Mar. Sci. 62, 878-8851, 2005.

Köster, F.W., Möllmann, C., Hinrichsen, H.-H., Wieland, K., Tomkiewicz, J., Kraus, G., Voss, R., Makarchouk, A., MacKenzie, B.R., St. John, M.A., Schnack, D., Rohlf, N., Linkowski, T. and Beyer, J.E. 2004. Baltic cod recruitment - impact of climate variability on key processes. Submitted to ICES Journal of Marine Science.

Rindorf, A.; Gislason, H.; Lewy, P. 1998: Does the diet of cod and whiting reflect the species composition estimated from trawl surveys? ICES CM. CC:**5**, 44pp.

Rückert, C., Floeter, J., Temming, A.: An estimate of horse mackerel biomass in the North Sea, 1991-1997. ICES J.mar.Sci. 2002, 0 - 130.

Schrum, C. (2001): Regionalization of climate change for the North Sea and the Baltic Sea. Climate Research 18, 31-37.

Schrum, C., Siegismund, F, St. John, M. 2003. Decadal Variations in the stratification and circulation patterns of the North Sea. Are the 90's unusual? ICES Symposium of Hydrobiological Variability in the ICES area 1990-1999, ICES Journal of Marine Science, Symposia series, Vol. 219, 121-131.

VOSS, R. and H.-H. HINRICHSEN: Sources of uncertainty in ichthyoplankton surveys: Influence of wind forcing and survey strategy on abundance estimates. J. Mar. Syst. 43, 87-103, 2003.

VOSS, R., F.-W. KÖSTER and M. DICKMANN. 2003. Comparing the feeding habits of co-occurring sprat (*Sprattus sprattus*) and cod (*Gadus morhua*) larvae in the Bornholm Basin, Baltic Sea. Fish. Res. 63, 97-111, 2003.

Williamson, C.E. 1993. Linking predation risk models with behavioral mechanism: Identifying population bottlenecks. Ecology **74**, 320-331.

Reports

Anon. 1998. Feeding ecology of the North Sea fish with emphasis on the data base of the "Stomach Sampling Project 1991" for use in multi species assessment. Final report. Contract AIR3-CT94-2410.

Kempf, A.; Vinther, M., Floeter, J. and A. Temming (UniHH, DIFRES) 2004: Evaluation of a North Sea Cod recovery plan taking into account multispecies interactions. Workshop on Harvest Control Rules for Sustainable Fisheries Management. 13.-15.09. 2004, IMR-N, Bergen.

Kempf, A.; Floeter, J. and A. Temming (UniHH) 2005: Importance of variations in 0-group fish predation mortalities for recruitment success and implications for fisheries management. ICES C.M. O:41.

Köster, F.W. (DIFRES) 2004. Recruitment processes in Baltic cod. ERANet BONUS workshop, 18. May 2004, Copenhagen.

Köster, F.W., Möllmann, C., Hinrichsen, H.-H., Tomkiewicz, J., Wieland, K., Kraus, G., Voss, R., MacKenzie, B.R., Schnack, D., Makarchouk, A., Plikshs, M., St. John, M.A., Rohlf, N., Linkowski T. and J.E. Beyer (DIFRES, IfM-Kiel, GNI, LATFRA, IHF, SFI) 2004. Baltic cod recruitment - the role of physical forcing and species interactions. ICES ASC 2004. Session: Baltic ecosystem structure and dynamics - consequences of physical and anthropogenic forcing.

Schrum, C., Huebner, U., Podzun, R., Jacob, D.: A coupled atmosphere/ice/ocean model for the North Sea and the Baltic Sea. Berichte des Zentrum für Meeres- und Klimaforschung der Universität Hamburg, 41, 68 p.

Schrum C. and F. Siegismund (2002): Modellkonfiguration des Nordsee/Ostseemodells, 40-Jahres NCEP Integration Berichte aus dem Zentrum für Meeres- und Klimaforschung der Universität Hamburg, Reihe B, 44, 179p.

Rückert, C.: Variations of large scale distributions in selected North Sea fish under the influence of hydrography. Diplomarbeit, IHF, UniHH, 2002.

Lucas, A.E. and W.P. Budgell. 2002. A GIS-based approach to characterising spatial and temporal variability at two scales. IFG Geografi I Bergen Series.