Application for Consent to conduct
Marine Scientific Research

Date: **20.01.2014**

1. General Information

1.1 Cruise name and/or number:**HE 428**

1.2 Sponsoring Institution(s):	
Name:	Alfred-Wegener-Institut für Polar- und Meeresforschung in the Helmholtz-Gemeinschaft
Address:	Am Handelshafen 12 27570 Bremerhaven
Name of Director:	Prof.Dr. Karin Lochte

1.3 Scientist in charge of the Project:	
Name:	J-Prof. Dr. Marc Hufnagl
Country:	Deutschland
Affiliation:	Universität Hamburg
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Email:	marc.hufnagl@uni-hamburg.de
Website (for CV and photo):	http://www.uni-hamburg.de/ihf/marchufnagl_e.html

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:	
Name:	NONE
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

2. Description of Project

2.1 Nature and objectives of the project:
Oceanographic and biological measurements along a linear transect from Helgoland, Germany to Stonehaven, United Kingdom. The primary objective is the connection of long-term zooplankton dataseries that have been gathered both around Helgoland and Stonehaven by regular *in situ*sampling for statistical integration, ultimately providing means for establishing a central North Sea ecosystem model. The goal of the NOAH project is to setup spatially resolved ecosystem models that are able to estimate (i) trophic transfer to higher trophic levels, (ii) bentho-pelagic coupling and especially (iii) spatio-temporal variability in ecosystem structure and function. Three modelling approaches, i.e. (i) species distribution models (SDMs), (ii) a spatially-resolved mass balanced based foodweb model (ECOSPACE), and (iii) Allometric Network Models (ATMs) need process parameters that allow for a reliable implementation of the key processes in high-, and low energy habitats. The sampling strategy of the NOAH cruise will be guided by almost real-time remote sensing results as well as ground truthing via high-speed (10kn) TRIAXUS transects. Current understanding of the drivers of changes in North Sea ecosystem structure and function lacks a sufficient knowledge on historical (+50 years) ecosystem states in relation to

climate, eutrophication and fisheries. The projects VECTORS and also CLISAP-2 will assess,model and further the predictive understanding of changes in the trophodynamic structure and function within the North Sea relative to the different drivers of ecosystem change.
During the cruise a transect will be sampled from Helgoland to Stonehaven (UK) to determine the size spectrum of zooplankton and its productivity, as well the distribution and condition of fish larvae. The transect connects two locations of long zooplankton time series, which enables their combined interpretation. Besides the TRIAXUS, a Continuous Plankton Recorder (CPR) will be deployed to inter-calibrate the two gears and enable the use of the long term CPR data set together with the TRIAXUS date in ecosystem models. Multinet and VPR samples will be used to get information on the vertical distribution of fish larvae and their prey. Hydroacoustic methods (EK 60) will be applied to determine the predator fields.

2.2 If designated as part of a larger scale project, then provide the name of the project and the Organisation responsible for coordinating the project:
BMBF NOAH

2.3 Relevant previous or future research projects:
Previous: BMBF GLOBEC GERMANY, EU LIFECO Current: DFG Exzellenzcluster CLISAP-2, EU VECTORS

2.4 Previous publications relating to the project:
Daewel U., Peck M., Kühn W., St. John M., Alekseeva I., Schrum C. (2008). Coupling ecosystem and individual-based models to simulate the influence of environmental variability on potential growth and survival of larval sprat (Sprattussprattus L.) in the North Sea. Fisheries Oceanography 17: 333-351. Möllmann, C., A Conversi, M Edwards: Comparative analysis of European wide marine ecosystem shifts: a large-scale approach for developing the basis for ecosystem-based management - Biology Letters, 2011 Möllmann, C, B Müller-Karulis, G Kornilovs, MA St John: Effects of climate and overfishing on zooplankton dynamics and ecosystem structure: regime shifts, trophic cascade, and feedback loops in a simple ecosystem - ICES Journal of Marine Science: Journal du Conseil, 2008 Hauss H, Peck M., 2009. Comparing observed and modelled growth of larval herring (*Clupeaharengus*): Testing individual-based model parameterisations. Scientia Marina 73S1: 37-45. Hufnagl M, Peck MA Physiological-based modelling of larval Atlantic herring (*Clupeaharengus*) foraging and growth: Insights on climate-driven life history scheduling. ICES JMS (2011), 68: 1170-1188. Peck MA , Hufnagl M. Can IBMs tell us why most larvae die in the sea? Model sensitivity analyses and scenarios reveal future research needs. Accepted at Journal of Marine Systems, (2012), 93:77-93 Rijnsdorp, AD, MA Peck, GH Engelhard, C Möllmann,... : Resolving the effect of climate change on fish populations - ICES Journal of Marine Science: Journal du Conseil, 2009

3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in Latitude and longitude in decimal degrees, including coordinates of cruise/track/way points/sampling stations). Please provide coordinates in a separate excel spreadsheet.
German and British Exclusive Economic Zones; The survey starts in Bremerhaven (53°32’20’’N and 8°32’3’’E). Sampling will take place along a transect starting off Helgoland (54°10’N and 7°50’E) through the German EEZ towards 55°53’ N 3°26’, through the UK EEZ towards Stonehaven (56°57’N 2°10’ W) and back along the same route.

3.2 Attach chart(s) at an appropriate scale (1 page, high-resolution) showing the geographical Areas of the intended work and, as far as practicable, the location and depth of sampling Stations, the tracks of survey lines, and the locations of installations and equipment.
A chart of the intended research transects is attached (see Annex 1). The exact positions of the stations and transects depend on weather, hydrographical conditions and equipment.

4. Methods and means to be used

4.1 Particulars of vessel:	
Name:	HEINCKE
Type/Class:	Research Vessel
Nationality (FlagState):	German
Identification Number (IMO/Lloyds No.):	8806113
Owner:	Federal Ministry of Education and Research German Government
Operator:	Alfred-Wegener-Institute for Polar- und Marine Research
Overall length (meters):	54.59
Maximum draught:	4.16m
Displacement/Gross Tonnage:	1322
Propulsion:	Diesel Electric
Cruising & maximum speed:	12.5 kn
Call sign:	DBCK
INMARSAT number and method and capability of communication (including emergency frequencies):	INMARSAT +870-764-140-491 IRIDIUM +881-631-815-155 INMARSAT +870-764-140-493
Name of Master:	Voss
Number of Crew:	11
Number of Scientists on board:	12

4.2 Particulars of Aircraft:	NONE
Name:	
Make/Model:	
Nationality (flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall Length (meters):	
Propulsion:	
Cruising & Maximum speed:	
Registration No.:	
Call Sign:	
Method and capability of communication (including emergency frequencies):	
Name of Pilot:	
Number of crew:	
Number of scientists on board:	
Details of sensor packages:	
Other relevant information:	

4.3 Particulars of Autonomous Underwater Vehicle (AUV):	NONE
Name:	
Manufacturer and make/model:	
Nationality (FlagState):	
Website for diagram & Specifications:	
Owner:	

Operator:	
Overall length (meters):	
Displacement/Gross tonnage:	
Cruising & Maximum speed:	
Range/Endurance:	
Method and capability of communication (including emergency frequencies):	
Details of sensor packages:	
Other relevant information:	

4.4 other craft in the project, including its use:
none

4.5 Particulars of methods,full description of scientific instrumentsto be used(for fishing gear specify type and dimension) and location			
Types of samples and Measurements:	Methods to be used:	Instruments to be used:	To be carried out within 12nm (yes or no):
Nutrients	Water samples	Carrousel Sampler	no
Chl– a	Water samples, Filtration	Carrousel Sampler with Niskin Bottles	no
Phytoplankton	Water samples	Carrousel Sampler	no
CTD	CTD casts	Seabird 911+	no
CTD	CTD surface profile	Thermosalinograph on RV Heincke	no
CTD	CTD transects	Seabird SEB49 Fastcat on TRIAXUS	no
Oxygen	Optode	AADI Oxygen Optode 4330F on TRIAXUS	no
Weather	Weather Station	Weather Station on RV Heincke	no
Turbidity	Turbidity sensor	Turner C7on TRIAXUS	no
Turbulence	ADCP	ADCP (1200 kHz) on RV Heincke	
Plankton	Submersible Fluorormeter	Turner Cyclops-7 on TRIAXUS	no
Plankton	Net hauls, vertical	Apstein Net (55µm)	no
Plankton	Net hauls, vertical	WP-2 Net (150µm)	no
Plankton	Net hauls, towed	Multi Net (150 µm)	no
Plankton& fish larvae	Net hauls, towed	Bongo Net (300 & 500µm)	no
Plankton	CPR transect	Continuous Plankton Recorder (CPR)	no
Plankton	Microscopic Images from VPR profiles	Video Plankton Recorder (VPR)	no
Particle density and size	Laser Optical Particle Counter	ODIM Laser Optical Particle Counter (LOPC) on TRIAXUS	no
Fish	Hydroacoustic transects	Simrad EK 60 on TRIAXUS (200 & 333kHz)	no
Fish	Hydroacoustic transects	Simrad EK 60 on RV Heincke (38, 70, 120, 200 kHz)	no
Fish	Pelagic trawling	Jungfisch Trawl (see Annex for technical drawing)	no
Fish	Demersal trawling	Jungfisch Trawl (see Annex for technical	no

		drawing)	
Water samples, Temperature & Conductivity	Continuous pumping	Thermosalinograph Seacat SBE21	no
Water sound velocity SVP/T	Continuous measurement	SVP/T fixed installation Valeport MIDAS SVP	no

4.6 Indicate nature and quantity of substances to be released into the marine environment:
None

4.7 Indicate whether drilling will be carried out. If yes, please specify:
Drilling will not be carried out

4.8 Indicate whether explosives will be used. If yes, please specify type and trade name, Chemical content, depth of trade class and stowage, size, depth of detonation, frequency of Detonation, and position in latitude and longitude:
No explosives will be used

5. Installations and Equipment

Details of installations and equipment (including dates of laying, servicing, method and Anticipated timeframe for recover, as far as possible exact locations and depth, and Measurements):
No equipment will be installed

6. Dates

6.1 Expected dates of first entry into and final departure from the research area by the research vessel and/or other platforms:
Entry: 2014 July 3 (Start of cruise in Bremerhaven) July 11th expected entry into the UK EEZ July 14th expected exit of the UK EEZ. Exit:2014 July 17 (End of cruise in Bremerhaven)
6.2 Indicate if multiple entries are expected:
No

7. Port Calls

7.1 Dates and Names of intended ports of call:
2014 July 3 Bremerhaven, Germany 2014 July 10 Bremerhaven, Germany 2014 July 17 Bremerhaven, Germany No intended ports of call in coastal state

7.2 Any special logistical requirements at ports of call:
nil

7.3 Name/Address/Telephone of shipping agent (if available):
Not available, as no portcall is planned.

8. Participation of the representative of the coastal State

8.1 Modalities of the participation of the representative of the coastal State in the research Project:
It will be acceptable to carry on board an observer from the coastalstate, although only for the entire cruise (as no ports of call are planned during the cruise) and only with prior announcement, because in this case the scientific crew would have to be reduced.

8.2 Proposed dates and ports for embarkation/disembarkation:
Bremerhaven 03.07.2014 – Bremerhaven 17.07.2014

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary report, which should include The expected dates of submission of the data and research results:
2014 October 17 (3 months after end of cruise)

9.2 Anticipated dates of submission to the coastal State of the final report:
2015 January 17 (6 months after end of cruise)

9.3 Proposed means for access by coastal State to data (including format) and samples:
- Cruise report (pdf-file) will be sent to the National Oceanographic Centre: vmt@noc.ac.uk and to the JNCC: offshoresurvey@jncc.gov.uk6 month after finishing the research cruise - Cruise Summary Reports (fka ROSCOP) via the DeutschesOzeanographisches Datenzentrum (DOD)

9.4 Proposed means to provide coastal State with assessment of data, samples and Research results:
- Cruise report (pdf-file) will be sent to the National Oceanographic Centre: vmt@noc.ac.uk and to the JNCC: offshoresurvey@jncc.gov.uk 6 month after finishing the research cruise - Scientific publication within the following years

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples and research results:
- personal communication with the scientist in charge of this cruise

9.6 Proposed means of making results internationally available:
- Cruise Summary Reports (fka ROSCOP) via the DeutschesOzeanographisches Datenzentrum (DOD) - Scientific publication within the following years - Public reports within the NOAH project

10. Other permits Submitted

10.1 Indicate other types of coastal state permits anticipated for this research (received or Pending):None

11. List of Supporting Documentation

11.1 List of attachments, such as additional forms required by the coastal State, etc.:
Annex 1 Chart& Cruise schedule Annex 2 Technical Drawing of the trawl “Jungfischtrawl” Annex 3 Map of research area of the entire cruise

Contact information of the focal point:
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Signature: 20.01.2014

M.Hirsekorn
(On behalf of the chief scientist)

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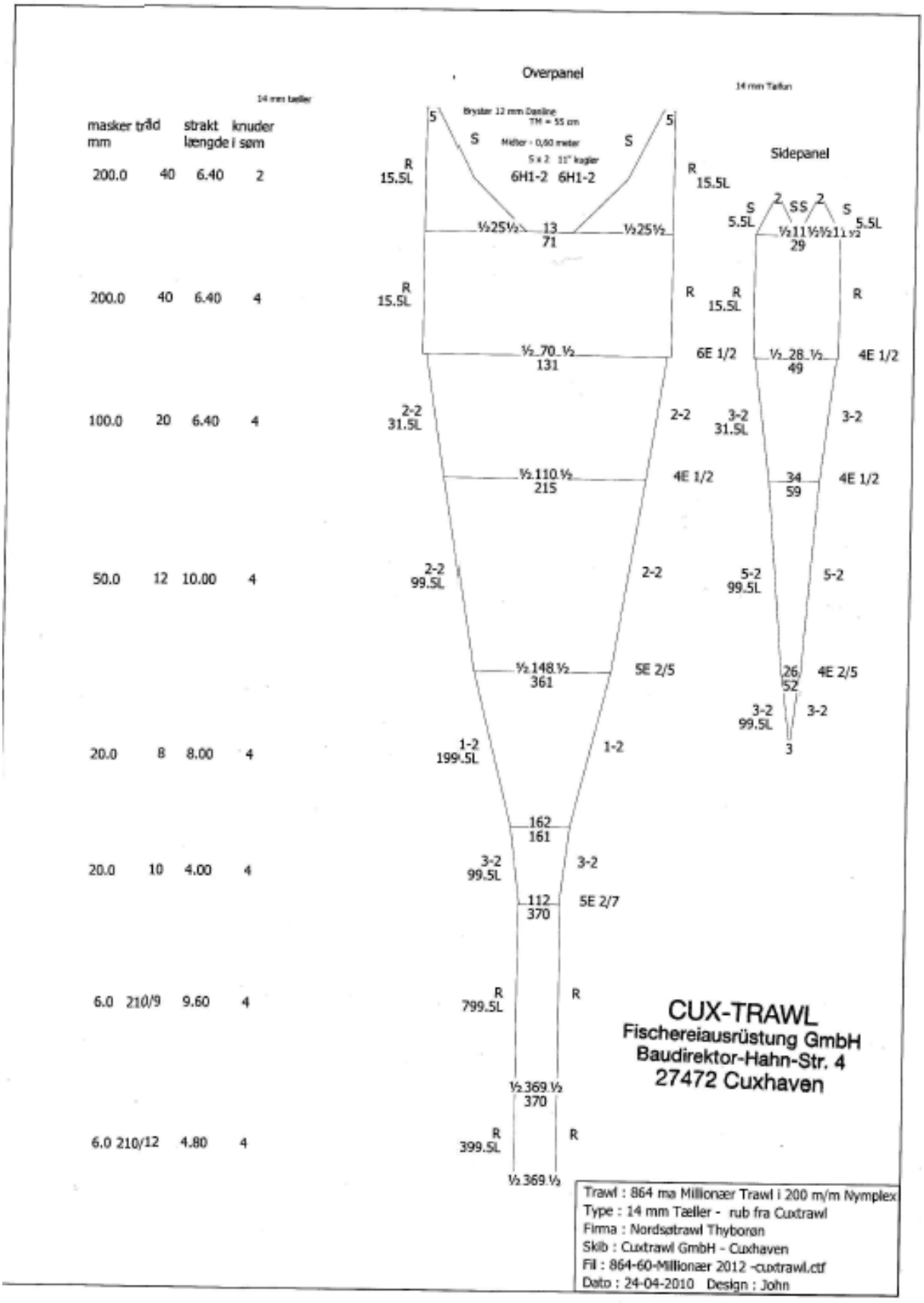
Annex 1: Chart and cruise schedule for the planned stations and samplings of the second part of the HE428 cruise which is of relevance for this application.

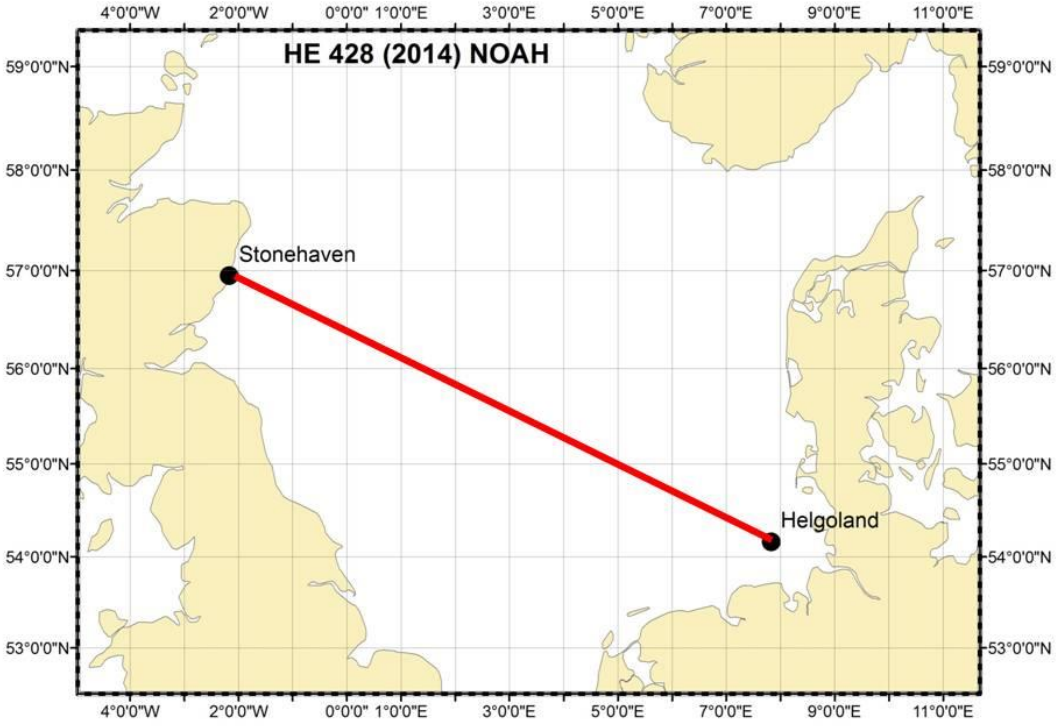
date	distance (from Helgoland)	Station Number	needed time	activity	sampling	required time	Latitude	Longitude
July 10th	**start from Bremerhaven**		10 h	preparations			53.525	8.578
				steaming towards Helgoland				
				system checks				
	0 miles	Station 1	2 h	1st sampling	Bongo	30 min	54.188	7.897
					Niskin, CTD	30 min		
					Multinet	1 h		
			8 h	Triaxus		8 h		
	64 miles	Station 2	2 h	2nd sampling	Bongo	30 min	54.779	6.376
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
			2 h	buffer time				
July 11th			8 h	Triaxus		8 h		
	128 miles	Station 3	3 h	3rd sampling	Bongo	30 min	55.351	4.809
				Triaxus on board control	Niskin, CTD	30 min		
Entering	184 miles			calibration	Multinet	1 h	55.835	3.400
UK EEZ			8 h	Triaxus		8 h		
	192 miles	Station 4	3 h	4th sampling	Bongo	30 min	55.886	3.183
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
July 12th			8 h	Triaxus		8 h		
	256 miles	Station 5	3 h	5th sampling	Bongo	30 min	56.283	1.419
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
			8 h	Triaxus		8 h		
	320 miles	Station 6	3 h	6th sampling	Bongo	30 min	56.656	-0.381
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
			8 h	Triaxus		8 h		
July 13th	**Stonehaven**							
	377 miles	Station 7	3 h	7th sampling	Bongo	30 min	56.964	-2.017
Return				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
			8 h	Triaxus		8 h		
	320 miles	Station 8	3 h	8th sampling (comp. to 6th)	Bongo	30 min	56.656	-0.381
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
July 14th			8 h	Triaxus		8 h		
	256 miles	Station 9	3 h	9th sampling (comp. to 5th)	Bongo	30 min	56.283	1.419
				Triaxus on board control	Niskin, CTD	30 min		

				calibration	Multinet	1 h		
			8 h	Triaxus		8 h		
	192 miles	Station 10	3 h	10th sampling (comp. to 4th)	Bongo	30 min	55.886	3.183
Leaving	184 miles			Triaxus on board control	Niskin, CTD	30 min	55.835	3.400
UK EEZ				calibration	Multinet	1 h		
July 15th			8 h	Triaxus		8 h		
	128 miles	Station 11	3 h	11th sampling (comp. to 3rd)	Bongo	30 min	55.351	4.809
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
			8 h	Triaxus		8 h		
	64 miles	Station 12	3 h	12th sampling (comp. to 2nd)	Bongo	30 min	54.779	6.376
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
July 16th			8 h	Triaxus		8 h		
	0 miles	Station 13	3 h	13th sampling (comp. to 1st)	Bongo	30 min	54.188	7.897
				Triaxus on board control	Niskin, CTD	30 min		
				calibration	Multinet	1 h		
	end							

Annex 2: Technical Drawing of the trawl “Jungfischtrawl”



Annex 3: Map of the research area of the entire cruise



Research Area: Upper panel: Transect (thick red line) from Helgoland (blue dot) to Stonehaven (red dot); lower panel with stations and EEZ borders.