

Autun Purser / Laurenz Thomsen  
Jacobs University Bremen Oceanlab  
Campus Ring 1  
Bremen  
28759  
Germany

Tel: 0049 421 200 3254  
Email: [a.purser@jacobs-university.de](mailto:a.purser@jacobs-university.de)

**RE: 11.4.2014, 15.6-15.10.14, Jnr 14/5865  
RV NORPPA II. MARINE SCIENTIFIC RESEARCH 15.6 – 15.10.2014**

Dear Sir / Madam,

We would like to report our preliminary output from the scientific research period outlined above. The full research proposal is also given below this text as 'Appendix 1'. We would like to thank you for permission to re-visit the location – an experience enjoyed and useful also for our students.

Unfortunately, due to inclement weather and other research commitments we only managed to visit the Tisler reef research area on one occasion in mid-June. For the remainder of the time we were operating exclusively in Swedish waters.

In the region of Norwegian operations we carried out the following work:

- 1) CTD surveys across the reef region at five locations, and from various depths within the water column.
- 2) Nisken bottle sampling.
- 3) Some limited echosounder work.

The collection of this material was primarily used as a teaching exercise for our students, with the CTD data adding to that collected by Jacobs University Bremen campaigns at the site.

At time of visit there was little variation indicated by the CTD in water composition across the reef site, with no clear 'reef drawdown effect' in evidence, as we have observed on previous cruises.

The full dataset has been imported into ArcGIS, for the full research cruise, within both Norwegian and Swedish waters, and is available for FTP download here:

username: autun                      passwd: lophelia@jacobs  
server: 212.201.49.161              sftp protocol

there is a zipfile entitled 'Norppa2014.zip' which may be downloaded and opened within ArcGIS or ArcGIS reader, with the data collected mapped to the correct geographical location.

If there is difficulty in downloading this data or if further input from us is required, please email me for assistance / alternate files.

We expect that the data collected at the reef will be included in a future manuscript, and we will inform you if and when this is the case.

Thankyou again for the expedient setup of the permission for this research cruise. During 2015 our vessel will be in the Mediterranean, though we hope to return to continue our summer data collections at the Tisler reef in the future.

Yours sincerely,

Autun Purser (also on behalf of Laurenz Thomsen)

30.4.2015

**NOTIFICATION OF PROPOSED RESEARCH CRUISE**

**PART A: GENERAL**

1. NAME OF RESEARCH SHIP R/B Norppa CRUISE NO. 2014-01
  
2. DATES OF CRUISE From 2014-06-15 To 2014-10-15
  
3. OPERATING AUTHORITY:  
 Jacobs University Bremen, Bremen, Germany  
TELEPHONE: +49-421 200 3254  
TELEFAX: +49-421 200 3229  
Email: l.thomsen@jacobs-university.de
  
4. OWNER (if different from no. 3)
  
5. PARTICULARS OF SHIP:

Name:	Research Boat NORPPA II
Nationality:	German
Overall length: (in metres)	<b>7.2 m</b>
Maximum draught: (in metres)	<b>0.5 m</b>
Net tonnage:	<b>1.6 tons</b>
Propulsion e.g. diesel/steam:	<b>Diesel</b>
Call sign:	
Registration port and number (if registered fishing vessel)	
  
6. CREW

Name of master:	Laurenz Thomsen, Annika Moje
Number of crew:	2
  
7. SCIENTIFIC PERSONNEL

Name and address of scientist in charge:	Laurenz Thomsen and Autun Purser
	Jacobs University Bremen, OceanLab, Campusring 8
	D- 28759 Bremen
Tel/telex/fax no.:	+49-421 200 3254, +49-421 200 3229
No. of scientists:	1-4
  
8. GEOGRAPHICAL AREA IN WHICH SHIP WILL OPERATE (with reference to latitude and longitude)  
 Polygon, with limitations given below.  
 59° 03',90 N, 10° 49',45 E; 59° 03',90 N, 11° 08',76 E;  
 58° 57',10 N, 10° 49',45 E; 58° 57',10 N, 11° 04',90 E
  
9. BRIEF DESCRIPTION OF PURPOSE OF CRUISE
  1. Education and Training for graduate students from Jacobs University Bremen and Sven Iovén Centre, Sweden.
  2. Carry out water sampling and CTD transects along a cold water coral reef at 5 – 50 m height above the reef.
  
10. DATES AND NAMES OF INTENDED PORTS OF CALL

None

11. ANY SPECIAL REQUIREMENTS AT PORTS OF CALL  
None

## NOTIFICATION OF PROPOSED RESEARCH CRUISE

### 1. PART B: DETAILS

1. NAME OF RESEARCH SHIP R/B Norppa CRUISE NO. 2014-01

2. DATES OF CRUISE From 2014-06-15 To 2014-10-15

3. a) PURPOSE OF RESEARCH

1) Within a joined research & training project with scientists and students from Jacobs University Bremen's OceanLab, biodeposition- and bioentrainment rates of Tisler cold-water corals (CWC) and of soft bottom communities of the Koster National Park will be compared for the second consecutive year. Both study sites promote high lateral fluxes of refractory organic material and periodic input of labile carbon. The research team consists of biological oceanographers, physicists, and geochemists. The students will learn to create mass budgets and ground truth data from online observatories and satellites. We want to further investigate food supply mechanisms to cold-water coral reefs and advanced soft bottom communities, with special emphasis on hydrodynamic forcing. We also want to investigate the biogeochemical influence of cold-water coral reefs on their environment ("reef effects"). The data from this cruise will be added to that collected in previous years, expanding a useful time-series of data.

2. Education and Training for graduate students from Jacobs University Bremen and Sven Iovén Centre, Sweden.

### Hypotheses

Biodeposition and bioentrainment of the Tisler reef is significantly enhanced in comparison to a soft bottom benthic community of similar hydrodynamic forcing.

Fishing or anchoring outside the Tisler reef in up-current direction leads to elevated lithogenic particle concentrations within the reef and modifies the characteristics of particulate organic matter passing the reef.

b) GENERAL OPERATIONAL METHODS (including full description of any fish gear, trawl type, mesh size, etc.)

The following types of equipment will be used:

CTD

Hummingbird Echosounder with GPS

Olex navigational system

Aanderaa RCM 9 Recording instrument (salinity, temperature, current, turbidity) and Aanderaa ADCP 600 (recording profiling current meter)

LLIST particle sizer

Time-lapse cameras

Niskin bottle water samplers

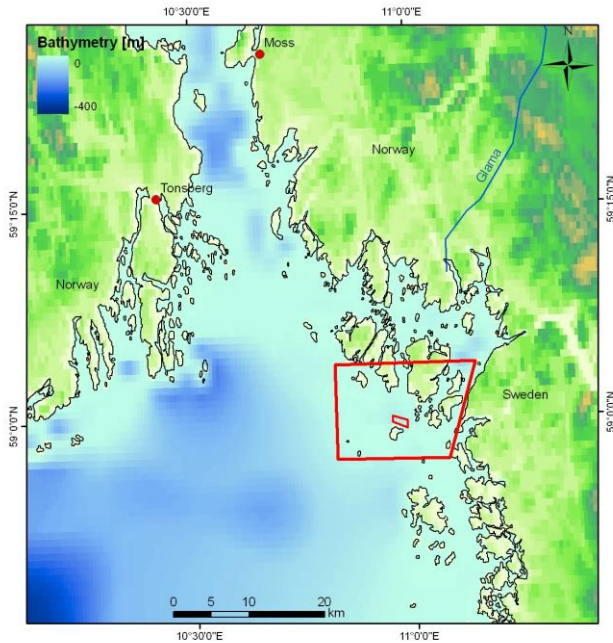
Particle-Cameras

4. ATTACH CHART showing (on an appropriate scale) the geographical area of intended work, positions of intended stations, tracks of survey lines, positions of moored/seabed equipment, areas to be sampled are within this area

Polygon, with limitations given below

59° 03',90 N, 10° 49',45 E; 59° 03',90 N, 11° 08',76 E;

58° 57',10 N, 10° 49',45 E; 58° 57',10 N, 11° 04',90 E



5. a) TYPES OF SAMPLES REQUIRED (e.g., geological/water/plankton/fish/radionuclide)  
 During teaching, continuous measurement of passing water will be carried out. Only water samples will be taken.

b) METHODS OF OBTAINING SAMPLES (e.g., dredging/coring/drilling/fishing, etc.)  
 During cruises sensors will be lowered into the water column on a winch cable (niskin bottles, flow profilers, CTDs). Care will be taken to ensure that the instruments do not impact on the seafloor. Both the winch counter and high resolution ecosounder are useful for this.

6. DETAILS OF MOORED EQUIPMENT -None -

<u>Dates Laying</u>	<u>Recovery</u>	<u>Description</u>	<u>Depth</u>	<u>Latitude</u>	<u>Longitude</u>
---------------------	-----------------	--------------------	--------------	-----------------	------------------

7. ANY HAZARDOUS MATERIALS (chemicals/explosives/gases/radioactives, etc.)  
 (Use separate sheet if necessary)

- None -

- Type and trade name
- Chemical content (and formula)
- IMO IMDG code (reference and UN no.)
- Quantity and method of storage on board
- If explosives give dates of detonation
  - Method of detonation
  - Position of detonation
  - Position of detonation
  - Frequency of detonation
  - Depth of detonation
  - Size of explosive charge in kg.

8. DETAIL AND REFERENCE OF

a) Any relevant previous/future cruises

Previous RV Norppa cruises as part of the HERMES and HERMIONE projects during 2009 – 2010. Previous RV Norppa cruise 2013-01 in the summer of 2013. This current cruise will augment the data collected during previous cruises, particularly 2013-01.

b) Any previously published research data relating to the proposed cruise

PUBLISHED AND IN PRESS:

Godø OR, Klungsøyr J, Meier S, Tenningen E, Purser A, Thomsen L (In press) Real time observation system for monitoring environmental impact on marine ecosystems from oil drilling operations. In press: Marine Ecology Progress Series

Purser A, Orejas C, Moje A, Thomsen L (In press) The influence of flow velocity and suspended particulate concentration on net prey capture rates by the scleractinian coral *Balanophyllia europaea* (Scleractinia: Dendrophylliidae). In press: Journal of the Marine Biological Association of the UK. doi:10.1017/S0025315414000046

Allers E, Abed RMM, Wehrmann LM, Wang T, Larsson AI, Purser A, de Beer D (2013) Resistance of *Lophelia pertusa* to coverage by sediments and drill cuttings. Marine Pollution Bulletin 74: 132-140.

Larsson AI, van Oevelen D, Purser A, Thomsen L (2013) Long-term particulate exposure and *Lophelia pertusa* growth. Marine Pollution Bulletin 70, 176-188.

Purser A, Ontrup J, Schoening T, Thomsen L, Tong R, Unnithan V, Nattkemper TW. (2013) Shrimp abundances and distribution patterns across a Norwegian cold-water coral ecosystem. Biogeosciences discussions 4,

Purser A, Orejas C, Gori A, Tong R, Unnithan V, Thomsen L (2013) Local variation in the distribution of benthic megafauna species associated with cold-water coral reefs on the Norwegian margin. Continental Shelf Research 54: 37-51.

Tong R, Purser A, Guinan J, Unnithan V (2013) Modeling the potential distribution of cold-water corals based on terrain parameters. Ecological Informatics 13: 123-132.

Tong R, Purser A, Unnithan V (2013) Predicting habitat suitability of cold-water coral *Lophelia pertusa* using multiscale terrain variables. Peer reviewed book chapter in: Lohmann et al. (eds) *Earth System Science: Bridging the Gaps between Disciplines*. Alfred Wegener Institute (AWI). p113-118. DOI: 10.1007/978-3-642-32235-8\_6

Purser A, Thomsen L (2012) Drill cutting discharge and Cold-Water Coral ecosystems. Marine Pollution Bulletin 64, p2309-2316.

Schoening T, Bergmann M, Ontrup J, Taylor J, Dannheim J, Gutt J, Purser A, Nattkemper TW (2012) Semi-automated image analysis for the assessment of megafaunal densities at the Arctic deep-sea observatory HAUSGARTEN. PLoS ONE 7(6): e38179. doi:10.1371/journal.pone.0038179

Larsson AI, Purser A (2011) Sedimentation on the cold-water coral *Lophelia pertusa*: Cleaning efficiency from natural sediments and drill cuttings. Marine Pollution Bulletin 62: 1159-1168

Pabortsava K, Purser A, Wagner H, Thomsen L. (2011) The influence of drill cuttings on the physical characteristics of phytodetritus. Marine Pollution Bulletin 62: 2170-2180

Wagner H, Purser A, Thomsen L, Jesus CC, Lundälv T (2011) Particulate organic matter fluxes and hydrodynamics at the Tisler cold-water coral reef. Journal of Marine Systems 85: 19-29

Purser A, Larsson AI, Thomsen L, van Oevelen D (2010) The influence of flow velocity and food concentration on *Lophelia pertusa* (Scleractinia) zooplankton capture rates. Journal of Experimental Marine Biology and Ecology 395: 55-62

Purser A, Bergmann M, Lundälv T, Ontrup J, Nattkemper T (2009) Use of machine-learning algorithms for the automated detection of cold-water coral habitats: a pilot study. Marine Ecology Progress Series 397: 241-251

IN REVIEW OR REVISION:

Purser A (2014) A time series study of *Lophelia pertusa* and reef megafauna responses to drill cuttings exposure on the Norwegian Margin. In revision, PloS ONE.

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

Jan Helge Fosså and Paal Buhl-Mortensen, Havforskningsinstituttet i Bergen

10. STATE

a) Whether visits to the ship in port by scientists of the coastal state concerned will be acceptable (Yes/No)

The ship will not visit any Norwegian ports

b) Participation of an observer from the coastal state for any part of the cruise together with the dates and the ports for embarkation and disembarkation

Possible in case of interest

c) When research data from the intended cruise are likely to be made available to the coastal state and by what means

Data will be integrated into the forthcoming 'Tisler Observatory' online data portal. Cruise Reports in 2015. Publications during 2015 onward.

**PART C. SCIENTIFIC EQUIPMENT**

Complete the following table using a separate page for each coastal state

Coastal state Norway

Port of call None

Dates 2014-06-15 – 2014-10-15

Indicate "YES" or "NO"

				DISTANCE FROM COAST		
<u>List scientific work by function</u> e.g.	Water column including sediment sampling of the seabed		Research concerning the natural resources of the continental shelf or its physical characteristics	yes  Within 4 nm	no  Between 4-12 nm	no  Between 12-200 nm
Water sampling	Yes			Yes	No	No
U/W TV	Yes			Yes	No	No
Moored instr.	no		No	No	No	No
Seabed sampling	No		No	No	No	No

*Traxer*

\_\_\_\_\_  
(Principal Scientist)

Dated 07.04.2014