

NOTIFICATION OF PROPOSED RESEARCH CRUISE

Part A: GENERAL

1. Name of research ship: **RV Pelagia** Cruise number: **64PE343**

2. Cruise dates: 15-30 August 2011

3a. Operating authority: NIOZ Royal Netherlands Institute for Sea Research
Telephone: (+31) (0)222-369300
Telefax: (+31) (0)222-319674

3b. Operating agent: NIOZ Royal Netherlands Institute for Sea Research
Telephone: (+31) (0)222-369300
Telefax: (+31) (0)222-319674

4. Owner: NIOZ Royal Netherlands Institute for Sea Research

5. Particulars of ship:

name: Pelagia
nationality: Dutch
overall length: 66.00 meters
maximum draught: 4.00 meters
nett tonnage: 1553 NRT
propulsion: 2 diesel electric Elliot White Gill
Bow Truster
call sign: PGRQ

6. Crew: name of master: J.C. Ellen
number of crew: 11

7. Chief scientist: name: Dr. C Brussaard
addresses: NIOZ Royal Netherlands Institute for Sea
Research
P.O. Box 59
1790 AB Den Burg
telephone: (+31) (0)222-369300/
telefax: (+31) (0)222-319674
e-mail address: corina.brussaard@nioz.nl

**8. Geographical area in which the ship will operate:
(with reference in latitude and longitude)**

North Sea, mostly EEZ of The Netherlands. One station, however, is located in the EEZ of the UK: 56.58N, 2.17E

9. Brief description of purpose of cruise:

The cruise is the first of three (summer 2011, early and late spring 2012) with RV *Pelagia*, covering a transect in the North Sea. The cruises are part of a larger project, CHARLET, with main goal to determine the limiting factors for phytoplankton growth in the North Sea and how changes in limiting resources affect the cellular composition, ecological stoichiometry and species composition of the plankton community.

Primary production by phytoplankton provides the basis of marine food webs and is strongly determined by nutrient and light availability. Measures against eutrophication have mainly led to a reduction in phosphorus inputs into coastal seas like the North Sea, whereas nitrogen and silica loadings were much less reduced. This has resulted in major changes in the relative availability of different nutrients, and there is currently substantial disagreement whether phytoplankton growth in coastal waters is limited by nitrogen, phosphorus, or light. Furthermore, resource-mediated changes in the cellular composition of phytoplankton will have major implications for their nutritional quality for zooplankton, with effects that may cascade throughout the entire aquatic food web.

What are the shifts in primary production and species composition of the phytoplankton that we may expect in future years? And how will this affect the efficiency by which the solar energy captured by these primary producers is transferred to higher trophic levels in the marine food web?

In this project, we will determine the limiting factors for phytoplankton growth in the North Sea, and how these limiting factors affect the food quality and species composition of the phytoplankton. We will develop novel approaches to assess in-situ resource limitation using stable isotope labeling, and implement the results of these studies in competition models describing phytoplankton growth in the North Sea. Furthermore, we will investigate how the transfer of primary production to the classical zooplankton-based food web versus the viral loop is affected by shifts in the phytoplankton community and their food quality. The project combines mathematical models, laboratory studies and field work during cruises with the R/V *Pelagia* in two contrasting areas of the North Sea: the productive coastal area with relatively high nutrient inputs from rivers and the central North Sea with much reduced nutrient levels especially during summer. The proposed work will offer key insights into the impact of changes in resource limitation on the carrying capacity of the North Sea.

The project is funded through the Netherlands Organisation for Scientific Research (NWO) and the NIOZ.

10. Names and dates of intended ports of call:

Texel - Texel

11. Any special logistic requirements at ports of call:

na

Part B: DETAIL

1. Name of research ship: RV Pelagia

2. Cruise dates: **15-30 August 2011**

3. Purpose of research and general operational methods:

Study the limiting factors for phytoplankton growth in the North Sea and how changes in limiting resources affect the primary production and species composition of the phytoplankton in future years. Moreover, we will study how will this affect the efficiency by which the solar energy captured by these primary producers is transferred to higher trophic levels in the marine food web.

Stations will be samples for physical parameters (temperature, salinity, turbulence etc), chemical parameters (nutrient concentrations, dissolved organic matter etc) and biological parameters (abundance and community diversity of algae, grazers and microbes (bacterial and viral community). The main stations will have a more extensive sampling program, including process assays; production and health of phytoplankton, grazing and viral lysis mortality.

Sampling gear will involve mainly CTD, aquapump and multineets. Additionally instruments to measure light will be used.

Operational methods upon sampling: (ultra)filtration to concentrate samples for diversity analysis, direct counting, fixation of samples for analysis at home lab, primary and secondary production and mortality assays, autoanalysis for nutrient concentrations and incubations for bioassays.

4. Attach chart showing (on an appropriate scale) the geographical area of the intended work, positions of intended stations/hydrographic sections:

We will sample along a transect from nutrient-rich coastal waters to more nutrient-poor central North Sea. About 10 stations distributed over the cruise track will be sampled, of which 5 main stations with a more extensive sampling program. Figure shows the schematic cruise track.

5a. Type of samples required:

water samples

5b. Methods by which samples will be obtained (including dredge/core/drill techniques):

CTD rosette sampling, aquaflo pump system of the ship, vertical nets for zooplankton

6. Details of moored equipment:

na

7. Explosives:

No explosives.

8. Detail and reference of:

a. Any relevant previous/future cruises:

within the CHARLET project we will have 2 additional cruises in 2012

b. Any previous published research data relating to the proposed cruise:

(Attach separate sheet if necessary)

na

9. Names and addresses of scientists of the coastal state in whose waters the proposed cruise takes place with whom previous contact has been made:

Na

10.State:

a. Whether visits to the ship in port by scientist of the coastal state concerned will be acceptable:

Yes

b. Whether it will be acceptable to carry on board an observer from the coastal state for any part of the cruise and dates and ports of embarkation/-disembarkation:

Depending on maximum number of participants, yes.

c. When research data from intended cruise is likely to be made available to the coastal state and if so, by what means:

The data will be made available through a scientific publication.

COASTAL STATE: UK

SCIENTIFIC EQUIPMENT

11. Complete the following table - include a separate copy for each coastal state (indicate "Yes" or "No" if applicable)

Marine scientific equipment used	water depth (m)	fisheries research	distance of research to coast in nautical miles			
				< 3	3-12	12-50
CTD-rosette sampler	Upper 50m	no	no	no	no	yes
Light meter	Upper 50 m	no	no	no	no	yes
Aquapump	5 m	no	no	no	no	yes
Multinets	Full depth	no	no	no	no	yes

List of intended sampling stations during Pelagia cruise

Main station 1; 53.40N, 5.15E

Main station 2; 54.14N, 4.33E

Main station 3; 55.17N, 3.15E

Main station 4; 55.75N, 3.33E

Main station 5; 56.58N, 2.17E

References

na