

NOTIFICATION OF PROPOSED RESEARCH CRUISE

Part A: GENERAL

1. Name of research ship: **RV Pelagia** Cruise number: **64PE 344**

2. Cruise dates: 1 September 2011 to 25 September 2011

3.

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: PGRO

6. Crew: name of master: J.C. Ellen / I. Burkhard

number of crew: 11

7. Chief scientist:

name: Dr. Elizabeth Jones

addresses: NIOZ Royal Netherlands Institute for Sea Research

telephone: (+31) (0)222-369523

telefax: (+31) (0)222-319674

e-mail address: Elizabeth.Jones@nioz.nl

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

Pelagia will operate in the entire North Sea basin, see below charts of station positions and cruise track.

Latitude ranges between 51 °N and 61 °N.

Longitude ranges between 03 °W and 10 °E.

The 92 intended stations will be within these ranges of latitude and longitude.

9. Brief description of purpose of cruise:

The overall aim is to quantify changes in CO₂ uptake by the North Sea via plankton blooms by means of field measurements, and to quantify the role of climate change by ecosystem modelling. Specifically the aim is to generate a high quality dataset (pH and CO₂-system) for the entire North Sea during the summer of 2011, to be directly compared to similar data sets of the summers of 2001, 2005 and 2008. The goal of the benthic sampling is to have a basin wide estimate of the alkalinity flux from North Sea sediments.

10. Names and dates of intended ports of call:

Pelagia will depart at 1 September 2011 from its own homeport of the NIOZ Royal Netherlands Institute for Sea Research, at the Island of Texel, The Netherlands. Upon completion of the stations and cruise track Pelagia will at 25 September 2011 return at the same home port. There are no other port calls envisioned during the cruise.

11. Any special logistic requirements at ports of call:

None.

Part B: DETAIL

1. Name of research ship: RV Pelagia

2. Cruise dates: 1 September 2011 through 25 September 2011

3. Purpose of research and general operational methods:

The overall aim is to quantify changes in CO₂ uptake by the North Sea via plankton blooms by means of field measurements, and to quantify the role of climate change by ecosystem modelling. Specifically the aim is to generate a high quality dataset (pH and CO₂-system) for the entire North Sea during the summer of 2011, to be directly compared to similar data sets of the summers of 2001, 2005 and 2008.

The water column will be sampled at 92 stations throughout the North Sea while the sediment will be sampled at 20 of these station (see chart). At the water column stations, samples will be taken at 12 different depths, except for some stations in the shallow southern part of the North Sea where less than twelve sampling depths are envisioned. Sampling will be with a CTD/Rosette system comprising individual samplers for each depth. Upon recovery the seawater will be collected from the samplers in a suite of smaller bottles, for subsequent analyses of the CO₂ system and ancilliary parameters in seawater.

At the sediment stations, the sea floor will be sampled using a box corer. The boxcore sediment will be subsampled and the sediment cores will be subsequently incubated on board to determine geochemical fluxes across the sediment-water interface.

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

The map indicates the entire sampling program, where as the attached stations list is restricted to the stations in the territorial waters.

The intended grid for water column stations of the September 2011 cruise, identical to station grids of the preceding cruises in 2001-2002 and 2005 and 2008. At each station all four variables pCO₂, DIC, Alkalinity and pH will be determined at 12 depths.

The intended list of sediment stations forms a small subset of the list of water column stations. At each benthic stations sediment will be sampled by means of box cores.

5a. Type of samples required:

Seawater samples collected at various depths in the water column.
Box core samples for sediment collection.

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

CTD/Rosette system with set of individual water samplers.
Box core

6. Details of moored equipment:

None

7. Explosives:

None

8. Detail and reference of:

a. Any relevant previous/future cruises:

Summer cruises aboard RV Pelagia in summers of 2002, 2005, 2008.

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

(Attach separate sheet if necessary)

- Thomas H., Bozec Y., Elkalay K. & de Baar H.J.W. (2004) Enhanced Open Ocean Storage of CO₂ from Shelf Sea Pumping. *Science*, 304: 1005-1008
- Thomas H., Schiettecatte L.-S., Suykens K., Koné Y.J.M., Shadwick E.H., Prowe A.E.F., Bozec Y., de Baar H.J.W. & Borges A.V. (2009) Enhanced ocean carbon storage from anaerobic alkalinity generation in coastal sediments. *Biogeosciences*, 6: 267-274
- Bozec, Y., H. Thomas, L.-S. Schiettecatte, A.Borges, K.Elkalay and H.deBaar (2006) Assessment of the processes controlling the seasonal variations of dissolved inorganic carbon in the North Sea. *Limnol. Oceanogr.*, 51(6), 2006, 2746-2762.
- Prowe, A.E.F., H.Thomas, J.Patsch, W.Kuhn, Y.Bozec, L.-S. Schiettecatte, A.V. Borges, H.J.W. de Baar (2009) Mechanisms controlling the air-sea CO₂ flux in the North Sea. *Continental Shelf Research* 29 (2009) 1801-1808.
- Thomas, H., F. Prowe, S. van Heuven, Y. Bozec, H.J.W. de Baar, L.S. Schiettecatte, K. Suykens, M. Koné, A.V. Borges, I.D. Lima, S.C. Doney (2007) Anthropogenic CO₂ uptake reduces ocean carbon buffering capacity, *Global Biogeochemical Cycles*, 21, GB4001, doi: 10.1029/2006GB002825, 2007

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:

Dr. Dorothee Bakker (Research Officer)
School of Environmental Sciences
University of East Anglia
Norwich NR4 7TJ, U.K.
Tel. (+44)(0)1603-592648

10. State:

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

Not relevant, there will not be a visit to another port in another coastal state.

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:

Yes an observer from a coastal state is welcome to join the entire cruise; embarkation at 31 August 2011 at NIOZ harbour, Island of Texel, The Netherlands; disembarkation at 25 September 2011 at NIOZ harbour, Island of Texel, The Netherlands.

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

Upon request the research data can be made available to a coastal state. Delivery of the dataset can be done after internal quality control and corrections, and is available for distribution to a coastal state and other third parties as off 1 January 2012. The data will be made available in electronic format as a Comma-Separated Values (CSV) file.

SCIENTIFIC EQUIPMENT

COASTAL STATE: UK

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	Close to the bottom	none	no	yes	yes	yes
Box core	Bottom	none	no	yes	yes	Yes

List of intended sampling stations during Pelagia cruise, see also chart below.

Stations list in territorial waters of the United Kingdom

Water column stations:

Station No	<u>°N</u>	<u>°E</u>
1	51.04	1.54
2	51.53	1.97
5	52.00	2.50
6	52.60	2.50
11	53.20	2.50
12	53.20	1.50
13	53.80	0.50
14	53.80	1.50
15	53.80	2.75
26	54.40	1.50
27	54.40	0.50
32	55.00	2.00
33	55.00	0.50
34	55.00	-0.50
35	56.00	-1.50
36	56.00	-0.50
37	56.00	0.50
38	56.00	2.00

47	57.00	2.25
48	57.00	0.88
49	57.00	-0.50
50	57.00	-1.50
54	58.00	-2.50
55	58.00	-1.50
56	58.00	-0.50
57	58.00	1.00
72	59.00	1.50
73	59.00	0.50
74	59.00	-0.50
75	59.00	-1.50
76	59.50	-2.50
77	60.00	-2.50
78	60.00	-1.70
79	60.00	-0.50
80	60.00	0.50
81	60.00	1.50
90	61.00	1.50
91	61.00	0.50
92	61.00	-0.50

Sediment stations:

Station No	<u>°N</u>	<u>°E</u>
1	51.04	1.54
2	51.53	1.97
5	52.00	2.50
11	53.20	2.50
14	53.80	1.50
15	53.80	2.75
27	54.40	0.50
32	55.00	2.00
33	55.00	0.50
36	56.00	-0.50
38	56.00	2.00
47	57.00	2.25
49	57.00	-0.50
56	58.00	-0.50
73	59.00	0.50
77	60.00	-2.50
80	60.00	0.50
91	61.00	0.50

References

See above section 8.b.

Map of the entire working area

The map lists the stations numbers and Exclusive Economic zones (identifying the stations in British territorial waters)

