

Annex A
Campaigns 06/09

INTERNATIONAL AFFAIRS / SURVEY / BNS BELGICA / UK TTW / 25/04 - 11/05 / 2006.

1. A. Participating naval unit: BNS BELGICA (A 962)
B. Ship's characteristics: length 51m / beam 10m / draught 4.6m / masthead height 28.8m / Displacement 1200 T
2. Waters to be passed: UK TTW
3. Waters :
A. Entrance UK TTW : 25 Apr PM near 51.48 N - 002.30 E
B. Leaving UK TTW : 11 May AM near 51.48 N - 002.30 E
4. Anchorage in UK TTW: in case of adverse weather or technical problems
5. Visit to harbour (harbour / period / character): nihil
6. Commanding officer: LTCDR Lieven GOUSSAERT (Sep 03)
7. Crew:
A. Total crew: 30
B. Officers: 2
C. Crew: 13
D. Civilian scientists: 15
8. Reason for visit: nil
Reason for stay in TW en EZ: MONITORING / SAMPLING
9. Communication requirements :
A.1. UKequencies: 2461K3, 4158K8, 8239K0, 8330K4
A.2. UKequencies: 2072k1, 4113k9, 8752k2
B.1. Transmission mode: F1B
B.2. Transmission mode: J3E
C. Effective output: 400 Watt
D. International call sign: OSCAR ROMEO GOLF QUEBEC
E. Receiver station: QSN
10. Organic aircraft: nil
11. Logistic requirements: nil
12. Summary of survey: See para 9 of NPRC (annexe B)

NOTIFICATION OF PROPOSED RESEARCH CRUISE

GENERAL ORGANISATION
PART A

01. Name of research ship : **BELGICA** Cruise N° : **2006/09**
02. Dates of cruise : From **25 April** to **11 May 2006**
03. Operation authority **Belgian Navy under contract for Belgian Ministry of Science Policy
Management Unit of the North Sea Mathematical Model "M.U.M.M.",
3° & 23° Linieregimentplein, 8400 Oostende
Telephone 32(0)59 70 01 31, Facsimile 32(0)59 70 49 35
Email : bmmost@mumm.ac.be**
04. Owner **Belgian State represented by Minister for Science Policy**
05. Particulars of ship
- | | |
|-----------------|-----------------------------|
| Name | Belgica |
| Nationality | Belgian |
| Overall length | 51 meters |
| Maximum draught | 4,5 meters |
| Net tonnage | 232 NRT |
| Propulsion | Diesel |
| Call sign | ORGQ |
| Telephone | INMARSAT 00870 76 218 73 27 |
| Facsimile | INMARSAT 00870 12 052 18 12 |
| E-mail | belgica@mumm.ac.be |
06. Crew
- | | |
|----------------|---|
| Name of master | L. GOUSSAERT, LTZ 1 st Class |
| Number of crew | 15 |
07. Scientific personnel
- Name and address of scientist in charge
- Prof. Lei Chou**
University of Brussels
Laboratoire d'Océanographie Chimique et Géochimique des Eaux
Campus de la Plaine - CP 208
Boulevard du Triomphe
1050 Bruxelles
Tel : +32-2-650 52 37, Fax : +32-2-650 52 28, e-mail : lei.chou@ulb.ac.be
- Number of scientists : 15
(a nominal roll of all personnel other than nationals of the applicant (flag) state is required)
08. Geographical area in which ship will operate (with reference in latitude and longitude).
Continental Shelves of the United Kingdom and Norway
58°00N, 2°00W and 60°30, 5°E
09. Brief description of purpose of cruise
EU-6th frame Programme Integrated Project (IP) : CARBOOCEAN : Marine Carbon sources and sink assessment
The overall objective of the project is the improved quantification of the marine sources and sinks for carbon dioxide on a time scale of -200 years to +200 from now with special focus on the Atlantic and Southern Ocean.
10. Port of Call, Dates, Reasons.
- | | | |
|-----------|-------------------------|-----------------------------------|
| Zeebrugge | 25/04 | Start of campaign 8a |
| Bergen | 02/05 (pm) - 05/05 (am) | Relaxation of crew and scientists |
| Bergen | 05/05 (am) | Start of campaign 9b |
| Zeebrugge | 11/05 | End of campaign |
11. Any special logistic requirements at ports of call (other than water, fuel provisions, etc.)
N.A.

NOTIFICATION OF PROPOSED RESEARCH CRUISE

DETAIL
PART B

01. Name of research ship : **BELGICA** Cruise N° : **2006/09**
02. Dates of cruise : from **25 April** to **11 May 2006**

03. Purpose of research and general methods.
(If the research work is being taken on behalf of a research institution of a third state, it is the responsibility of that state to obtain prior permission; it is essential that written confirmation that this has been done is obtained and quoted in this application)

The CarboOcean Integrated Project aims at an accurate assessment of the marine carbon sources and sinks. Target is to reduce the present uncertainties in the quantification of net annual air-sea CO₂ fluxes by a factor of 2 for the world ocean and by a factor of 4 for the Atlantic Ocean. The IP will deliver description, process oriented understanding and prediction of the marine carbon sources and sinks with special emphasis on the Atlantic and Southern Oceans on a time scale -200 to +200 years from now.

The 'Laboratoire d'Océanographie Chimique et Géochimie des Eaux' of the ULB and 'l'Unité d'Océanographie Chimique' of the ULg are both partners of CarboOcean and are involved in the Core Theme 3 « Regional assessment for the North Sea ». In this framework a campaign is planned aiming at the study of the biogeochemistry of carbon and associated elements during the spring bloom in the North Sea.

04. Attach chart(s) showing (on an appropriate scale) the geographical area of the intended work, positions of intended stations, tracks of survey lines, positions of moored / seabed equipment.

See chart in annex

05. Types of samples required, e.g. Geological / Water / Plankton / Fish / Radioactivity / Isotope
water, plankton; sediment; suspended matter

and methods by which samples will be obtained (including dredging/coring/drilling).

SCTD rosette equipped with Niskin & Go-FLO bottles, in situ measurements (SCTD, ...), planktonnet; in-situ pumping of large volume of water; Van Veen grab, Reineck corer, multicorer B&C, NIOZ box corer; non-toxic sea water circuit and on board centrifuge, continuous measurements

06. Details of moored equipment : **N.A.**

Dates		Description	Latitude	Longitude
Laying	Recovery			

07. Explosives : **N.A.**

(a) Type and Trade Name

(c) Depth of trade class and stowage

(e) Depth of detonation

(g) Position in longitude and latitude

(b) chemical content

(d) Size

(f) Frequency of detonation

(h) Dates of detonation

08. Details and reference of

(a) any relevant previous/future cruises

BG03/21, BG03/27, BG03/32, BG04/03, BG04/07, BG04/12

(b) any previous published research data relating to the proposed cruise (attach separate sheet if necessary)

See Annex 1

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

Prof. Christoph Heinze
Coordinator of the CarboOcean project
University of Bergen, Geophysical Institute
Bjerknes Centre for Climate Research
Prof. in Global Carbon Cycle Modelling
Allegaten 70, N-5007 Bergen, Norway (room 302)
Phone: +47 55 58 98 44 Fax: +47 55 58 98 83
Email: heinze@gei.uib.no

Prof Andrew J. Watson
School of Environmental Sciences
University of East Anglia,
Norwich, NR4 7TJ, U.K.
Tel +44 1603 593781
Fax +44 1603 507719
Email: a.j.watson@uea.ac.uk

Dr. Jørgen Bandtzen / Dr. Bo Riemann
National Environmental Research Institute
Dept. of Marine Ecology
Frederiksborgvej 398
PO Box 358
DK-4000 Roskilde, Denmark
Telephone: +45 46 30 18 63 / +45 46 30 12 00
Fax: +45 46 30 12 11
Email: job@dmu.dk / brl@dmu.dk

10. State:

- (a) whether visits to the ship in port by scientists 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

YES, cfr. part A § 10

- (c) when research data from intended cruise is likely to be made available to the coastal state and if so by what means. (If the final report is likely to be delayed beyond 12 months, interim progress reports are required.)

- Cruise report available within 2 months by request to the chief scientist
- see Bb above

NOTIFICATION OF PROPOSED RESEARCH CRUISE

SCIENTIFIC EQUIPMENT
PART CCOASTAL STATE:

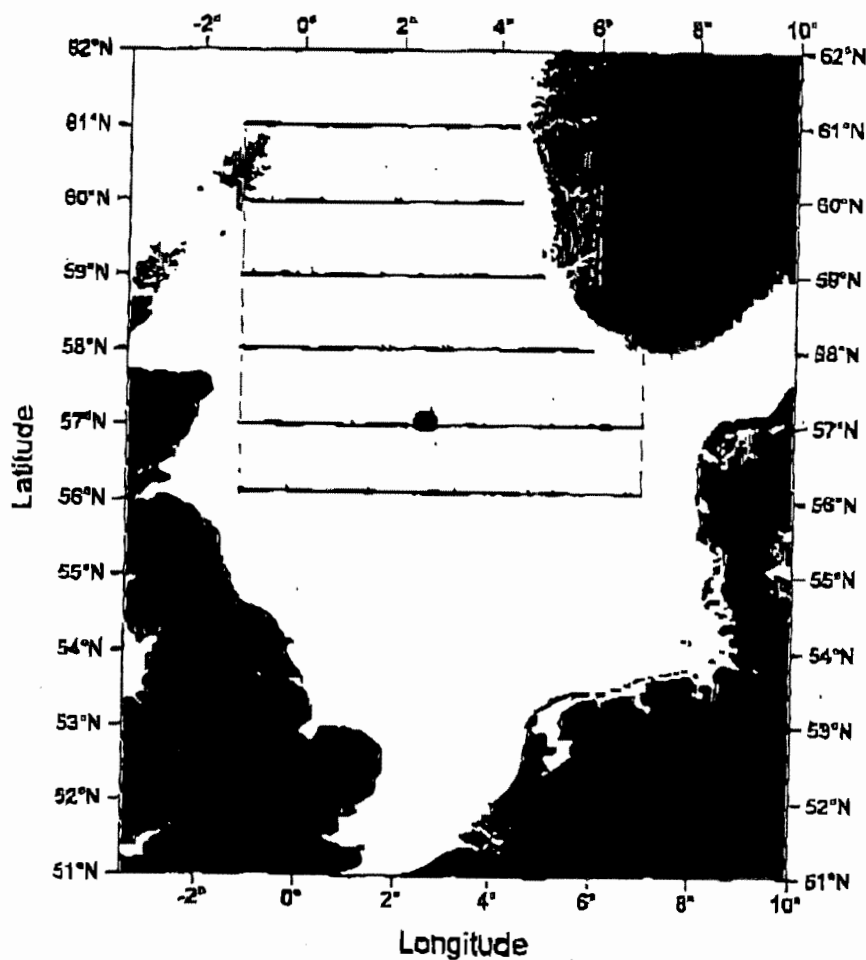
UNITED KINGDOM

Complete the following table - separate page for each coastal state

Indicate "Yes or No"

LIST SCIENTIFIC WORK BY FUNCTION	Water column including sediment sampling of the seabed	Fisheries research within fishing limits	Research concerning the natural resources of the continental shelf or its physical characteristics	Distance from coast		
				WITHIN 12 NMS	BETWEEN 12-200 NMS	(CONTINENTAL SHELF WORK ONLY) BEYOND 200 NM BUT WITHIN THE CONTINENTAL MARGIN
e.g. Magnetometry: Gravity Diving: Seismics: Bathymetry seabed sampling Trawling Echo sounding: Water sampling UAV TV: Moored instruments: towed instruments:						
Niskin and Go Flo bottles	Yes	No	No	Yes	Yes	Yes
In situ measurements with SCTD-system	Yes	No	No	Yes	Yes	Yes
In-situ pumping of large volume of water	Yes	No	No	Yes	Yes	Yes
Planktonnet	Yes	No	No	Yes	Yes	Yes
Van Veen grab	Yes	No	No	Yes	Yes	Yes
Reineck corer	Yes	No	No	Yes	Yes	Yes
Multicorer B & C	Yes	No	No	Yes	Yes	Yes
NIOZ box corer	Yes	No	No	Yes	Yes	Yes
vessel's non toxic sea water intake and on board centrifuge	Yes	No	No	Yes	Yes	Yes
continuous measurements	Yes	No	No	Yes	Yes	Yes

Belgica BG06/09 Cruise



The area of investigation is indicated by the the blue box. The blue lines denote possible transects during the campaign. The red dot is the position of a station that will be repeatedly occupied during the cruise.

oceanic campaign 04/04a-b : Annex 1

- Thomas H., Y. Bozec, H. J. W. de Baar, K. Elkalay, M. Frankignoulle, L.-S. Schiettecatte, G. Kattner & A.V. Borges (2005) The Carbon budget of the North Sea, *Biogeosciences*, 2(1): 87-98
- Borges A.V., B. Delille & M. Frankignoulle (2005) Budgeting sinks and sources of CO₂ in the coastal ocean: Diversity of ecosystems counts, *Geophysical Research Letters*, in press
- Thomas H., Y. Bozec, K. Elkalay, H.J.W. de Baar, A.V. Borges & L.-S. Schiettecatte (submitted) Variability of the surface water partial pressure of CO₂ in the North Sea, *Biogeosciences*
- Bozec Y., H. Thomas, L.-S. Schiettecatte, A.V. Borges, K. Elkalay & H.J.W. de Baar (submitted) Assessment of the processes controlling the seasonal variations of dissolved inorganic carbon in the North Sea, *Limnology and oceanography*
- Elkalay K., H. Thomas, Y. Bozec, A.V. Borges, L.-S. Schiettecatte, R. Heerdink, P. Ruardij & H. de Baar (submitted) Biogeochemical 1D ERSEM ecosystem model applied to recent carbon dioxide and nutrient data in the North Sea, *Journal of Marine Systems*
- Borges A.V., Do we have enough pieces of the jigsaw to integrate CO₂ fluxes in the Coastal Ocean?, ASLO 2005 Summer Meeting, 14-24 June 2005, Santiago de Compostela, Spain, oral presentation
- Bozec Y., H. Thomas, L.-S. Schiettecatte, A.V. Borges, K. Elkalay & H.J. de Baar, Processes controlling the seasonal variations of inorganic carbon in the North Sea, ASLO 2005 Summer Meeting, 19-24 June 2005, Santiago de Compostela, Spain, oral presentation
- Harley J., C. van der Zee, L.S. Schiettecatte, R.H. Godoi, K. Aerts, P.E. Lapernat, N. Roevros, L. Rebreaux, S. Groom, S. and L. Chou (2005) Biogeochemical study of a coccolithophore bloom at the continental margin in the northeast Atlantic, ASLO 2005 Summer Meeting, 19-24 June 2005, Santiago de Compostela, Spain, oral presentation
- Borges A.V., Diversity of Ecosystems and Coastal Ocean CO₂ Fluxes, XXXVII International Liège Colloquium on Ocean Dynamics, Gas Transfer At Water Surfaces, 2-8 May 2005, Liège, Belgium, oral presentation
- Elkalay K., H. Thomas, Y. Bozec, A.V. Borges, L.-S. Schiettecatte, R. Heerdink, P. Ruardij & H. de Baar, Biogeochemical 1D ERSEM ecosystem model applied to recent carbon dioxide and nutrient data in the North Sea, XXXVII International Liège Colloquium on Ocean Dynamics, Gas Transfer At Water Surfaces, 2-6 May 2005, Liège, Belgium, poster
- Gypens N., C. Lancelot & A.V. Borges, Mechanisms controlling the air-sea exchanges of CO₂ in the eutrophied coastal waters of the Southern Bight of the North sea: a modelling study, XXXVII International Liège Colloquium on Ocean Dynamics, Gas Transfer At Water Surfaces, 2-6 May 2005, Liège, Belgium, oral presentation
- Harley J., C. van der Zee, L.-S. Schiettecatte, N. Roevros, L. Rebreaux, P.-E. Lapernat, A.V. Borges & L. Chou, Dissolved Inorganic Carbon dynamics in the northern Bay of Biscay during a Coccolithophore bloom, XXXVII International Liège Colloquium on Ocean Dynamics, Gas Transfer At Water Surfaces, 2-6 May 2005, Liège, Belgium, poster
- Schiettecatte L.-S., F. Gazeau, M. Frankignoulle & A.V. Borges, CO₂ air-sea exchange and NEP in the Scheldt plume (Belgian coast) over 4 years, XXXVII International Liège Colloquium on Ocean Dynamics, Gas Transfer At Water Surfaces, 2-6 May 2005, Liège, Belgium, oral presentation
- Bozec Y., H. Thomas, L.-S. Schiettecatte, A.V. Borges, K. Elkalay & H.J.W. De Baar, Processes controlling the net carbon consumption of inorganic carbon in the North Sea, European Geosciences Union General Assembly, 24-29 April 2005, Vienna, Austria, oral presentation
- Schiettecatte L.-S., F. Gazeau, M. Frankignoulle & A.V. Borges, Four years of dissolved inorganic carbon dynamics along the Belgian coast, European Geosciences Union General Assembly, 24-29 April 2005, Vienna, Austria, oral presentation
- Thomas H., Y. Bozec, K. Elkalay, R. Heerdink, P. Ruardij, H.J.W. de Baar, L.-S. Schiettecatte & A.V. Borges, Variability of the CO₂ air-sea fluxes in the North Sea, European Geosciences Union General Assembly, 24-29 April 2005, Vienna, Austria, poster