EURO-BASIN
BASIN SCALE ANALYSIS, SYNTHESIS AND INTEGRATION

SEVENTH FRAMEWORK PROGRAMME THEME 7 Environment

Collaborative project (Large-scale Integrating Project)

Project no: 246 933

Project Acronym: EURO-BASIN

Project title: European Basin-scale Analysis, Synthesis and Integration

Deliverable 2.3 Mesocosm data delivery to WP1

Contributors: Christina De La Rocha (CNRS) and mesocosm participants

Due date of deliverable: June 2013
Actual submission date: June 2013
Organisation name of the lead contractor of this deliverable: CNRS

Start date of project: 31.12.2010 Duration: 48 months
Project Coordinator: Michael St John, DTU Aqua

Project co-funded by the European Commission within the Seventh Framework Programme, Theme 6 Environment

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission)	
RE	Restricted to a group specified by the consortium (including the Commission)	
CO	Confidential, only for members of the consortium (including the Commission)	

Deliverable 2.3 Mesocosm data delivery to WP1

is a contribution Task 2.1.2

MESOCOSM We will undertake a mesocosm experiment (at the HYDRALAB mesocosm facility in Trondheim, Norway) in 2011. We have had preliminary discussions with the manager of this facility (see Letter of support B 3.1.2) and will submit a full application during 2010 once EURO-BASIN funding is confirmed. This activity will determine how particle formation, aggregation, remineralization, and sinking is controlled by various ecological parameters in a more natural environment. Ecological parameters we will consider include the dominant phytoplankton (diatoms versus coccolithophorids), and the magnitude of mesozooplankton grazing and community size structure. Aggregates formed under the various environmental conditions will be harvested and their properties, sinking rate and state of degradation monitored.

Responsible: CNRS; Participants: Uni Research, IMS-METU, NERC _NOCS and DTU-AQUA.
Start: Month 1; End Month 24

Executive Summary:

The deliverable is proof of data archiving, and free access to primary research data in support of the EU initiatives stated below.

Relevance to the project & potential policy impact:

The deliverable has no direct impact on Marine Policy, but supports Europe 2020 Strategy[1] flagship initiatives “Digital Agenda for Europe[2]” and “Innovation Union[3]” objectives on improving researchers Open Science (Open data and Open Access to research) practices as means to boost innovation and Blue Growth[4]. Open Data and Open Access to Research in this project directly supports Responsible Research & Innovation policy[5] pillar “Share results to advance”.

Access to Data:

The following datasets are archived and freely available:

De La Rocha, Christina L (2013): Mesocosm Experiment in the Bay of Hopavagen, Norway, August 2012. *Centre national de la recherche scientifique*, Unpublished dataset #817354 , 10.1594/PANGAEA.817354

Hänselmann, Kristin; Walter, Bettina (2013): Microzooplankton grazing experiment during Maria S. Merian cruise MSM26. *Institut für Hydrobiologie und Fischereiwissenschaften, Universität Hamburg*, doi:10.1594/PANGAEA.819256

Appendices:

Proof of datasets submission into www.pangaea.de archiving queue.

[1] http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/
[2] http://ec.europa.eu/digital-agenda/
[3] http://ec.europa.eu/research/innovation-union/index_en.cfm
[4] http://europa.eu/rapid/press-release_IP-12-790_en.htm
[5] http://ec.europa.eu/research/science-society/document_library/pdf_06/responsible-research-and-innovation-leaflet_en.pdf

Data Description

Citation: **De La Rocha, Christina L (2013):** Mesocosm Experiment in the Bay of Hopavagen, Norway, August 2012. *Centre national de la recherche scientifique*, Unpublished dataset #817354

Abstract: The goal of this work has been to examine the influence of upper ocean food web structure and functioning on both the natural and artificially enhanced sequestration of carbon within the ocean. Data obtained in the mesocosm experiment run in the Bay of Hopavågen in August 2012 are used to assess the extent to which organic matter produced within four different food webs is retained in the upper ocean food web versus remineralized back to carbon dioxide and inorganic nutrients (ammonium, dissolved silicon, phosphate) versus exported from the system in the form of rapidly sinking particles. The experiment was carried out in a set of 12 mesocosms covering, in triplicate, 2 different phytoplankton communities (diatom versus non-diatom) exposed to 2 different zooplankton communities (-copepod and +copepod). These starting conditions were established by first filling the bags, roughly simultaneously, with seawater from the Bay of Hopavågen. Mesozooplankton were then removed to the most complete extent possible immediately removed from half of the mesocosms through repeated vertical hauls of a plankton net (200 µm mesh). Nitrate and phosphate was added to half mesocosms daily to promote the growth of non-siliceous phytoplankton (e.g. dinoflagellates or coccolithophores). To the other half of the mesocosms, nitrate, phosphate, and silicate were added to promote the growth of diatoms. Material was allowed to settle and the two distinct phytoplankton populations were allowed to develop for 4 days, after which copepods collected from the Bay of Hopavågen were added back to the half of the N+P mesocosms and to the half of the N+P+Si mesocosms from which mesozooplankton had not been removed at the beginning. This yielded a set of four initial starting conditions (N+P-copepods, N+P+copepods, N+P+Si-copepods, and N+P+Si+copepods). In the primary mesocosms, samples for a set of core parameters were taken every time the mesocosms were sampled. Samples for particulates (PIC, BSi, POC, PON) were collected on GF/F or 0.4 µm polycarbonate.

Project(s): **Basin Scale Analysis, Synthesis and Integration** (EURO-BASIN)

Event(s): **HOPA-2012** * *Date/Time Start:* 2012-08-02T00:00:00 * *Date/Time End:* 2012-08-26T00:00:00 * *Location:* Norwegian fjord * *Device:* Mesocosm experiment * *Comment:* Mesocosm experiment conducted in the Bay of Hopavaagen at the Sletvik field station

Parameter(s):

#	Name	Short Name	Unit	Principal Investigator	Method	Comment
1	Experiment	Exp				
2	Incubation duration	Inc dur	days			
3	DEPTH, water, experiment	Depth water exp	m			Geocode
4	Depth, top/min	Depth top	m			
5	Depth, bottom/max	Depth bot	m			
6	Carbon, organic, particulate	POC	µmol/l	De La Rocha, Christina L	Elemental analyzer, Thermo Quest Flash 1112	
7	Nitrogen, organic, particulate	PON	µmol/l	De La Rocha, Christina L	Spectrophotometer Shimadzu UV 1700	

8	Biogenic silica	bSiO2	µmol/l	De La Rocha, Christina L	Colorimetry	
9	Chlorophyll a	Chl a	µg/l	De La Rocha, Christina L	High Performance Liquid Chromatography (HPLC)	
10	Carbon, organic, dissolved	DOC	µmol/l	De La Rocha, Christina L	TOC analyzer (Shimadzu)	
11	Nitrogen, organic, dissolved	DON	µg/l	De La Rocha, Christina L	TOC analyzer (Shimadzu)	
12	Nitrate	NO3	µmol/l	De La Rocha, Christina L	Technicon Autoanalyser (Treguer & Le Corre, 1975)	
13	Nitrite	[NO2]-	µmol/l	De La Rocha, Christina L	Technicon Autoanalyser (Treguer & Le Corre, 1975)	
14	Ammonium	NH4	µmol/l	De La Rocha, Christina L	Spectrophotometer Shimadzu UV 1700	
15	Phosphate	PO4	µmol/l	De La Rocha, Christina L	Technicon Autoanalyser (Treguer & Le Corre, 1975)	
16	Silicate	Si(OH)4	µmol/l	De La Rocha, Christina L	Technicon Autoanalyser (Treguer & Le Corre, 1975)	
17	Experimental treatment	Exp trtm		De La Rocha, Christina L		

Size: 1142 data points

Download Data (login required)

Download dataset as tab-delimited text *(use the following character encoding:*
ISO-8859-1: ISO Western (PANGAEA default) *)*

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Data Description

Show Map | Google Earth

Citation: **Hänselmann, Kristin; Walter, Bettina (2013):**

Microzooplankton grazing experiment during Maria S. Merian cruise MSM26. *Institut für Hydrobiologie und Fischereiwissenschaften, Universität Hamburg*, doi:10.1594/PANGAEA.819256

Project(s): **Basin Scale Analysis, Synthesis and Integration** (EURO-BASIN)

Coverage: *Median Latitude:* 59.694500 * *Median Longitude:* -34.200978 * *South-bound Latitude:* 53.358000 * *West-bound Longitude:* -55.977000 * *North-bound Latitude:* 62.857000 * *East-bound Longitude:* -11.000160

Date/Time Start: 2013-03-24T19:30:00 * *Date/Time End:* 2013-04-13T13:49:00

Minimum DEPTH, water: 20.0 m * *Maximum DEPTH, water:* 50.0 m

Event(s): **MSM26_126-1** * *Latitude:* 61.500000 * *Longitude:* -11.000160 * *Date/Time:* 2013-03-24T19:30:00 * *Elevation:* -1329.3 m * *Location:* North Atlantic * *Campaign:* MSM26 * *Basis:* Maria S. Merian * *Device:* CTD/Rosette

MSM26_127-4 * *Latitude:* 62.857000 * *Longitude:* -21.441000 * *Date/Time:* 2013-03-27T18:08:00 * *Elevation:* -1133.0 m * *Location:* North Atlantic * *Campaign:* MSM26 * *Basis:* Maria S. Merian * *Device:* CTD/Rosette * *Comment:* SL max. 1097m /EL1

MSM26_131-18 * *Latitude:* 60.520000 * *Longitude:* -23.753000 * *Date/Time:* 2013-03-31T13:44:00 * *Elevation:* -2057.0 m * *Location:* North Atlantic * *Campaign:* MSM26 * *Basis:* Maria S. Merian * *Device:* CTD/Rosette * *Comment:* SL max. 1972m /EL I

Comment: The microzooplankton grazing dilution experiments were conducted at stations 126, 127, 131 and 133-137, following Landry & Hassett (1982). Seawater samples (whole seawater - WSW) were taken via Niskin bottles mounted on to a CTD Rosette out of the chlorophyll maximum at each station. Four different dilution levels were prepared with WSW and GF/F filtered seawater - 100% WSW, 75% WSW, 50% WSW and 25% WSW. The diluted WSW was filled in 2.4 L polycarbonate bottles (two replicates for every dilution level). Three subsamples (250 - 500 mL depending on in situ

chlorophyll) of the 100% WSW were filtered on to GF/F filters (25 mm diameter) and chlorophyll was extracted in 5 mL 96% ethanol for 12-24 hours. Afterwards it was measured fluorometrically before and after the addition of HCl with a Turner fluorometer according to Jespersen and Christoffersen (1987) on board of the ship.

In addition, one 250 mL subsample of the 100% WSW was fixed in 2% Lugol (final concentration), to determine the microzooplankton community when back at the Institute for Hydrobiology and Fisheries Science in Hamburg. Also, one 50 mL subsample of the 100% WSW was fixed in 1 mL glutaraldehyde, to quantify bacteria abundance. The 2.4 L bottles were put in black mesh-bags, which reduced incoming radiation to approximately 50% (to minimize chlorophyll bleaching). The bottles were incubated for 24 hours in a tank on deck with flow-through water, to maintain in situ temperature. An additional experiment was carried out to test the effect of temperature on microzooplankton grazing in darkness. Therefore, 100% WSW was incubated in the deck tank and in two temperature control rooms of 5 and 15°C in darkness (two bottles each). The same was done with bottles where copepods were added (five copepods of Calanus finmarchicus in each bottle; males and females were randomly picked and divided onto the bottles). In addition, two 100% WSW bottles with five copepods each were incubated at in situ temperature at 100% light level (without mesh-bags). All experiments were incubated for 24 hours and afterwards two subsamples of each bottle were filtered on to GF/F filters (25 mm diameter); 500 - 1000 mL depending on in situ chlorophyll. One 250 mL subsample of one of the two replicates of each dilution level and each additional experiment (temperature and temperature/copepods) was fixed in 5 mL lugol for microzooplankton determination. One 50 mL subsample of one of the two 100% WSW bottles as well as of one of the additional experiments without copepods was fixed in 1 mL glutaraldehyde for bacteria determination later on. Copepods were fixed in 4% formaldehyde for length measurements and sex determination.

References:

Jespersen, A M; Christoffersen, K (1987) Measurements of chlorophyll-a from phytoplankton using ethanol as extraction solvent. Archiv für Hydrobiologie, 109: 445-454.

Landry, M R; Hassett, R P (1982) Estimating the Grazing Impact of Marine Microzooplankton. Marine Biology 67: 283-288.

Parameter(s):

#	Name	Short Name	Unit	Principal Investigator	Method	Comment
1	Event label	Event				Metadata
2	DATE/TIME	Date/Time				Geocode
3	LATITUDE	Latitude				Geocode
4	LONGITUDE	Longitude				Geocode
5	Elevation of event	Elevation	m			Metadata
6	DEPTH, water	Depth water	m			Geocode
7	Duration	Dur	h	Hänselmann, Kristin		of experiment
8	Dilution	Dilution	%	Hänselmann, Kristin		
9	Copepoda	Copepoda		Hänselmann, Kristin		
10	Light intensity	Io	%	Hänselmann, Kristin		
11	Temperature, water	Temp	°C	Hänselmann, Kristin		minimum
12	Temperature, water	Temp	°C	Hänselmann, Kristin		maximum
13	Experiment	Exp		Hänselmann, Kristin		
14	Chlorophyll a	Chl a	µg/l	Hänselmann, Kristin		at start of experiment
15	Chlorophyll a	Chl a	µg/l	Hänselmann, Kristin		at end of experiment
16	Growth rate	µ	1/day	Hänselmann, Kristin		

License:

Size: 1536 data points

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ISO-8859-1: ISO Western (PANGAEA default) *)*

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