

Annual Report Y2

Project Acronym: AMBER

Reporting Period: months 13-24

Gained scientific results during the reporting period

2010 started with the BONUS Conference in Vilnius. This conference was quite successful for the AMBER Project (6 oral and 13 poster presentations):

<http://www.io-warnemuende.de/amber-presentations.html>

The Consortium Agreement was signed by all legally responsible persons and distributed.

The annual meeting took place in Warnemünde on March 15. 2010. Details are given in:

http://www.io-warnemuende.de/tl_files/project/amber/Protocols/Protocol%20AMBER-AM2010.pdf

On this meeting Dr. Schumacher from the BONUS Project PROBALT gave a presentation on "The capacity of the European Union to address Baltic Sea eutrophication."

http://www.io-warnemuende.de/tl_files/project/amber/Protocols/Schumacher.pdf

Hannah Brocke gave a comprehensive overview on "Translation Science into Policy":

http://www.io-warnemuende.de/tl_files/project/amber/Protocols/TranslationSciencePolicy_Brocke.pdf

By the end of 2010, the AMBER participants have given 28 oral talks and 21 poster presentations.

<http://www.io-warnemuende.de/amber-presentations.html>

One diploma thesis has been written on "Uptake of dissolved organic nitrogen (DON) by phytoplankton communities of the Baltic Sea"

http://www.io-warnemuende.de/tl_files/project/amber/Theses/Diplomarbeit_ClaudiaFrey.pdf

Up to present day have 7 peer reviewed papers been published, in addition 6 have been accepted and 7 are submitted. Remarkable is the invited feature for Estuarine Coastal and Shelf Science:

<http://www.io-warnemuende.de/amber-publications.html>

Highlights:

The AMBER Project was presented to the President of the Republic Finland Tarja Halonen and the President of the Russian Federation Dimitri Medwedew during their stay on Seili at July 21, 2010.

The AMBER PI Prof. Christian Möllmann has received the 2010 ESA Price from the Ecological Society of America.

Research Cluster A: Time series analyses

WP A1 Finalized in year 1.

WP A2 Maps of ecological patterns in form of Hovmöller diagrams and phase diagrams are presented on the AMBER home page:

<http://www.io-warnemuende.de/results-cluster-a.html>

WP A3 This WP is rather problematically and the reasons have been explained in a separate letter to BONUS EEIG. After a brain storming of the PIs in research cluster A, we found an alternative solution of the problem and the WP will probably finished in the mid of the year.

WP A4 Maps of the influence of climate change on ecological patterns in graphical form are presented on the AMBER home page:

<http://www.io-warnemuende.de/results-cluster-a.html>

WP A5 and WP A6 are still ongoing.

Research Cluster B: Process studies and observations

WP B1 The observation program was subject of reduction due to budget reduction. A lot of cruises with different research vessels took place as documented in the “Cruise Reports” and “Sampling Reports”

<http://www.io-warnemuende.de/amber-reports.html>

and all collected data are documented in the AMBER metadata base

<http://www.io-warnemuende.de/amber-observations.html>

WP B2 All own observations carried out in this WP are documented on the AMBER metadata base:

<http://www.io-warnemuende.de/amber-observations.html>

More than 70% of all analyses were performed (Table 1) and a first end-member-mixing-model approach (EMMA) was carried out by means of $\delta^{15}\text{N}$ and $\delta^{13}\text{C-DOM}$ values. The remaining samples will be prepared and analyzed in the first quarter of 2011. This is documented on

<http://www.io-warnemuende.de/results-cluster-b.html>

and on

<ftp://amberdel:amber@bnisrc.dyndns.org/AMBER/Deliverables/>

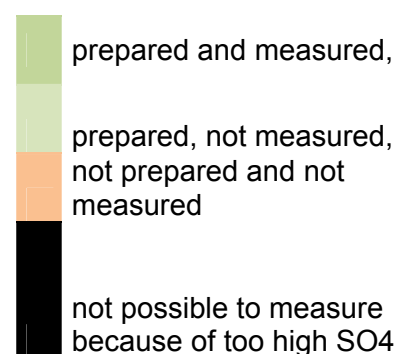
Tab. 1: Status of all samples taken for WP B.2

SampleID	DOC	DON	DOS	^{13}C -DOM	^{15}N -DOM	^{34}S -DOM	
12_4_001							Merian cruise Aug/Sep 2009
12_4_003							
12_4_011							
12_4_013							
12_4_023							
12_4_025							
12_4_030							
12_4_031							
12_4_033							
12_4_035							
12_4_037							
12_4_041							
12_4_043							
12_4_044							

OB-T1-S							AMBER cruise March 09
OB-T1-M							
OB-T1-N							
OB-T1-Na							
KL-T1-O							
KL-T1-3							
KL-T1-4							
KL-T1-W							

BB-02							Bothian Bay Salinity Gradient
BB-03							
BB-04							

Nemunas 1							rivers 2010/2011
Kalix 04-2010							
Kalix 05-2010							
Kalix 08-2010							
Kalix 10-2010							
Kalix 01-2011							



WP B3 All own observations carried out in this WP are documented on the AMBER metadata base:

<http://www.io-warnemuende.de/amber-observations.html>

and additional information is given in the "Cruise Reports" and "Sampling Reports"

<http://www.io-warnemuende.de/amber-reports.html>

N uptake rates in the Oder outflow were 8 times higher than in the Nemunas due to the already developed spring bloom in the Oder. Longer nitrate turnover times than residence time of the water suggest that not all of the incoming nitrogen can be taken up by phytoplankton. It is further suggested that a huge amount of nitrate is removed via denitrification. But only a few rate measurements quantified the losses up to now. Here the stable isotope signature of nitrate will give an insight into the processes that take place. The isotopic signature in nitrate for source identification is given in a scientific report:

<http://www.io-warnemuende.de/results-cluster-b.html>

WP B4 – WP B6 are still ongoing.

Research Cluster C: Spatial river basin – coast – sea interaction

WP C1 Finalized in year 1.

WP C2 We have calculated the effect of changes in temperature and precipitation on N and P fluxes for 83 watersheds using the strong correlation functions between load and runoff for the catchments of the various Baltic Sea basins (n=7). We have not calculated the land cover scenarios because we realized that agricultural practices which we calculated with the NANI tool (Net anthropogenic nutrient inputs) are much more significant for N and P fluxes than relatively moderate changes in agricultural areas. We calculated therefore 4 lifestyle scenarios:

- i) the effects of 20% increase in fertilizer use, human consumption, animal consumption, animal production, crop production to humans and animals;
- ii) effect of adjustment of agricultural practices to EU-15 level on nutrient fluxes from transitional countries (Poland, Baltic States and Russia);
- iii) effect of 20% decrease in atmospheric deposition following the NEC directive and
- iv) business as usual, increase in human consumption of animal proteins by 3% annually with using the relationships of the various NANI components (animal and crop production and finally fertilizer use).

Furthermore we have used several climate scenarios to drive the hydrological changes that are forecasted; ECHAM5 A1B_1, ECHAM_B1 and ECHAM5_A2. We can also provide data from runs using the following weather, ECHAM5_A1B_2, ECHAM5_A1B_3, HADCM3_A1B and CCSM3_A1B. All runs gives data for the period 1961 to 2100. All runs are documented on:

<ftp://amberdel:amber@bnisrc.dyndns.org/AMBER/Deliverables/>

WP C3 The results of the climate change scenarios (ECHAM A2 and B2, HADAM A2 and B2) have been used for a first application of MONERIS for the period from 2071 to 2100. As the modelled climate data showed a considerable bias from the observed values, we analysed the relative change of precipitation and added this to the mean precipitation values of 1983 to 2005. Modelled runoff data for this period have not been available yet and had to be estimated too. Here, the mean monthly precipitation-runoff ratio for each analytical unit of the period 1983 to 2005 has been transferred to the period of 2071-2100. As the precipitation-runoff ratio will change with changing temperatures these results can only be seen as preliminary and have to be corrected as modelled runoff is provided by the project partners. The model results are presented in a scientific presentation. Both can be found on:

<http://www.io-warnemuende.de/results-cluster-c.html>

WP C4 The climate change scenarios are documented on the AMBER Web page:

<http://www.io-warnemuende.de/amber-model-data.html>

and a publication on the analysis of climate change is in press. A further paper will be submitted in the 1st quarter of 2011.

WP C5 The river-coastal water-sea model system which allows projections of anthropogenic and climate changes is documented in two peer reviewed publications and a comparative study of lagoons and their functional changes is under revision.

<http://www.io-warnemuende.de/amber-publications.html>

WP C6 The deliverable “Quantification of mean integrated ecological quality indicators suggested by HELCOM for 1961–1990 and 2071–2100” has been skipped due to budget reduction. The biogeochemical fluxes between coastal regions and the open sea are documented on the AMBER metadata database. All data are available at the National Swedish Supercomputer Centre.

Research Cluster D: Policy and advisory

This research cluster has started this year and is ongoing.

Education

The BONUS+ AMBER summer school “Stable isotope analysis in biogeochemistry with focus on the Baltic Sea and its catchment” took place at the Stockholm University from September 15-23, 2010. The summer school was sponsored by the ESF Nitrogen in Europe Research Networking Programme which is greatly acknowledged. Without this support, we would not have been able to invite Prof. Brian Fry as teacher to this summer school. A list of participants and teachers and details of the complete teaching program, the presentations and the exercises can be found on:

<http://www.io-warnemuende.de/stable-isotope-analysis.html>

The BONUS+ AMBER “Climate Modelling School” took place at SMHI Norrköping on October 13, 2010. All details are given at:

Supplement to “Statistics and Research Infrastructure”

2. Number of times the scientists working in your Project have served as members or observers in stakeholder and scientific committees.

A. Razinkovas-Baziukas was a member and convener of the Curonian lagoon transboundary international stakeholder committee (meetings in Lithuanian and Russian Federation).

4. Number of suggestions for designing, implementing and evaluating the efficacy of pertinent public policies and governance originating from the work of your Project.

1. Results of the modelling efforts were taken into account when Lithuanian ministry of Environment was building the plan of Activities Nemunas basin

2. Based on the projects results, report for the Nida city municipality on eutrophication and public bathing possibilities was prepared.

12. Number of times your project has contributed to dissemination products/events addressed to general public concerning coupling between marine environmental quality and human health and well-being.

Numerous lectures have been given in public, for visitors at Seili and in various occasions in Turku and elsewhere, throughout the whole year when Turku was the cultural capital of Europe.

16. Number of modifications made to current PhD course programmes that resulted from the work of your Project.

Ongoing changes to the course “Ecology of fresh and brackish waters”

Comparison with the original research and financial plan

We are following the original research and financial plan.

Statement if the research plan and schedule of deliverables had to be adapted

No adaptation necessary.

Do results of third parties will have influence on the working program?

We are not aware of such results.

Are there any changes in the future working plan expected?

No changes expected.

Are there any changes expected for the deliverables?

We are convinced that the delayed WP A3 will be finalized in the mid of the year.