



Baltic-C Fourth Scientific Study Workshop on the Baltic Sea carbon cycle

IOPAS, Sopot

24-26 May 2011







Baltic-C: Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen systems



Baltic-C kick off November 2008













Agenda Tuesday, May 24, 2011

- 1300-1315 Welcome and organizational information (Janusz Pempkowiak)
- 1315-1330 Introduction to the workshop and program outline (Anders Omstedt)
- 1330- Achievements and deliverables (each WP 30 min)
- 1830- Joint dinner



Agenda Wednesday, May 25, 2011

- 09:00 10:00 Model validations for all three biogeochemical model components
- 10:00-10:30 Break
- 10:30-11:45 Model validations for all three biogeochemical model components
- 11:45- Group photo
- 12:00-13:00 Lunch
- 13:00-14:00 Scenarios, implications and uncertainties
- 14:00-15:30
- Working group 1. Baltic-C deliverables and data base
- Working group 2. Baltic-C scenario runs implications and uncertainties



Agenda Wednesday, May 25, 2011

- Break
- 15:30-17:00
- The Baltic-C assessment of Baltic Sea CO2 system and the Baltic-C phase II (2012-?).
- 17:00-17:30
- Coordination of our presentations during BSSC in August, 2011 and during the BONUS-Stakeholders meeting, October 2011. Joint posters
- Next meeting
- 19:00- Joint dinner



Agenda Thursday, May 25, 2011

- 9:00 11:15:
- Summary of the meeting
- Action items
- 11:15: End of the Meeting



WP1. Programme management, synthesis and assessment, dissemination (Anders Omstedt, University of Gothenburg, Sweden, and participant code 1).



Anders Omstedt



David Rayner













WP1. Programme management, synthesis and assessment, dissemination (Anders Omstedt, University of Gothenburg, Sweden, and participant code 1).

• Task 1.1 Program managements

Science board, International advisory board?

Task 1.2 Workshops and estimated environmental economics aspects

Outside Baltic-C: BalticSTERN+Swedish Institute for the Marine Environment,

- Task 1.3 Synthesis and assessment of Baltic Sea CO2 system
 Baltic-C, BACC II
- Task 1.4 Dissemination

Bornholm summer school +book, modeling guide book, exchange program?



WP1. Programme management, synthesis and assessment, dissemination (Anders Omstedt, University of Gothenburg, Sweden, and participant code 1).

- <u>https://proposals.etf.ee/bonus/</u>
- BONUS 15-16 June, 2011
- BSSC 2011 22-26 August, 2011
- Gdansk meeting 24-26 October, 2011
- Brussel 8 November, 2011
- Annual Report December, 2011



WP8. Modelling the Baltic Sea physical-biogeochemical system based on the CO₂/O₂ dynamics and climate change (Anders Omstedt, University of Gothenburg, Sweden, and participant code 1).



Moa Edman



Erik Gustafsson







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LIPPSAL A

UNIVERSITET

Lund

PROBE-Baltic model



UNIVERSITY OF GOTHENBURG

WP8. Modelling the Baltic Sea physical-biogeochemical system based on the CO_2/O_2 dynamics and climate change (Anders Omstedt, University of Gothenburg, Sweden, and participant code 1).

- Task 8.1: Modelling present and past changes of the Baltic Sea CO2 system
- Task 8.2 Modelling possible future changes in the Baltic Sea CO2 system



Modelling strategy





Climate change scenarious (SRES)









Next generations of scenarios for climate change research and assessment

RH Moss et al. Nature 463, 747-756 (2010) doi:10.1038/nature08823

The four pathways								
Radiative forcing	*Atmospheric CO ₂ equivalent (parts per million)	When						
8.5	>1370	By 2100, but rising						
6	850	Stabilisation after 2100						
4.5	650	Stabilisation after 2100						
2.6	490	Peak before 2100 then decline						

Four plausible global radiative forcing pathways from greenhouse-gas emissions from human activities. The new pathways, known as Representative Concentration Pathways, have been developed for the Intergovernmental Panel on Climate Change Fifth Assessment Report. The numbers associated with each scenario relate to the final radiative forcing (W/m²) by 2100. The 8.5 scenario equates to little effort to reduce emissions, while 2.6 sees emissions peak early then fall.

Figure adapted by permission from Macmillan Publishers Ltd: Nature. Moss R H et al. (2010). v.463: 747-756. Copyright 2010.





BONUS/Baltic-C Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen systems





Baltic-C scenarios

	GCM	SRES	Ensemble	Land	Nutrient	GCM bias	Factor
		narrative	member	COVET	loads	correction	addressed
1	ECHAM	AlB	#1	present-	present-	none	(baseline
				day	day		scenario)
2	ECHAM	AIB	#2	present-	present-	none	natural
				day	day		variability
3	ECHAM	AIB	#3	present-	present-	none	natural
				day	day		variability
4	HadCM	AIB		present-	present-	none	climate system
-				day	day		
5	CCSM	AIB		present-	present-	none	climate system
	DOTIAN	40		day	day		
0	ECHAM	A2		present-	present-	none	(higher)
7	ECHAM	D1		mocont	necont	2020	(mgner)
1	ECHINI	DI		day.	day.	none	(lower)
8	ECHAM	AIR	#1	GRAS	present-	none	land cover
				0.010	day		change
0	ECHAM	AIB	#1	present-	"medium"	none	nutrient loads
-				day			change
10	ECHAM	A2		BÁMBU	"business	none	multi-factor.
					as usual"		"business as
							usual"
11	ECHAM	AlB	#1	GRAS	"medium"	none	multi-factor,
							"balanced
							policy"
12	ECHAM	B1		SEDG	Baltic Sea	none	multi-factor,
					action		"environmental"
					plan		
13	ECHAM	A2		BAMBU	"business	yes	bias-corrected
					as usual."		version of
							Scenario 10
14	ECHAM	AIB	#1	GRAS	medium	yes	bias-corrected
							version of
15	PCHAM	D1		SEDG	Daltic Cos		Scenario 11
15	ECHAM	DI		SEDG	Editic Sea	yes	uns-corrected
					action		Version of
					pian .		Scenario 12



















































River runoff Scen=10





River runoff Scen=13





PROBE-Baltic model simulations





































Baltic Sea acid-base (pH) balance in the future?

Increased forcing due to: CO2 increase, nutrient increase? temperature increase





Future?













PAS



