

Report of a MAGELLAN-Workshop

“Paleoenvironmental Evolution of the Baltic Sea through the Last Glacial Cycle” funded by the European Science Foundation (ESF)

Rationale:

The Baltic Sea Basin hosts high resolution sedimentary records of the Last Glacial Cycle. Coring the sediments and a multi-proxy based interpretation of its litho- and biostratigraphy and sedimentary facies would increase our knowledge and understanding of the environmental and climatic development in respect to (1) the transition from glacial to interglacial periods and vice versa, and its regional driving forces, (2) periodicities in Fennoscandian Ice Sheet dynamics and its possible feedback to the MOC, (3) varved Holocene BSB sediments as detailed archives of changes in Holocene atmospheric circulation patterns, including variations in AO and NAO, and (4) influence of glacial/interglacial change on microbial communities.

Aims:

- (1) to bring together a group of geoscientists, young researchers and drilling scientists to exchange ideas about the utilization of marine drilling technologies for the investigation of marginal seas with special respect to the Baltic Sea and to summarize the possibilities of paleoenvironmental reconstructions of the border area between the Northern Atlantic and Eurasia,
- (2) to justify the targets and sites for a drill campaign in order to sample a complete stratigraphic record of the BSB for the LGC.
- (3) to develop a drilling strategy to reconstruct the Late Quaternary history of the BSB
- (4) to select the optimal proxies for paleo-environmental interpretations of the development of the BSB during the LGC.
- (5) to improve the final application #672-Full3 for a Baltic IODP drilling campaign.

Conveners:

Thomas Andrén, Södertörn University, Huddinge, Sweden
Svante Björck, Geobiosphere Science Center, Quaternary Sciences, Lund University, Sweden.

Jan Harff, Leibniz-Institute for Baltic Sea Research, Germany / Szczecin University / Poland

Jørn Bo Jensen, Geological Survey of Denmark and Greenland, Copenhagen, Denmark

Bo Barker Jørgensen, Aarhus University, Denmark

Aarnoo Kotilainen, Geological Survey of Finland, Espoo

Dates:

March 14 – 15, 2009

Site:

Geological survey of Denmark and Greenland
Øster Voldgade 10, DK-1350 Copenhagen K, Denmark

Program:

March 13, 2009

Arrival of participants,
Registration and Ice breaker beer: GEUS, 5 – 8 pm

March 14, 2009

09 :00 B. K. Jensen (Vice-Director GEUS): Welcome, opening remarks, topics and aims of the workshop

D. McInroy (UK, IODP-ESO): Welcome

Plenary presentations

09:30 Andren (Sweden): Paleoenvironmental evolution of the Baltic Sea Basin through the last glacial Cycle – a Baltic IODP initiative

General / regional processes

10:00: K. Lambeck (Australia): Scandinavian ice sheet and Baltic Lake evolution through the last glacial cycle from rebound analysis

10:45: A. Groh (Germany): Geodetic observation of sea-level change and crustal deformation in the Baltic Sea region and intercomparison to GIA modelling results

11:00 A. Bitinas (Lithuania): Dynamics of the Scandinavian Ice Sheet in the Baltic Sea region

11:15 S. Uscinowicz (Poland): Glacio-isostatic rebound of northern Poland and its expression sediments of the Gulf of Gdansk

11:30 B. B. Jørgensen (Denmark / Germany): The deep sub-seafloor biosphere

11:45 J. Harff (Germany / Poland): Periodicities within the sedimentary facies from the Central Baltic Sea as climate signals for the Late Pleistocene and Holocene

12: 00 A. Kotilainen (Finland): BONUS Programme INFLOW –project

12:15 Lunch

Stratigraphy

13:30 K.L. Knudsen (Denmark): The western Baltic Sea basin and southern Kattegat during the Late Saalian to Eemian glacial-interglacial cycle: foraminifera and stable isotopes

14:00 E. Emelyanov (Russia): Quaternary deposits of the Baltic: stratigraphy, thickness, composition and paleogeography

14:20 M. Houmark (Denmark): MIS-3 glaciations in the western Baltikum: stratigraphy, age determination, glacier dynamics.

14:40 S. Björck (Sweden): Glacial stratigraphy of Kriegers Flak, south Baltic

15:00 Coffee

Proxies

15:30 M. Moros (Germany): Sedimentological/geochemical/paläontological multi-proxy approaches

Sites and drilling

15:45 A. Trampe, V. Spieß (Germany): Pre-Site Surveys of Quaternary and Holocene Sequences Baltic Sea for IODP Drilling.-

16:00 J. B. Jensen (Denmark): Southern Kattegat and Arkona Basin as possible coring site areas

16:15 D. McInroy (UK): Using the IODP Mission Specific Platform approach for scientific drilling proposals in the Baltic Sea.

16::30 Discussion

Evening lecture

19:00 J. Thiede (Denmark /Germany): Drilling in Cold Oceans AURORA BOREALIS –A new International Research Icebreaker for Future Polar Deep-Sea Drillin

20:00 **Joint dinner**

March 15, 2009

Working group meetings and final discussion

09:00 Working groups

- Interglacials and transition Glacial / Interglacial (rapporteur: M. L. Knudsen) ,
- Ice sheet dynamics / Weichselian sediments (rapporteur: S. Björck)
- Connections of the BSB with the ocean (saline phases),
(rapporteur: A. Kotilainen)
- drilling/sampling/measuring technologies (Rapporteur: J. Backman)

11:00 Reports of working groups / conclusions for #672-Full3 IODP proposal

12:30 Lunch

14:00 Internal meeting of the #672-Full3 IODP proposal proponents

15:30 end of the workshop

Results:

Project-Objectives

The Project will be structured into 4 main objectives:

1. Climate and sea level dynamics of MIS5
2. The complexity of the last Glacial: MIS4 – MIS3
3. Deglacial and Holocene climate forcing
4. Deep-seafloor biosphere of the Baltic Sea

Site prioritization and classification:

Theme	Primary site(s)	Alternate site(s)	Additional data from site(s)
1: Climate change and sea level dynamics of the MIS5	BSB3	BSB4	BSB1
2: The complexities of the last glacial; MIS4-MIS3	BSB5, 8	BSB6, 7	BSB1, 3, 9
3: Deglacial and Holocene (MIS2-1) climate forcing	BSB1, 9-11	BSB2	BSB 8
4: Deep biospheres	BSB3, 9, 11		

Proposal:

Structure:

INTRODUCTION

Overarching goals & background incl. Scandinavian ice sheet, the focus on the Last Glacial Cycle, etc.,
Explanation of the 4 ob

OBJECTIVE x (x=1, 2, 3, 4)

1. Specific scientific questions to be addressed

1. Rationale for choice of sites? If you need more than one site to address the objective, explain why!
 - proxies to be used and why these?
 - age model work, how?

1. Drilling strategies
 - 3xAPC to refusal, XCB to target depth, downhole measurements where meaningful
 - dropstones should be flagged as a potential problem
 - deep biosphere OBJECTIVE requires special strategies, e.g., coring a 4th hole at three sites, rhizone pore water & other geochem sampling/measurements onboard, cold storage...

SSP-Data:

The SSP will be contacted in order to clarify questions of the submission of data for the drill sites proposed

Deadlines/Responsibilities:

- Descriptions of the objectives 1 to 4 according to the structure given above
Respons.:
 - Objective 1: M.L. Knudsen
 - Objective 2: S. Björck
 - Objective 3: A. Kotilainen
 - Objective 4: B. B. Jörgensen

to be submitted to T. Andren by March 25, 2009

- Proposal IODP #672 Full3
“Paleoenvironmental Evolution of the Baltic Sea through the Last Glacial Cycle”
Respons.: T. Andren
to be submitted to SSEP by March 31, 2009

- SSP data
Contact the SSP before March 31, 2009
Respons.: J. Harff, V. Spiess

Data management meeting at GEUS Copenhagen
Before end of May, 2009
Respons.: J. Harff, V. Spiess, J. B.Jensen

List of participants:

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