

Merian-Expedition MSM 01/02
March 27 to April 6, 2006
Warnemünde – Warnemünde
Chief scientist: Prof. Dr. J. Harff

Preliminary Report

A presite survey for a Baltic IODP served as the core task of the expedition MSM 01/02. In 2004 a group of scientists from Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Russia, and Sweden had submitted a pre-proposal for a Baltic IODP “Paleo-environmental evolution of the Baltic Sea Basin through the last glacial cycle”. The general aims of the project is to use the high resolution sedimentary record of the Baltic Sea in order to reconstruct the climatic response of Northern Europe to the forcing of the Northern Atlantic atmospheric and oceanic circulation system during the last c. 130 000 years. It is anticipated to close the gaps in knowledge by the mission specific IODP drill campaign. Information from seismic surveys and onshore drill results imply that the Baltic Sea will not only host complete sedimentary sequences in high resolution for the Late Pleistocene and Holocene but also for the entire last glacial cycle. During the cruise MSM 01/02 a scientific crew of 21 scientists and technicians coming from Denmark, Finland, Germany, Lithuania, Norway, Poland, Russia and Sweden investigated four areas:

Kattegat: “Anholt Loch”, Southern Baltic: Kriegers Flag, Northern Arkona Basin and Hanö Bay (Bornholm Basin). These areas having been ice free before the LGM are regarded prospective for complete records from the Eemian interglacial through the early and middle Weichselian to the Holocene. The sites have been investigated by a 912 nm seismoacoustic survey (echosounder SES2000 DEEP) and sampled by multicorer, gravity corer and vibrocorer (18 sites). It was anticipated to receive sediment cores representing the lithostratigraphic units “Interglacial” (Eemian), “Glacial”, “Late Glacial” (Weichselian) and “Holocene”. For each of the stratigraphic target units cores have been taken in 1 m plastic liners and transported to the IOW laboratories. Here, sedimentological and sedimentphysical (MSCL) parameters will be measured. These data will be used as basic information for the construction of a stratigraphic composite of the expected sediment sequence to be penetrated by the IODP campaign. These data has to be included into the full proposal for the Baltic IODP to be submitted by October 2006.

Furthermore, it was anticipated to investigate the Holocene sediment sequence of the Mecklenburgian Bight, Great Belt, southern Kattegat, Arkona Basin in terms of their sedimentological and dynamic features. In the frame of the DFG project SINCOS (www.sincos.org) the coastal and basin sediments are investigated with respect to changes in the paleo-ecosystem caused by the transgression of marine water into the former lacustrine Baltic basin (Littorina transgression). Here the history and the tracks of the saline water inflow during the early Holocene play the most important role.

14 sites have been sampled by gravity corer for the measurements of paleoceanographic proxies in the laboratories of the IOW and its partners.

As a surprising preliminary result it is noted that in an isolated sub-basin within the Great Belt a sediment core has been taken that shows a texture clearly stratified by grain size and organic carbon. Such a laminated facies mirroring quite water environment has not been expected in the Great Belt. Obviously, the sediment sequence deposited in a semi-enclosed isolated sub-basin displays the history of the hydrographic interrelation between the Baltic and the North Sea in a high temporal resolution. For the detailed investigation of this sediment core a specific program will be elaborated.

The sediment cores taken in the Kattegat, Arkona Basin and Mecklenburgian Bight shall contribute to the solutions of open questions of the history of the Littorina transgression in the western Baltic Sea (project SINCOS). Data available by now lead to assumptions about the transgression between 7000 and 8000 cal. y BP. Swedish data of marine sediments from an area close to the Blekinge coast older then 9000 cal. y BP contradict to these information. The investigation of the gravity cores taken from the Arkona Basin will contribute to answer these open questions based on a multi-proxy concept including sedimentological, mineralogical, bio- and chronostratigraphical methods.

The scientific tasks of the expedition have been fulfilled completely. In addition, it has to be stated that the R/V “Maria S. Merian” is extraordinary suitable for sediment sampling. Cranes, core frame and the wide work deck allow the sampling of up to 24 m length and its further treatment and subsampling. The automatic positioning system as an appropriate ship technology to keep the position precisely during sampling.

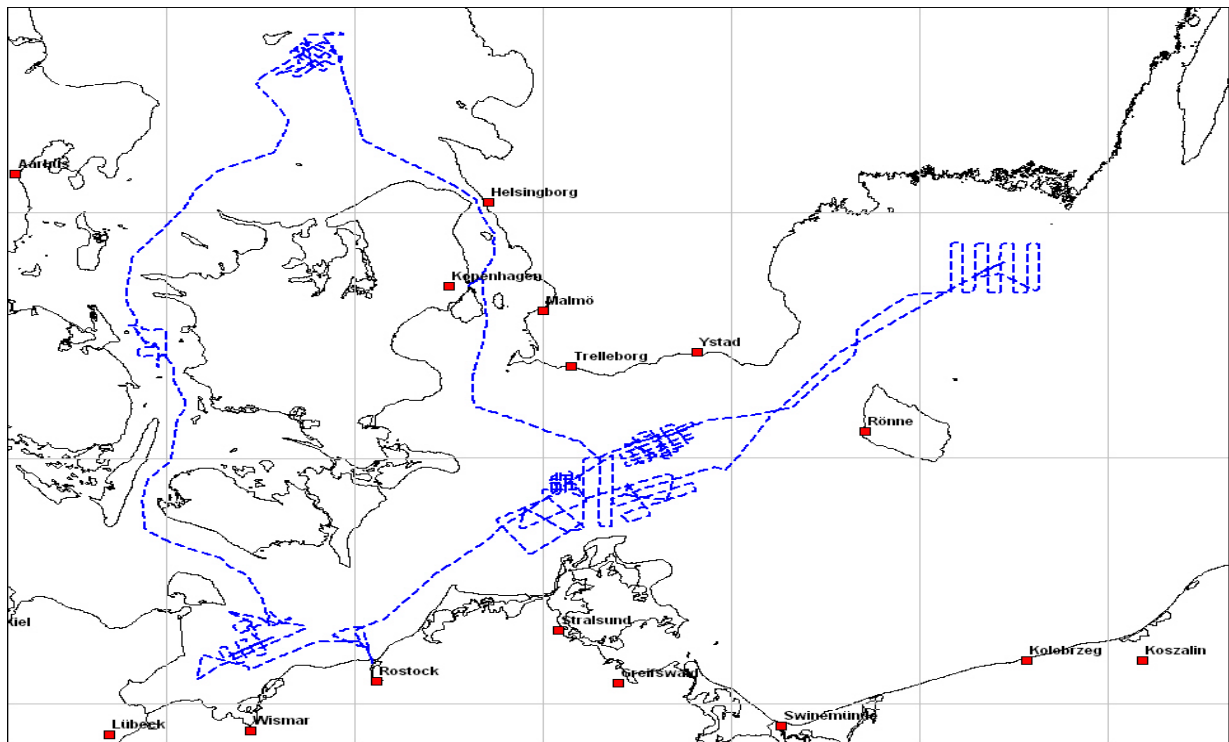


Figure 4: Track plot of cruise MSM 01/02.