

Baltic Sea Research Institute Warnemünde

Cruise Report

R/V " A.v.Humboldt "

Cruise- No. 44 / 01 / 13

This report is based on preliminary data:

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1. **Cruise No.:** 44 / 01 / 13
2. **Dates of the cruise:** from 12.11.2001 to 17.11.2001
3. **Particulars of the research vessel:**
Name: A.v.Humboldt
Nationality: Germany
Operating Authority: Baltic Sea Research Institute
Warnemünde (IOW)
4. **Geographical area in which ship has operated:**
Eastern Gotland Basin (57° - 57.5°N; (19.6° - 20.5°)E
5. **Dates and names of ports of call**
nil
6. **Purpose of the cruise**
Recovering and deployment of moored current meters for long time studies of the current field beneath the perennial halocline.
7. **Crew:**
Name of master: G. Herzig
Number of crew: 12
8. **Research staff:**
Chief scientist: E. Hagen
Scientists: R. Feistel

Students: J. Passig (Rostock Univ.)
M. Oppitz (Rostock Univ.)

Technicians: G. Plüschke
M. Sommer
9. **Co-operating institutions:**
Physical Dept. of the Rostock University
10. **Scientific equipment:** Sea-Bird CTD – probe SBE911+, recording current meters (RCM), and Automatic Weather Station
11. **General remarks and preliminary results** (ca. 4 pages)

In consequence of the former MESODYN field campaigns, which were carried out between 1996 and 2000 to study meso-scale anomalies of the mass field in layers beneath the perennial pycnocline in four deep Baltic basins, these activities focus on the establishment of multi year time series of deep currents near the position 57.4°N , 20.32°E , just above the eastern topographic flank of the Eastern Gotland Basin (EGB). Its position is shown in Fig.1. Here, the water depth lies between 220m and 224m.

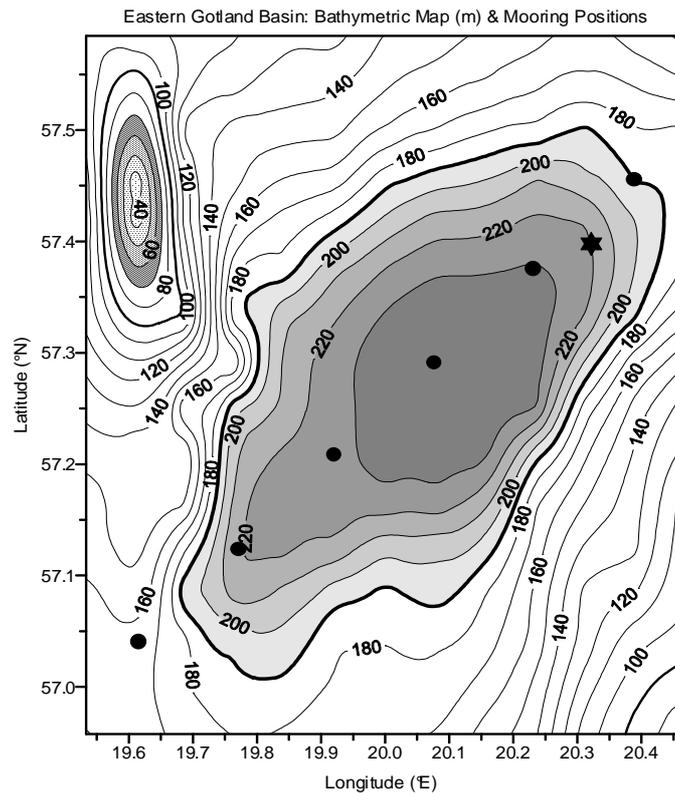


Fig.1 Bathymetric map of the Eastern Gotland Basin with selected standard positions of hydrographic field campaigns of the MESODYN program (dots) and the position of the north-east mooring (star for the string NO4 at $57^{\circ}22.33'\text{N}$, $20^{\circ}19.11'\text{E}$ above the water depth of 224m).

Usually, the moored string is equipped with two or three recording current meters (RCM) and thermometers at 170m, 200m and 215m depth. The available battery capacity enables the sampling interval to be one hour when the total recording length exceeds the duration of one year. Previous records indicated that sporadically occurring inflow events were frequently accompanied by a step-like response in temperature and accelerated deep currents, which exceed the annually averaged northward velocity of 3.5 cm/s by a factor of about two. Due to the water depth of 224m at the position of the string NO4, the recovered RCM's took place at 174m and 204m depth. Their measuring period covered one seasonal cycle (NO4: 2 November 2000 until 14 November 2001). Resulting records also show

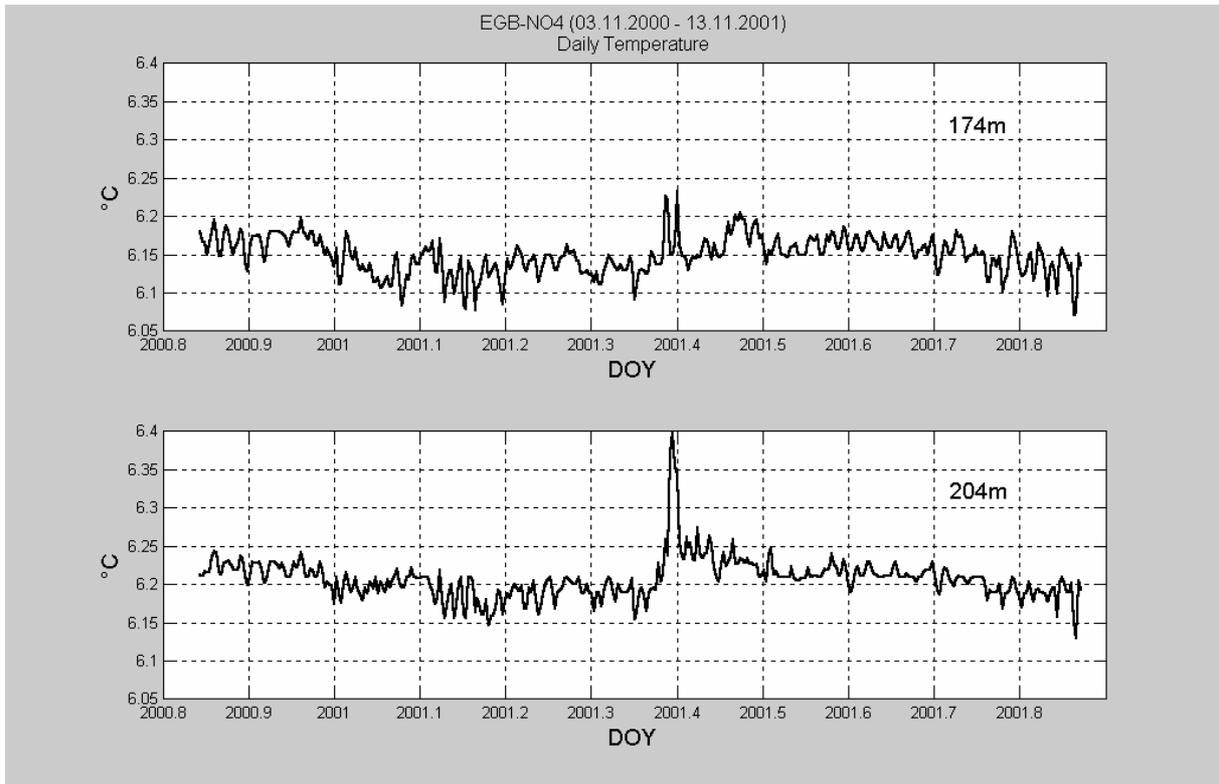


Fig.2 Daily temperature recorded by the string NO4 (03 Nov. 2000 – 13 Nov. 2001)

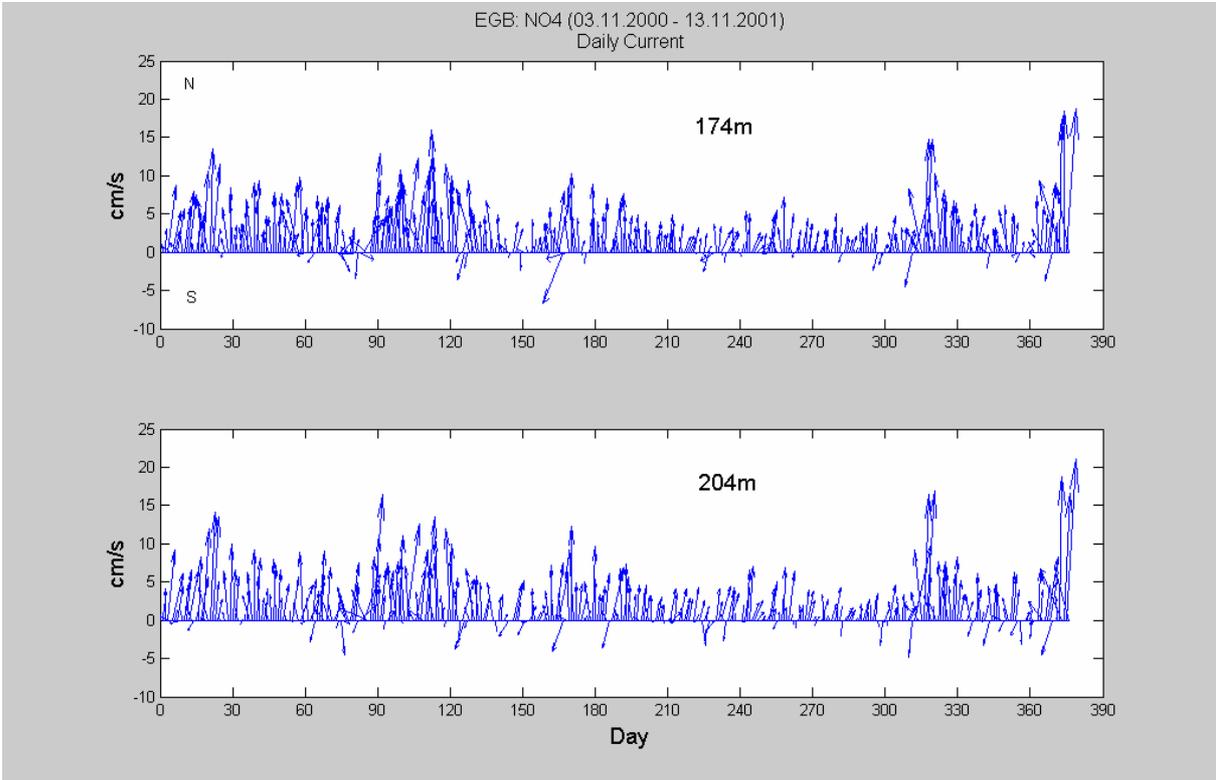


Fig.3. Daily averaged current arrows of the string NO4

such a temperature ‘jump’ by daily means for May 2001 in Fig.2. However, no comparable acceleration could be detected in the deep motion field, which is locally described by daily current arrows in Fig.3.

After the deployment of the string NO5 at 224m depth (57°22.49’N, 20°19.26’E), vertical CTD profiles followed the topographic main axis of the EGB as shown in Fig.1. The resulting mass field distribution indicates a dome-like shape in surfaces of the potential density, especially in layers beneath the perennial pycnocline (upper panel of Fig.4.).

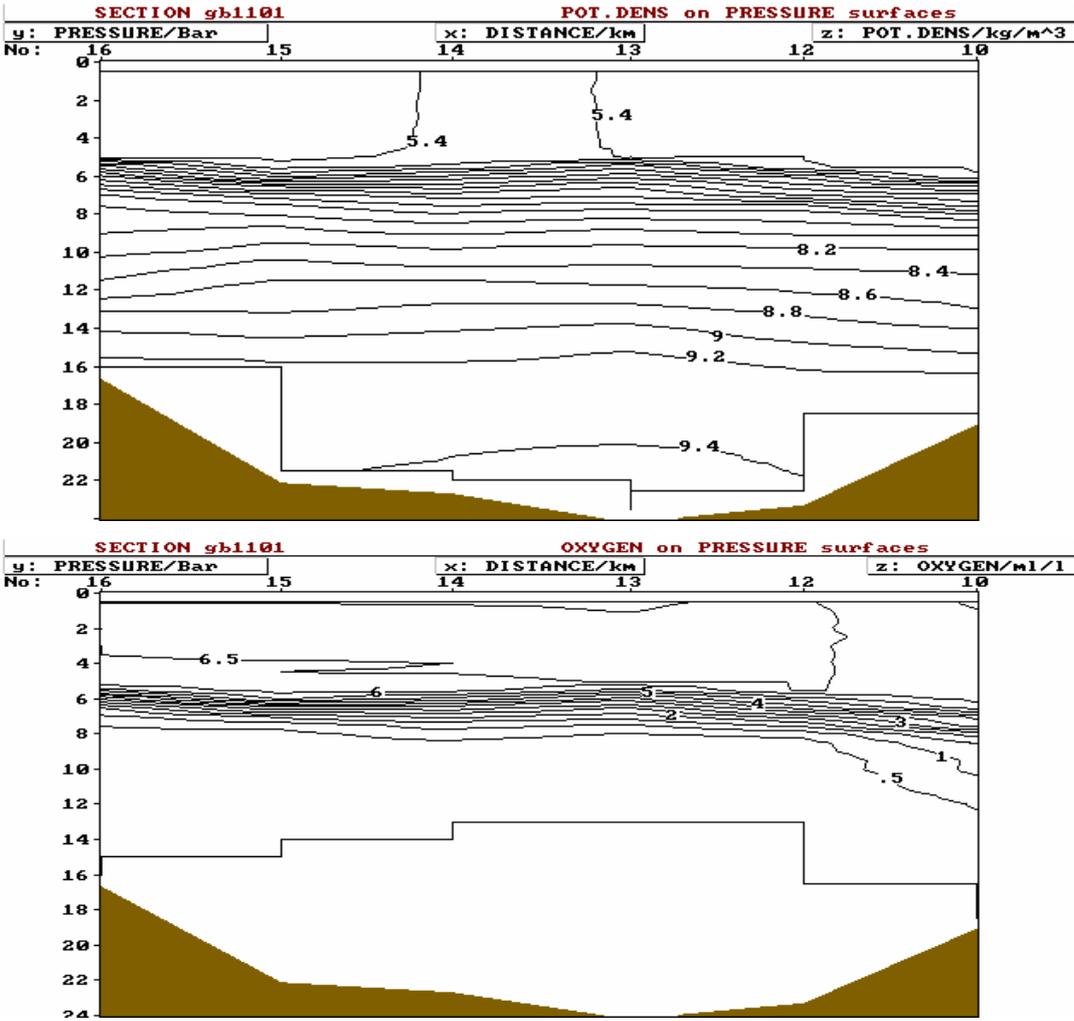


Fig.4 Vertical plots of the potential density and dissolved oxygen along the hydrographic stations shown in Fig.1; profiling was carried on 15 November, 2001 and started at station no.10 in north-east and ended at no.16 in south-west.

This shape suggests a cyclonic deep water circulation with a relatively strong geostrophic component above the eastern topographic flank. The accuracy of the CTD sensors provides geostrophic currents within the range of ± 1 cm/s. The daily quality control of CTDO-measurements revealed following uncertainties:

pressure:	± 0.02 dbar,
temperature	± 0.0071 K
salinity:	± 0.0028 (psu)
dissolved oxygen:	± 0.4 ml/l.

The corresponding distribution of dissolved oxygen is plotted in the lower panel of Fig.4. The whole deep EGB was still filled by H_2S . This roughly follows from the course of the zero-oxygen line between 140dbar and 160dbar pressure levels.

E. Hagen

Chief scientist