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Oceanographical Laboratory

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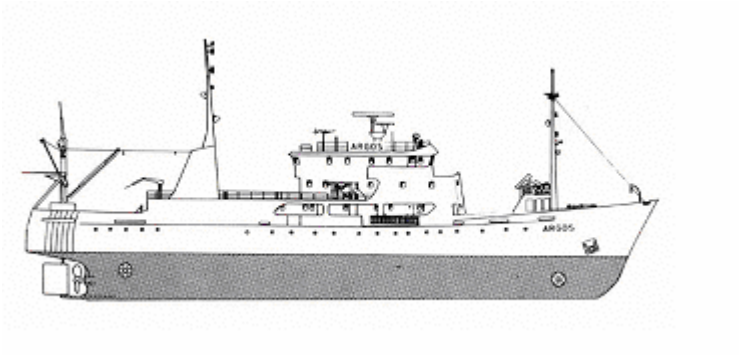
CRUISE REPORT FROM R/V ARGOS



Survey period: 2007-04-15 - 2007-04-20

Survey area: The Skagerrak, the Kattegat, the Sound, and the Baltic Proper

Principal: SMHI

SUMMARY

The expedition was part of SMHI's regular marine monitoring programme and covered the Skagerrak, the Kattegat, the Sound and the Baltic Proper.

Nutrient concentrations in Skagerrak and Kattegat were normal for the season. In the Sound silicate concentrations were enhanced. The other nutrients showed normal values. Inorganic nitrogen (DIN) had been consumed in the coastal waters of Skagerrak and in Kattegat and in all stations in the Baltic Proper. Phosphorus concentration remains elevated in the south Baltic Proper. Also silicate concentrations were elevated in the same area.

High chlorophyll fluorescence was noted in coastal waters of Skagerrak, in Kattegat and in some Baltic Proper stations.

Oxygen concentrations lower than 2 ml/l were found at depths greater than 80 metres in Baltic Proper. Hydrogen sulphide was was found in western Gotland basin from 90-100 metres and in eastern Gotland basin from 145 metres. A thin bottom layer with oxygenated water was found at Gotland deep (BY15).

The next expedition is scheduled for May 21 to 26, 2007.

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PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Göteborg on April 15th and ended in the same port on April 20th.

During the expedition warm weather with weak wind prevailed, but during the last days of the cruise the wind speed increased to near-gale force. There was no precipitation during the cruise.

Water samples were taken for analysis of oxygen- and carbon isotopes for the University of Göteborg (FRISBEE-project). Water samples were also taken for analysis of radioactive iodine by attendance personal from University of Uppsala. Extra samplings were taken at the site of the Måseskärs-mooring (Forum Skagerrak II project).

The Skagerrak

Surface water temperatures were slightly elevated in the whole area. They varied from 8.1°C in the central Skagerrak (Å17) to 9.8°C at the coast (Släggö). Salinity varied between 30.0 psu at Å13 and 20.8 psu at the coast (Släggö).

Phosphorus and DIN ($\Sigma NO_2+NO_3+NH_4$) concentrations were normal for the season. Phosphorus was between 0.04 µmol/l and 0.06 µmol/l in the whole area. DIN concentrations was found to be below detection limit (0.1 µmol/l) near the coast, as is normal for the season. At Släggö however the DIN concentration was 2.7 µmol/l. In the remainder of Skagerrak, DIN concentration, varied between 1.0 µmol/l and 2.2 µmol/l, with the highest value at Å17. Silicate concentrations were also normal for the season, only at Å17 there was enhanced values (2.0 µmol/l). At Släggö silicate concentrations was found to be 1.1 µmol/l, at the other coastal stations in the Skagerrak the value was 0.2 µmol/l.

High chlorophyll fluorescence and high values of oxygen saturation (120 %) indicated phytoplankton activity above halocline in the whole area, higher in the eastern parts. High chlorophyll fluorescence values were also found below the low salinity surface water near the coast. Secchi-depth varied between 4 and 5 metres.

The Kattegat and the Sound

Surface water temperature in the area was between 8.2 °C and 8.8 °C, which is slightly above normal for the season. Surface salinities were normal for the season and decreased from ca 20.1 psu in the northern part to 8.1 psu in the Sound. The halocline was found at depths between 10 and 15 metres. At W Landskrona a very sharp halocline was found at 13 metres. The oxygen concentration dropped from 8.3 ml/l (107% oxygen saturation) above the halocline to 3.8 ml/l (50 % oxygen saturation) below the halocline. Secchi-depth was 7.5 metres at Anholt E and 13 metres at W Landskrona. Chlorophyll fluorescence values were lower compared to Skagerrak.

At both passing through the Sound there was an outflow from the southern Baltic through the Sound.

All nutrient concentrations, besides silicate at W Landskrona, were normal for the season. Phosphorus concentrations varied between 0.05 µmol/l from the north (Anholt E) to 0.5 µmol/l in the south (W Landskrona), silicate concentrations varied from 2.2 µmol/l at Fladen to 10.6 µmol/l at W Landskrona. The high silicate concentrations are probably due to outflow of silicate rich water from the southern Baltic through the Sound. DIN concentrations were close to or below detection limit in the whole area, which is normal for the season.

Baltic Proper

Surface water temperature was higher than normal (6.4°C-6.9°C) for the season in the south-west of Baltic Proper (BY1-BY5). In the reminder of the Baltic proper sea, surface temperature showed normal values and decreased from 6.3°C in the south (BCSIII-10) to 4.3°C in the north (BY32).

Secchi-depths were found to be 9-10 metres at BY5 and BCSIII-10 and 6 metres at BY20. Fluorescence records indicated biological activity at stations BY4 and BY5 and also at stations BCSIII-10 and BY20. At these stations oxygen saturation were enhanced, 115 % at the first two and 120 % at the last two respectively.

Phosphorus concentrations showed also elevated values on this cruise, in southern Baltic Proper, 0.6 µmol/l at BY1-BY5. In the reminder of the Baltic proper the concentrations showed normal values, 0.4 µmol/l. The silicate values, as well, were higher in the southeastern part. The silicate concentration varied between 10.7 µmol/l at BY1 to 15.2 µmol/l at BY4. Also in northern Baltic Proper (BY20) and in western Gotland basin (BY32 and BY38) the values were elevated, 12.8 µmol/l and 14.3 µmol/l respectively. All other stations showed normal values for this time of the year (8.8 µmol/l-9.8 µmol/l). DIN was found to be below detection limit

In the southern and western of the Baltic Proper, oxygen concentrations below 2 ml/l were found at depths exceeding 70 metres and in the rest of the area at depths exceeding 80 metres.
Hydrogen sulphide was found from 90-100 metres in western Gotland basin and at BY20 in the northeast. In eastern Gotland basin Hydrogen sulphide was found at depths exceeding 145 metres.
A thin intermediate layer of higher oxygenated water (1.2 ml/l) was found at 90 metres at BY10. At the bottom, below the hydrogen sulphide, a thin layer of oxygenated water (0.4 ml/l) was found at Gotland deep (BY15).

PARTICIPANTS

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APPENDICES

Plots

Click on the button to open appendices.
Note that this will only work when connected to Internet!

- Track chart
- Table over stations, parameters and sampling depths
- Map showing bottom oxygen concentrations
- Monthly average plots for selected stations
- Profiles for selected stations

Data presented in this report have been subject to preliminary quality control procedures only