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Oceanographical Laboratory

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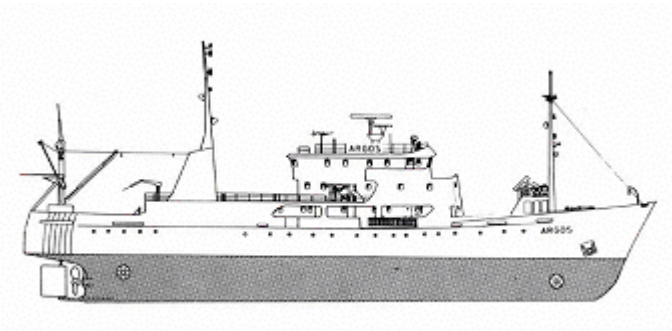
CRUISE REPORT FROM R/V ARGOS



Survey period: 2005-06-13 - 2005-06-18

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

Principal: SMHI

SUMMARY

The cruise took place within SMHI's regular marine monitoring programme and covered Skagerrak, Kattegat, The Sound and Baltic Proper.

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

An early blue-green algal bloom of *Aphanizomenom baltica* and *Nodularia spumigena* was found near the northern and northwest coast of Gotland.

Phosphate concentrations in the south and western Baltic Proper remain much higher than normal. Silicate measurements also showed high levels, while nitrate levels were normal. Nutrient concentrations in the Skagerrak and Kattegat were normal.

In the Baltic Proper oxygen concentrations below 2 ml/l were found at depths exceeding 70 to 90 metres. Hydrogen sulphide was found in the bottom water in the Hanö Bight and the Bornholm Basin and also in the bottom waters exceeding 220 metres east of Gotland and 150 metres in the bottom waters west of Gotland

The next expedition is scheduled for July 11 to 16, 2005.

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PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Gothenburg on the 13th June and ended in the same port on the 18th June.

SMHI:s second wave-buoy were launched in southern Baltic Sea at E 55° 55, N 18° 47.

The cruise was interrupted with a short stop in Visby on the 16th to leave personnel. The weather was dominated by steadily increasing air pressure, from 1005 to 1022 hPa. Initial cloud broke up during the first days, leaving almost clear skies for the rest of the week. Winds were weak to moderate (3 – 8 m/s), mostly from south to east. Later in the week the wind calmed and rarely exceeds 2-3 m/s. Air temperature were steady at comfortably 12-13°C. At the short stop in Visby, there was summer weather with air temperature over 20°C. The last evening and night of the cruise the wind speed increased to 10-14 m/s.

The Skagerrak

Surface water temperatures were normal throughout the area. They varied from 13.2°C at the outermost station to 14.0°C at the coast. Surface salinities were also normal, between 23.8 and 30.7 psu. Surface stratification was located at a depth of 5 to 10 metres at the coastline stations. Between station **Å14** and **Å15** sea surface salinity rapidly decreased from 26 psu to 31 psu. Surface stratification was located at 20 meter at the stations furthest offshore.

All nutrients had the low surface concentrations that are typical for the time of year. Phosphate was between 0.04 and 0.06 µmol/l. Nitrate concentrations were generally lower than 0.2 µmol/l. Silicate had concentrations of 0.7 µmol/l, with exception of **Släggö** were the silicate concentration were 1.4 µmol/l.

As in previous cruises relatively high peaks of chlorophyll fluorescence were recorded in the more nutrient rich water just below the halocline. The distinct difference in plankton population discovered from satellite pictures between stations **Å14** and **Å15** was confirmed in samples analysed onboard.

The Kattegat and the Sound

Surface water temperature in this area was between 11.3°C and 12.3°C, which is very close to average for this time of year. Surface salinity was 22.6 psu in the northern part of the area and 22.6 psu in the southern. The halocline and thermocline were found between 10 and 15 metres in Kattegatt and at 15 to 20 metres at **W Landskrona**.

Surface nutrient concentrations in the Kattegat were normal for the season. Phosphate concentrations were 0.03-0.07 µmol/l and silicate varied between 0.2 to 0.6 µmol/l. In the Sound, phosphate concentrations remain elevated: surface concentration at W. Landskrona reached 0.36 µmol/l. Nitrate concentrations were below the limit of detection (0.10 µmol/l) throughout the whole region.

Fluorescence peaks were found at 15 metres depth in Kattegatt and at 20 metres at **W Landskrona.** Secchi depth was between 8 and 9 metres at all stations in the area.

A Baltic outflow through the Sound was ongoing during the whole cruise.

Baltic Proper

Surface water temperature varied between 11°C and 13°C, which is normal for the season. The halocline in the Arkona Basin remained at 35-40 metres and in all other regions the halocline began at depths of 65 to 80 metres. Thermal stratification, due to summer warming, began at 15-20 metres in the Arkona Basin and at 20 metres at all other stations.

Secchi depth varied between 6 and 8 metres. Turbidity measurement showed enhanced values at station BY32. The value was found to be 1.8 NTU compared to 0.7 at all other stations in the Baltic Proper.

An early blue-green algal bloom (cyan bacteria) was found near shore the coast of northern Gotland. Water samples analysed onboard showed large quantities of pollen that may explain the yellowness of the surface waters. Patchiness of blue-green algal blooming could be followed in the surface water from the northern tip of Fårö to **BY32**. Also between BY32 and Visby and furthermore in the area west of Gotland showed traces of algal bloom but a in a smaller amount compared to the waters north of Gotland.

Surface phosphate concentration remains very high in Arkona Basin and in Bornholm Basin. Elevated values were also observed at **Hanöbukten** and at **BY38.** In the Arkona Basin and in the Bornholm Basin, concentrations were about 0.50 µmol/l, which are similar to normal winter values. At **BY38** phosphate concentration was found to be 0.39 µmol/l. In the rest of the Baltic Proper concentrations were normal for this time of year, between 0.10 and 0.15 µmol/l.
Silicate concentrations were also above normal at stations in Arkona Basin, Bornholm Basin and at **Hanöbukten**, between 11 and 13.5 µmol/l. Nitrate and nitrite concentrations in the surface water were at or below the detection limit, 0.10 µmol/l, at all stations, which is within one standard deviation of normal.

In the Arkona Basin, oxygen conditions were good. In the remainder of the Baltic Proper oxygen concentrations below 2 ml/l were found at depths exceeding 70 to 90 metres. In the Bornholm Basin and in the Hanö Bight, hydrogen sulphide was found in bottom water samples.

The next expedition is scheduled for July 11 to 16, 2005.

PARTICIPANTS

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Arne Svensson - Sjöquist	Chief scientist	SMHI Oceanographic lab.
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Tuulikki Jaakko		-”-
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Bodil Thorstensson		-”-
Henrik Lindh		SMHI Norrköping

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