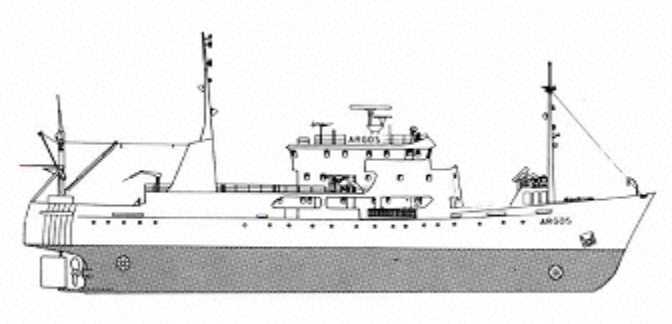
Arne Svensson

Swedish Meteorological and Hydrological Institute
Oceanographical Laboratory

2010-05-08
RefNr: 2010-094

CRUISE REPORT FROM R/V ARGOS



Survey period: 2010-05-03 - 2010-05-08

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.

At visited stations in Kattegatt, Skagerrak and the Sound nutrient concentrations showed normal values for the season. Lower silicate concentrations was found in western and north western Baltic proper.

Lower oxygen values compared to normal were found in the bottom water of the Sound. Values below 2 ml/l were found at all stations in western, eastern and northern Baltic Proper with bottom depth greater than 80 to 90 metres. Hydrogen sulphide was found from 125 metres and deeper in eastern Baltic Proper and from 90 metres and deeper in western Baltic Proper.

The next expedition is scheduled for May 31th to June 5th, 2010.

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

Adress:
Swedish Meteorological and Hydrological Institute, SMHI
Sven Källfelts gata 15
SE-426 71 Västra Frölunda, SWEDEN

Phone:
+46 11 495 8000
Telefax:
+46 31 751 8980

Mail:
Firstname.lastname at smhi se
www:
www.smhi.se

PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Göteborg on May 3rd and ended in same port on May 8th.

At 23 visited stations full hydrography sampling was performed. CTD-sampling was made at 3 stations.

The weather during the week was calm and sunny. The last days the wind increased.

There was no precipitation during the week.

The Skagerrak

The sea surface temperature at visited stations in Skagerrak were normal or for the season, lowest measured temperature was 7.1 °C (**P2**) and highest temperature was 9.0 °C (**Släggö**).

Sea surface salinities were at the normal. The lowest value measured was at **Släggö** and was found to be 23.8 psu. The highest value, 30.1 psu was found at **Å15**.

All nutrients from the surface layer, analyzed from stations just outside the Swedish coast (**P2** and **Släggö**), were normal for the season. Silicate was slightly enhanced at **Släggö**. Offshore stations in central parts of Skagerrak (**Å13-Å17**) also showed normal values.

At the coastal area stations (**P2** and **Släggö**) phosphate concentrations near surface were 0.09 µmol/l and 0.06 µmol/l respectively. At stations in the central parts of Skagerraks lowest value was found to be 0.02 µmol/l (**Å13**) and the highest value 0.10 µmol/l (**Å17**).

Near surface ∑ nitrite+nitrate concentrations at the coastal station **P2** were below detection limit (0.10 µmol/l). At **Släggö** the concentration was 1.10 µmol/l. Sampling from central parts of Skagerrak stations also gives concentrations below detection limit.

Silicate levels at coastal **P2** was found to be 0.2 µmol/l and at **Släggö** silicate level were 7.1 µmol/l. Samplings analyzed from the remainder of Skagerrak stations showed silicate concentrations varying between 0.2 µmol/l (**Å15** and **Å17**) and 0.3 µmol/l (**Å13**).

Secchi depth at the coastal area stations (**Släggö** and **P2**) were 5 m and 10 m respectively. At station **Å13** in the central part of Skagerrak secchi depth was found to be 6 m.

The Kattegatt the Sound

Sea surface temperature at visited stations in Kattegatt was at the normal or slightly enhanced compared to normal, the lowest recorded value was 8.6°C (**Anholt E**) and the highest value was 8.8°C (**N14 Falkenberg**). In the Sound (**W Landskrona**) sea surface temperature was normal for season and was found to be 8.1°C.

Sea surface salinities at the Kattegatt stations were normal or over the normal (**Fladen**). At coastal station **N14 Falkenberg** the sea surface salinity were lower than normal. Highest value was 25.8 psu at **Fladen** and the lowest was 17.8 psu at **N14 Falkenberg**. In the Sound (**W Landskrona**) the value was 10.7 psu.

In Kattegatt and in the Sound the halocline was situated between 10 and 15 metres.

Argos ADCP showed a north going water velocity in the Sound, indicating an ongoing outflow from the Baltic Sea to Kattegatt.

All analyzed nutrients taken from the surface layer in Kattegatt and in the Sound indicated levels near the normal for the season.

Lowest concentration of phosphorus in the Kattegatt surface waters was 0.03 µmol/l (**Fladen** and **N14**). Highest analyzed value was 0.04 µmol/l (**Anholt E**). At **W Landskrona** phosphorus concentration in the surface water was 0.2 µmol/l.

Near surface ∑ nitrite+nitrate concentrations values were below detection limit (0.10 µmol/l) in the whole area.

Finally, silicate levels at stations **Fladen** and **Anholt E** were 0.6 µmol/l and 0.3 µmol/l respectively. At **N14** Falkenberg silicate level was found to be 1.9 µmol/l. In the Sound at **W Landskrona** silicate levels was 4.3 µmol/l.

This expedition also showed oxygen values lower than normal in the deepwaters of the area. Lowest oxygen values (3.6 ml/l) was observed in the deep waters of the Sound (**W Landskrona**). The concentration is equal to an oxygen saturation of 56 %. At all other stations values were over 4 ml/l.

Secchi depth in Kattegatt was 9.5 metres (**Anholt E**). At **W Landskrona**, in the Sound, Secchi depth was found to be 9 metres.

*Mean and standard deviation for **N14 Falkenberg** is **not** based on data from SMHI.*

The Baltic Proper

At visited stations in Baltic Proper, sea surface temperature was normal for the season. Lowest recorded value was 4.2°C (**BY15** and **BY38**) and highest value was 6.3°C (**BY1**).

Salinity measured in the surface water was below at stations **BY32**, **BY38** and **REFM1V1**. At all other visited stations in Baltic proper values were found to be normal.

A weak thermocline was found between 15 and 20 metres at stations in southern and north-western Baltic Proper.

In Arkona basin (**BY1** and **BY2**) the halocline was found between 30 and 40 metres, in the remainder of the Baltic proper it was found between 60 and 80 metres.

The silicate concentration was below normal in north-western and western Baltic propert. Rest of the stations in the Baltic Proper showed normal levels. The other nutrients analyzed showed normal values throughout the whole area.

Phosphorus concentration in near surface waters in Baltic Proper showed values between 0.1 µmol/l (**BY2**) and 0.3 µmol/l (**Hanöbukten**).

Near surface ∑ nitrite+nitrate concentrations values were below detection limit (0.10 µmol/l) in the area.

Silicate concentration at the near shore station **REFM1V1** was found to be 5.5 µmol/l. Sea surface samples analyzed for silicate concentrations from all other visited stations in the Baltic Proper showed values from 4.9 µmol/l (**BY2**) to 8.6 µmol/l (**BY5**).

A higher value of hydrogen sulphide compared to normal, was found at visited stations in eastern Baltic proper, **BY10**, **BY15** and **BY20.**

At station BCSIII-10 a thin layer of more oxygenated water compared to levels above, was found. Oxygen level was 2.2 ml/l compared with 0.4 abowe.

Oxygen values below 2 ml/l were found at all visited stations in Baltic Proper with bottom depth greater than 80 to 90 metres. Hydrogen sulphide was found from 125 metres and deeper in eastern and in north-eastern Baltic Proper (**BY10, BY15** och **BY20**) and finally from 90 metres and deeper in western (**BY32**) and south-western Baltic Proper (**BY38**).

The Secchi depth never exceeds 10 metres. The lowest value was found to be 8 metres at (**BY20**).

PARTICIPANTS

Arne	Svensson	Chief scientist	SMHI Oceanographic lab
Martin	Hansson		-”-
Sari	Sipilä		-”-
Bodil	Thorstensson		-”-
Bengt	Yhlen		-”-

APPENDICES

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

Plots

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

*Mean and standard deviation for **N14 Falkenberg** is **not** based on data from SMHI.*

"Normal" values are values within ± 1 standard deviation compared with mean values taken from the period 1995 - 2004