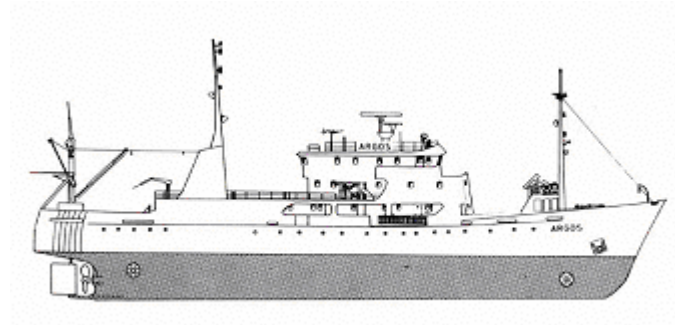


## CRUISE REPORT FROM R/V ARGOS



**Survey period:** 2009-03-15 - 2009-03-20

**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 Baltic Proper, the Sound, the Kattegat and the Skagerrak.

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

The early spring bloom has finished in the Skagerrak and Kattegat. Surface nutrient concentrations were still low. The spring bloom had not really started in the Baltic Proper and nutrient concentrations were normal, with the exception of phosphate which was high, particularly in the southern Baltic. An algal bloom was observed in the Kalmar Sound. Surface water temperature was normal in the whole area.

Below the halocline in the Arkona Basin, the water was well oxygenated with levels of ca. 8 ml/l. In the remainder of the Baltic Proper, oxygen concentrations below 2 ml/l were observed at depths exceeding 80 to 100 metres.

Hydrogen sulphide was found deeper than 100-150 metres in the Western Gotland Basin while in the eastern Gotland Basin hydrogen sulphide began at depths between 125 and 150 metres.

The next expedition will take place between the 14<sup>th</sup> and 19<sup>th</sup> April.

## **PRELIMINARY RESULTS**

The cruise, part of SMHI's ordinary monitoring programme, began in Karlskrona on March 15<sup>th</sup> and ended in Göteborg March 20<sup>th</sup>. At the beginning of the expedition wind speeds were moderate: 9-10 m/s. Wind direction was southerly. In the middle of the expedition the wind veered to the north and increased to gale force: 15-19 m/s. After a day the wind speed decreased in strength, though remained northerly. Air temperature was between 3.5 and 4.5°C.

### **The Skagerrak**

Surface temperatures were between 3.3 and 4.6°C, which is normal for the time of year. Surface salinities were 23-28 psu. In the central Skagerrak salinity was lower than normal. The halocline was found shallower than 10 metres and the early spring bloom was finished.

Surface nutrient concentrations were normal in the monitored region: nitrate concentrations were 1.4-2.9 µmol/l; phosphate 0.11-0.20 and silicate 2.0-2.7 µmol/l. At Släggö the silicate concentration was 6 µmol/l.

A 10 metre thick layer, with peak concentrations of phosphate and nitrate (0.5 and 9-11 µmol/l respectively) was observed at Å13 between 5-15 metres. The layer had a salinity of 32-33 psu, silicate concentrations of 6-7 µmol/l and rather high ammonia concentrations. This layer was also recognisable further south at station P2.

### **The Kattegat and the Sound**

The surface water temperatures were normal for the season: 3.0-3.4°C in the Kattegat and 3.7-4.2°C in the Sound. Surface salinities in the Kattegat were also normal: 20-21 psu. In the Sound, the salinity was higher than normal, at 17 psu. The halocline was found above 10 metres in the north and between 10 and 15 metres in the south.

The spring bloom was also over in the Kattegat, and surface nutrient concentrations were normal in both the Kattegat and Sound. The nitrate concentrations in both the Kattegat and Sound were <0.1 µmol/l (lower than the limit of detection) and 1.7 µmol/l respectively. Silicate concentration was 0.7-0.8 in the Kattegat and 3.7 µmol/l at W Landskrona in the Sound. Phosphate concentrations were 0.06-0.08 in the Kattegat and 0.25 µmol/l in the Sound.

The lowest oxygen concentration in the bottom water was recorded at a depth of 20 metres in the Sound: 5.1 ml/l, corresponding to a saturation of 71 %.

### **Baltic Proper**

Surface water temperatures, which varied from 2.5° (BY32) to 3.4°C (BCSIII-10) were normal for the season. The halocline began at 60 to 70 metres in the Baltic Proper, at ca. 50 metres in the Bornholm Basin and at 30 -35 metres in the Arkona Basin. The thermocline often coincided with the halocline. The concentrations of phosphate in surface waters ranged between 0.7 and 0.8 µmol/l and were higher than normal in the Gotland Basins, south eastern Baltic Proper and Bornholm Basin. In Arkona the phosphate concentration was 0.55 µmol/l. Silicate levels were between 10.8 and 14.1 µmol/l with higher values in western Baltic. Nitrate + nitrite levels were between 1.9 and 3.9 µmol/l; lowest in southern Baltic and highest at the Fårö Deep. In the Arkona Basin the nitrate concentration was 0.6-0.8 µmol/l and the CTD indicated a chlorophyll fluorescence of 3 mg/m<sup>3</sup>, which could be seen as the beginning of an algal bloom. Oxygen was oversaturated from the surface down to 20 metres.

The water below the halocline in the Arkona Basin was well oxygenated with levels of c.a. 8 ml/l. In the rest of the Baltic Sea oxygen concentrations below 2 ml/l were observed at depths exceeding 80 to 100 metres.

Hydrogen sulphide was found deeper than 100-150 metres in the Western Gotland Basin. In the eastern Gotland Basin hydrogen sulphide began at depths between 125 and 150 metres.

### **Coastal stations**

At the station Ref M1V1 in the Kalmar Sound an obvious algae bloom was evident. It was most likely a diatom bloom. CTD Fluorescence showed values of 6 mg/m<sup>3</sup> from the surface down to 12 metres. Nitrate concentrations were lower than normal, while silicate levels were higher than normal. Oxygen saturation was 106 %. Surface water temperature was 1.1°C.

## PARTICIPANTS

Name		From
Bodil Thorstensson	Chief scientist	SMHI Oceanographic laboratory.
Kristin Andreasson		-“-
Johan Håkansson		-”-
Jenny Lycken		-”-
Anna-Kerstin Thell		-”-
Bengt Yhlen		-”-

## 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