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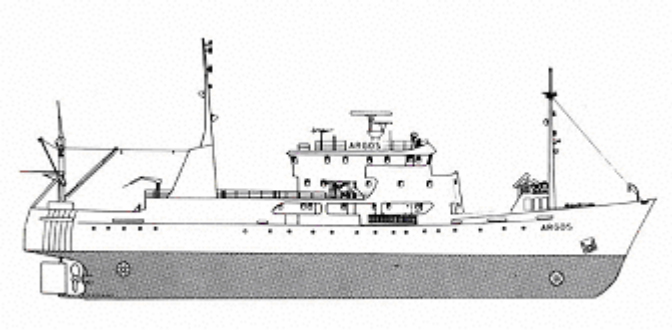
# CRUISE REPORT FROM R/V ARGOS



**Survey period:** 2009-07-27 - 2009-08-01

**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.
Data presented in this report have been subject to preliminary quality control procedures only.
Surface water temperatures were normal in the whole area.
Nutrient concentrations were normal in the whole investigated area, with the exception of phosphate that showed elevated levels in the Arkona Basin.
The water below the halocline in the Arkona Basin showed values just above 2 ml/l. In the rest of the Baltic Proper oxygen concentrations below 2 ml/l were observed at depths exceeding 60 to 80 meters. Hydrogen sulphide was found, in the Western Gotland Basin, deeper than 70-80 meters. In the eastern Gotland Basin hydrogen sulphide began at depths between 100 and 125 meters.

Next expedition will take place August 17-22.

**Algal report (Pdf)**

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# PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Göteborg on July 27 and ended in the same port August 1. The winds during most of the expedition were weak to moderate. Zooplankton samples were taken as part of the Bazooca project, studying the occurrence of the comb jelly Mnemiopsis.

## The Skagerrak

Surface temperatures were normal for the season and varied between 16.8-17.5$^{o}$C. Surface salinity was about 32 psu in the whole area, which is normal for the central- and western parts, but above mean in the eastern area. Close to the coast, thermocline and halocline were weakly developed and found at depths between 50 and 80 metres. Further west thermocline and halocline were well developed and located at depths between 10 and 20 metres.
Nutrient concentrations in the surface layer were, for the season, normal throughout the area. Inorganic nitrogen components were consumed (< 0.10 µmol/l), phosphate concentrations varied from below detection limit (<0.02 µmol/l) to 0.07 µmol/l and silicate between 0.3 and 0.9 µmol/l.

The diversity of phytoplankton was low except at Släggö where for example *Prorocentrum micans* and the genus *Pseudo-Nitzscha* vere common. The water column was well mixed except for Å17 where a chlorophyll fluorescence maximum at 30-40 meters was found and dominated by the genus *Ceratium*.

## The Kattegat and the Sound

Surface water temperatures were normal for the season, between 17.5 and 18.2°C, lowest in the northern parts of Kattegat and highest in the Sound. Surface salinities varied from 20.5 psu in the southern Kattegat to 25.8 psu in the northern part. Salinity in the Sound was 13.5 psu, which is above normal. The halocline and thermocline were found at 15 to 20 metres depth.
All nutrients showed normal concentrations: inorganic nitrogen was below detection limit while phosphate varied between 0.03 and 0.09 in Kattegat and 0.19 µmol/l in the Sound. Silicate concentrations varied between 0.2 and 0.6 µmol/l in the Kattegat, while the concentration in the Sound was about 2.7 µmol/l.
The lowest oxygen concentration in the bottom water was recorded in the Sound, at 3.88 ml/l, which corresponds to a saturation of 56%.
The diversity of phytoplankton was overall high in the Kattegat. The diatom *Proboscia alata* dominated at all stations. Chlorophyll fluorescence maximum was noted at Anholt E and W Landskrona. The peak mainly consisted of *Ceratium longipes* and *Guinardia flaccida* respectively.

## Baltic Proper

Surface temperatures were normal for the time of year, and varied between 17.5° and 18.5°C. The halocline started at 60 to 70 metres in the central Baltic, at 40 to 50 metres in the Bornholm Basin, and at 30 to 40 metres in the Arkona Basin. The thermocline was found between 20 and 25 metres. Phosphate concentrations in the surface water varied between 0.06 and 0.20 µmol/l – highest in the Arkona Basin, normal elsewhere. The sum of nitrite and nitrate in the surface waters were normal, being under the detection limit (< 0.10 µmol/l) throughout the study area. Silicate levels varied between 7.8 and 10.1 µmol/l: lowest in Arkona and highest (and higher than normal) in the eastern and western Gotland Basin.
Oxygen concentrations below the halocline were just above 2 ml/l in the Arkona Basin. In the remainder of the Baltic Proper, oxygen concentrations below 2 ml/l were found below 60 to 70 metres. Hydrogen sulphide was found below 70 – 80 metres in the West Gotland basin, while in the East Gotland Basin, hydrogen sulphide started below 100 and 125 metres.

Small accumulations of cyanobacterium were observed east of BY5. These accumulations persisted more or less until BCS III-10. No aggregations where however found north of the stations and up to the northeast of Gotland. Both *N. spumigena, Aphanizomenon* spp. and *Anabaena* spp. was however still found in surface and integrated samples. The amount of *N. spumigena* and *Aphanizomenon* spp decreased going southwest of Gotland and in the Kalmar sound whereas *Anabaena* spp. increased slightly southwardly.

**Coastal stations**

Temperature at Ref M1V1 in the Kalmar Sound was somewhat higher than normal. All other parameters were, at the coastal stations, normal for the time of year.

## PARTICIPANTS

| Name | | From |
|---|---|---|
| Lars Andersson | Chief scientist | SMHI Oceanographic laboratory. |
| Marie Johansen | | -”- |
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| Matilda Haraldsson | | Göteborg University |
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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