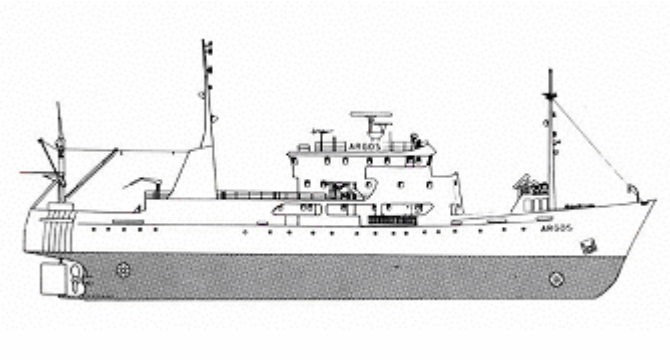
Arne Svensson
Ann-Turi Skjevik

**Swedish Meteorological and Hydrological Institute**
**Oceanographical Laboratory**

2005-08-13
Dnr: Mo-2005-179

# CRUISE REPORT FROM R/V ARGOS



**Survey period:** 2005-08-08 - 2005-08-13

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

**Principal:** SMHI

## SUMMARY

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

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

Nutrient concentrations in the Skagerrak and Kattegatt were normal.
Phosphate concentrations in the surface water of the Arkona and Bornholm Basins remain higher than normal.

Oxygen concentrations below 2 ml/l were found at depths exceeding 70 – 80 metres in the entire Baltic proper. Hydrogen sulphide was found in the bottom water in the Hanö Bight and the Bornholm Basin, in the eastern Gotland Basins at depths exceeding 200 metres and in western Gotland Basin at depths exceeding 80 - 90 metres.

No cyanobacteria (blue-green algae) were observed in Baltic Proper and analysis showed only dead or dying cells.

*The next expedition is scheduled for August 8 to 13, 2005.*

**Address:**
Nya Varvet 31
SE-426 71 Vastra Frolunda
SWEDEN

**Telephone:**
+46 11 4958000
**Telefax:**
+46 31 7518980

**E-mail:**
shark@smhi.se
**WWW:**
http://www.smhi.se/

# PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Gothenburg on the 8th of August and ended in the same port on the 13th of August.

Supplementary phyto-plankton sampling was done at all stations in the Baltic Proper on commission of Ulf Larsson, SMF, Stockholm University.

The week started with weak to moderate winds initially from the south or from southwest. A low pressure centred in the south west of Baltic gave waves up to sex metres, gale and heavy rainfall, in the middle of the week. Air temperature varied between 15 to 20 °C during the cruise.

## The Skagerrak

Surface water temperature varied between 14.4 °C in centre of Skagerrak and 17.8 °C at stations near the coast. Lowest surface salinity was 23.2 psu near the coast and 32.3 psu furthest offshore.

All nutrients had low concentrations, typical for the time of the year.

Secci depth varied between 9 and 10 metres.

High peaks of chlorophyll fluorescence, and by implication chlorophyll-a concentration, were recorded between 10 and 20 metres at the coast station **Släggö.** An integrated surface water sample (0-10 metres) was analysed and was dominated by dinoflagellates, especially *Prorocentrum micans*. A few cells of the potentially toxic specie *Dinophysis acuta* were observed. A very few cells of diatoms were observed.

Relatively high peaks of chlorophyll fluorescence at 14 meters were also recorded at **Å13** near the Swedish coast. A sample from that depth was analysed and showed a large number of dinoflagellates. Also here *Prorocentrum micans* dominated. In the sample diatoms were more common compared with the Släggö sample but showed no sign of an early autumn bloom.

## The Kattegat and the Sound

Surface temperature had recovered from the high values during last cruise. during this week temperatures between 17.5 °C and 18.0 °C were recorded. Surface salinities varied between 9.3 psu at the southern Kattegat and the Sound to 21.3 psu in the northern Kattegat.
The halocline was located at 15 - 20 metres in the Kattegat. Thermocline was somewhat deeper, 20 - 30 metres. Both thermocline and halocline were found at 15 metres in the Sound.

Secci depth was 10 metres in the area.

Surface nutrient concentrations in the Kattegat were normal for the season. Phosphate concentrations were 0.03 - 0.07 µmol/l, silicate varied between 0.2 - 0.6 µmol/l. In the Sound phosphate and silicate concentrations remain elevated, 0.45 µmol/l and 10.3 µmol/l, respectively.

An outflow, throw the Sounds, was going on during the whole cruise.

## Baltic Proper

Surface water temperature varied between 16.0 °C and 17.7 °C, which is normal for the season. Surface salinities were normal for the season.

Halocline was found at normal depths of 35 - 40 metres depth in the Arkona Basin and at 65 - 80 meters in rest of Baltic Proper. A well developed summer thermocline were recorded at 10 - 20 metres in eastern Gotland Basin and in the Hanö Bight. At all other stations the thermocline was found at 20 - 30 metres.

Secci depth in Baltic Proper varied between 5 metres and 7 metres.

Surface phosphate concentration remains high in Bornholm Basin, Arkona Basin and Hanö Bight. Elevated values were also recorded in south east of the Baltic Proper. In first-mentioned areas the values are still similar to normal winter values, 0.40 - 0.50 µmol/l. At **BCSIII-10** in south-east of the Baltic Proper the surface phosphate concentration was 0.25 µmol/l. Remaining Baltic Proper stations showed values normal for the season, near 0.06 µmol/l. Silicate concentrations had recovered from the high values observed during earlier cruises and were normal for the season. Nitrate concentrations in surface water was below detection limit, 0.10 µmol/l, at all stations.

Oxygen concentration below 2 ml/l were found at bottom in the Arkona Basin and at depths exceeding 80 metres in the Baltic Proper. Only station **BCSIII-10** in the south east of Baltic Proper showed bottom values above 2 m/l. Hydrogen sulphide was found in bottom waters of the Bornholm Basin and in the Hanö Bight. Hydrogen sulphide was also found at depth exceeding 200 metres in east Gotland Basin and exceeding 80 - 90 metres in west Gotland Basin.

A water sample from a relatively low chlorophyll fluorescence peak taken at 10 metres at **BY20** in east Gotland Basin was analysed. The sample showed a small number of dying *Aphanizomenon* cells and a even smaller number of dinoflagellate species *Dinophysis*.

Analyses from the Hanö Bight showed same value chlorophyll fluorescence peak as **BY20** but here the maxima were extended between 5 metres and 15 metres. Analyses showed traces from this summer's blue-green algae bloom. Sample showed large numbers of the species *Anabaena* and *Aphanizomenon.* Also the potentially toxic species *Nodularia spumigena* were observed but in smaller amounts. The low chlorophyll fluorescence value and the aggregation of the cells implicate that the cells were dead and the bloom was over.

*The next expedition is scheduled for August 8 to 13, 2005.*

## PARTICIPANTS

| Name | | From |
|---|---|---|
| Arne Svensson - Sjöquist | chief scientist | SMHI Oceanographic lab. |
| Sara Johansson | | -”- |
| Sari Sipilä | | -”- |
| Tuulliki Jaakko | | -”- |
| Ann-Turi Skjevik | | -’’- |

## 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