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Swedish Meteorological and Hydrological Institute
Oceanographical Laboratory

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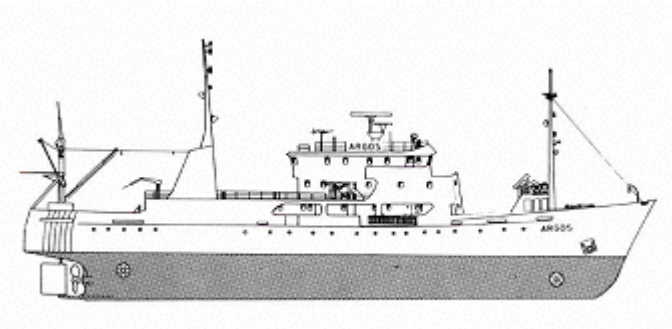
CRUISE REPORT FROM R/V ARGOS



Survey period: 2010-03-14 - 2010-03-19

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

Principal: SMHI

SUMMARY

The expedition was part of 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.

Surface water temperatures were below normal in the central Skagerrak and in the Kattegat and Baltic Proper.

Surface nutrient concentrations were low in the Skagerrak and Kattegat. Otherwise surface nutrients were normal in most areas with the exception of phosphate concentrations, which were above normal in the Arkona- and Bornholm Basins.
Oxygen concentrations below 2 ml/l were found at depths exceeding 60-90 metres in the Baltic Proper, except in the Bornholm Basin.
Hydrogen sulphide was found in the eastern and western Gotland Basins.

The next expedition is scheduled for April 12 to 17, 2010.

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PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Karlskrona on March14th and ended in Göteborg/Gothenburg on March 19th.
Two scientists from the University of Gothenburg studied the occurrence of the comb jelly Mnemiopsis. Current measurements (by ADCP) were made along a transect in the Bornholm Basin on behalf of NordStream AG.
During the expedition winds were mainly north-westerly and with speeds of 8-10 m/s. Several days had sunshine. During the final day the wind backed south-westerly and increased to 12-13 m/s.

The Skagerrak

Surface water temperatures were below normal (except coastal area) and varied between 1.9 and 3.0°C throughout the area. Surface salinities were normal, varying between 29-30 psu. The halocline and thermocline were very well defined and were both found at 8-10 metres depth. Surface nutrient concentrations were low: Phosphate concentrations varied from 0.05 to 0.10 µmol/l. and silicate concentrations between 0.1-0.2 µmol/l. At Släggö, at the mouth of the Gullmar Fjord, these increased to 0.14 and 0.7 respectively. The sum of nitrite + nitrate was below detection limit (<0.10 µmol/l) except at Släggö, where the concentration was 0.16 µmol/l. A strong phytoplankton bloom was ongoing just below the halocline across the whole area.

The Kattegat and the Sound

Surface water temperatures were below normal. Surface temperatures in the Kattegat were between 1.1 and 2.2°C, while in the Sound the temperature was 1.7°C. Surface salinities in the Kattegat varied between 21.6 and 25.9 psu. The salinity at W Landskrona in the Sound was 11.8 psu. Halocline and thermocline both started at ca 8 to 12 metres depth.
Surface nutrient concentrations were low for the season: nitrite + nitrate varied between <0.1, the limit of detection, and 0.15 µmol/l; phosphate concentrations varied between 0.08 and 0.09 µmol/l and silicate concentration was 0.7µmol/l. In the Sound, nutrient concentrations were closer to the seasonal average: phosphate 0.33 µmol/l, silicate 8.7µmol/l and sum of nitrite + nitrate 1.4µmol/l. A fluorescence peak was observed at 10 – 12 metres depth at Fladen, although the spring bloom in other areas of Kattegat and the Sound appears to be over.
The lowest oxygen concentration was observed at W Landskrona in the Sound, in the bottom water extending from 25 metres to the bottom: 3.95 ml/l corresponding to a saturation of 59%.

Baltic Proper

Surface water temperatures were normal or below normal for the season, varying between 0.3 °C at the Fårö Deep and 1.5°C in the Bornholm Basin. Surface water temperature in the Kalmar Sound was below zero. The halocline generally began at 40 to 50 metres and the thermocline at circa 40 metres, although at Arkona and the Fårö Deep, they were shallower, at 20-30 metres.
Surface phosphate varied between 0.55 and 0.70 µmol/l. This is higher than normal in the Arkona- and Bornholm Basins and in the Gotland Deep, but otherwise normal. Surface nitrite + nitrate were normal, between 1.8 and 4.0 µmol/l. Surface silicate was slightly above normal in the Arkona- and Bornholm Basins, at 11.6-14.9 (in Kalmar Sound 18) µmol/l.
The bottom water of the Arkona Basin was well oxygenated with concentrations exceeding 8 ml/l. The oxygen situation in the Bornholm Basin was also good. In the western and southeastern Baltic oxygen concentrations below 2 ml/l were found at depths from 70-90 metres. In the eastern Gotland Basin oxygen concentrations below 2 ml/l were observed at depths exceeding 60 to 90 metres. Hydrogen sulphide was found deeper than 80 –100 metres in the western Gotland Basin. In the eastern Gotland Basins, hydrogen sulphide began at depths of 130 to 150 metres.
Phytoplankton activity was low throughout the study area.

PARTICIPANTS

Name		From
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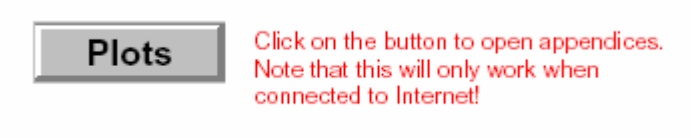
Philip Axe		-”-
Sara Johansson		-"-
Sari Sipilä		-”-
Anna-Kerstin Thell		-"-
Björn Becker		SMHI Norrköping
Matilda Haraldsson		University of Gothenburg
Christine Röllike Ditlefsen		-”-

APPENDICES



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