

Report from the SMHI monitoring cruise with R/V Aranda



Survey period: 2014-03-17 - 2014-03-24
Survey area: Skagerrak, Kattegat and the Baltic Proper
Principal: SMHI and the Swedish Agency for Marine and Water Management

SUMMARY

The expedition was part of the Swedish regular marine monitoring programme and covered the Skagerrak, Kattegat and the Baltic Proper. Data presented in this report have been subject to preliminary quality control procedures only.

In the Skagerrak and Kattegat, surface nutrient was normal for the season in most of the investigated places. In the Baltic Proper, except the Arkona Basin, the concentrations of phosphate and silicate were higher than normal. The oxygen concentrations in the bottom water in the Hanö Bight and the Bornholm Basin had increased since the last measurement and were above acute hypoxia. In the Western, Northern and northern part of Eastern Gotland Basins the oxygen situation was unchanged. At the station BY15 Gotland Deep you could see decreased concentration of hydrogen sulphite. Oxygen free conditions, anoxia, were found from 100 – 125 meters depth and acute hypoxia from 70 – 90 meters depth in the Western, Northern and Eastern Gotland Basins. The spring bloom was ongoing in the Western part of Skagerrak and in the Southern part of Baltic Proper.

The next cruise will begin on 25th of April and will cover the Skagerrak, Kattegat and the Baltic Proper.

PRELIMINARY RESULTS

The cruise, which was the first in-house with the Finnish research vessel Aranda, began in Helsinki on March 17th and ended in Nynäshamn on March 24th. A short visit was made to the port of Lysekil for loading of complementing equipment and to take ashore some samples. Winds were weak in the beginning and the end of the expedition and moderate in the middle, wind direction varied. The air temperature varied between -1 and 9°C.

The Skagerrak

Surface temperatures were normal for the season and varied between 5.3 and 5.7°C. The salinity in the surface layer varied between normal to slightly above normal, varying from 27.5 psu close to the coast to 31.2 psu in the southern part. The halocline and the thermocline was weak developed in the whole area except in the western part where it was well developed and was found at 10 – 70 meters depth.

Nutrient concentrations showed normal values for the season. Phosphate concentrations were between 0.07 and 0.28 µmol/l, silicate varied from 1.0 to 5.3 µmol/l, while the sum of nitrite + nitrate had concentrations between 2.1 – 6.5 µmol/l.

Fluorescence measurements showed an ongoing spring bloom in the western part of the area.

The Kattegat and the Sound

Surface water temperatures were slightly above normal and varied between 5.3 and 5.7°C. The salinity of the surface water was above normal, 22.4 – 31.4 psu, in the Sound 21.8 psu. Thermocline and halocline coincided at depths between 15 and 25 meters and was weak developed.

All nutrients in the surface layer showed, for the season, normal to under and above normal values. Phosphate concentrations, below normal in the Sound, were between 0.03 and 0.21 µmol/l. The amount of nitrite + nitrate, above normal in the northern part, varied from below the detection limit (< 0.10 µmol/l) to 6.3 µmol/l. Silicate values were in the range 0.4 to 3.3 µmol/l, below normal in the Sound.

The fluorescence measurements showed that the spring bloom was over for this time.

The oxygen situation in the deep water was good. The lowest oxygen concentration in the Kattegat area, 5.2 ml/l, was measured at the station Anholt E. In the Sound, 5.5 ml/l was registered at W Landskrona.

The Baltic Proper

Surface temperatures were normal for the season, varying between 2.8 - 4.0°C. The surface layer of the Baltic Proper was well mixed, both thermocline and halocline was found at about 50 - 80 meters depth in the Northern, Western and Eastern Gotland Basins, at 50 meter in the Bornholm basin and at 30 meters depth in the Arkona Basin.

The concentrations of phosphate and silicate were higher than normal in the whole area except for the Arkona Basin where they were lower than normal. Phosphate concentrations varied between 0.15 – 0.77 µmol/l and silicate concentrations were between 1.3 and 15.6 µmol/l. The amount of nitrite + nitrate was normal, except in the Arkona Basin where the amount was lower than normal, varying between < 0.10 and 3.4 µmol/l.

In the Arkona Basins bottom water, the oxygen situation was still very good. In the Bornholm Basin and in the Hanö Bight, oxygen concentrations in the bottom water had increased since the last measurements to above acute hypoxic conditions (< 2 ml/l). At the station BCSIII-10, the situation had worsened, and was now only 0.27 ml/l in the bottom water. North of BCS III-10, at BY15 Gotland Deep an early inflow was shown that the amount of hydrogen sulphite in the bottom water



has decreased. In the Western, Northern and the northern part of the Eastern Gotland Basins the oxygen situation was the same as at the last measurements. Completely oxygen free conditions, (anoxia) were found from 100 - 125 meters depth in the Western, Eastern and Northern Gotland Basins and acute hypoxia from 70 – 90 meters depth.

In the Arkona, Bornholm Basin and in the Hanö Bight the spring bloom was ongoing with high fluorescence. In remaining areas plankton activity was low.

PARTICIPANTS

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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