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Report from SMHIs monitoring cruise on board KBV001 Poseidon

Survey period: 2012-04-10 to 2012-04-16
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, the Kattegat, the Sound and parts of the Baltic Proper. Data presented in this report have been subject to preliminary quality control procedures only.

In the Skagerrak and Kattegat, the situation was normal for the season. In the Sound, phosphate and silicate concentrations were much higher than normal. In the Baltic Proper the spring bloom was underway, but the concentrations of phosphate and silicate were still much higher than normal. The inflow that occurred in November/December 2011 was still apparent in the southeastern part of the Baltic Proper. Hydrogen sulphide was found in the western and eastern Gotland Basins at depths exceeding 100-150 metres. Oxygen concentrations below 2 ml/l were found at depths exceeding 80-85 metres in the western Gotland Basin and from 70-85 metres in the eastern Gotland Basin. No hydrogen sulphide was detected in the southern part of the western Gotland Basin. Oxygen conditions in the Arkona Basin were very good and in the Hanö Bight it was good.

The next expedition will take part in mid-May.

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PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Göteborg on April 10th and ended in the same port April 16th. Winds during the expedition were fresh to strong during the first day. During the rest of the cruise winds were weak to moderate with fog or sleet. The sun showed through on the last day of the cruise. Due problems obtaining the necessary permits in time, some stations in Danish, Polish and Latvian waters had to be excluded. Nearby positions in Swedish waters were occupied instead where possible.

The Skagerrak

Surface water temperatures were normal and varied between 5.0 and 5.8°C. Surface salinities were also normal, varying between 25 and 31 [psu]. The thermocline was weakly developed, except in the offshore Skagerrak where the thermocline and halocline coincided at 20 metres depth. At the coastal stations the halocline was found at a depth of 15 metres.
Nutrient concentrations in the surface layer were normal for the season and had increased somewhat compared to the previous measurement in March.
Phosphate concentrations varied from 0.05 to 0.13 µmol/l. The sum of nitrite + nitrate varied from 0.13 to 1.82 µmol/l while the silicate concentration varied between 1.2 and 3.1 µmol/l. The spring bloom was over at coastal stations but remains of the bloom could be seen in the offshore Skagerrak as a fluorescence maximum in the surface layer. Oxygen saturation in the surface layer was lower than normal which also suggests that the spring bloom had passed.
Oxygen conditions in the offshore deep water were good. At the coastal station Släggö oxygen concentrations in the bottom water were lower than normal.

The Kattegat and the Sound

Surface water temperatures were normal, varying from 4.8 to 5.3°C. Surface salinity was also normal, 19-22 [psu] except at the coastal station N14 Falkenberg, where it was below normal. The halocline and thermocline were both found at depths between 15 to 20 metres. The thermocline was weak.
Nutrient concentrations were normal or slightly below normal for the season in the Kattegat, while in the Sound, silicate and phosphate levels were elevated.
Phosphate concentration varied between 0.07 and 0.55 µmol/l. The sum of nitrite+nitrate varied from below the detection limit (< 0.10µmol/l) to 0.26 µmol/l and the silicate concentration varied from 1.2 to 9.4 µmol/l.
Plankton activity was low in the whole area, which could be seen in the oxygen saturation which was lower than normal. Oxygen concentration in the deep water was lower than normal, with around 4-6 ml/l at all stations.

Baltic Proper

Temperature in the surface water was normal at all stations and varied between 2.9 and 3.9°C. The thermocline and halocline were found at a depth of 30-40 metres in the Arkona Basin, 60 metres in the Hanö Bight and at 60 – 70 metres in the central parts of the Baltic Proper.
Nitrite+nitrate concentrations were normal in the surface waters and varied from below the detection limit to 2.83 µmol/l. Concentrations were lowest in southwest and highest in the northeast.
Phosphate concentration was higher or much higher than normal throughout the area, except in the Kalmar Sound where concentrations were normal. Phosphate concentration varied between 0.38 and 0.71 µmol/l. Silicate concentration was also well above normal in the areas mentioned above and varied between 6.2 and 14.7 µmol/l.

The bottom water of the Arkona Basin was well oxygenated with concentrations exceeding 6.6 ml/l. The Hanö Bight was also oxygenated with concentrations above 2.8 ml/l.
The oxygen conditions in the southern part of western Gotland Basin were improved and no hydrogen sulphide was found at the bottom. In the West Gotland Basin, oxygen concentrations below 2 ml/l were found at depths exceeding 80-85 metres, while in the eastern Gotland Basin these were found at depths exceeding 70-75 metres. Hydrogen sulphide was found in the northern part of Gotland Basin from 150 metres deep and in the western part from 100-125 metres.
The inflow that occurred in late 2011, which improved the oxygen conditions in the Hanö Bight, the Arkona Basin and the Bornholm Basin, was still apparent in the southeast part of the eastern Gotland Basin, and could be perceived at intermediate depths at BY10W. At the station BY9W, the inflow was observed at a depth of 95 to 105 metres, with oxygen concentrations of 1.3 ml/l.
The spring bloom was in progress throughout the area, which showed as increased fluorescence above the pycnocline and high oxygen saturation in the surface waters.

PARTICIPANTS

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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