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Report from SMHIs monitoring cruise on board KBV001 Poseidon

Survey period: 2012-05-09 to 2012-05-16
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 Skagerrak and Kattegat, nutrient conditions were normal for the season, with the exception of silicate, that in Kattegat showed elevated concentrations. In the Sound, both phosphate and silicate levels were much higher than normal. In the Baltic Proper concentrations of phosphate and silicate were high, while inorganic nitrogen showed normal values in the whole area. Spring bloom was ongoing in large areas of the Baltic proper, while it in some parts was at its end.
Oxygen concentrations below 2 ml/l (hypoxia) were found at depth exceeding 80-90 meters in parts of the Bornholm Basin as well as in the Eastern- and Western Gotland Basins. Hydrogen sulphide was measured in the northern parts of the Eastern and Western Gotland Basins, from 100 to 125 meters depth.
The effects of the inflow that occurred in November/December 2011 was still seen in the south-eastern part and could also be seen in the southern part of the Eastern Gotland Basin. Oxygen conditions in the Hanö Bight, Arkona- and Bornholm Basins had worsened since the last measurements in April.

The next expedition will probably take place in July.

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SMHI

PRELIMINARY RESULTS

The cruise, part of SMHI´s ordinary monitoring programme, began in Göteborg on May 9th and ended in the same port May 16th. Winds during the expedition were mainly week to moderate, with the exception of one day during the middle of the cruise, when they were strong. Wind directions between south and west dominated. Due to permits not granted, to enter Latvian waters, some stations had to be moved into Swedish EEZ.

Skagerrak

Surface water temperatures were normal for the season and varied from 8.5°C in the western parts to 9.1°C at the coast. Surface salinities varied from ca. 20 psu close to the coast till 31.7 psu in the central parts. Thermocline and halocline coincided and were found at depths between 5 and 15 meters. The thermocline was weakly developed while the halocline was very distinct, especially close to the coast.
Nutrient concentrations in the surface layer were typical for the season. Concentration of phosphate varied from 0.02 to 0.07 µmol/l, the sum of nitrite/nitrate was below detection limit (<0.10 µmol/l), except at one station in the Baltic Current, were a concentration of 0.82 µmol/l, were measured, probably an influence of water from Göta River. Silicate concentrations varied between 1.4 and 3.5 µmol/l.
Some plankton activity, in the form of a peak in fluorescence at 20 meters depth, could be seen in the central parts.
The oxygen conditions in the offshore deep water were good, while the coastal station Släggö, showed lower oxygen concentration, in the bottom water, than normal (4.3 ml/l).

Kattegat and the Sound

Surface water temperatures were normal, about 9.5°C. Also surface salinities showed normal values, between 15 and 19 psu, in the Sound 9.7 psu. The halocline and thermocline coincided at depths between 10 and 15 metres, both very distinct.
Concentrations of phosphate and nitrite+nitrate, in the Kattegat surface water, were typical for the season, phosphate varied between 0.12 and 0.17 µmol/l, while the concentrations of nitrite+nitrate were below detection limit. Silicate concentrations, on the other hand, were clearly enhanced, varying between 3.6 and 5.3 µmol/l. Also, in the Sound, nitrite+nitrate was below detection limit, while both phosphate and silicate showed elevated levels. Phosphate was measured to 0.5 µmol/l and silicate to 8.6 µmol/l.
Plankton activity was low in the whole area, indicated by fluorescence measurements and oxygen saturation, which was lower than normal.
The lowest oxygen concentration in the Kattegat deep water was measured in the Laholm Bay, 2.90 ml/l. In the deep water of the Sound the concentration at the bottom was 3.95 ml/l.

Baltic Proper

The temperature in the surface water was normal, at all stations visited, increasing from 5.7°C in the north to 7.7°C in the south. Also salinity showed normal values between 6.4 and 7.9 psu. The halocline was found at 30-35 meters depth in the Arkona Basin, 50-60 meters in the Bornholm Basin and Hanö Bight, while it in the central parts of the Baltic Proper was located at depths between 70-80 meters. The thermocline was found at a depth of 10 to 20 metres. Both halocline and thermocline were weakly developed in the south-eastern part and in the southern part of the Western Gotland Basin.
The amount of nitrite+nitrate in the surface layer was normal, below detection limit in the whole investigated area. The concentration of phosphate was much higher than normal in the Hanö Bight,

Arkona- and Bornholm Basins, about 0.5 µmol/l. In the remainder of the Baltic Proper the values were somewhat above normal for the season, ca 0.3 µmol/l. Silicate concentration was well above normal in the Arkona Basin, 10 µmol/l, in the remaining areas 11-13 µmol/l, which is normal or just above mean.

The oxygen conditions in the bottom water of the Arkona Basin were relatively good, 3 to 6 ml/l. Also the bottom water of the Hanö Bight and Bornholm Basin were oxygenated with concentrations between 1 and 2 ml/l. Hypoxia (< 2 ml/l) was found at depth exceeding 80-90 meters in parts of the Bornholm Basin and in the Eastern and Western Gotland Basin.
Hydrogen sulphide was detected, in the northern part of the Eastern and Western Gotland Basins, from 100-125 meters depth.
The effects of the inflow that occurred in late 2011 could still be seen in the south-eastern parts of the Baltic Proper, as well as in the southern part of the Eastern Gotland Basin. Oxygen conditions in the Hanö Bight, Arkona- and Bornholm Basins had worsened since the last cruise in April.
The spring bloom was still in progress in the central and northern parts, which was indicated by high fluorescence and elevated oxygen saturation above the thermocline. In other areas the spring bloom was at its end.

PARTICIPANTS

Anna-Kerstin Thell	Cruise leader	SMHI Oceanographic laboratory
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Sari Sipilä		- ” -
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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