

Report from SMHI's monitoring cruise on board KBV001 Poseidon



Survey period: 2012-02-28 - 2012-03-06
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 the north Kattegat the spring bloom was ongoing and the amount of nutrients was low. The southern parts of the Kattegat and the Sound were influenced by outflowing winter water from the Baltic with high concentrations of nutrients. In the Baltic Proper winter conditions prevailed. The concentrations of nitrite+nitrate were normal while the amount of phosphate were elevated at all stations and much over normal in the southwest parts. Silicate was also elevated in these areas. The inflow that occurred in November/December 2011 had reached the southeast parts of the Baltic Proper and had started to enter the eastern Gotland Basin. Hydrogen sulphide was found in the western Gotland basin from depth exceeding 125 meters and in the north Gotland Basin from 100 meters depth. In the central parts of the eastern Gotland Basin from 80-90 meters depth. The oxygen concentrations below 2 ml/l (hypoxia) was found from depth exceeding 65-75 meters in the eastern Gotland Basin and from 85 meters in the northern and western Gotland Basin

The next expedition will take part in late March.

PRELIMINARY RESULTS

The cruise, part of SMHI's ordinary monitoring programme, began in Göteborg on February 28th and ended in the same port March 6th. Winds during the expedition were weak to moderate. Due to missing permits to enter Danish, Polish and Latvian waters the stations BY15, BY10 and BCSIII-10 had to be moved to Swedish waters to be sampled. Station BY4 and BY5 was excluded. At BY29 the hydrographic winch was inoperative and only the CTD and surface samples could be performed during the rest of the cruise. During the cruise the Coast Guard had to assist a merchant ship that had stranded at Fårösund. Water to QUASIMEME was taken west of Fårö.

The Skagerrak

Surface water temperatures were normal and varied between 3.2 and 3.7°C. Surface salinities were also normal, varying between 26 to 31 psu. The halocline and thermocline coincided at a depth of 10 metres.

All nutrients in the surface layer were lower than normal, hence were more or less consumed by the ongoing spring bloom. The concentration of phosphate and the sum of nitrite + nitrate varied from below the detection limit to 0.12 µmol/l and 1.64 µmol/l, respectively. The amount of silicate was below the detection limit at the offshore stations in Skagerrak while at the coastal station Släggö 0.4 µmol/l was measured. The spring bloom was ongoing in the whole area which was indicated by high fluorescence in the surface layer, low secchi depth, high oxygen saturation and consumed nutrients. The oxygen conditions were good.

The Kattegat and the Sound

Surface water temperatures were normal, varying from 1.7 to 2.7°C. The surface salinity were lower than normal at the coastal station N14. At the remaining stations the salinity was normal and varied from 13 psu in the Sound to 22 at Fladen. The halocline and thermocline were weakly developed and both found at 15 to 25 metres.

Generally, the concentration of nutrients was lower at the northernmost stations compared with the stations in the south due to spring bloom that was ongoing in the northern parts while the southern parts and the Sound were influenced by outflowing winter water from the Baltic.

The concentration of phosphates varied between 0.03 µmol/l in the north to 0.8 µmol/l in the Sound, which for the Sound it much higher than normal. The silicate concentration, 17.3 µmol/l, was also high while the sum of nitrite+nitrate were normal. In the remaining areas the nitrite+nitrate was lower than normal. Oxygen conditions in the deep water was good.

Baltic Proper

The temperature in the surface was normal at all stations. At the coastal station Ref M1V1 the temperature was 0.42 °C. while the offshore temperature varied between 2.0 and 3.2 °C. The thermocline and halocline were found at 25-35 meters depth in Arkona, 50-60 meters depth at Hanö Bight and in the central parts of the Baltic Proper from 60-80 meters. In the southern parts of the western Gotland basin the stratification were weak.

The amount of nitrite+nitrate in the surface was normal and varied between 2.8 and 5.0 µmol/l. The concentration of phosphate was elevated at all stations and much higher than normal in Hanö Bight, the Kalmar Sound and in the Arkona Basin. The concentration were between 0.72 and 1.2 µmol/l. The high concentrations of phosphate in these areas are most likely due to upwelling of deep water since surface salinity and silicate were higher than normal. The silicate concentration was well above normal in the areas mentioned and varied between 15.3 and 24.8 µmol/l. In the remaining parts of the Baltic Proper the silicate concentration varied between 12.4 and 15.7 µmol/l.

The oxygen condition in the southern parts of the western Gotland Basin had improved since the previous visit in December 2011. Hypoxia (< 2 ml/l) was found from depth exceeding 85 meters and no hydrogen sulphide was found. During the previous sampling occasion hypoxia was found from 55 meters depth and hydrogen sulphide was found from depth exceeding 65 meters. The cause of this improvement are probably related to a weak stratification and not because of the inflow that occurred in November/December 2011. Though, the oxygen conditions can worsen quickly if the stratification develops again. This has occurred at a number of occasions during the 2000s.

The inflow that occurred in late 2011, which improved the oxygen conditions in the Hanö Bight, the Arkona Basin and the Bornholm Basin, had now reached the southeast part of the Baltic Proper and started to enter the east Gotland Basin. At the station BY9 W the inflow was observed, in a layer of 10 meters thickness, at the bottom with oxygen concentrations, about 2 ml/l, and a slightly elevated salinity, 11.5 psu.

Hydrogen sulphide was present in the western Gotland Basin from depth exceeding 125 meters and in the northern Gotland Basin from 100 meters depth. In the central parts of the eastern Gotland Basin from hydrogen sulphide was found from depth exceeding 80-90 meters. Hypoxia (< 2ml/l) was found from 65-75 meters depth in the eastern Gotland Basin, from 85 meters in the northern Gotland Basin and in the western Gotland Basin.

The phytoplankton activity was low in the whole area. The CTD fluorescence showed no activity what so ever and high secchi depth, 10-16 meters were noted.

PARTICIPANTS

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APPENDICES



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