

CRUISE REPORT FROM R/V ARGOS

Survey period: 990325-990329

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

Principal: SMHI

SUMMARY

The expedition was performed within SMHI's regular marine monitoring program and covered the Skagerrak, the Kattegat, the Sound and the Baltic Proper. The weather was calm with weak southerly winds. It was mainly sunny weather with temporary fog. The surface nutrient concentrations were still at winter level in the Baltic with the exception of the Bornholm and Arkona basins. The spring bloom had started as was seen from the nitrate and chlorophyll analyses and from measurements of fluorescence. In the northern Kattegat and the southern Skagerrak the spring bloom was more pronounced. The surface water had an oxygen saturation of more than 100%. In the eastern Kattegat nitrate and silicate concentration was below the limit of detection.

At P2, 15-40m, and Fladen, 20-30m, high nitrate values were registered, more than twice the normal level, about 25 $\mu\text{mol/l}$. It is probably water from the southern North Sea, which has been transported into the Skagerrak and the Kattegat.

Oxygen concentrations less than 2 ml/l were found from 70m and downwards in the northern and eastern Baltic as well as in the Hanö Bight, from 90m in the western Baltic and from 80m in the southern Baltic. Hydrogen sulphide was observed from 140m in the eastern Gotland Basin.

A detailed algal situation report is available on <http://www.smhi.se/sgn0102/nodc/reports/>

PRELIMINARY RESULTS

The expedition, which was a part of SMHI's ordinary monitoring program, began in Kalmar and ended in Göteborg. The weather during the expedition was calm with mainly southerly weak winds with exception of the last day, when the wind increased. Most of the time there was a sunny weather, though with some foggy regions, e.g. the Sound. The air temperature was between 2 to 8°C.

The Skagerrak

The sea surface temperatures varied between 3.5 and 5.1°C. The highest temperature at the Danish coast and the lowest in the southeastern Skagerrak. In the southern Skagerrak an algae bloom in the surface was clearly seen. Nutrient concentrations were reduced in the surface water at all stations and fluorescence maxima supported the spring bloom. At P2, 15-40m, and Fladen, 20-30m, nitrate values were registered, that were of more than twice the normal level, about 25µmol/l. It is probably water from the southern North Sea, which has been transported into the Skagerrak and Kattegat.

The Kattegat and the Sound

The sea surface temperature varied between 2.9°C and 3.5°C. The phosphate and nitrate concentrations were lower than normal winter values. In the eastern Kattegat the nitrate and silicate values in the surface water were less than the limit of detection 0.1 och 0.2µmol/l. A remarkable algae bloom, that was almost finished, was registered at Anholt E. The secchi depth was 5.5m. That the spring bloom had started was also seen by high fluorescence in the halocline at about 10 meters and high oxygen saturation, 120%. At W Landskrona in the Sound the water was strongly stratified. In a surface layer of less than 10 meters thickness the oxygen saturation was 105-110 %, the phosphate and nitrate concentrations 0.2 and 0.7µmol/l resp., while the oxygen saturation of the deeper layer was 78% and the phosphate and nitrate concentrations 1 and 15µmol/l respectively. In the halocline the ammonia concentration was higher than in the surrounding layers.

The Baltic Sea

The sea surface temperatures varied between 1.2°C and 2.9°C. The thermo-and halocline were both located at the same depth interval, 60-70m. At the Karlsö Deep they were located 10m deeper, that is 70-80m, and at BY 29 and in the Bornholm Basin 10m more shallow, 50-60m. At BY2 the halocline was found somewhat over 40m, while there was no stratification at BY1. In the main part of the Baltic nutrient concentrations of the surface water were still at winter level; phosphate 0.4-0.65 µmol/l, nitrate+nitrite 3.7-5.8 µmol/l and silicate 10.2-13.8 µmol/l. The secchi depth was 12-13m. From the Bornholm Basin and westwards the spring bloom had begun. This was evident due to lower concentration of nitrate, higher chlorophyll values together with high fluorescence and an oversaturation of oxygen in the photic zone. The secchi depth was here reduced to 8.5m. Oxygen concentrations less than 2 ml/l were observed at depths from 70 m and downwards in the northern and eastern Baltic and in the Hanö Bight, from 90m in the western Baltic and from 80m in the southern Baltic. Hydrogen sulphide was found in the eastern Gotland Basin from 140m and deeper.

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