Lars Andersson

Swedish Meteorological and Hydrological Institute
Oceanographic Laboratory

2014-06-15
Dnr: Sh-2014-92

Report from the SMHI monitoring cruise with R/V Aranda

Survey period: 2014-06-09 - 2014-06-15
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.

Surface water temperatures were above normal in most of the investigated areas, with the exception for the Northern and Central Baltic Proper, where temperatures were typical for the season. Nutrients in the surface layer showed concentrations normal for the season in all areas. Oxygen situation in the Hanö Bight and Bornholm Basin were relatively good and was above acute hypoxia. In the southeastern part of the Baltic Proper signs of an earlier inflow were seen. Oxygen free conditions, anoxia, were found from 100 – 125 meters depth and acute hypoxia from ca. 80 meters. Plankton activity was present in all areas.

The next cruise will begin on 10th of July and will cover the Skagerrak, Kattegat and the Baltic Proper.

Address:
Sven Källfelts gata 15
SE-426 71 Vastra Frolunda
SWEDEN

Telephone:
+46 11 4958000

E-mail:
shark@smhi.se
WWW:
http://www.smhi.se/

SMHI

PRELIMINARY RESULTS

The cruise, part of the Swedish regular marine monitoring programme, began in Helsinki on June 9th and ended in Hangö on June 15th. Winds were week during the beginning of the expedition, mainly from north. However, during the last part, winds increased to westerly gale which later turned to northerly. The air temperature varied between 11 and 17°C.

The Skagerrak

Due to a tight schedule and winds of gale strength, only the station P2 in the south-eastern part of Skagerrak was visited. Surface temperature was above normal for the season, 15.8°C. The salinity in the surface layer, also higher than normal, was 31.5 psu. Thermocline and halocline were both found at a depth of 10 meters. All nutrients, in the surface layer, had concentrations below or just above detection limits, phosphate < 0.02 µmol/l, nitrite + nitrate < 0.10 µmol/l and silicate 0.2 µmol/l, which is normal for the season.
A bloom was ongoing in the whole surface layer down to about 40 meters, with an oxygen saturation of about 110%.

The Kattegat and the Sound

Also in this area surface water temperatures were above normal, just over 17°C. The salinity of the surface water varied between 16.8 and 18.3 psu in the Kattegat, while it was 9.9 psu in the Sound. Thermocline and halocline coincided at a depth of 10 meters in the whole area.
All nutrients in the surface layer showed, for the season, normal values. In Kattegat phosphate concentrations were 0.03 µmol/l and in the Sound 0.19 µmol/l. Silicate values were in the range 1.1 to 2.1 µmol/l in the Kattegat, while it in the Sound was 5.5 µmol/l. The amount of nitrite + nitrate was below the detection limit (< 0.10 µmol/l) in both areas.
The fluorescence measurements showed elevated values just below the pycnocline.
Oxygen saturation in the surface layer was about 110%. Secchi depth of 5 meters was measured.
The lowest oxygen concentration in the Kattegat area, 5.3 ml/l, was found at the station Anholt E. In the Sound, 4.4 ml/l was registered at W Landskrona.

The Baltic Proper

Surface water temperatures varied from normal values in the northern and central parts (10.8°C) to temperatures above normal (up to 15.6°C) in the south. The salinity in the surface layer varied from 6.7 to 7.8 psu, normal in most areas. However, at the station BY15 surface salinity was still below normal, which has been the case since last summer. The halocline was found at depths between 60 and 80 meters in the Northern, Western and Eastern Gotland Basins, while it was located shallower, between 40 and 60 meters in the southern parts. A thermocline was found at depths between 10 and 20 meters.
All nutrients in the surface layer, showed for the season, generally normal values. Concentrations of phosphate was in the interval 0.07-0.32 µmol/l and silicate varied between 6.1 and 12.2 µmol/l. Silicate somewhat elevated in the Western Gotland Basin, which has been the case the whole spring. Inorganic nitrogen (nitrite + nitrate) was below detection limit in the whole area. In the bottom water of the Arkona Basin, the oxygen situation was extremely bad at station BY1, 0.6 ml/l, while the situation at station BY2 was relatively good, 4.16 ml/l. In the Bornholm Basin and Hanö Bight, oxygen concentrations in the bottom water were around the limit for acute hypoxic conditions (< 2 ml/l). Water probably originating from a couple of inflows during February and March, with a total volume of ca. 35 km^3 trough the Sound, was detected in the southern part of the Eastern Gotland Basin. At the station BCSIII-10 an oxygen concentration of 2.8 ml/l was measured

in the bottom water and at the station BY10, the bottom water was oxygenated while hydrogen sulphide was present at intermediate depths around 125 meters. Completely oxygen free conditions, (anoxia) were found from 100 - 125 meters depth and acute hypoxia from ca. 80 meters.
Plankton activity, based on fluorescence measurements and oxygen saturation, were ongoing in the whole investigated area.

PARTICIPANTS

Name		**Institute**
Anna-Kerstin Thell	Cruise leader	SMHI
Lars Andersson		SMHI
Johan Håkansson		SMHI
Vivi Månsson		SMHI
Sari Sipilä		SMHI

APPENDICES

- Track chart
- Table over stations, parameters and sampling depths
- Map showing bottom oxygen concentrations
- Monthly average surface water plots for selected stations
- Vertical profiles for selected stations