

Joint expedition of: R/V 'Poseidon', Institute of Marine Research, Kiel/FRG, and R/V 'Professor Albrecht Penck', Institute of Marine Research, Rostock-Warnemünde/GDR. From August 17 to August 24, 1989

Institut für Meereskunde  
Eingang  
21. DEZ. 1989 V.H.

Participating staff:

R/V 'Professor Albrecht Penck'

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R/V 'Poseidon'

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H.P. Hansen Chemistry

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The joint expedition has been undertaken within the framework of the Warnemünde-Kiel cooperation on particle flow in the western Baltic Sea.

The aim of this investigation was to study the relationship between summer production in the pelagic ecosystem and its impact on remineralization processes below the halocline with emphasis on the near bottom layers.

Besides the meteorological, physical, chemical and biological standard parameters, rate measurements like primary production, heterotrophic potential biological oxygen demand (BOD 5), respiration and remineralization as well as sediment trapping were main points of the joint programme.

The investigations were undertaken in Mecklenburg Bight and the adjacent sea areas. The programme consisted of sampling on three transects approaching from the Darss-Zingst-sill, from the Great Belt and from the Lübeck-Bight.

In the central part of the Mecklenburg Bight, at BMP-station DDR-012, R/V 'Professor Albrecht Penck' was on another station for the measurement of time series. At this station two sediment traps of the Kiel-type and one mooring with two current meters were positioned.

From August 20 to August 24, six positions around the central station were repeatedly (daily) investigated, to receive a resolution in time and space.

At night investigations on microgradients of oxygen and nutrients close to the bottom and transects with a towed CTD-fluorescence measuring equipment were undertaken. (For the investigation area and stations see attached map.)

An intercalibration of chemical and biological standard methods has been carried out on board of both ships.

The time of the experiment was favoured by calm weather with high irradiance rates. A few first results can be enumerated as follows:

The oceanographic conditions were rather stable over the time of the experiment and showed a double stratification. A surface layer of 8 m with a temperature of more than 18°C and a salinity of about  $9 \times 10^{-3}$  covered a medium layer with decreased temperatures. The salinity from 8 m on increased steadily with depth. At 23 m, 2 m above the bottom, a colder intrusion of water with a salinity of more than  $16 \times 10^{-3}$  could be observed most of the time.

The surface layer showed saturated oxygen conditions. Oxygen decreased steadily with depth in the intermediate layer and dropped drastically in the bottom layer reaching values close to zero near the bottom.

There were almost no nutrients (P and N) left in the surface and the medium layer. While bottom water contained sufficient nutrients for potential algal growth.

During the experiment a strong bloom of *Ceratium fusus*, *C. tripos* and *Procentrum minimum* could be observed. The dinoflagellates were distributed mainly in the surface layer with two pronounced maxima close to the two discontinuity layers. A deeper maximum at about 23 m depth was beyond the euphotic layer. Although microscopical analysis showed that the Algae of this depth were in a healthy condition, oxygen consumption in this layer was extremely high. After the 5 days of incubation the initial content of  $1.5 \text{ cm}^3 \times \text{cm}^{-3}$  had been completely respired which leads to the conclusion that late summer blooms may considerably contribute to a fast consumption of oxygen in the bottom water of this sea area.

First results of the sedimentation traps show that sedimentation of phytoplankton was rather rapid during the time of the experiment.

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