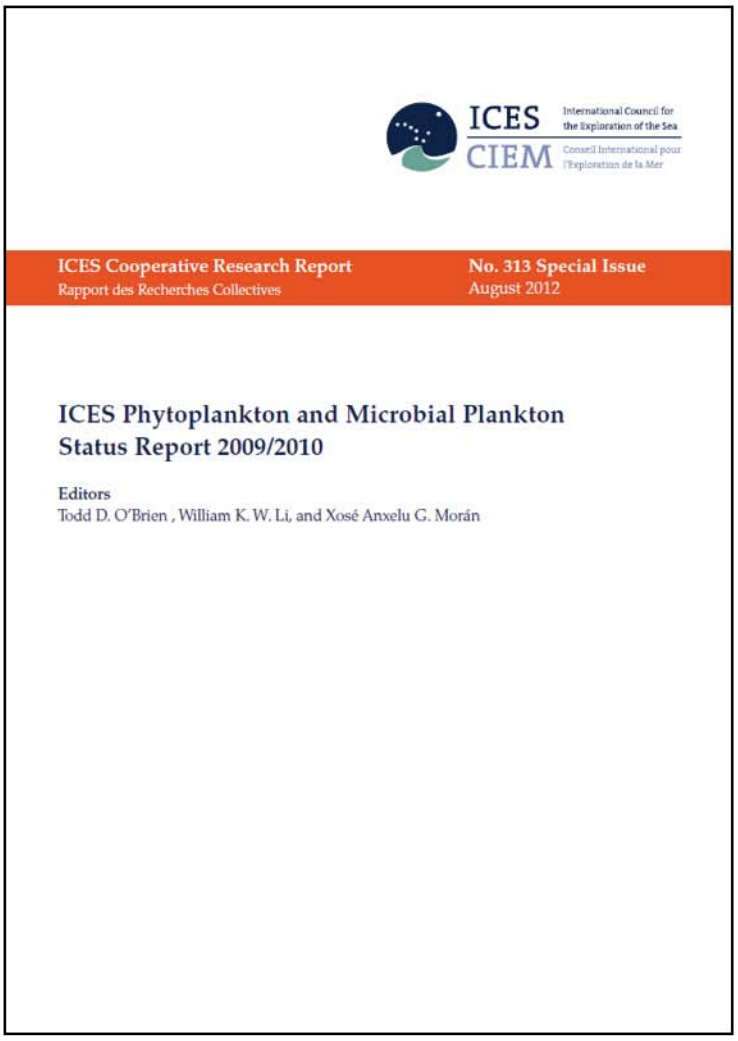

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ICES Phytoplankton and Microbial Plankton Status Report 2009/2010.
ICES Cooperative Research Report No. 313. 196 pp.

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5.6 Mecklenburg Bight (Site 26)

Norbert Wasmund and Günther Nausch

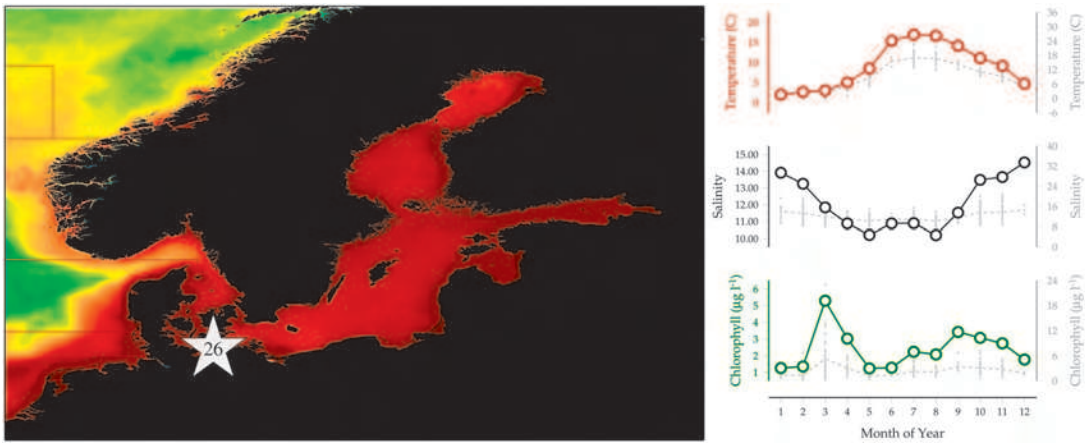


Figure 5.6.1
Location of the Mecklenburg Bight plankton monitoring area (Site 26), plotted on a map of average chlorophyll concentration, and its corresponding environmental summary plot (see Section 2.2.1).

The Mecklenburg Bight is part of the Belt Sea within the western Baltic Sea. Its maximum depth is 27 m. The area is influenced by periodical inflow of marine water or outflow of Baltic brackish water and, therefore, is highly variable. In the frame of the international monitoring programme of the Helsinki Commission (HELCOM), three stations were sampled: BMP M1 (54°28'N 12°13'E), BMP M2 (54°18.9'N 11°33'E), and O22 (54°6.6'N 11°10.5'E). The data of these stations are pooled to a representative dataset of this sea area. Only integrated surface samples of the upper 10 m are considered. Sampling and processing of the samples and the data was carried out according to the compulsory manual (HELCOM, 2010).

This analysis is based on data collected in the frame of the monitoring programme of the Helsinki Commission (HELCOM) and contributed by the riparian countries of the Baltic Sea. The data are available from the ICES databank.

Seasonal and interannual trends (Figure 5.6.2)

The annual development of the phytoplankton is characterized by three blooms of different intensity, from which the summer bloom demonstrates a surprisingly high biomass, whereas the spring and autumn blooms are mainly reflected in the chlorophyll data. The spring bloom is, in most years, dominated by diatoms, but in some years also by Dictyochophyceae, which are included in the chrysophytes in this study. Dinoflagellates and *Mesodinium rubrum*, which contribute significantly to the spring bloom in the Baltic Proper, are of minor importance in the Mecklenburg Bight in spring. Also, cyanobacteria biomass does not normally grow up to bloom concentrations. However, the diatoms can reach a second peak in summer. The autumn bloom is dominated by dinoflagellates and/or diatoms (Wasmund and Siegel, 2008).

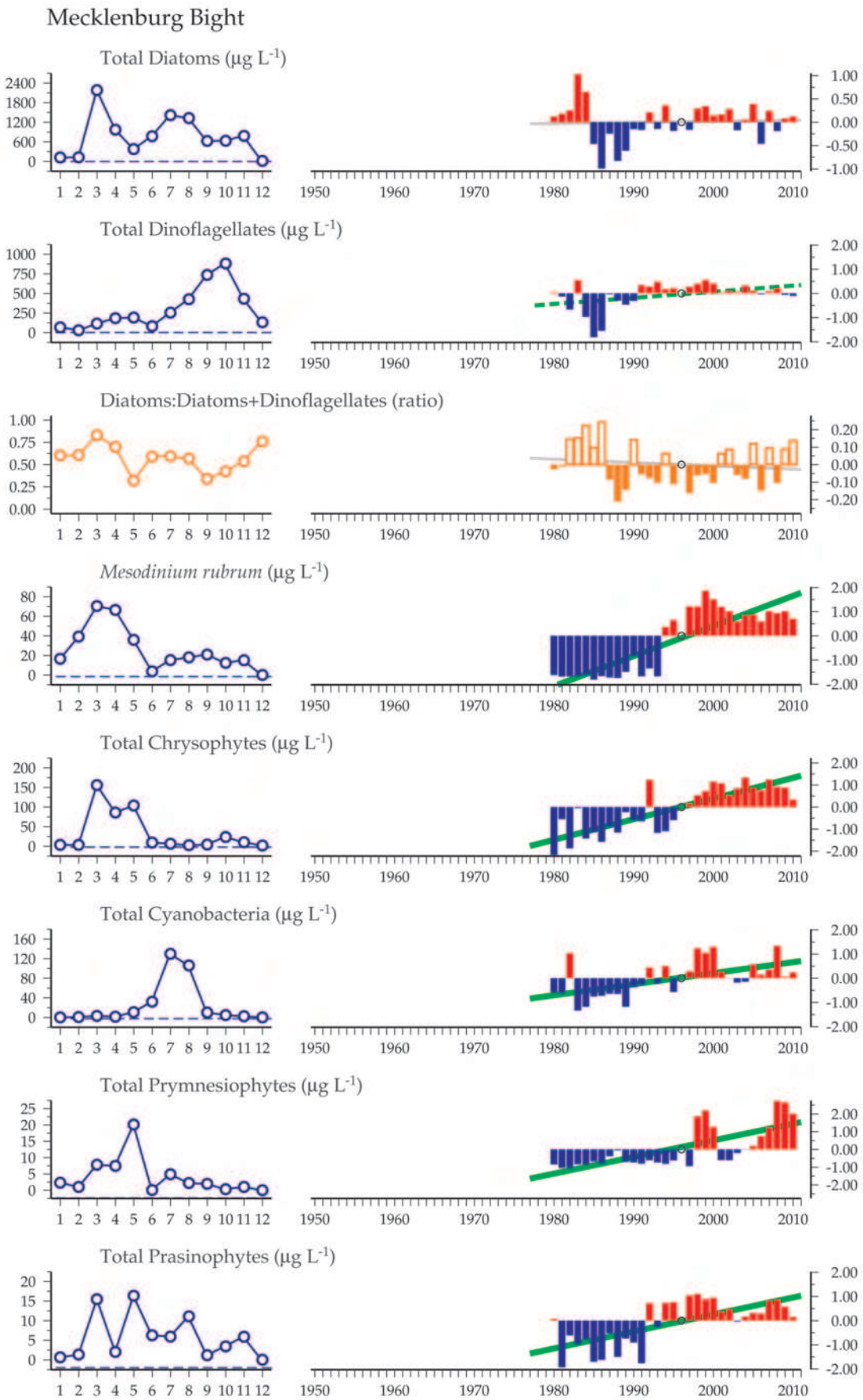
Since the start of the monitoring programme in 1979, the biomass of phytoplankton groups is decreasing in spring but increasing in summer in this area, as demonstrated by Wasmund *et al.* (2011). The important group of dinoflagellates is increasing, mainly in March. On the other hand, diatom spring biomass is decreasing. As a result, the diatoms:diatoms+dinoflagellates ratio during the spring bloom period is decreasing. The Dictyochophyceae (i.e. chrystophytes) become more important in spring. The autotrophic ciliate *Mesodinium rubrum* increased in the Baltic Proper, but probably the result of a changed counting strategy (cf. chapter on the Arkona Sea). The cyanobacteria biomass is increasing. Monthly

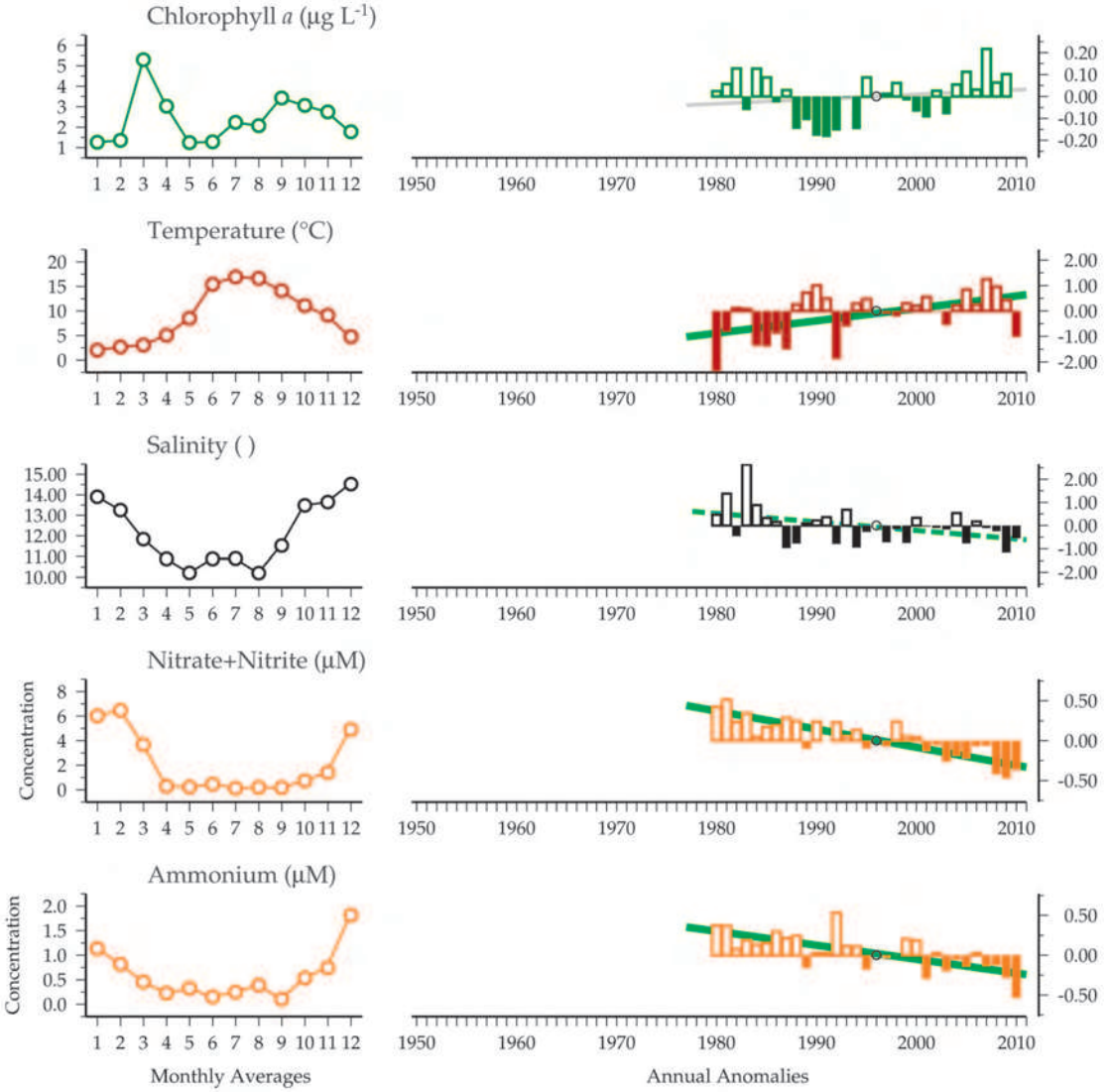
analysis finds no trend in summer, and the increase is evident only in the months of April and September, when their biomass is generally low, and an increase can be detected.

Changes in the smaller groups are statistically more significant, but the ecological importance of these groups is rather low owing to their small biomass. The prymnesiophytes and prasinophytes increased in all seasons, with the prymnesiophytes increasing especially since the end of 2007 (Hajdu *et al.*, 2008).

A general increase in temperature was also detected in the Mecklenburg Bight. The concentrations of the main components of dissolved inorganic nitrogen (i.e. DIN = NO_2+NO_3 + NH_4) were decreasing in the long-term dataseries. Nitrogen is considered to be the limiting nutrient in the Baltic Proper, but its trend does not agree with that of the phytoplankton biomass. Chrysophytes, prymnesiophytes, prasinophytes, and *Mesodinium rubrum* are negatively correlated to this DIN trend. The chlorophyll *a* concentration is not correlated to any other parameter and demonstrates no general trend. Only seasonal-level trends (January–March) reveal a significantly decreasing trend in the chlorophyll *a* concentrations.

Figure 5.6.2 (continued on facing page)
Multiple-variable comparison plot (see Section 2.2.2) showing the seasonal and interannual properties of select cosampled variables at the Mecklenburg Bight plankton monitoring site. Additional variables from this site are available online at http://wgpme.net/time-series.




Chlorophyll a (µg L-1)
Temperature (°C)
Salinity ( )
Nitrate+Nitrite (µM)
Ammonium (µM)
Concentration
Concentration
Monthly Averages
Annual Anomalies