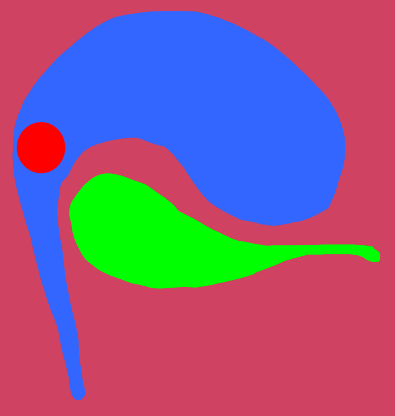


SEASONAL PELAGIC-BENTHIC INTERACTIONS IN SHALLOW TEMPERATE ECOSYSTEM OF BALTIC SEA, WITH EMPHASIS TO BIOGENIC SILICA

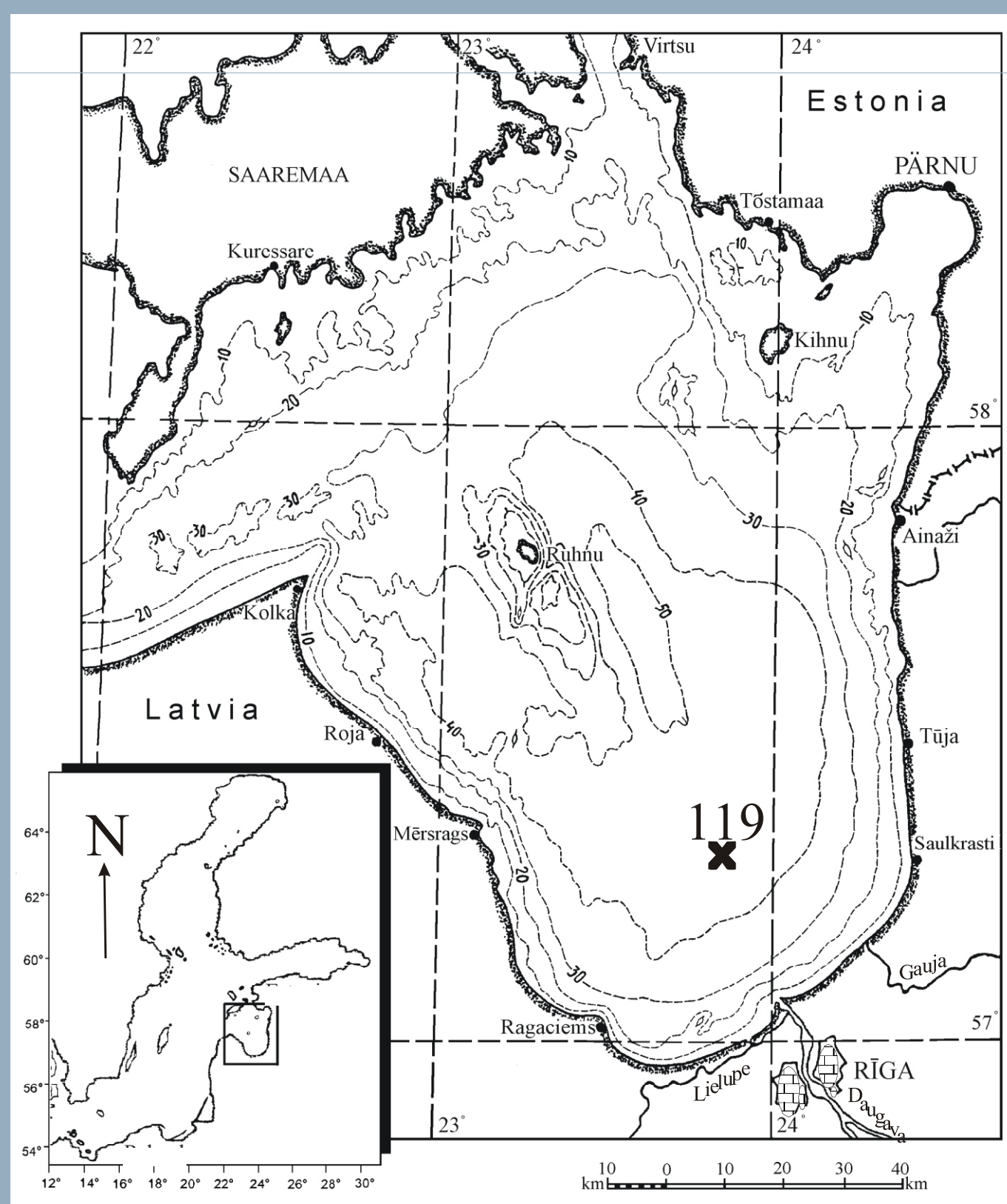
Aigars, J., Poikane, R., Ledaine, I.
Institute of Aquatic Ecology, University of Latvia



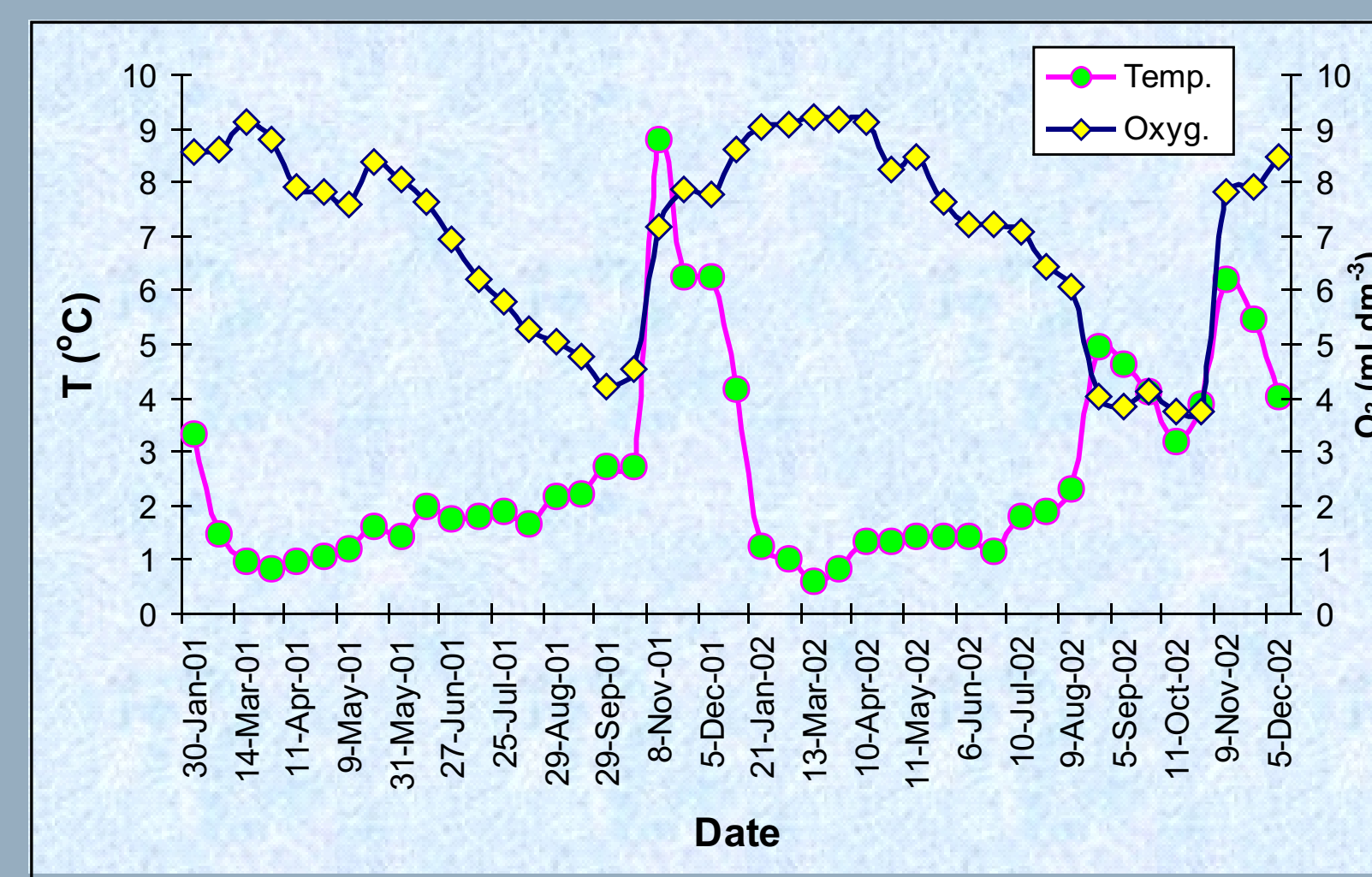
INTRODUCTION

Experiments of simulation of spring phytoplankton bloom deposition in Baltic sea indicate that 7-100 % of added material is remineralized within 2-6 weeks after addition of particulate material. Furthermore, most intensive remineralization of added material occurred during first week after addition. Since estimated velocity of diatom sinking in the Baltic sea is 3-6 m/day it can be expected that most intensive degradation of phytoplankton cells occurs in water column and therefore some of previously estimated rates of phytoplankton degradation on sediment surface are overestimated. To test this hypothesis we conducted seasonal study of sediment response to pelagic dynamic.

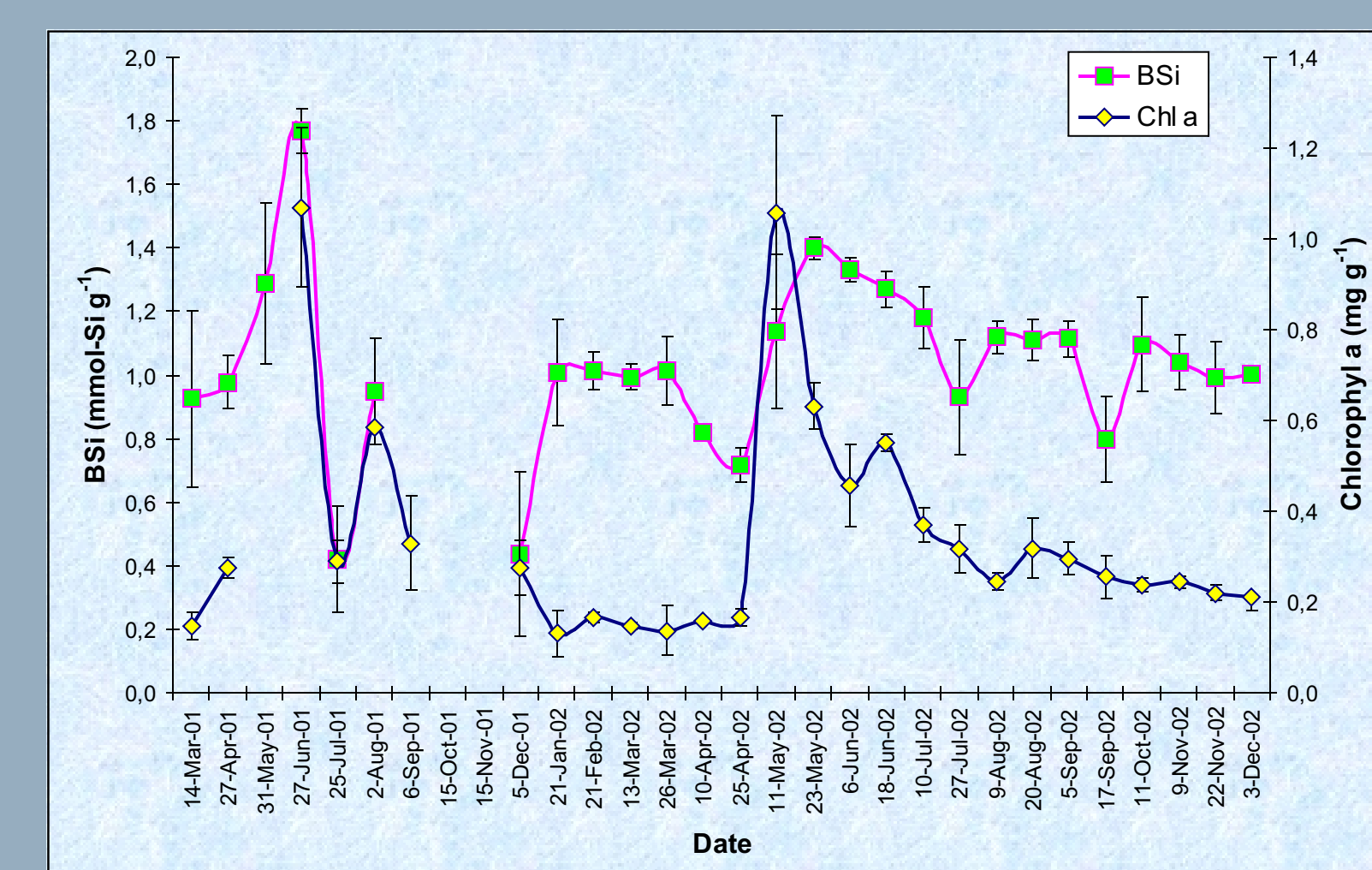
MATERIALS AND METHODS



For this study we selected the 43 m deep site in the central part of the Gulf of Riga, Baltic sea. Cores for flux measurements and sediment surface analyses were collected 17 and 30 times, respectively. We incubated sediment cores n=5 along with controls for 24 h at near-bottom water temperature recorded during sampling. All analyses were performed in accredited laboratory according to standard methods.

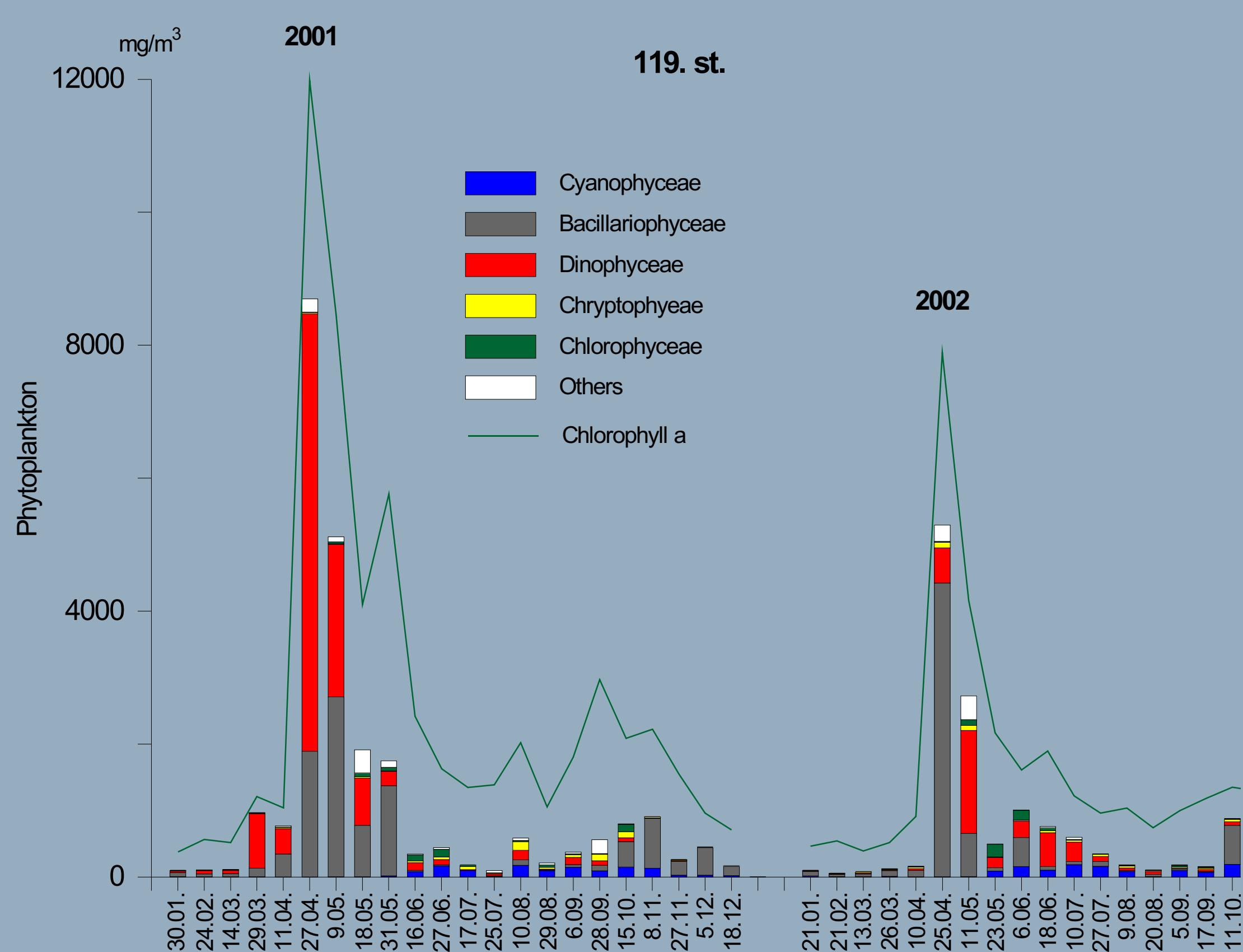


The temperature and oxygen dynamic of near-bottom (1 m above sediment surface) water during experiment.



The Chlorophyll a and biogenic silica concentrations of surface (approx. 0-2 mm layer) sediments during experiment. Bsi concentration pattern correlates with size class distribution pattern of *Thalassiosira baltica*.

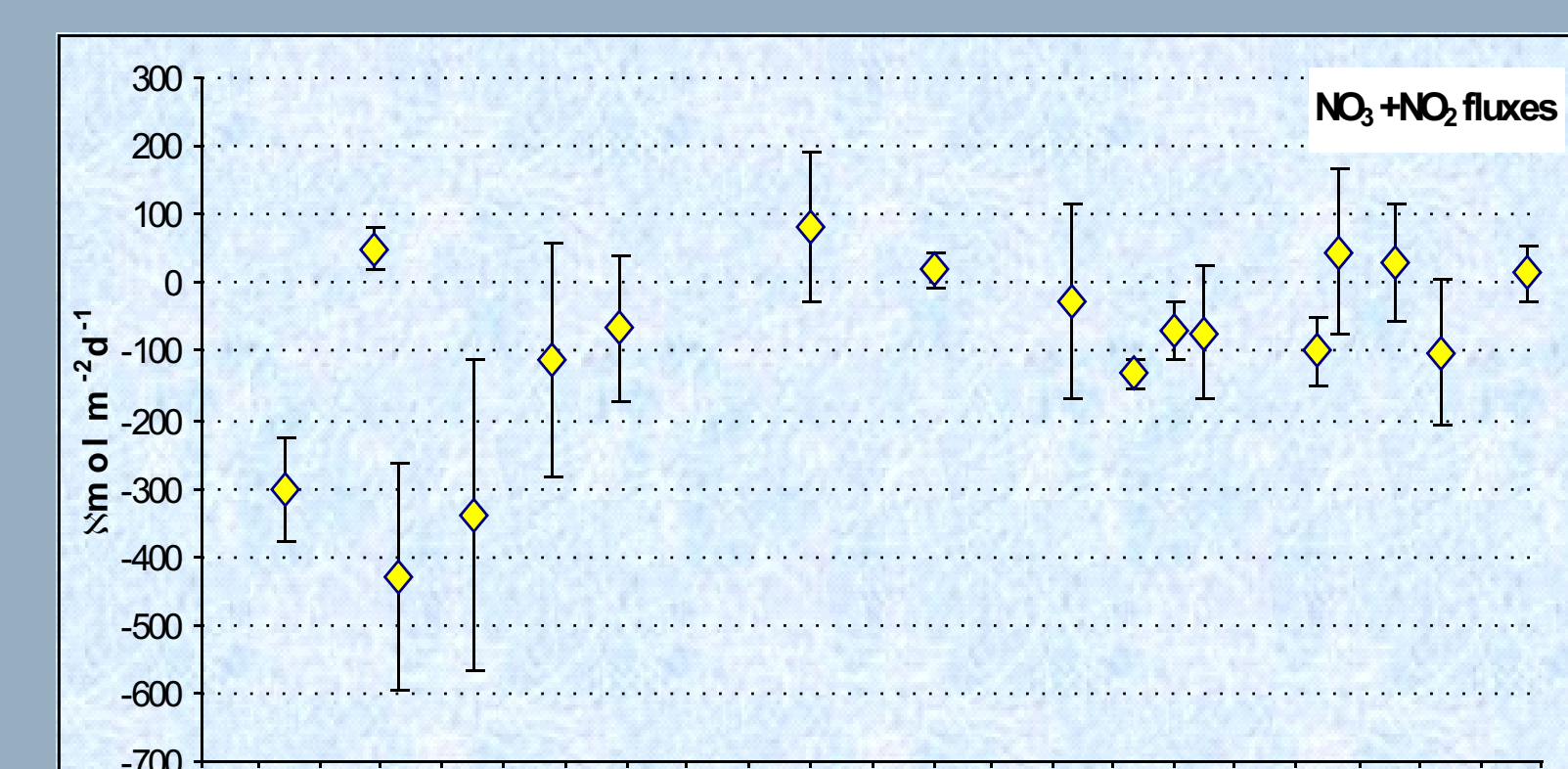
RESULTS



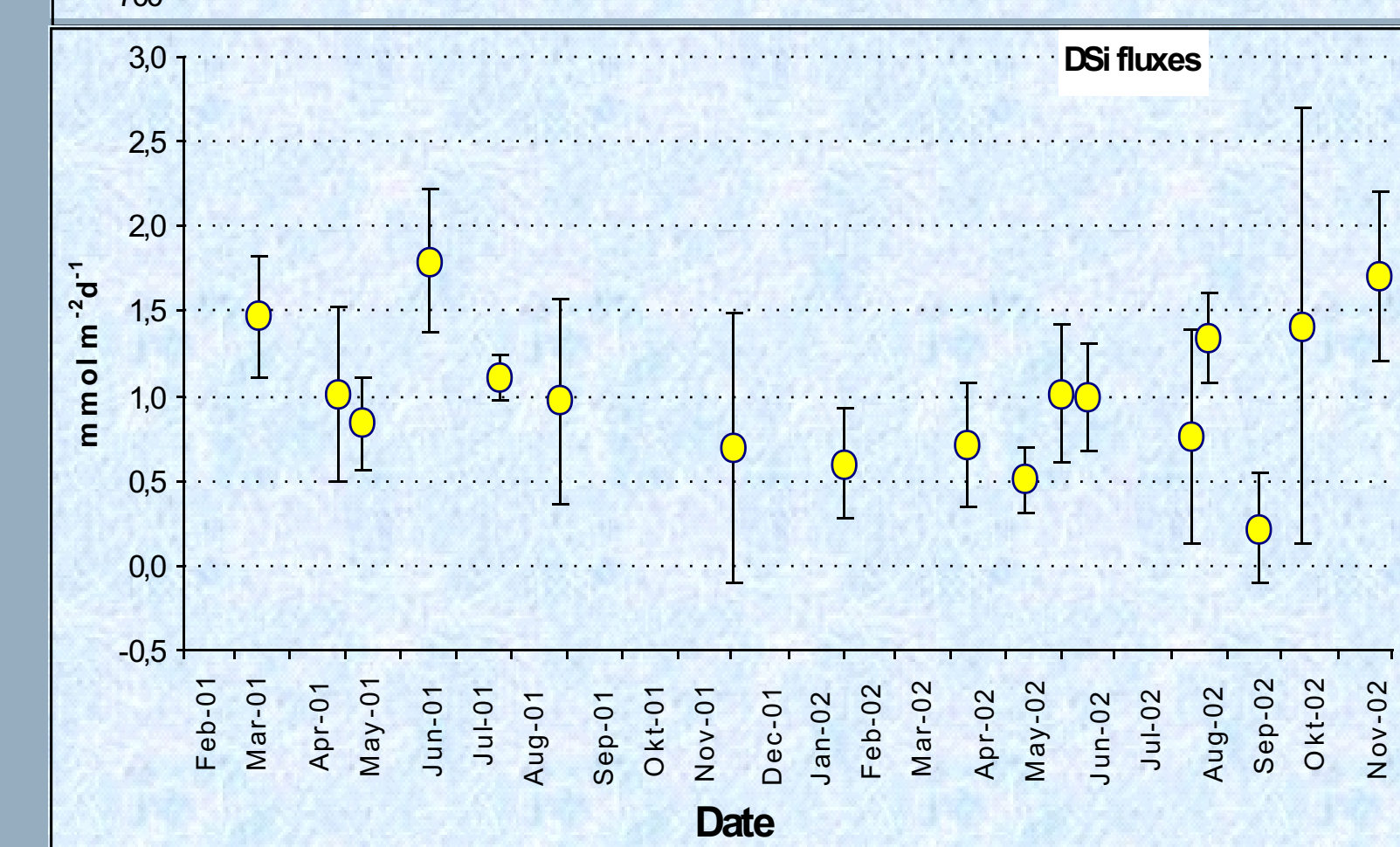
The phytoplankton dynamic in the Gulf of Riga, Baltic Sea. The dominant species were dynophagelate *Peridiniella catenata* and diatom *Chaetoceros wighamii* during spring blooms of 2001 and 2002, respectively.

The round and fast sinking diatom *Thalassiosira baltica* size class distribution is presented in the table. It is obvious that round *Thalassiosira baltica* have more profound impact on sediment surface processes than chain forming *Chaetoceros wighamii*.

<i>Thalassiosira baltica</i> size class (μ)	<i>Thalassiosira baltica</i> biomass (mg m ⁻³)	
	Year 2001	Year 2002
22-25	720	1302
40-45	719	15
50-55	32	104



The sediment-water fluxes observed during experiment. Significant negative nitrate+nitrite fluxes, indicative of intensive microbial processes, correlate with dynophagelate dominated spring bloom deposition.



Enhanced DSi fluxes correlate with size class distribution of *Thalassiosira baltica* and nearbottom water temperature in spring and autumn, respectively.

CONCLUSIONS

1. Fluxes observed during this experiment were considerably lower than previously observed in the Baltic Sea. Partly this can be due to lower exposition temperature and lower estimated deposited cell biomass than those used in previous studies.
2. The magnitude of spring bloom impact on sediment surface is defined by species composition, i.e. dynophagelate more readily triggers expected sediment-water nutrient flux patterns than diatoms. Furthermore, different diatom species have different impact on sediment surface biogeochemical processes.
3. The ecological significance of phytoplankton species deposited on sediment surface is directly linked to phytoplankton cell size.
4. The further decrease in DSi concentration observed in the Baltic Sea is bound to cause spring bloom dominant species shift from diatoms to dynophagelates, what will increase pressure on sediment surface even if eutrophication level will remain unchanged.