

MONITORING OF ZOOPLANKTON IN THE COASTAL AREA OF THE NE BLACK SEA IN 2005-2009.

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Abstract

The monitoring of the zooplankton community was conducted from June 2005 to October 2009 in the North-East Black Sea coastal area. Samples were taken along the cross-shelf transect at three stations. In the present work we studied the intensity of the cross-shelf exchange of the zooplankton in different seasons, seasonal changes in the zooplankton community and made a comparison of the present and past state of the zooplankton in this region.

Keywords: *Zooplankton, Black Sea, Coastal Systems*

Introduction

It is known, that shelf pelagic ecosystems are very productive, in different basins they provide up to 80% of the total production. In the Black Sea, where the most of the water column is contaminated by hydrogen sulfide, the productive abilities of the basin are limited. So the processes that take place on the shelf and continental slope play the key role for the whole basin. The Caucasian sector of the Black Sea has a narrow shelf with width of 3-5 miles and a steep slope. Due to the bottom topography, the hydrodynamic processes (generation of eddies, cross and along shelf water exchange) are very active in this region [4, 1]. That's why the distribution of the zooplankton is very heterogeneous and the species composition changes very quickly in the coastal area. Pelagic system of the Black Sea has changed dramatically during the last decades. The invasion of ctenophore *Mnemiopsis leidyi* in the middle of eighties caused significant decrease in zooplankton biomass and led to the changes in species composition of zooplankton. The invasion of ctenophore *Beroe ovata* feeding on *Mnemiopsis* led to the enhancement of zooplankton community in the end of nineties. The detailed monitoring of the coastal ecosystem has not been conducted since 1994. This work was aimed to reveal the cross shelf exchange of zooplankton in the different seasons; to study the seasonal changes in zooplankton community in the different regions of the coastal zone (inner shelf, middle shelf and continental slope); to make an assessment of the current state of zooplankton community.

Methods

Zooplankton sampling along with CTD probes were done monthly from June 2005 to October 2009. Zooplankton was collected with a Juday net (mouth area 0.1 m², mesh 180 µm) at three stations located over the inner shelf, middle shelf and continental slope along the transect off Geledzhik. Zooplankton were identified to species level and counted under the dissecting microscope.

Results

Zooplankton composition differed significantly over the shelf and the continental slope. Bathypelagic species were mostly found over the slope while the surface dwelling species were distributed evenly along the transect. Seasonal changes in species composition were more pronounced over the shelf than over the slope because of decline/disappearance of these species in winter. The seasonal dynamics of zooplankton biomass differed from year to year. On average, two biomass maxima were observed during a year and the autumn maximum was higher than the spring one (fig. 1).

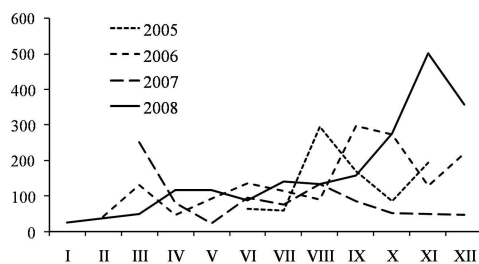


Fig. 1. The seasonal dynamics of the zooplankton biomass in different years

High values of zooplankton biomass in 2005 and 2006 as compared with the average biomass for the last 50 years indicates the recovery of plankton

community after its collapse in the 90-s. There were some differences in species composition and seasonal dynamics of zooplankton between these periods. In 1991-1994, cladoceras shrank and chaetognaths virtually vanished from zooplankton. The share of these species in the total biomass was higher in 2005-2008 than in 1970's. Populations of *Oikopleura* and meroplankton have also decreased since 1970's, these populations haven't recovered yet. In 1970's maxima of plankton biomass were observed in April and August-September [3]. In 1991-1994's maximum of plankton biomass was observed in March, another small peak was observed in October [2]. In 2005-2009 plankton biomass was the highest in September-November (fig.2).

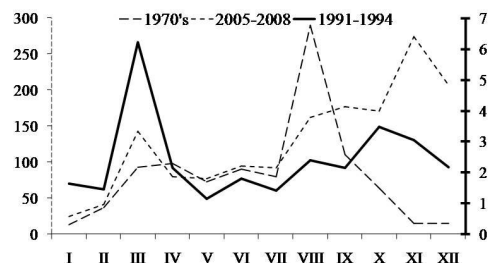


Fig. 2. The seasonal dynamics of the zooplankton biomass in different periods

Conclusions

In the study period, the cross-shelf exchange was very intensive, since the distribution of zooplankton was even in the upper mixed layer. The hydrophysical conditions played the important role in zooplankton distribution along the transect. The considerable interannual changes in seasonal dynamics of zooplankton community in 2005-2009 were evidence of the life cycle plasticity and seasonal shift in reproduction of dominant species. At present, zooplankton abundance and biodiversity have recovered after the collapse of 1991-1994, and reached the values observed in 1970-es before the alien ctenophore invasion.

References

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