



Long-Term Changes of Nutrients Concentrations in the Surface Waters of Zmiinyi Island Area

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Abstract

As it is shown in our previous study [1] the quality of marine Black sea marine waters very closed with nutrients levels. The aim of this work is to analyse the changes and to estimate the trends of main nutrients concentrations such as nitrates (NO₃), ammonium (NH₄), nitrites (NO₂), total nitrogen (N_t), phosphates (PO₄) and total phosphor (P_i) during 2004-2012 in the Zmiinyi Island area of the Black Sea. As the source material sets of the studied characteristics of marine waters sampled and analysed by the Research Station "Zmiinyi Island" of Odessa National I.I. Mechnikov University in 2004-2012 were used. The main methods of observation and results' analyses are briefly described. Results of definition of compounds of nitrogen and of phosphor concentrations in surface waters in Zmiinyi island area in the Black Sea investigations of 2004-2012 are presented. The main values of concentrations of observed nutrients illustrated by table 1.

Table 1. The minimal, maximal and average values of N and P compounds in surface and bottom layers of coastal waters near Zmiinyi island in the Black Sea

Compound	Surface layer Concentrations [mg/l]		Bottom layer Concentrations [mg/l]	
	Minimal - Maximal	Average	Minimal - Maximal	Average
NH ₄	0-634	77.5±15.0	1-291	58.5±13.1
NO ₃	0-617	48.6±6.6	0-460	41.6±5.7
NO ₂	0-32	3.5±0.4	0-38	3.4±0.4
N _t	7-4900	723±34	11-3530	620±29
PO ₄	0-154	9.0±1.2	0-205	8.3±1.1
P _t	1-230	21.0±3.4	1-503	22.5±3.1

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Results of statistical analysis and trends of studied parameters' sets, as well as characteristics of correlation analysis of their interrelations are presented. It was shown that concentrations of P_t more as 100 mg/l were observed during January and October 2007 and May, August 2011 and August 2012. For the concentration of N_t distribution of high as 1000 mg/l concentrations were in other periods (January – November 2004, March-April and August-November 2006, April – August 2007, May, June and September 2008 and May-June, November and December 2012) and significant correlations with P compounds was not observed. It was described cases and analysed the reasons of high levels of nutrients concentrations in coastal waters. Practically all cases of increasing of concentrations of N compounds can be explain with advection of Danube river waters in area of Zmiinyi island. But the cases of high concentrations of P compounds practically is not connected with river waters inputs and the study of this phenomena is for future. The study has been carried out in the framework of research activities funded by the Ministry of Education and Science of Ukraine (2011-2013) and as a contribution to the European FP7 project PERSEUS.

References

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