



Commission on the  
Protection of the Black Sea  
Against Pollution



Ministry of Environment and  
Climate Change, Romania



NIRDEP - National Institute for  
Marine Research and Development,  
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# ABSTRACTS BOOK

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*Black Sea - Challenges Towards  
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## Back-to-back events

- Celebration of the International Black Sea Day - 2013
- International Symposium "Protection and Sustainable Management of the Black Sea - 3<sup>rd</sup> Millennium Imperative"- 6<sup>th</sup> Edition

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with ENSO event is followed by the positive NAO phase in spring, cyclonic activity, rivers' discharge and water temperature are usually lower than a seasonal norm.

## **Long-Term Changes of Physical & Chemical Characteristics of the Surface Waters in the Zmiinyi Island Area of the Black Sea**

V. Medinets<sup>a</sup>, N. Kovalova<sup>b</sup>, Ye. Gazyetov<sup>c</sup>, S. Snigirev<sup>d</sup>, I. Soltys<sup>a</sup>

Odessa National I.I. Mechnikov University. 7, Mayakovskogo lane, Odessa, 65082, Ukraine

<sup>a</sup>medinets@te.net.ua, <sup>b</sup>n.kovaleva@onu.edu.ua <sup>c</sup>gazetov@gmail.com,  
<sup>d</sup>snigirev@te.net.ua

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### **Abstract**

It is known [1,2] that the natural factors like temperature (T), salinity (S), transparency (TI), pH and oxygen (O<sub>2</sub>) are the basic parameters for assessments of marine ecosystems' state and marine environment quality. The aim of this work is to analyse the changes and to estimate the trends of main physical and chemical characteristics during 2004-2012 in the Zmiinyi Island area of the Black Sea. As the source material sets of the main principal physical and chemical marine water parameters' observations carried out 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 2004-2012 studies of temporal distribution of the sets of physical (T, TI, S) & chemical (O<sub>2</sub> and pH) characteristics of surface waters for 2004-2012 are presented. Very high seasonal changes are shown for the observed T and S values. Minimal and maximal T values of surface water and bottom waters were very different, especially in spring and in summer time. The absolute maximal value of T in surface layer (29.00°), was registered on 14-18.08.2010, the minimal (0.64°) - on 2.02.2006. The average values for 2004-2012 were 18.32±0.35 for the surface and 17.59±0.27 for the bottom layer. The absolute maximal value of S (19.479

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PSU) in the surface layer were registered on 21-22.09.2012, minimal (6.332 PSU) – on 6.05.2012. In the bottom layer, accordingly: 19.549 PSU on 22.09.2012 and 14.799 PSU – on 29.07.2004. The average values of S for 2004-2012 were  $15.237 \pm 0.235$  PSU for the surface and  $15.698 \pm 0.201$  PSU for the bottom layer accordingly. The values of pH in the surface water layer varied within 7.00 (15.11.2016) and 8.88 (10.12.2009) with the average value  $8.36 \pm 0.08$ . Changes of pH in the bottom layer were almost similar: from 7.00 (25.11.06) to 8.97 (4.11.2009) with the average value  $8.37 \pm 0.05$ . The values of O<sub>2</sub> concentrations in the surface layer varied during the observation period between 4.60 (5.07.2008) and 14.60 mg/l (21-22.12.2007) at the average value  $8.03 \pm 0.32$ . At that, practically functional dependence of oxygen concentration on water temperature has been observed. Concentrations of O<sub>2</sub> on bottom layer varied from 4.54 (30.06.2006) to 14.55 (22.12.2007) mg/l, with the average value  $7.74 \pm 0.27$ . The values of T<sub>l</sub> varied within 0.7 (in summer period) and over 8 m – practically all over the winter months. Results of statistical analysis and trends of studied parameters' sets, as well as characteristics of correlation analysis of their interrelations are presented. Vertical profiles of S, T, O<sub>2</sub> and pH in coastal waters of the Zmiinyi Island are analysed. Anomaly high O<sub>2</sub> concentrations on depths 10-15 m in 2010 are described. Significant positive correlation connection between S and transparency is revealed, which will enable us to use salinity and transparency variations for assessment of the stage of marine and river waters' transformation, as well as to assess indirectly the Danube flow influence. 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.

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