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**BLACK SEA OUTLOOK**

*Drivers, pressures, state, impacts, response and recovery indications  
towards better governance of Black Sea environmental protection.*

**JOINTLY ORGANIZED BY**

**THE COMMISSION ON THE PROTECTION OF THE BLACK SEA AGAINST POLLUTION (Black Sea Commission)**

**&**

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**&**

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**ABSTRACTS**

## Table of Contents

<b>Web-GIS for Marine Environment's Monitoring, based on up-to-date Satellite Imagery.....</b>	<b>32</b>
Novorossiysk Sea Port Administration, Filimonova N.A., Antonyuk A.Y., Kucheiko A.A.	
<b><i>Dinophysis spp.</i> and <i>Prorocentrum spp.</i> dynamics in South Eastern Black Sea Continental Shelf Area during 2004-2005</b>	<b>33</b>
A.Muzaffer Feyzioglu, Ulgen Kopuz, F. Basak Esensoy	
<b>Petroleum Hydrocarbon Pollution Survey of Georgian Black Sea Basin Rivers.....</b>	<b>34</b>
N. Gelashvili, V. Gvakharia, G. Maisuradze, N. Machitadze, N.Janashvili	
<b>Oil Spill Drift Operational Forecasts for Bulgarian Coastal Area and Numerical Study of Potential Oil Pollution in the Bay of Burgas .....</b>	<b>35</b>
Vasko Galabov	
<b>Content of Mn and As in the river Rioni Hydrosystem and Estuarine Zone Bottom Sediments.....</b>	<b>36</b>
V. Gvakharia , N. Machitadze, N. Benashvili ,G. Bzhalava , Ts. Khukhunia, T. Adamia	
<b>Changes in the Water Quality along a Eutrophication Gradient South from the Burgas City .....</b>	<b>37</b>
G. Hiebaum, I. Georgieva, D.Berov, D.Deyanova	
<b>Riverine Input of Technogenic Pollutants to the Black Sea: Methodological Problems and Results of Estimation.....</b>	<b>38</b>
Yuriy Ilyin, Vitaliy Simov, Lidiya Shevela	
<b>Estimation of the Mutagenic Effects of Pollution Marmara and Black Sea by Using Bayes Classifier .....</b>	<b>39</b>
Bekir Karlık, Mustafa Petek	
<b>Simulation of Different Types of Pollutants in the Dnieper-Bug Estuary Depending on Meteorological and Hydrological Conditions .....</b>	<b>39</b>
Khmara T.V., Slepchuk K.A., Tuchkovenko Yu.S.	
<b>Conceptual design of the Black Sea MONINFO (Monitoring and Information Systems for Reducing Oil Pollution) .....</b>	<b>41</b>
Ahmet E. Kideys , François-Xavier Thoorens ,Sertel Elif , Kevin O'Connell, Tayfun Sivas, Kiril Iliev, Dumitru Dorogan, George Balashov, Valeria Abaza	
<b>Long-Term Effects of Kerch Strait Residual Oil-Spill: Hydrocarbon Concentration in Bottom Sediments and Biomarkers in <i>Mytilus Galloprovincialis</i> (Lamarck, 1819) .....</b>	<b>42</b>
Kolyuchkina G.A., Belyaev N.A.	
<b>Modern Pesticide Pollution in the Black Sea.....</b>	<b>43</b>
Alexander Korshenko, Yuriy Denga	
<b>Oil Pollution in the Kerch Strait accident, 11th November 2007 .....</b>	<b>43</b>
Alexander Korshenko, Yury Ylyin, Violeta Velikova	
<b>Comprehensive Assessment of Long-Term Changes of the Black Sea Water Quality in the Zmiinyi Island Area.....</b>	<b>43</b>
N. Kovalova, V. Medinets	
<b>Assessment of Phosphorus Compound Loads on Ukrainian Black Sea Coastal Waters and Corresponding Water – Protective Measures.....</b>	<b>44</b>
Volodymyr Kresin, Volodymyr Bruk	
<b>Applications of Analytical Probabilistic Methodology for the Assessment of Urban Stormwater Pollution Load Dynamics on Coastal Waters .....</b>	<b>45</b>
Kuzin S. A.	

## Modern Pesticide Pollution in the Black Sea

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Concentration of chlorinated pesticides in marine waters and bottom sediments of the Black Sea in last 5 years was described based on monitoring data from different countries, scientific expeditions. Special attention was provided for the Kerch Strait area. It was noted rather low and/or moderate level of pesticides pollution almost in all examined places of the sea.

## Oil Pollution in the Kerch Strait accident, 11th November 2007

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The long-term observations of consequences of oil accident spill under stormy conditions on 11 November 2007 were investigated. It was shown on numerous expeditions on minimal after-effect of this even on local ecosystem with evident exception of marine birds. Despite the large spatial coverage the temporal effect were limited to several months.

## Comprehensive Assessment of Long-Term Changes of the Black Sea Water Quality in the Zmiinyi Island Area

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**Key words:** Black Sea, water quality, TRIX; Chlorophyll “a”

Results of recent studies of the Black Sea ecosystem [1] have shown that the main factor influencing the North-Western Black Sea (NWBS) water quality is eutrophication caused by nutrients input from coastal sources, with river flow and atmospheric transport. The objective of our work is to study the trends of marine waters quality and trophic state changes in the Zmiinyi Island area, which according to the results of our studies practically refer to high seas, though from time to time are influenced by the Danube River discharge. The optimal way of marine water quality assessment is using the TRIX trophic index [2], which integrally considers four parameters

(Chlorophyll “a”, Total Phosphorous and Nitrogen, Dissolved Oxygen) determining sea water quality for living organisms.

Material for analysis included authors’ data (last 22 years) from NWBS (coastal areas) and from the Zmiinyi Island coastal waters (last 7 years). The Trophic State Index (TRIX) is defined by the linear combination of four fundamental parameters of surface water quality (Chlorophyll “a”, Total Phosphorous and Nitrogen, Dissolved Oxygen). Measurements of chlorophyll “a” concentration were carried out using standard spectrometric method. The samples of nutrients and oxygen were analysed by routine methods.

Data on the dynamics of the TRIX trophic index in the Zmiinyi Island area are presented for the years 2004-2010, changes of chlorophyll “a” concentrations analysed for the period 1988 - 2010. TRIX index varied in wide range between 3.1 and 7.0 that included trophicity categories from low to very high. Minimal values (TRIX<4) were most often found during summer period and maximal (TRIX=6-7) in spring and autumn when river discharge increased and organic matter accumulated in the ecosystem. The main massif of data (43 % and 39 %) shows that the studied waters refer to the categories “mesotrophic” (TRIX=4-5) and “eutrophic” (TRIX=5-6) correspondingly. The range of chlorophyll “a” fluctuations (0.12 – 28.04 mkg/l), like the trophic index, during last 8 years correspond to meso-eutrophic type of sea water. However retrospective data on chlorophyll “a” content show that compared to 1988-1994 its concentrations became 1.5-3.5 times lower now. The indicative dynamics of maximal chlorophyll content values decrease in the last two decades is as follows: 1989 – 55.2 mkg/l; 1994 – 31.9 mkg/l; 2005 – 28.3 mkg/l; 2007 – 16.8 mkg/l; 2010 – 12.3 mkg/l. Data collected by the authors are compared to the results of other Black Sea researchers. The comparison has shown that sea water quality near the Zmiinyi Island is much higher than in the other coastal areas of the Black Sea.

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## **Assessment of Phosphorus Compound Loads on Ukrainian Black Sea Coastal Waters and Corresponding Water – Protective Measures**

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**Keywords:** phosphorus compounds, eutrophication, waste waters, Black Sea

Considerable growth of “biogenic substances” loads – nitrogen and phosphorus into Black Sea coastal waters in recent years leads to eutrophication and oxygen depletion in sea waters. For marine waters phosphorus is a limiting factor for eutrophication processes. Excessive loads of phosphorus compounds into marine waters leads to degradation of marine biocenosis and negatively impacts fishery industry.

In order to develop a set of protection measures aimed at reduction of sea water phosphorus pollution, analysis of phosphorus loads in coastal areas was conducted. Analysis shows, that during