



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,  
Romania

# ABSTRACTS BOOK

The 4<sup>th</sup> Bi-annual Black Sea Scientific Conference  
28 - 31 October 2013, Constanța, Romania

*Black Sea - Challenges Towards  
Good Environmental Status*



## Jointly organized by

- The Commission on the Protection of the Black Sea Against Pollution (Black Sea Commission)
- Ministry of Environment and Climate Change of Romania
- NIRDEP - National Institute for Marine Research and Development "Grigore Antipa" (NIMRD), Constanța, Romania

## 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

**CONSTANȚA, 2013**



dose rates measured with a dosimeter equipped with a CsI detector and the cosmic ray contribution. Also, Tritium in water samples was analyzed by an ultra low level liquid scintillation spectrometer.

All results indicate no risk of exposure for humans, and, at the same time, could contribute to a better understanding of marine processes and anthropogenic environmental impact.

Radioactivity and radiation exposure remain both human and environmental health indicators as long as there are nuclear activities.

## **Nitrogen Problem for the Black Sea Ecosystem**

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Keywords: Black Sea, Nitrogen cycling, Zmiinyi Island, balance, atmospheric input

### **Abstract**

It is known that Nitrogen (N) problem has been getting more and more important and urgent year after year as N is a key nutritional element for any living form both on land and in sea. Many efforts of scientific society were made during past decades to investigate N cycling with peculiarities of different ecosystems around the globe, determinate main sources, sinks, crucial N species, label main threads to develop basic ways to mitigate an impact of N to the environment and humans, especially for marine ecosystems [1]. Periodical eutrophication events, which occurred on huge areas of the Black Sea in the past, were directly connected with N surplus.

The aim of the report presented was development of a comprehensive scheme of balance and biogeochemical N cycling for the Black Sea: discussion of exchange of N, its main sources/sinks and the processes involved: identify weak under-studied

## Session 1 - Pollution and Eutrophication

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points and uncertainties, to which the Black Sea countries' research community should pay attention and focus its efforts immediately.

The balance and N cycling scheme for the Black Sea with main external sources from rivers, coasts, atmosphere, shipping and secondary pollution sources from sediments and dumping, involving internal processes of N transformation and emissions to the atmosphere using the historical published by the Black Sea Commission (BSC) data and our own recent data [2] were presented.

The results of the Black Sea balance development and biogeochemical N cycle were discussed taking into account the unique peculiarities of this ecosystem, connected with biological processes' vertical partitioning. It was shown that to compose detailed N balance and cycle for the whole sea the processes in three parts of the Sea had to be consider: coastal (shallow) water up to 80-100 m deep (ca. 10% of the whole Black Sea area) and two parts of open waters (over 80-100 m deep): layer from the surface to 80-100 m (productive zone without H<sub>2</sub>S) and the layer with oxygen minimum zone (OMZ) or without oxygen (H<sub>2</sub>S zone) over 80-100 m deep, where biogeochemical processes of N transformation were very different. Special attention was paid to the anammox process in the OMZ/H<sub>2</sub>S zones of the Black Sea and the sink of N to the atmosphere. External inputs of N into the Black Sea: riverine, coastal, dumping and shipping and especially the atmospheric one were estimated. The role of each input into the three proposed blocks of balance scheme was analyzed. The significance of organic N in atmospheric fluxes, which according to our observations in 2010 – 2013 on the Zmiinyi Island made ca.  $63 \pm 13\%$  was discussed. It was shown that the main external N sources for the Black Sea were the atmosphere (50%), rivers (40%) and coasts and shipping (10%), which agreed with Moore et al. [3] data, who estimated that 60.9% of N comes from atmosphere for the globe ocean area. It was concluded that the atmospheric N input for the Black Sea especially for its open waters was likely the main source. Paying more attention to the sea-atmosphere N exchange study and including these investigations into BSIMAP for all the Black Sea countries were recommended. The study has been carried out as a contribution to the European FP7 projects No. 282910 ECLAIRE and No. 287600 PERSEUS.



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## Results of Hydrobionts Pollution Studies in the Zmiinyi Island Area of the Black Sea in 2011-2013

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## Abstract

Pollution of marine hydrobionts is the problem being one of main topics of the Convention on the Protection of the Black Sea Against Pollution and the EU Marine Strategy Framework Directive.

The aim of our studies has been to investigate the current state of hydrobionts (fish and mussels) pollution with trace metals (TM), organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs) in the Zmiinyi Island area, which according to our studies of water and bottom sediments pollution is the area with