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**CONCLUSIONS OF THE  
THE INTERNATIONAL SYMPOSIUM  
“PROTECTION AND SUSTAINABLE MANAGEMENT OF THE BLACK  
SEA ECOSYSTEM, THIRD MILLENNIUM IMPERATIVE“**

Sixth Edition  
31 October 2013  
Constanta, ROMANIA  
back-to-back event organized within  
the 4<sup>th</sup> Bi-annual Black Sea Scientific Conference  
“Black Sea - Challenges Towards Good Environmental Status“  
and marking the celebration of the International Black Sea Day

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The International Symposium “PROTECTION AND SUSTAINABLE MANAGEMENT OF THE BLACK SEA ECOSYSTEM, THIRD MILLENNIUM IMPERATIVE“, Sixth Edition, held in Constanta, of 31 October 2013, was divided into 5 distinct sessions: a Plenary Session and 4 poster sessions.



### **Plenary Session:**

6 presentations were made by the authors from Romania and Finland. The main conclusions are:

- The state and evolution trends of the Romanian marine and coastal environment were monitored in 2012 from the physical, chemical and biological point of view, compared to the reference period of the 1960s and more recent data. The state of the marine and coastal environment in 2012 confirmed the general tendency of slight improvement of the monitored parameters.

- Until the spring of 2013, a number of 175 sturgeon specimens were marked, which represent the highest number recorded so far at European level. Based on scientific evidence, it was detected that sturgeons are passing through the cross-sections where the maximum recorded velocities are between 2 m/s and 2.5 m/s. The DKTB telemetry station was deployed in order to assess sturgeon migration monitoring. Another system for monitoring, control and alarm was also implemented, for determining the sturgeons' upstream swimming speed. It is very important to scientifically determine sturgeons' swimming speed in-situ, in order to understand their behavior in an integrated environment. The monitoring should continue for determining, based on scientific evidence, the possible impact of hydrotechnical works on the abiotic and biotic factors (especially for sturgeons).

- It was presented an advanced concept for the active protection of coastal shore line using on site conversion of the energy of wave and marine currents to power and to use for generating "damping waves";

- It was presented, also, a data assimilation scheme to improve the wave prediction in the Black Sea at the entrance of the Danube Delta; the procedure allows corrections to the boundary conditions considered for the high resolution computational domain implemented in the vicinity of the entrance of Sulina channel;

- The presentation of the marine fish farm in recirculating system from the Romanian Black Sea coast underlined the possibilities of development of this sector in Romania and in the Black Sea, to mitigate the pressure on the natural turbot stocks through the practice of the marine aquaculture;

- It was tested a new product (ORS-Sorb product) as a very efficient oil sorbent to be used in the marine environment by a private company from Finland.

## **Session I - Oceanography, Marine and Coastal Engineering**

7 papers (posters) were presented within the “Oceanography, Marine and Coastal Engineering” session), belonging to authors from NIMRD and “Lower Danube” University of Galati, Faculty of Mechanics.

The research areas addressed were:

- Coastal zone dynamics / Evolution of the Black Sea Shore
- Interactions ocean - atmosphere - land
- Marine Technology
- Chemical characterization of Romanian marine waters
- Anthropogenic pressures on marine ecosystem

The presentations in the field of oceanography were related mainly to the knowledge of the state of the marine environment, physical and chemical characterization of Romanian marine waters and phenomena of eutrophication, identification of sources, and monitoring of hazardous substances. Most of the presentations were focus on long term studies of Romanian coastal marine waters and of the changes in the land - sea interface.

The shoreline studied during 1962 - 2012 in the area of the Danube Delta Biosphere Reserve had shown that coastal erosion was prevalent and was determined on about four times greater seashore length than the accretion phenomenon.

The analyses of the evolution of sea water temperature and air temperature, shown that both parameters show positive growth trends, likely being the cause of the sea level rise, thus favoring beach erosion.

The assessment of the current nutrient levels and eutrophication of the Romanian Black Sea waters and of hazardous substances as part of the Marine Strategy Framework Directive implementation was based on data acquired during 2006-2011 from the monitoring network stations. On the long-term, decreased nutrients concentrations compared to the values of the 1960s, reference period for the good quality of the Romanian Black Sea waters, were observed. Individual compounds concentrations of organochlorine pesticides and polycyclic aromatic hydrocarbons show a decreasing trend in time.

The presentations revealed also the importance of the development/implementation of new technologies and tools in marine research, in understanding the impact of human pressure on the marine system, as the influence of a potential wave wind farm operating in the local wave conditions from the Romanian near shore waters.

## **Section II - Marine Ecology and Environmental Protection**

The topics addressed by the papers were varied starting from spring distribution of phytoplankton along the Romanian coast or status of benthic populations from the marine zone of the Danube Delta Biosphere Reserve, to the compliance level of the waters quality for mollusks or a scientific network for the prevention of environmental hazards in the Black Sea.

The following conclusions were drawn from this session:

- Under current conditions, with a reduced intake of nutrients and pollutants through the Danube, we can observe a change in the structure of phytoplankton especially on the ratio of diatoms and dinoflagellates and a reduction of density toward the southern part of the Romanian coast and offshore;
- The monitoring of benthic populations in the Natura 2000 site Marine Zone of the Danube Delta Biosphere Reserve is part of the measures taken to maintain a favorable conservation status of this Community important site, as well as the most feasible indicator of the management actions efficiency;
- during 2012-2013 nematod infestation of main commercial important fish species was rather high reaching up to 20-50 parasites/host in up to 80-100 % of the analyzed fish.
- Water and sediment quality along Romanian coastline in 2011 was, overall, in conformity with the Shellfish Waters Directive 2006/113/EC;
- a strong regional partnership and cooperation to develop a scientific network for the establishment of scientific consensus, in order to setup common strategies for natural hazard prevention will be realized with the help of Joint Operational Programme “BLACK SEA BASIN 2007-2013” and the project “A Scientific Network for Earthquake, Landslide and Flood Hazard Prevention (SciNetNatHaz)”.
- by using flotation separation process during the seawater treatment we can achieve a more simple, rapid and economic process with an efficiency of more than 90%;
- controlled intake of adjuvants with antioxidant properties like Vitamin E and CATINOFORT (sea buckthorn extract) can mitigate the effects of oxidative stress related and inherent to working in hyperbaric conditions.

### Section III - Marine Living Resources

During this section, 5 papers were presented, belonging to Romanian authors. The research areas addressed were: Fishery resources - 2; Dolphin protection - 1; Marine aquaculture - 1; Marine litter - 1.

The two papers in the field of fishery resources were related mainly to the knowledge of the main species of fish population status of economic interest in the Romanian coast of the Black Sea and the trends of development of their stocks in the context of current changes in biotic and abiotic environment conditions. The results obtained within the National Fisheries Data Collection during 2008 - 2012 were appreciated by participants, many of them highlighting data on: fishing, fleet structure, fishing gear and fishing effort, number of engaged in marine fisheries sector, qualitative and quantitative structure of catches, the influence of fisheries on the marine environment, the legal and institutional recommendations for the management of fishery resources.

The management of turbot resources at the Romanian Black Sea littoral in order to find the ways to protect this valuable resource and to sustain its exploitation was also presented. Modern fisheries management is often referred to as a governmental system of appropriate management rules based on defined objectives and a mix of management means to implement the rules, which are put in place by a system of monitoring control and surveillance. The main objectives of the turbot sustainable management are to: maximize sustainable biomass yield, maximize sustainable economic yield, secure and increase employment in coastal region, secure protein production and food supply, increase income from export etc.

In the conservation and protection of dolphins area one paper was presented, with particular reference to technical solutions to reduce the by catch of dolphins. The interaction between cetaceans and fisheries is a problem that can affect the conservation of dolphins populations due to mortality occurred following the incidental apprehension or tangling in gillnet type gear.

Knowing the major ecological role of epibiotic biofilter for seawater cleansing and the fact that in recent decades its natural restoration in coastal areas of social and economic major importance was insignificant, in the section on aquaculture was presented a paper on finding feasible and appropriate measures to provide a controlled and efficient rehabilitation of rocky structures. The developed and recommended method is to create an artificial substrate of epibiotic organisms needed to be fixed in areas with rocky structures affected by clogging.

Regarding the marine litter, currently there are no national programs for strict monitoring of existing waste on the seabed. However, adjacently, by conducting other research activities were obtained quantitative and qualitative data on the distribution of marine litter. In the paper presented were highlighted their abundance and spatial distribution on the Romanian coast of the Black Sea.

## Session IV - Ecological Education

The papers presented emphasized the experience gathered from the first summer school in the frame of the EU/FP7 PERSEUS Project on “**The contribution of environmental indices in meeting the objectives and principles of the Marine Strategy Framework Directive**” on environmental assessment for both seas (Black Sea and Mediterranean), with the participation of the international experts. The second summer course **CoCoNET GIS and Marxan Summer course**, under the auspices of the EU-FP7 CoCoNET Project - Towards COast to COast NETworks of marine protected areas (from the shore to the high and deep sea), coupled with sea-based wind energy potential, provided CoCoNET Phd students and junior marine scientists dedicated to spatial data collection and analysis in different disciplines (geology, biology, oceanography) with up to date tools and skills. The courses represented an excellent opportunity to understand how we can identify an efficient system of conservation sites that include a suite of conservation targets at a minimal cost, which are the gaps of knowledge we have to face in order to produce an effective regional spatial conservation prioritization, and the challenge to incorporate both ecological (e.g. connectivity) and socio-economical data within a heavily exploited region like the Mediterranean and Black seas.

During Session IV it was possible to interact freely and exchange ideas among the participants. It represented an excellent opportunity for discussing new management tools on the specific marine reserve in Vama Veche - 2 Mai, where a long time project has been successfully applied by NIMRD “Grigore Antipa”, custodian of the reserve.

### General conclusions

From all presentations a general conclusion can be drawn: the marine ecosystem recovery is still fragile and could be easily destabilized by the influence of the anthropogenic pressures and climate change.

Throughout the presented papers, future research goals were identified, such as:

- Understanding of the processes and consequences of sea-air-land interactions;
- Continuing and extension of the coastal water quality monitoring;
- Further identifying and monitoring of the sources of anthropogenic impact on the marine environment;
- Diversification of the research to further understand of the marine ecosystems;
- There is a need to:
  - continue the monitoring of marine biodiversity, to identify and promote solutions to protect endangered species and their habitats, for a sustainable management of coastal ecosystems;
  - strengthen the regional cooperation and joint projects lead to a better understanding of the marine ecosystem;
  - find solutions for the implementation of research results in production and development of recommendations for the conservation and protection of dolphin populations and monitoring of existing waste on the seabed.

- It was also revealed that in, the last decades, the fisheries sector has contributed significantly to the continuing need for food, especially the harvesting of marine species that provide important opportunities for increasing global food production and food security.

During the Symposium, there a number of research objectives for a better understanding of marine resource were identified, such as:

\*Understanding the processes and consequences of changes in marine biodiversity by highlighting aspects of the environment and their effects on biodiversity;

\*Strengthening the connections between marine ecology, oceanography and living marine resources;

\* Developing the ecosystemic approach to the study of living marine resources.

The papers presented are sequences in time and space of research, but should be integrated in the areas mentioned. It is appropriate and necessary to continue, deepen, diversify the investigation methods applied in complex, integrative research projects, bringing together the scientific community interested in the Black Sea and the European Union, with the aim of achieving the transfer of knowledge and creating scientific partnerships.



The Conference created a unique platform for networking and exchange of experiences and research results. It was evident from several presentations that the sustainable development must be conducted in a transparent and traceable way, as all stakeholders will have their input in the overall outcome.