INTERNATIONAL SYMPOSIUM
"PROTECTION OF THE BLACK SEA ECOSYSTEM AND SUSTAINABLE MANAGEMENT OF MARITIME ACTIVITIES"
8th Edition

PROMARE 2017

BOOK OF ABSTRACTS

Editing coordinators:
Simion Nicolaev, Tania Zaharia, Mariana Golumbeanu, Magda Nenciu

Back-to-back events

- Workshop on Bio-Nano Genomics
- Copernicus Training Black Sea Monitoring and Forecasting Center
- Workshop on Earth Observation and Marine Science
- Stakeholder Workshop within the MareFrame Project
- TraSiPesc Project Workshop
- ECOAST Stakeholder Meeting

7-9 September 2017, Constanta, ROMANIA

With the support of:

ROMANIAN BLACK SEA TITLEHOLDERS ASSOCIATION

Ministry of Research and Innovation

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"PROTECTION OF THE BLACK SEA ECOSYSTEM AND SUSTAINABLE MANAGEMENT OF MARITIME ACTIVITIES"

PROMARE 2017

8th Edition
7-9 September 2017
Constanta, ROMANIA

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PROGRAMME

OF THE INTERNATIONAL SYMPOSIUM PROTECTION OF THE BLACK SEA ECOSYSTEM AND SUSTAINABLE MANAGEMENT OF MARITIME ACTIVITIES

PROMARE 2017

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Thursday, 7 September 2017		
	Conference Hall (1st floor)	
09.30 - 10.00	**Registration of participants**	
10.00 - 10.30	**Official Opening** Opening Address - **Dr. Eng. Simion NICOLAEV**, General Director of NIMRD "Grigore Antipa" Addresses of central and local authorities Messages from R&D institutes and universities, NGOs, other international and national organizations	
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	Press Conference	***Museum Hall (1st floor)***
11.00 - 12.00	**PLENARY SESSION**	***Conference Hall (1st floor)***
• **Luis Ovidiu Popa** - *Grigore Antipa - Beginnings* • **Caner Zanbak** - *Safety and Security of Water Quality and Resources* • **Irina Makarenko** - *Black Sea Commission Address* • **Violin Raykov**, Miguel Bernal - *The GFCM BLACKSEA4FISH Project; A Technical Support Towards Improved Management in the Black Sea*		
12.00 - 13.00	**Workshop on Bio-Nano Genomic- ACCELA - Our Story**	***Conference Hall (1st floor)***
Moderators:	***J. Peart, R. Fillerova***	
13.00 - 14.00	**Lunch Break**	***B.EN.A. Hall (ground floor)***

14.00 - 15.30	**Copernicus Training Black Sea Monitoring and Forecasting Center**	***Conference Hall (1st floor)***
Moderator:	***Elisaveta Peneva***	
Atanas Palazov, Giovanni Coppini, Stefania Angela Ciliberti, Marilaure Gregoire, Joanna Staneva, **Elisaveta Peneva**, Emin Özsoy, Luc Vandenbulcke, Andrea Storto, Benedicte Lemieux, Tomas Lovato, Simona Masina, Nadia Pinardi, Francesco Palermo, Sergio Creti, Francesca Macchia, Rita Lecci, Arno Behrens, Veselka Marinova, Vasil Donev, Violeta Slabakova, Mauro Buonocore, Paola Agostini - Copernicus Training Black Sea Monitoring and Forecasting Center		
15.30 – 18.30	**SCIENTIFIC SESSIONS**	***Conference Hall (1st floor)***
15.30 - 16.30	**Session I - Oceanography and Coastal and Marine Engineering ORAL PRESENTATIONS**	***Conference Hall (1st floor)***
Chairpersons:	***L. Buga, M. Sur, J. Hanganu***	

- **Luminița Buga**, Alessandra Georgetti, Gheorghe Sîrbu - EMODNET Chemistry - Data Aggregation and Product Generations in the Black Sea
- **Corina Anca Simion**, Romul Mircea Mărgineanu, Nicolae Mocanu, Ana Maria Apostu Blebea, Vasile Pătrașcu - Tritium as Tritiated Water in the Upper Layer of the Seashore and Stretches of Shoreline Surrounding Water; from Periboina Channel to Vama Veche (2007 - 2017)
- **Muhammet Boran** - Pollution of Marine Environment by Ship
- **Mürşide Sur**, Halil İ. Sur - Distribution of Total Suspended Solids in the Turkish Coasts of the Black Sea
- **Muhammed Baran Kiliç**, Ali Alkan, Dilek Fidan, Bayram Zengin, Ömer Kalipçi - Investigation of the Discharge Levels of Dissolved Inorganic Nutrients from Yeşilirmak River to the Black Sea
- **Alina Daiana Spînu**, Maria Emanuela Mihailov, Luminița Buga, Silică Petrișoaia - Use of Digital Terrain Model for the Evaluation of Beach Vulnerability on the Romanian Coast

	PARALLEL WORKSHOP	
15.30 - 17.30	**Stakeholder Workshops within the MareFrame Project, TraSiPesc Project, ECOAST Stakeholder Meeting**	***Museum Hall (1st floor)***
Moderators:	***T. Zaharia, L. Moga, C.G. Nicolae***	
Magda Nenciu, Tania Zaharia, Valodia Maximov, Gheorghe Radu, Gheorghe Sirbu, Kare Nolde Nielsen, Michaela Aschan, Mika Rahikainen - Stakeholder Workshop within the MareFrame Project **Liliana Mihaela Moga**, Tania Zaharia, Carmen Georgeta Nicolae - Stakeholder Workshop within the TraSiPesc Project **Laurenta Alexandrov** - New Methodologies for an Ecosystem Approach to Spatial and Temporal Management of Fisheries and Aquaculture in Coastal Areas (ECOAST) - Constanta Stakeholder Workshop		
16.30 - 17.00	**Coffee Break**	***B.EN.A. Hall (ground floor)***
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Chairpersons:	***L. Boicenco, L. Bat, V. Pătrașcu***	

- **Laura Boicenco**, Simion Nicolaev, Otilia Mihail, Tania Zaharia - The Implementation of the Marine Strategy Framework Directive in Romania
- **Mihaela C. Melinte-Dobrinescu** - Coccolithophore and Diatom Distribution on the NW Part of the Romanian Black Sea Inner Shelf
- **Elena Stoica**, Adriana Radulovici, Magda-Ioana Nenciu, Adrian Filimon, Oana Marin, Cristian Sorin Danilov, Romulus-Marian Paiu - DNA Barcoding and Black Sea Biodiveristy: A Pilot Study at the Romanian Coast
- **Derya Ürkmez**, Murat Sezgin, Levent Bat, Fatih Şahin - Assessment of the Ecological Quality Status (EQS) of a Coastal Area (Sinop, Black Sea) Based on Nematode Maturity Index
- **Valeria Abaza**, Camelia Dumitrache, Adrian Filimon - Ecological Quality Assessment of Circalittoral Major Habitats Using M-AMBI*(N) Index

- **Oana Culcea** - Isolation and Maintenance Methods for *Skeletonema costatum* in Laboratory Cultures

Oana Marin - The State of the Phytobenthic Communities along the Romanian Black Sea Coast during Summer 2016

Vasile Pătrașcu, Romul Mircea Mărgineanu, Ana Maria Blebea Apostu, Oana Marin, Mariana Claudia Gomoiu - New Data of Cs-137 in Biota from the Romanian Sector of the Black Sea

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09.30-11.00	**Session IV - Maritime Spatial Planning ORAL PRESENTATIONS**	***Conference Hall (1st floor)***
Chairpersons:	***L. Alexandrov, J. Zauka, F. Grati***	

- **Bogdan Ghinea, Diana Țenea** - Maritime Spatial Planning Directive - EU/89/2014, Level of Implementation In Romania
- **Nicolae Dimulescu** - The Activity of the National Agency for Fisheries and Aquaculture in the Context of the Community Fisheries Policy
- **Stephen Jay** - Implementing Marine / Maritime Spatial Planning
- **Jacek Zaucha**, Magdalene Matczak - Methodology of Maritime Spatial Planning in Poland
- **Ivana Lukic** - Study of Maritime Spatial Planning - Vision - as a Tool to Support Sustainable Blue Economy
- **Aneta Kovacheva**, Daniel Nigohosyan - Maritime Spatial Planning Indicators
- **Fabio Grati**, Luca Bolognini, Francois Bastardie - ECOAST Project: Spatial Planning for Fisheries in the Adriatic Sea
- **Iulian Nichersu**, Marian Mierlă, Iuliana Nichersu, Cristian Trifanov - Collaborative Assistance for Spatial-Temporal Cohesion (Cast) - Coherent Collection of Participatory Methods in MSP Directive Implementing – Results of Sf. Gheorghe Case Study

11.00 - 11.30	**Coffee Break**	***B.EN.A. Hall (ground floor)***
	PARALLEL WORKSHOP	
11.30 - 13.00	**Addressing National and Regional Needs by Enhancing the Uptake and Relevant Functionalities of the Earth Observation Portals towards Business Performance within COSMOMAR and Romanian Cluster Of EO/ RO-CEO**	***Conference Hall (1st floor)***
Moderators:	***R. Mateescu, D. Nicolae***	

- **Doina Nicolae**, Mircea Radulian, Răzvan Mateescu, Vladimir Gancz, Mugurel Bălan, Anca Andreea Popescu, Anca Coste, Iurie Maxim - Romanian Cluster for Earth Observation
- **Răzvan Mateescu** - COSMOMAR "Constanta Space Technologies Competence Centre Dedicated to the Romanian Marine and Coastal Regions Sustainable Development"
- **Anca Nemuc**, Dragoş Ene, Victor Nicolae, Livio Belegante, Doina Nicolae, Andreea Calcan - Ground Based Measurements in Support for Earth Observation Missions
- **Lucian Ionescu**, Florin Iosub - EYEs in the sky - Very High Resolution Imagery from Unmanned Aerial Systems
- **Livio Belegante**, Doina Nicolae, Anca Nemuc, Victor Nicolae, Dragoş Ene - Multiply: Development of an Advanced European HSRL Facility
- **Vasile Crăciunescu**, Marian Neagu, Krzysztof Mysłakowski, Rok Mocnik, Igor Kratochvil, Bartosz Buszke, Przemysław Turos, Marcin Gil - EO4SEE: Satellite Exploitation Platform for South-East Europe
- **Alexandru Mărmureanu**, Mircea Radulian, Alexandra Muntean, Eduard Năstase, Raluca Partheniu, Constantin Ionescu - Real Time Data Products and Services for the South East of Romania and the Black Sea
- **Daniela Faur** - Big Data Analytics for Earth Observation. Methods and Potential
- **Mugurel Bălan**, Marius Trusculescu, Claudiu Drăgăşanu, Alexandru Pandele, Silvana Radu, Mihnea Ion, Ion Ciobanu, Costel Cherciu - In Orbit Demonstration (IOD) Satellite Program UK-Romania Satellite Advancement Study URSA

• **Alexandru Dandocsi**, Luminița Mărmureanu, Anca Nemuc, Livio Belegante, Sabina Ștefan - Aerosol Characterization by Sun Photometer in the Black Sea Region • **Răzvan Mateescu** - Integrated Service for Water Quality Monitoring in the Mamaia Bay (iSWIM) • **Gancz Vladimir, Gabriel Nedea, Adrian Lorenț** - Use Of Sentinel 2 Satellite Imagery In Forest Management Activity – An Experiment • **Florin Iosub** - Demonstration of the RO-CEO portal • **Doina Nicolae** (moderator) - Discussions: RO-CEO portal, what should it be?		
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• **Anca-Maria Gheorghe**, Angelica Paiu, Mihaela Mirea Cândea, Marian Paiu - Public Engagement - A Step Towards Responsible Research And Innovation • **Florin Nicolae**, I. Roman, A. Cotorcea - Air Pollution from the Maritime Transport in the Romanian Black Sea Coast • **Mihaela Mureșan**, Tatiana Begun, Cristiana Voicaru, Daniela Vasile, Adrian Teacă - Beach Litter Occurrence in Sandy Littoral: A Case Study Romanian Black Sea Coast • **Mădălina Sbarcea**, Peter Hislaire, Marian Tudor, Iuliana Nichersu, Carmen Nașcu - Green Policing in the Danube Delta Biosphere Reserve • **Tamara Stanciu**, Andrei Scupi, Dumitru Dinu - Solving the Problems of Gas Flow External Resistance Through the Breathing Apparatus of Divers Using Computational Fluid Dynamics		
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14.00 – 17.00	**SCIENTIFIC SESSIONS**	
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• **Simion Nicolaev**, Valodia Maximov, Magda-Ioana Nenciu - Commercial Fisheries in Natura 2000 Marine Protected Areas in the EU Black Sea Waters • **Marian Paiu,** Mihaela Mirea Cândea, Anca - Maria Gheorghe, Angelica Paiu - Cetacean Abundance and Distribution for Romanian Territorial Waters between Constanta and Vama Veche Using the Line Transect Sampling Method • **Antonis K. Kokkinakis**, D. Kiourtidou, P. Miltiadou - Important Fish Fauna of Lakes of Macedonia and Thrace Regions (Greece), according to the Evaluation of Fish Species Protection Status • **Levent Bat**, Murat Sezgin, Fatih Şahin - Determination of Metal Contents in *Belone belone euxini* Günther, 1866 from the Black Sea and Its Potential Risk for People Health • **George Ţiganov**, Irina Cernişencu, Magda-Ioana Nenciu, Aurel Năstase, Marian Tudor - Estimates of the Population Parameters and Exploitation Rate of Pontic Shad (*Alosa immaculata*, Bennet, 1835) in the Romanian Black Sea Coast • **Liliana Mihaela Moga, L**orena Dediu, Carmen Georgeta Nicolae, Magda-Ioana Nenciu - Information Flow for A Traceability System Designed for Romanian Fish and Fish Products Supply Chain • Konstandinos Panitsidis, **Zacharoula Andreopoulou**, Antonis K. Kokkinakis - Development of a Multimedia Database for Fresh Water Fish Fauna and Inland Water Ecosystem Management • **Sertel F. Seçer**, I. Yavas, Z. Cantekin, Y. Bozkurt, T.K. Yavas, A. Atanasoff - Effect of Different Plant Extracts Decrease on Microbial Population in the Frozen *Clarias gariepinus* Semen		
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16.00 - 17.00	**Conclusions of PROMARE 2017 & Awards Ceremony**	***Conference Hall (1st floor)***
	Closing of the Scientific Symposium	

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P1.3. G. Bandoc, R. Prăvălie, R. Mateescu, D. Niculescu, M. Degeratu - Assessment of offshore wind energy potential in the North Western part of the Black Sea Basin based on Weibull distribution function

P1.4. Dănuţ Diaconeasa, Silică Petrişoaia, Răzvan Mateescu, Alina Daiana Spînu, Dragoş Niculescu, Vasile Pătraşcu, Adrian Niculescu - Geoindicators of Beach Vulnerability Within the Danube Delta Biosphere Reserve

P1.5. E. Vlăsceanu, N. Buzbuchi, E. Rusu - Application of Numerical Hydrodynamic Models in the Study of Waves and Currents in the Romanian Black Sea Area

P1.6. M.E. Mihailov, A.D. Nicolaev, L.F. Constantinoiu - Initial Results on Adapted Methods, Measurements and Descriptions of Underwater Noise on the Romanian Black Sea Shelf

P1.7. R. Mateescu, D. Niculescu, E Vlăsceanu, O. Goicea, M. Enache - Presentation of the ECOMAGIS Platform for Romanian Coastal area

P1.8. A. A. Kordzadze, D.I. Demetrashvili - Easternmost Black Sea Forecasting System Applied for Ecological Problems

P1.9. Valentina Coatu, Nicoleta-Alexandra Damir, Andra Oros Luminiţa Lazăr - A Revised Methodology of Black Sea Chemical Status under the Water Framework Directive

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P2.2. P. Barghini, V.Giovannini, M. Fenice, S. Gorrasi, M. Pasqualetti - High Lutein Production by a Halo-Tolerant Strain of *Dunaliella* sp. (Chlorophyceae) Isolated from Solar Salterns in Central Italy

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P2.4. Marius Făgăraş, Răzvan Popovici, Bogdan Negreanu-Pîrjol - Coastal Vegetation Decline on the Southern Romanian Coast as a Consequence Of Anthropogenic Impact

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P2.8. Mürşide Sur, Halil İ. Sur - Assessment of Metals in Fish and Mollusks from the Turkish Coastal Waters of the Black Sea

P2.9. Muhammet Boran - Effects of Ballast Water on Black Sea Ecosystem

P2.10. Derya Ürkmez, Murat Sezgin - First Black Sea Records of Two Free-Living Nematode Genera and One Species (Nematoda: Xyalidae)

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P.2.17. Daniela Mariana Roşioru, Oana Marin - *Ulva rigida* from the Romanian Black Sea Coast, a Source Of Dietary Fiber

P.2.18. Vasile Pătraşcu - Multi Yearly Variation of Cs-137 Content in Fish Catches from Romanian Sector of the Black Sea

P.2.19. Elena Bişinicu, George Emanuel Harcotă, Aurelia Ţoţoiu, Florin Timofte, Gheorghe Radu - Romanian Black Sea Zooplankton and Its Role in the Diet of *Sprattus sprattus* in 2016-2017

P2.20. Elena Bișinicu, Florin Timofte, Cristina Tabarcea, George Emanuel Harcotă, Luminița Lazăr - Spatio-Temporal Distribution of Mesozooplankton Community along the Romanian Shelf during 2013-2016

P.2.21. George Emanuel Harcotă, Florin Timofte, Cristina Tabarcea, Elena Bișinicu - Gelatinous Zooplankton along the Romanian Shelf-Qualitative and Quantitative Distribution during 2010-2013

P.2.22. Marian Mierlă, Marian Tudor, Silviu Covaliov, Cristian Trifanov, Mihai Doroftei - Ecosystem Services Assessment within Danube Delta Biosphere Reserve

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P3.4. Violin Raykov, Antoaneta Trayanova - Biological Parameters and Stock Size Estimation of *M. galloprovoncialis* from Mariculture Collector Lines

P3.5. Aurelia Țoțoiu, Mădălina Galațchi, Cristian Sorin Danilov, Gheorghe Radu - Evolution of the Sprat (*Sprattus sprattus*, Linnaeus 1758) Population at the Romanian Littoral during 2008-2016

P3.6. Aurelia Țoțoiu, Eugen Anton, Gheorghe Radu, Cristian Sorin Danilov, Neculai Patriche - Impact of Industrial Fishing Gears on the Health Status of Commercial Fish Populations at the Romanian Black Sea Coast

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PLENARY SESSIONS - ORAL PRESENTATIONS

GRIGORE ANTIPA - BEGINNINGS

Luis Ovidiu Popa*

"Grigore Antipa" National Museum of Natural History
Sos. Kiseleff No. 1, Bucharest 011341, ROMANIA
**E-mail: popaluis@antipa.ro*

In 2017, we celebrate 150 years from the birth of the prominent scientist Prof. Dr, Grigore Antipa. Grigore Antipa was born in Botoşani on 7 December 1867. Two Romanian symbol institutions dedicated to the study of nature, the National Museum of Natural History in Bucharest and the National Institute for Marine Research and Development in Constanta bear the name of this brilliant naturalist. Grigore Antipa is the founder of Romanian oceanography, due to his extensive studies dedicated to the Black Sea and the Danube Delta. Between 1892 and 1944 he was the director of the Bucharest Natural History Museum. He is also considered to be the first person to modernize the diorama by emphasizing the three-dimensional aspect and first to use dioramas in a museum setting. Additionally, Antipa was a specialist in zoology, ichthyology, ecology and oceanography, and was a university professor. He was elected as member of the Romanian Academy in 1910 and was also a member of several foreign academies. He founded a school of hydrobiology and ichthyology in Romania. During 1894, 1895 and 1896, Antipa initiated major research into the Black Sea on board the cruiser "Elisabeta". This work brought him major public duties as first organizer, then director general, and eventually chief inspector of the State Fisheries of Romania. Due to his growing reputation, in 1925 H.S.H. Prince Albert I of Monaco invited him to join the Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée (CIESM). Thanks to his prodigious activity, CIESM designated him reporter for the Black Sea in 1927, which area it extended the following year to the entire environs of the Eastern Mediterranean. Then, in 1932, he founded the Bio-oceanographic Institute at Constanța, one of the first steps in creating today's National Institute for Marine Research and Development (NIMRD).

Key-Words: oceanography, National Museum of Natural History, National Institute for Marine Research and Development in Constant, Black Sea

SAFETY AND SECURITY OF WATER QUALITY AND RESOURCES

Caner Zanbak *

Environmental Advisor, Turkish Chemical Manufacturers Association, Istanbul, Turkey
Vice-president, Balkan Environmental Association (B.EN.A.)
**E-mail: caner.zanbak@tksd.org.tr*

Safety is a term defining the measures to take precautions and measures to protect subjects from the negative effects of potentially harmful events, while Security covers the physical measures to assure application of safety measures from misconduct or willful intervention of others. The term "development - apparent/measurable growth", generally refers to state of gradual progress and improvements in economy and social well-being as compared to conditions in the past. Realizing that economic development require substantial use of natural resources and likely impact the environmental quality which may lead to deprivation of future generations of their needs, a balance between the economic, social and environmental aspects has to be maintained within the context of "Sustainable Development". Chemicals are integral matters of all components of environmental media, from air, soil and rocks and also they are the necessities for human survival/sustainability of life and development. Despite being vital for human life and sustainability of development, chemicals do carry inherent risks for human life and environmental quality, require special safety management practices to minimize their risks to the workers, users and environmental media. Availability and quality of water, on the other hand, are also "vital", not only for human beings, but for all living organisms and plants to sustain life. Assuring availability/access of water at needed quantities has been the primary goal of communities throughout the history. Following birth of the industrial revolution, water has also become an energy input that sparked its excessive use. Recent major changes in the climate patterns, increasing regional population trends, degredation in environmental soil and water quality in undeveloped/developing nations have become major roadblocks in achievement of global sustainable development efforts. Despite its abundance on earth, water has also become a precious natural resource and a commodity for its lack of availability and quality for communities at global level, making "supply security" and "quality safety" a matter of a major management concern for public authorities. Security risk assessments for chemicals and water are based on the similar logic used for general risk evaluations incorporating intentional intervention (theft or sabotage) of outsiders.

Security also incorporates the means and ways of commodity distribution throughout the supply-chain. Therefore, on a macro scale, implementation of security measures require Private/Public Partnership in order to minimize potential deprivation/harm of public as water/chemicals are delivered and stored until they reach the intended end-users. In this presentation, distinction between Safety and Security concepts in chemicals management will be reviewed along with a discussion of applicability of these concepts in water management, in terms of "quality-safety" and "supply security".

Key-Words: Safety, Security, Chemicals Management, Water Safety, Water Security

ADDRESS ON BEHALF OF THE COMMISSION FOR THE PROTECTION OF THE BLACK SEA AGAINST POLLUTION

Irina Makarenko*

Permanent Secretariat - Commission on the Protection of the Black Sea Against Pollution (Bucharest Convention)
Maslak Mahallesi, Büyükdere Caddesi, No 265,
Sarıyer – Istanbul, 34398, TURKEY
**E-mail: irina.makarenko@blacksea-commission.org*

Dear colleagues, dear General Director, distinguished participants of the Symposium,

With warmest regards from beautiful Istanbul and on behalf of Executive Director of the Black Sea Commission's Permanent Secretariat, Prof. Halil Ibrahim SUR, it is my pleasure and honor to have a chance to address you on the occasion of your remarkable event, PROMARE 2017 Scientific Symposium, an excellent occasion and chance to discuss marine research and cooperation in the Black Sea countries.

Using this chance, I would like to extent our gratitude to Grigore Antipa Romanian National Institute for Marine Research and Development for organization of this important event and also to mark your significant achievements as one of our leading partner in Romania and in the Black Sea, in general. Let me also thank the BENA-Balkan Environmental Association and Marsplan BS Project, as well as other partners and scientists that will contribute to the success of PROMARE 2017 by arranging and participating in a series of workshops covering important scientific topics related to the conservation of the Black Sea environment.

As you may know, the Black Sea Commission was created as an executive body to implement the provisions of the Convention on the Protection of the Black Sea Against Pollution also known as Bucharest Convention, which was ratified by all the Black Sea riparian countries back in 1994. Since then the Black Sea Commission plays a major role in addressing similar issues of conservation of the environment of the Black Sea, mainly combating pollution from land-based sources and maritime transport, achieving sustainable management of marine living resources and pursuing sustainable human development through a set of dedicated measures. Just as other European Seas Conventions, the Bucharest Convention may be considered an important regional instrument of the environmental law, bringing political will as well as expertise and investments to the Black Sea Region, this vulnerable region in terms of its economics, environment and sustainable development.

Let me inform you that during the recent years, the Black Sea Commission and its Permanent Secretariat managed to put on the agenda some important issues of our cooperation. Let me mention some of them.

First of all, our Black Sea Integrated Monitoring and Assessment Program (BSIMAP for 2017-2022) was adopted at the regular meeting of the Black Sea Commission in October, 2016. We have finally some legal document of the Black Sea Commission with clear interaction with provisions of Marine Strategy Framework Directive, we finally have definition of Good Environmental Status (GES) for the Black Sea; and we have important annexes relevant to different data-bases and data portals, list of Black Sea priority studies and joint reporting parameters to Danube Commission (ICPDR) and now about to finalize the Marine Litter Regional Action Plan and Monitoring Program for the Black Sea. We also now finalizing the Black Sea State of Environment (SoE) Report for 2009-2014. Very significant achievement during last years was the elaboration of the Short format of reporting, incorporating some indicators agreed by consensus (E-TRIX, BEAST, H-Shannon 95 (biomass), Landings per unit of effort etc.), also compatible with EU MSFD, GFCM, IMO and ACCOBAMS requirements. Despite this progress I mentioned, we still need to work hard to introduce many concepts, like Maritime Spatial Planning, circular economy, blue growth etc. into our documents and day-to-day activities.

We signed Memorandum of Undertanding (MoU) with Mediterranean Action Plan (UNEP/MAP – Barcelona Convention) and now exchange experience on issues of management of marine litter under a dedicated project.

Under cooperation with International Atomic Energy Agency in Monaco (IAEA) we signed "Practical Arrangements for the cooperation in the area of strengthening data quality assurance in the analysis of contaminants in the

Black Sea marine environment" and 12 appointed laboratories from the Black Sea region participated free of charge in 2 proficiency tests (PT) (1) analysis of trace elements and (2) organic contaminants in marine samples (petroleum hydrocarbons, chlorinated pesticides, PCBs) and we have already reports provided by IAEA.
The dedicated BSC-ICPDR Joint Technical Working Group (JTWG) is discussing mutual reporting (Annexed to BSIMAP), aimed at assessing the current status of monitoring and assessment of Danube loads on the Black Sea ecosystems, reinforcing the cooperation and developing appropriate mechanisms for the implementation of the BSC-ICPDR MoU signed back in 2001.
We became members of the Global Earth Observations System of Systems (GEOSS)
We worked fruitfully with General Fisheries Commission for Mediterranean and the Black Sea (UN FAO GFCM) and ACCOBAMS Agreement, jointly developed lists of fisheries and cetaceans indicators and contributed to High Level Fisheries Conference which was held last year and adopted the so called Bucharest Declaration. Together with ACCOBAMS we plan to introduce the Cetaceans Conservation Module, "training the trainers", to be taught to PhD students around the Black Sea and they will be then able to get relevant certificates and teach this module at different universities in their countries.
We are ready to disseminate and use the outcomes of PROMARE 2017 Symposium and let me wish all of us successful meeting!

THE GFCM BLACKSEA4FISH PROJECT: A TECHNICAL SUPPORT TOWARDS IMPROVED MANAGEMENT IN THE BLACK SEA

Violin Raykov*, Miguel Bernal

[1]Institute of Oceanology-BAS, 40 Primorski blvd., P.O.Box 152,9000 Varna
BlackSea4Fish Project
[2]GFCM - Via Vittoria Colonna, 1, 00193, Rome, Italy
**E-mail: vio_raykov@abv.bg*

The BlackSea4Fish Project long term objective is to enhance cooperation in fisheries among the Black Sea riparian countries by contributing to their rational management, thus supporting national economies and protecting the livelihoods of those dependant on the fisheries. Its immediate objective, however, is to support national fisheries departments in increasing and improving their scientific and technical capacity for fisheries management,

with a view to developing effected, coordinated and participative fisheries management plans in the Black Sea. This objective will be achieved through institutional and technical support to national fisheries departments, as well as by facilitating interaction and dialogue between scientists, decision makers and fishers. Such dialogue will improve the knowledge base and will encourage greater communication, cooperation and coordination. In turn, enhanced national and regional information exchange will improve the GFCM's ability to provide management advice. In essence, the project is oriented towards specific tasks that aim to solve the dire state of Black Sea fisheries. Target groups of the project will be decision-makers, managers and fishers. Some deliverables are also expected to be used to support the implementation of GFCM requirements under certain recommendations currently in place. Ultimately, fisheries administrators, managers, scientists and fishers in all coastal states are beneficiaries of the project.

Key-Words: support, fisheries management, dialogue, stakeholders, GFCM

SCIENTIFIC SESSIONS - ORAL PRESENTATIONS

Session I - Oceanography and Coastal and Marine Engineering

EMODNET CHEMISTRY - DATA AGGREGATION AND PRODUCT GENERATIONS IN THE BLACK SEA

Luminita Buga[1]*, Alessandra Georgetti[2], Gheorghe Sîrbu[1]

[1]National institute for Marine Research and Development "Grigore Antipa", 300, Blvd. Mamaia, Constanta, Romania
[2]OGS - Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - Borgo Grotta Gigante, 42/C - 34010 Sgonico (TS), Italy
**E-mail: lbuga@alpha.rmri.ro, lbuga@web.de*

Large amounts of marine data are continuously being collected around the world. Access to marine data and a good management of these data is of vital importance for marine research, for international cooperation and data exchange. In order to unlock fragmented and hidden European marine data resources, to improve Europe's marine data infrastructure, increase the availability of high quality data and assemble them under a common framework and to make these available to individuals and organisations (public and private), DG-Mare launched in 2009 a new initiative: European Marine Observation and Data Network (EMODNet) as proposed in the EU Green Paper on Future Maritime Policy. In present EMODNet (www.emodnet.eu) provides access to marine data and derived data products from eight thematic portals: bathymetry, geology, sea bed habitats, chemistry, biology, physics, human activity and coastal mapping. Through a stepwise approach, EMODnet Chemistry (www.emodnet-chemistry.eu) aims to collect, standardize, check the quality of data developing new services to share and visualize information and products at the scale of regions and sub-regions defined by the Marine Strategy Framework Directive. The third phase of EMODnet Chemistry partnership involves 45 institutes from 27 countries and 3 international organisations (ICES, Black Sea Commission, UNEP/MAP) from all European Seas. The Black Sea is one of the regional seas in EMODNet Chemistry. Data products on nutrients, Chlorophyll, Oxygen as well as contaminants in the Black Sea will be presented, highlighting the availability of historic and present time data and problems encountered with the datasets from contributors. The data QC and aggregation was done using ODV (Ocean

Data View) software and DIVA (Data-Interpolating Variational Analysis) was used for the generation of climatological maps for different parameters.
Key-Words: EMODnet, Black Sea, data availability, ODV, DIVA, nutrients, contaminants

TRITIUM AS TRITIATED WATER IN THE UPPER LAYER OF THE SEASHORE AND STRETCHES OF SHORELINE SURROUNDING WATER, FROM PERIBOINA CHANNEL TO VAMA VECHE (2007 - 2017)

Corina Anca Simion[1]*, Romul Mircea Mărgineanu[1], Nicolae Mocanu[1], Ana Maria Apostu Blebea[1], Vasile Pătraşcu[2]

[1]"Horia Hulubei" National Institute of RD for Physics and Nuclear Engineering - IFIN-HH, Magurele/Ilfov, Romania
[2]National Institute for Marine Research and Development 'Grigore Antipa" 300 Mamaia Blvd.., Constanta, Romania
**E-mail: anke@nipne.ro*

A ten years occasionally survey of tritium radioactive concentration as tritiated water at the Romanian seashore and stretches of shoreline surrounding water was developed at "Horia Hulubei" National Institute for Physics ans Nuclear Engineering using Liquid Scintillation Counting (LSC) Technique. Depending on annual and seasonal effect of cosmogenic tritium production and anthropic tritium releases (> 98% as tritiated water, HTO) a smooth distribution were observed from North to South area, the values being slightly larger in late springtime and in the month of July, generally. Also, the values are higher in the gulf areas and in the continental waters. The distribution of values along the coastline highlights the contribution of the adjacent continental waters to the confluence points with the sea. In the North, the intake of waters that reach the sea through the Periboina Channel can be emphasized separately from the contribution of the Danube River to the shallow waters of the shore. The phenomenon is similar to the South, where we could highlight the contribution of the water from Limanu Pond Lake - Mangalia Lake. In the Central area, the contribution of Tabacariei Lake was also determined. These continental waters are not in direct connection with the liquid releases from the Cernavoda NPP, such as the Danube - Black Sea and the White Gate - Midia Navodari Channels. They can highlight the indirect contribution of routine gaseous releases or the maintenance periods

of Cernavoda NPP. Activity levels added to the terrestrial environment due to atmospheric releases from facilities which are below $5x10^{11}$ Bq/year (for example, the least powerful NPPs) cannot normally be detected since they are blocked out by current background activity. The influence of tritium releases from such facilities is potentially only visible in the aquatic environment. In the case of annual atmospheric releases ranging between $5x10^{11}$ and 10^{13} Bq (for example, the most powerful NPPs), activity levels higher than background activity (5 to 10 Bq/L) have occasionally been measured in the environment without it having been possible to conclude, in statistical terms, that contamination had occurred. The influence of atmospheric releases of tritium from NPPs will be easier to detect once the background level has dropped. Having a gaseous releases around 10^{12} Bq/year, Cernavoda NPP proves to be a good environmental tracer since, after 50 years of the main emissions generated by nuclear tests to the planetary atmosphere inventory, the current level of anthropic trititum concentration is becoming more and more difficult to differentiate from the values of cosmogenic tritium. With a total percent below 1% of LDE and a tritium volumic concentration ten to twenty times smaller than the maximum admissible concentration limit in continental waters (100Bq/L) imposed by Romanian legislation, the gaseous releases from Cernavoda NPP become a usefull scientific tool for Dobrogea region and Romanian Black Sea coast.

Key-Words: tritium, radioactive concentration, tritiated water, shoreline, lakes

POLLUTION OF MARINE ENVIRONMENT BY SHIP

Muhammet Boran*

Karadeniz Technical University, Faculty of Marine Sciences, Trabzon/Türkiye
**E-mail: mboran@ktu.edu.tr*

Many pollutants are released into the marine environment far upstream from coastlines. But there are various ways by which pollutants enters to the marine environment. Ships are one of the sources of these pollutants. There are two ways in which the seas are contaminated by ships. One of them is routine pollution the other are ship accidents that cause pollution in the seas. Routine contamination occurs when the wastewater such as bilge, ballast and sewage of vessels is discharged into the sea without resorting to international rules. Accidental pollution occurs by landing and collision of vessels carrying

petroleum and other harmful cargo. The types of pollution that may originate from ships include oil, chemicals, garbage sewage, air pollution from the ship's engines and bunker fuel and the anti-fouling paint on a ship's hull. Marine pests in ship's ballast water or clinging to the ship's hull can also harm marine environments. The purpose of this document is to demonstrate the marine pollution caused by ship.

Key-Words: ship-sourced pollution, bilge water, ballast water, sewage

DISTRIBUTION OF TOTAL SUSPENDED SOLIDS IN THE TURKISH COASTS OF THE BLACK SEA

Mürşide Sur*, **Halil İ. Sur**

İstanbul University, Institute of Marine Science and Management, Müşküle Sokak, No. 17, Vefa, 34134, Istanbul, Turkey
**E-mail: mursidesur@istanbul.edu.tr*

The purpose of this study was to determine the concentrations of total suspended solids (TSS) and to investigate horizontal and vertical distributions of TSS in the Turkish coastal waters of the Black Sea. According to results, regional and seasonal variations of TSS were related to the seasonal variations in currents and linked to the variations in the transport of land-derived suspended solids in coastal stations from the river discharges. Total suspended solid concentrations in late autumn (2010) and winter (2011) ranged from 5.5 to 56.0 mg/l. Generally, the average value of TSS in autumn were higher than the winter average values of TSS at both surface and bottom seawater. Maximum concentrations (except Yenice River mouth) at the nearshore stations were measured in surface seawater of Fatsa and in bottom seawater of Ereğli in autumn, and in surface seawater of Terkos and bottom seawater of Şile in winter. The highest amount of TSS in both seasons near the mouth of the Yenice River showed the influence of the river. Additionally, positive correlation was determined between TSS values and anionic surfactant (r =0.8-0.9) and negative correlation with salinity (r=0.2-0.3) in surface seawater of the nearshore stations. Correlation between TSS and salinity in bottom seawater of the offshore station (r=+0.6) was higher than the surface seawater in both season.

Key-Words: Suspended matter, Yenice River, salinity, Pearson's correlation

INVESTIGATION OF THE DISCHARGE LEVELS OF DISSOLVED INORGANIC NUTRIENTS FROM YEŞİLIRMAK RIVER TO THE BLACK SEA

Muhammed Baran Kiliç[1]*, Ali Alkan[2], Dilek Fidan[1], Bayram Zengin[1], Ömer Kalipçi[1]

[1]Central Fisheries Research Institute, 61250, Yomra, Trabzon, Turkey
[2]Karadeniz Technical University, Institute of Marine Science and Technology, 61080, Trabzon, Turkey
**E-mail: muhammedbaran.kilic@tarim.gov.tr*

In this study it has been performed 14 sampling and measurements between 2014 – 2017 years with seasonal periods, at the point which river Yeşilırmak is poured itself into the Black Sea, Çarşamba district of Samsun. Temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total hardness, total suspended solid (TSS), sulphate, chlorophyll-a, nitrate (NO_3^--N), nitrite (NO_2^--N), ammonium (NH_4^+-N), o-phosphate (o-PO_4^{3-}-P) and silicate (Si) water quality parameters were measured within this study.

Seasonal average concentrations were compared with limit values of the water quality criterias according to relevant regulations of legislation in force. Moreover characteristic values in Yeşilırmak (µM) for NO_3^--N, NO_2^--N, NH_4^+-N, o-PO_4^{3-}-P and Si were calculated respectively as 89,43; 1,79; 18,09; 7,00; 385.

Furthermore, dissolved nutrients transported to the Black Sea by Yeşilırmak were calculated using seasonal flow. Annual average loads (tones/year) for NO_3^--N, NO_2^--N, NH_4^+-N, o-PO_4^{3-}-P, Si and TSS were calculated as 4120; 62; 349; 243; 35048, 47445.

Key-Words: Yeşilırmak, nutrient loads, characteristic value, Black Sea

USE OF DIGITAL TERRAIN MODEL FOR EVALUATION OF BEACH VULNERABILITY ON ROMANIAN COAST

Alina Daiana Spînu*, Emanuela Mihailov[1], Luminița Buga[1], Silică Petrișoaia[1]

National Institute for Marine Research and Development „Grigore Antipa", Constanta, Romania,
**E-mail: aspinu@alpha.rmri.ro*

In the last four decades, increasing of environmental and other risks due to climate change and sea level rise have been registered, leading to negative evolution of shoreline.

Black Sea relative sea-level is rising by an estimated rate of 1- 2 mm/year and many coastal areas are becoming susceptible to flooding. In addition to sea level rise, storm surge and waves are carried to higher levels on rising mean sea level are also factors of the beach erosion.

The surveillance of the shoreline evolution based on GPS and remote sensing modern techniques (UAV aerial photos, LIDAR), shows the need of the shoreline management, coastal protection and rehabilitation, especially for the vulnerable coastal areas against the threat of high waves and storm surges.

Capture aerial images in coastal area using drones was tested successfully by INCDM. Aerial photographs (obtained by drones or aircraft) with specific measurements in situ provides a clear and detailed picture of the coastal system and can be used in coastal erosion monitoring

The integration of data is provided by a GIS system that improves their accessibility and their availability. GIS system provides "developed intelligent tools" for specific spatial analysis - detection of spatial changes, assessment of future evolution and impact simulations.

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Key-Words: beach vulnerability, coastal erosion, UAV, digital terrain model

Session II - Marine Ecology and Environmental Protection

THE IMPLEMENTATION OF THE MARINE STRATEGY FRAMEWORK DIRECTIVE IN ROMANIA

Laura Boicenco[1]*, Simion Nicolaev[1], Otilia Mihail[2], Tania Zaharia[1]

[1] National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., 900 581 Constanta, Romania
[2] Department for Water Resources Management, Ministry of Water and Forests, Calea Plevnei 46-48, Sector 1, Bucharest
**E-mail: lboicenco@alpha.rmri.ro*

The European Marine Strategy Framework Directive (MSFD; European Commission 2008) aims at achieving or maintaining a Good Environmental Status (GEnS) by 2020 in marine waters, following an ecosystem-based approach. According to MSFD, GES is defined in terms of 11 descriptors and using a number of criteria and indicators associated to each descriptor. By the end of 2012, the first steps have been taken in the implementation of the directive, including its transposition into national legislations and the preparation of the Initial Assessment (IA) (Art.8), Determination of Good Environmental Status (GES) (Art.9), and Setting Environmental Targets and Indicators (Art.10). These steps should further include the development of a Monitoring Programme and a Programme of Measures, by the end of 2015. The aim of paper is to describe the preparation process of the MSFD in Romania that took place up to 2016.

Key-Words: Marine Strategy Framework Directive, Good Environmental Status, environmental target, indicator

COCCOLITHOPHORE AND DIATOM DISTRIBUTION ON THE NW PART OF THE ROMANIAN BLACK SEA INNER SHELF

Mihaela C. Melinte-Dobrinescu*

National Institute of Marine Geology and Geo-ecology,
223-25 Dimitrie Onciul Street,
RO-024053 Bucharest, Romania
**E-mail: melinte@geoecomar.ro*

Calcareous nannoplankton and diatom groups of organisms are very sensitive to environmental changes, such as salinity, temperature, geochemistry of waters and nutrient input. The calcareous nannoplankton taxa are mostly marine ones, while the diatoms may be found in a large variety of environments, i.e. marine, brackish and fresh-waters. This study is focused on the distribution pattern of the calcareous nannoplankton and diatoms in the NW Black Sea inner shelf, on a water depth between 20 and 60 m. The samples have been taken both from the water column and from the sediment surface. As concerning the calcareous nannoplankton, only one species has been found in the water column, i.e. *Emiliania huxleyi*, which is a very cosmopolitan taxon that survives at high salinity and temperature variations. The quantitative analysis indicates a high abundance between 40 and 60 m water depth and a progressive decrease towards the coast of *Emiliania huxleyi*. Besides, in the samples taken from the sediment surface, *Braarudosphaera bigelowii* has been also encountered; some samples surely contain reworked specimens, but in deeper parts of the study area, coccospheres of *Braarudosphaera bigelowii* have been observed, indicating the presence of the taphocaenosis. In the samples form the water column, a large variety of diatoms were identified. These are mainly marine taxa, but also brackish species are present towards the coast, where the inner shelf is characterized by a lowering salinity. Along with these, fresh-water diatoms are present, but these ones are considered as belonging to the tanatocaenosis, being probably brought by the Danube waters and sediments on the NW/Romanian inner shelf.

Key-Words: calcareous nannoplankton, diatoms, geochemistry

DNA BARCODING AND BLACK SEA BIODIVERISTY: A PILOT STUDY AT THE ROMANIAN COAST

Elena Stoica[2], Adriana Radulovici[1]*, Madga Nenciu[2], Adrian Filimon[2], Oana Marin[2], Sorin Cristian Danilov[2], Romulus-Marian Paiu[3]

[1]Centre for Biodiversity Genomics, University of Guelph, 50 Stone Road East, N1G 2W1, Guelph (ON), Canada
[2]National Institute for Marine Research and Development "Grigore Antipa" (NIMRD), Bd. Mamaia no. 300, 900581, Constanta, Romania
[3] "Mare Nostrum"NGO, Bd. 31 Decembrie 1918, 900711, Constanta, Romania
**E-mail: aradulov@uoguelph.ca*

DNA barcoding is a recent molecular-based approach for taxonomic classification and identification of species. During the last decade DNA barcoding has proved to be a valuable tool of biological diversity identification in most marine regions of the world. The Black Sea, historically considered a sea abundant in biodiversity, currently houses a large variety of habitats with a relatively low diversity of species as a consequence of 1970s environmental collapse of this unique sea. Moreover, our estimates of the Black Sea diversity are still incomplete as they are mostly based on conventional morphological specimen identification. Therefore, NIMRD Constanta in collaboration with University of Guelph, Canada has initiated in 2016 the first pilot study with the main purpose of analyzing and updating the biodiversity inventory of the Romanian waters by using molecular-based approaches. Here we tested the feasibility of using DNA barcoding to assign species to tissue samples from macroalgae, invertebrate, fish and mammals (dolphins) collected along the Romanian Black Sea coast during 2004 - 2016. Our study confirms the application of DNA barcoding as highly effective identification tool for the analyzed marine species. However, additional international collaborative efforts are needed to explore the usefulness of DNA barcoding in proper species identification across all taxa in the entire Black Sea.

Key-Words: DNA barcoding, biodiversity, species identification, macroalgae, zoobenthos, fish, dolphins, Black Sea

ASSESSMENT OF THE ECOLOGICAL QUALITY STATUS (EQS) OF A COASTAL AREA (SINOP, BLACK SEA) BASED ON NEMATODE MATURITY INDEX

Derya Ürkmez[1]*, Murat Sezgin[2], Levent Bat[2], Fatih Şahin[2]

[1]Scientific and Technological Research and Application Center, Sinop University, Sinop, Turkey
[2]Department of Hydrobiology, Faculty of Fisheries, Sinop University, Sinop, Turkey
**E-mail: deryaurkmez@gmail.com*

European Water Framework Directive recommended the Ecological Quality Status (EQS) for the assessment of water quality. Biological indicators are considered more expressive for the evaluation of ecological quality and several biotic indices are used which serve as tools to classify coastal waters into five groups of quality (High, Good, Moderate, Poor, Bad). Maturity Index (MI) and c-p values of free-living marine nematodes have only recently been used for this purpose based on suggested thresholds. For this study we applied the proposed thresholds on nematode community structure of the sampled shallow stations (2 m) in the scope of an ongoing meiobenthos project. Samples were collected seasonally between summer 2015 - spring 2016 using a sediment corer. As a part of the project, nematodes collected at 4 stations (S1A, S2A, S3A, S4A) in autumn were identified to genus level and the MI was calculated for the nematode assemblage as the weighted average of the individual colonizer–persister (c–p) values. The index values of the stations were found to be between 2.26-2.83, ranging from poor to high quality. When c-p classes are considered, EQS seemed better, with each station assigned to one level above. Class c-p1 and c-p5 were totally absent in our samples. Relative abundance of class c-p4 was minimum at st. S1A (5.66%) and maximum at st. S4A (20.19%). Opportunistic nematode genera (class c-p2) revealed values between 37.60% (st. S4A) - 80.70% (st. S2A). As a result, st. S4A showed a considerably elevated MI value revealing a high quality of EQS in autumn. On the contrary, low values of MI and dominance of class c-p2 indicated a high stress level at stations S2A and S1A during the same sampling period. This research was supported by the project "Meiofauna as an environmental bio-indicator in marine ecosystems of Turkey and Montenegro" (project no 114Y376) sponsored by TÜBİTAK (The Scientific and Technological Research Council of Turkey) and MoS (The Ministry of Science of Montenegro).

Key-Words: Biotic Index, Biological Indicators, Meiobenthic Nematodes, Turkey

ECOLOGICAL QUALITY ASSESSEMENT OF CIRCALITTORAL MAJOR HABITATS USING M-AMBI*$_{(N)}$ INDEX

Valeria Abaza*, Camelia Dumitrache, Adrian Filimon

National Institute for Marine Research & Development Grigore Antipa, Constanta, Romania
**E-mail: vabaza@alpha.rmri.ro*

The EU Commission Decision2017/848 laying down the criteria and methodological standards on good environmental status of marine waters under Marine Strategy Framework Directive (MSFD), referring to benthic habitats, clearly specifies that assessment must take into consideration benthic broad habitat types, including their associated biological communities. Using data set collected in 14 years along four decades (1980ies to 2010s) at depths ranging between 30 and 100m on Romanian shelf, circalittoral broad habitat types were identified and their reference conditions were established. Based on the available dataset three habitat types were identified: Circalittoral biogenic reefs with *Mytilus galloprovincialis*, Circalittoral mud with *Melinna palmata* at depths between 30 and 50-60m and Circalittoral mud with *Modiolula phaseolina* at 70-100m depth. As the polychaete *Melinna palmata* is a permanent species in the circalittoral biogenic reefs with *Mytilus*, and statistical analysis showed the two habitats are superimposed, they were considered together as broad habitat type of biogenic reefs of *Mytilus galloprovincialis*. Present ecological status of the two circalittoral habitats was assessed using M-AMBI*$_{(n)}$ index (Sigovini et al, 2014). The results showed a good status of both habitats, although 25% of the samples showed non-GES in circalittoral biogenic reefs with *Mytilus galloprovincialis* located in Danube mouths area. Considering the results, M-AMBI*(n) was proposed as one of the indicators for assessing good environmental status of marine habitats in the Romanian marine waters.

Key-Words: Marine Strategy Framework Directive, good environmental status, benthic broad habitat types, circalittoral habitats, *Mytilus galloprovincialis*, *Modiolula phaseolina*

ISOLATION AND MAINTENANCE METHODS FOR *Skeletonema costatum* IN LABORATORY CULTURES

Oana Culcea*

National Institute for Marine Research and Development 'Grigore Antipa', 300 Mamaia Blvd., 900 581 Constanta, Romania
**E-mail: oculcea@alpha.rmri.ro*

Skeletonema costatum is an important species that frequently cause microalgal blooms in the Black Sea waters especially during spring. This study was aimed to use different techniques to isolate the species from their natural habitat. The first stage was the identification of the period when the species was dominant in the samples collected from the Mamaia station. Then the sea water sample was filtered (through a 60 μm multi-layer filter) to remove most of the phytoplankton and zooplankton species present in the sample. Successive dilutions followed until only the species of interest remained in the culture. The next stage was to observe *Skeletonema costatum* growth rate under laboratory conditions and to maintain the culture viable for future experiments. These experiments will imply the response of the species to a controlled variation of some important physico-chemical parameters, which may trigger some limitations in their development.
Key-Words: *Skeletonema costatum*, Black Sea, microalgal cultures, growth rate

THE STATE OF THE PHYTOBENTHIC COMMUNITIES ALONG THE ROMANIAN BLACK SEA COAST DURING SUMMER 2016

Oana Marin*

National Institute for Marine Research and Development 'Grigore Antipa', 300 Mamaia Blvd., 900 581 Constanta, Romania
**E-mail: omarin@alpha.rmri.ro*

The work aims to present the state of the macroalgae and phanerogams communities from the Romanian Black Sea shore during the summer 2016. The samples were collected from 11 stations (from Năvodari to Vama Veche) at depths between 1 - 3 m and analysed both qualitative and quantitatively. The paper presents information both on perennial, sensitive species with key

ecological role for the marine environment and opportunistic ones capable of developing algal deposits along the shore during the summer season. In this respect, the dominant species were: *Ulva rigida* (with a fresh biomass variation between 3.3 and 1030 g/m^2, with a maximum value recorded at Agigea), *Cladophora* sp. (with a fresh biomass variation between 0 and 816 g/m^2, with a maximum value recorded at Pescărie) and the red alga *Ceramium virgatum* (with a fresh biomass variation between 0 – 125 g/m^2, with a maximum value recorded at Costineşti). Regarding the perennial key species (*Cystoseira barbata, Coccotylus truncatus, Zostera noltei*) they are currently in a regeneration period along the Romanian Black Sea coast, and the fresh biomass varies as follows: *C. barbata* - between 5623.33 and 9355 g/m^2, *Coccotylus truncatus* (only one record of 760 g/m^2), and the marine phanerogam *Zostera noltei* between 438.33 and 1325 g/m^2.

Acknowledgments: This work was funded by the Nucleu Project no. PN16230201, developed with the support of Ministry of Research and Innovation, Romania.

Key-Words: macroalgae, *Phyllophora*, *Cystoseira*, fresh biomass

NEW DATA OF CS-137 IN BIOTA FROM ROMANIAN SECTOR OF THE BLACK SEA

Vasile Pătraşcu[1]*, Romul Mircea Mărgineanu[2], Ana Maria Blebea Apostu[2], Oana Marin[1], Mariana Claudia Gomoiu[2]

[1]National Institute for Marine Research and Development „Grigore Antipa" ,300 Mamaia Blvd., 900 581 Constanta, Romania

[2] „Horia Hulubei" National Institute of Research and Development for Physics and Nuclear Engineering - IFIN-HH, Romania

**E-mail: vpatrascu@alpha.rmri.ro*

The living components of the marine environment are in constant interaction with its physicochemical state. The Cs-137 radionuclide continues to be present in this environment as long as there are controlled discharges from the generating sources (nuclear reactors), and the diminutive physical processes have not reached the maximum. The paper presents new results to the Cs-137 content in algae and molluscs. The composition, by measuring the parts of molluscs, reveals the presence of the radionuclide only in the soft part. Radiation analysis, perform in underground ultra low level laboratory in the saline from Slanic Prahova, was able to highlight low gamma levels in marine components.

Key-Words: Cs-137, Black Sea, marine radioecology, marine biota

Session III - Sustainable Use of Marine Resources

COMMERCIAL FISHERIES IN NATURA 2000 MARINE PROTECTED AREAS IN THE EU BLACK SEA WATERS

Simion Nicolaev*, Valodia Maximov, Magda Ioana Nenciu

National Institute for Marine Research and Development 'Grigore Antipa"
300 Mamaia Blvd., Constanta, Romania
**E-mail: snicolaev@alpha.rmri.ro*

As a Member State, Romania has implemented the Birds and Habitats Directives (79/409/EEC and 92/43/EEC) through national legislation (Emergency Ordinance no. 57/2007, Minister's of Environment and Forests Order no. 2387/2011, amending Minister's of Environment and Sustainable Development no. 1964/2007 and, recently, Minister's of Environment, Waters and Forests no. 46/2016). Pursuant to the most recent legislative document, there are 9 Sites of Community Interest (SCIs) along the Romanian Black Sea coast, as follows: ROSCI0311 Viteaz Canyon (newly established), ROSCI0413 Southern Lobe of Zernov's Phyllophora Field (newly established), ROSCI0281 Cape Aurora, ROSCI0066 Danube Delta - marine zone, ROSCI0094 Mangalia Sulphide Seeps, ROSCI0197 Eforie North - Eforie South Submerged Beach, ROSCI0269 Vama Veche - 2 Mai, ROSCI0273 Marine Area of Cape Tuzla and ROSCI0293 Costineşti - 23 August.

The extension and creation of new Natura 2000 site in the Romanian EEZ at the Black Sea was made by overlapping with pre-existing traditional economic actvities, mainly fishing, but also offshore oil and gas exploitation.

The main traditional areas covered by the new Natura 2000 sites include:

- trawl fishing areas
- turbot gillnets
- pelagic trawl

The main traditional areas for offshore actvities covered by the new Natura 2000 sites include:

- drilling platforms
- oil and gas pipeline
- exploration oil fields

It is obvious that this overlapping of MPAs on existing activities has generated limitations and constraints of economic activities, which resulted in conflicts of interest between fishermen communities and environmental protection authorities. Under such circumstances, the amicable settlement of economic

and conservation interests should be made using compromise solutions: one of these solutions could be the differentiated zoning of Natura 2000 sites. Some of these areas would allow certain activities, while others would limit/ban them temporarily or permanently.

Key-Words: MPAs, traditional activiries, SCIs, overlapping, conflict resolution

CETACEAN ABUNDANCE AND DISTRIBUTION FOR ROMANIAN TERRITORIAL WATERS BETWEEN CONSTANTA AND VAMA VECHE USING LINE TRANSECT SAMPLING METHOD

Marian Paiu*, Mihaela Mirea-Cândea, Anca-Maria Gheorghe, Angelica Paiu

Mare Nostrum NGO, Bvd. 1 Decembrie 1918 no. 3, 900711, Constanta, Romania
**E-mail: marian_paiu@marenostrum.ro, romulus.marian@gmail.com*

Cetacean abundance is estimated for the Romanian Territorial Waters (12 NM) between Constanta and Vama Veche based on a ship line-transect survey from 7-29 March, 2017, using distance sampling method and Distance 7 software for survey plan design and data analysis. Distance sampling, which takes undetected individuals into account, is one of the most widely used methods for generating population estimates. The European Union (EU) Habitats Directive requires Member States to monitor and maintain at favorable conservation status those species identified to be in need of protection, including all cetaceans. That is why the studies related to Black Sea cetaceans are of great importance, keeping in mind the important role of cetaceans in the marine ecosystem. The survey plan covered 8 transects, from east to west with a distance of 5 km between, perpendicular on the shore line summing a total of 246.404 Km and was conducted ≤ Beaufort 4 in an area of 1082 km^2 and with a coverage of 0.396%. In total there were 59 sightings of all the three species of cetaceans known for the Black Sea with a very low frequency of common dolphin (*Delphinus delphis ponticus*). The survey is one of the two surveys (spring and summer) made in the frame of the the project **"Increase the regional capacity for developing cetacean distribution and abundance studies"** financed from the Supplementary Conservation Funds of ACCOBAMS.

Key-Words: Black Sea, line transect sampling, Harbour porpoise, Bottlenose dolphin, Common dolphin, vessel survey, MSFD

IMPORTANT FISH FAUNA OF LAKES OF MACEDONIA AND THRACE REGIONS (GREECE), ACCORDING THE EVALUATION OF FISH SPECIES PROTECTION STATUS

Antonis K. Kokkinakis*, D. Kiourtidou, P. Miltiadou

*Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Wildlife and Freshwater Fisheries, P.O. Box. 241, 54124 Thessaloniki, Greece, *E mail: akokkin@for.auth.gr*

Lakes are very important ecosystems and nowadays accepts many pressures from human interventions and from the deterioration of ecosystems that inhabits. The fish fauna of these ecosystems is a very important parameter for both their conservation and also for their rational and environmental friendly management and fishery. The main purpose of this study is, except from recording the fish fauna of the lakes in Northern Greece, the grouping and classification of the species according to the category of 'risk' in relation to the legislation that concerns and protects them in each administrative region, as the regions of Western, Central and Eastern Macedonia & Thrace in Greece.

In this paper was recorded the fish fauna in the 17 most important lake ecosystems in the regions of Western, Central and Eastern Macedonia & Thrace of Greece. It was verified the protection status for each one of the 99 different fish species recognized there, according to the Red List of IUCN, the Greek Red Book, the Berne Convention and the Directive 92/43/ of EEC. It was evaluated the contribution of the number of species in relation to their classification under their protection status by ecosystem and region area in Greece and for the total study area in Northern Greece.

The conservation of the biodiversity and of the natural resources of the lakes has a significant environmental, social and economic value. The rational management and the protection of the fish fauna of lakes in Northern Greece is vital both for their natural environment and for the society.

Key-Words: fish fauna, lakes, species protection status, Macedonia, Thrace, Greece

DETERMINATION OF METAL CONTENTS IN *Belone belone euxini* GÜNTHER, 1866 FROM THE BLACK SEA AND ITS POTENTIAL RISK FOR PEOPLE HEALTH

Levent Bat*, Murat Sezgin, Fatih Şahin

University of Sinop, Fisheries Faculty, Department of Hydrobiology, TR57000 Sinop, Turkey
**E-mail: leventbat@gmail.com*

In the present study, mercury, cadmium, lead, arsenic, aluminium, copper, zinc and iron contents in muscle, liver and gill of *Belone belone euxini* Günther, 1866 were analysed with inductively coupled plasma mass spectrometry (ICP-MS). According to the results, liver and gill tissues had more metal levels than those in muscle tissues. Hg and Cd in the edible part of garfish were below the detection limits. None of metal concentrations in the edible tissues exceeded both international and national legal limits. Results of estimated daily and weekly intakes showed that these metals did not pose any risk of public health.

Key-Words: garfish, metal contents, Black Sea, public health

ESTIMATES OF THE POPULATION PARAMETERS AND EXPLOITATION RATE OF PONTIC SHAD (*Alosa immaculata* BENNET, 1835) IN THE ROMANIAN BLACK SEA COAST

George Tiganov[1]*, Irina Cernișencu[1], Magda-Ioana Nenciu[2], Aurel Năstase[1], Marian Tudor[1]

[1]DDNIRD-Danube Delta National Institute for Research and Development 165, Babadag Street, Tulcea, Romania
[2]National Institute for Marine Research and Development "Grigore Antipa" Constanta 300 Mamaia Blvd., Constanta, Romania
**E-mail: george.tiganov@ddni.ro*

Sex ratio, morphometric characteristics, age and growth for Pontic shad from Romanian Black Sea Coast were examined. A total of 2,133 individuals, were caught between March 2012 and September 2013. Female : male sex ratio was 0.62. According to the age reading, distribution varied from II to V years old. The von Bertalanffy equation and growth performance index were

determined by ESP software in Pontic shad. The asymptotic length ($L\infty$ = L infinity) of Pontic shad generated by the ELEFAN I method, after introducing total length data for the two years of study, was 41.5. The natural mortality instantaneous coefficient (M) of the entire Pontic shad population, calculated according to Pauly's empirical equation, using the growth parameters of the Von Bertalanffy formula and the mean annual temperature of the two study years of 13oC, recorded the following values: M=0.585 in 2012 and M=0.639 in 2013.

Key-Words: Age, growth, morphometric characteristics, sex ratio

INFORMATION FLOW FOR A TRACEABILITY SYSTEM DESIGNED FOR ROMANIAN FISH AND FISH PRODUCTS SUPPLY CHAIN

Liliana Mihaela Moga[1]*, Lorena Dediu[1], Carmen Georgeta Nicolae[2], Magda Ioana Nenciu[3]

[1]Lower Danube University of Galati, 47 Domneasca Street, Galati, 800008, Romania,
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania,
[3]National Institute for Marine Research and Development Grigore Antipa, 300 Mamaia Blvd, 900 581 Constanta, Romania
**E-mail: liliana.moga@gmail.com*

A traceability system able to integrate the entire fish and fishery products supply chain, implemented at national level, can decisively influence the evolution of fish and fishery products consumption in Romania, by providing basic information such as origin, rearing, processing, transportation and marketing. All these would result in an increasing trust of consumers.
This paper provides a presentation of the information flow of the traceability system designed for fish and fishery products which was developed in accordance with European and national regulations and the needs of all the actors involved in the fish and fishery products supply chain and consumers.
The specific requirements of Romanian supply chain actors render its specificity and, along with several other factors, can influence its acceptance rate among companies/operators in the sector, as well as among consumers.

Key-Words: traceability system, supply chain, fish and fishery products, information flow

DEVELOPMENT OF A MULTIMEDIA DATABASE FOR FRESH WATER FISH FAUNA AND INLAND WATER ECOSYSTEM MANAGEMENT

Konstandinos Panitsidis, Zacharoula Andreopoulou, Antonis K. Kokkinakis*

*Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Wild Life and Freshwater Fisheries, P.O. Box. 241, 54124 Thessaloniki, Greece, *E-mai: akokkin@for.auth.gr*

This paper describes the development of an innovative application with a multimedia database, concerning the management of fresh water fish fauna in the inland water ecosystems of Greece. This database is a baseline for keeping descriptive information of fresh water fish fauna and bibliographic spread reports. The database has provision for both descriptive and geographic mapping (GIS). The sources of the data used for the database population were from a) The Red Book of Endangered Animals of Greece b) IUCN (International Union for Conservation of Nature and c) Ministry of Environment & Energy (Study 6: Supervision and Evaluation of the Conservation status of fish species of Community interest in Greece). A detailed description will be made for the development stages of the database (Conceptual - Logical - Physical Design). The database management system was developed in Microsoft Access and in pgAdmin which is an open source administration and development platform for PostgreSQL. In addition, reference will be made to database population and Entity - Relationship Model. Moreover, the above database will also provide to application the capacity to create hypothetical (what-if) scenarios in order to achieve the best form of intervention. Furthermore the aim of this project is to construct a database that will provide ichthyologic and environmental data. The main advantage is the compatibility with various software platforms and can be easily future expanded. Finally, the database will be used as a user-friendly information decision support system tool for environmental projects and reference for research institutes, authorities and organizations dealing with environmental issues and fishery management on similar wetlands or inland water ecosystems.

Key-Words: databases, multimedia system, decision support system, fresh water fish fauna; inland water; wetlands management; inland water ecosystems

EFFECT OF DIFFERENT PLANT EXTRACTS DECREASE ON MICROBIAL IN THE FROZEN *Clarıas gariepınus* SEMEN

Sertel F. Seçer[1]*, I. Yavas[2], Z. Cantekın[3], Y. Bozkurt[4], T.K. Yavas[5], A. Atanasoff[6]

[1] *Department of Fisheries and Aquaculture, Faculty of Agriculture, Ankara University, Turkey*
[2]*Department of Veterinary Clinicial Sciences. University of Mustafa Kemal, Turkey*
[3]*Department of Microbiology, University of Mustafa Kemal, Turkey*
[4]*Departmen of Aquaculture, University of İskenderun Technical, Turkey*
[5]*Control Laboratory Directorship of Hatay, Ministry Of Food, Agriculture And Livestock, Turkey*
[6]*Trakia University, Faculty of Veterinary Medicine, Stara Zagora, Bulgaria*
E-mail: sertelsecer@yahoo.com

The aim of this study was to determine the effect of different plant extracts decreasing microbial population of cryopreserved African catfish (*Clarias gariepinus*) sperm. Diluted sperm was packaged in 0.25 ml straws and left for 10 min equilibration at 4ºC. Following equilibration, the straws were exposed to liquid nitrogen vapour for 10 min and plunged into the liquid nitrogen (-196ºC) and then thawed in water bath. 35ºC for 20 s. Sperm samples put into sterile 1,5 ml tubes immediately after thawing and microbial count detected with classical microbiological culture method. In the results of microbiological analyses, these tree plant extract especially *Echinacea purpurea* were found highly effective for decreasing bacterial contamination level of African catfish (*Clarias gariepinus*) semen. These plant extract may have potential for antibacterial affect and they can be useful for dilution of semen.

Key-Words: African catfish (*Clarias gariepinus*), semen, bacterial count, plant extract

Session IV - Maritime Spatial Planning

MARITIME SPATIAL PLANNING DIRECTIVE - EU/89/2014, LEVEL OF IMPLEMENTATION IN ROMANIA

Bogdan Ghinea*, Diana Țenea

MRDPAEF - Ministry of Regional Development, Public Administration and European Funds, Srt. Apolodor nr. 17, Bucharest, Romania
**E-mail: bogdan.ghinea@mdrap.ro*

The activity of Maritime Spatial Planning started to be developed in Romania in official way under the EU/89/2014 DIRECTIVE since August 2015 in the same time with MARSPLAN-BS Project /DG-MARE/2014/22 which has supported this EU Directive implementation in the Black Sea basin. This project has very important and ambitious objectives: 1) to continue support the implementation of the EU Directive for Maritime Spatial Planning in Romania and Bulgaria; 2) to create a Maritime Spatial Planning institutional framework for Romania-Bulgaria cross-border and to create a common MSP Plan; 3) to develop cooperation with all Black Sea countries in the field of Maritime Spatial Planning; 4) to consolidate the cross-border information exchange between Romania and Bulgaria; 5) to set out the vision and strategic goals for Black Sea area on MSP, taking into account the land sea interaction; 6) To contribute to a wider dissemination of all gathered information concerning Marine Spatial Planning field, best practices and stakeholders involvement on the larger area, to Black Sea regions.

Under the MARSPLAN Project frame have been elaborated MSP Methodology, MSP indicators, legislation support, national laws and regulations harmonization at the EU recommendation.

All project partners contributed to be elaborated a complex and integrated study regarding the analysis of Romanian marine areas, covering all ecological, economic, social and political aspects by the MSP point of view and other five study cases for different MSP processes: Eforie (coastal erosion), Sfantul Gheorghe (stakeholders involvement), Bourgas (land–sea interaction), Ships routing system (Bulgaria), Marine Fisheries and Aquaculture, and also Shabla - Mangalia transboundary approach as part of MSP Methodology and common spatial plan.

All of these aim to create specifical data base, thematically and integrated maps, all necessary for an objective spatial analysis and conflicts evaluations to sustainable development of maritime activities and uses. In parallel with

this project were nominated Romanian MSP Authority, its National MSP Committee (including all interested and involved ministries in the marine space and MSP Expert Groups, specifical laws and rules. There are in development for the next future the official approval of MSP Methodology, MSP practices, national and transboundary maritime spatial plans with Bulgaria, both countries being the only Member States of the Black Sea Basin.
Key-Words: maritime spatial planning, Member States, Black Sea basin, MARSPLAN Project, European MSP Platform, EU/89/2014 Directive implementation

THE ACTIVITY OF THE NATIONAL AGENCY FOR FISHERIES AND AQUACULTURE IN THE CONTEXT OF COMMUNITY FISHERIES POLICY

Nicolae Dimulescu*

National Agency for Fisheries and Aquaculture, 2 Transilvaniei Str., Sector 1, Bucharest, Romania
**E-mail: anpa@anpa.ro*

Fisheries policy for Romania and Bulgaria sits within the context of EU and international fisheries agreements. The international framework is provided by the UNCLOS (1982), FAO Conference Resolution 15/93 and the Agreement of 1995 (Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks). The country also fulfils the commitments of the FAO Code of Conduct for Responsible Fisheries 4/95 as well as the Convention for the International Trade with Endangered Species (CITES).
Romania adopts measures for sustainable exploitation of aquatic resources to ensure the appropriate legal framework for the implementation of the Operational Program for Fisheries 2007-2013; have been elaborated a series of regulations influencing the fisheries sector aiming to accelerate the absorption level of the on-going funds. These documents were prepared for the purposes of all communitarian provisions application in conjunction with the national ones and respectively for enlarge the national legislation aiming the insurance of the legal, administrative and institutional framework, necessary for a better implementation of the Operational Program for Fisheries.
The Multiannual National Strategic Plan for Fisheries and aquaculture 2014-2020 has been also elaborated. It is referring to:

- The present national context linked with the main national objectives, including (a) the strategy approach according to the EU objectives; (b) the main quantified objective for national grow,
- The answer to the strategy directions, containing: (a) the administrative proceedings simplification, (b) the sustainable development and growth of aquaculture ensuring through coordinated territorial planning, (c) competitiveness consolidation, (d) a level playing field promoting for operators, exploiting their competitive advantages
- Governance and partnership; Best Practices; Recommendations.

The specialized communitarian legislation applicable AM FOP is related to adopted measures for sustainable exploitation of aquatic resources, normative acts affecting the FOP implementation, aquaculture legal base, etc. Concluding:

- National legislative aspects and planning competences include fisheries under the MS responsibility, despite the extensive EU competences;
- The quality of Maritime Spatial Plans will rise with the inclusion of fisheries, for a better consideration and balancing of demands;
- Maritime Spatial Planning is still pioneer work for the Black Sea and integrating fisheries is crucial;
- Including fisheries and regionalizing regulations areas for them can be beneficial for nature conservation, for medium and long term economic viability and efficiency of fisheries.

National Agency for Fisheries and Aquaculture is deeply involved in all of these and support the fisheries and maritime European Directives implementation.

Key-Words: marine fisheries and aquaculture, maritime spatial planning, Black Sea Member States

IMPLEMENTING MARINE / MARITIME SPATIAL PLANNING

Stephen Jay*

University of Liverpool, UK, https://www.liverpool.ac.uk/contacts/
**E-mail: stephen.jay@liverpool.ac.uk*

Marine / maritime spatial planning (MSP) is currently spreading globally as a means of facilitating the sustainable use of marine resources and organising maritime activities in a coordinated way. General frameworks for carrying out MSP have been put forward, including those of UNESCO and the European Union. However, the practical implementation of MSP varies greatly between different countries, and even, in some cases, within countries. This is because

MSP needs to be carried out in a way that respects the legal and administrative frameworks for planning and marine management and the broader traditions and methods of planning that are established at national and sub-national levels. Implementation must also reflect the specific socio-economic and environmental needs of the area in question. In this paper, I illustrate the variety of practice that is developing with reference to examples of MSP implementation in different countries. I then suggest different approaches to the implantation of key steps of MSP, namely: specifying planning boundaries and time frames; defining principles, goals & objectives; organizing stakeholder participation; mapping existing areas of human activities; mapping future demands for ocean space; and developing and evaluating the spatial management plan.

The study is related with http://www.msp-platform.eu/ and DG MARE Project *Assisstence in Maritime Spatial Planning*, EASME/EMFF / 2014 / 1.3.1.7 / SI2.721508, SERVICE CONTRACT #320-4

Key-Words: Marine Spatial Planning, MSP Practices, marine spatial plan

METHODOLOGY OF MARITIME SPATIAL PLANNING IN POLAND

Jacek Zaucha[1]*, Magdalene Matczak[2]

[1]Maritime Institute in Gdańsk Długi Targ 41-42, Gdańsk Poland
[2]University of Gdańsk Faculty of Economics Armii Krajowej 119 Sopot Poland
**E-mail: jacek.zaucha@gmail.com*

The paper discusses the methodology of maritime spatial planning (MSP) in Poland and the lessons learned so far. Poland is among the MSP leaders in EU. The law allowing preparation of the maritime spatial plans was ready in 2003. However it was not sufficient to allow starting the real work. Another problem was lack of financial and human resources. Therefore the period 2003-20013 was spent for accumulating knowledge on MSP in the course of several international project and on those basis amending the Polish MSP law accordingly. In the meantime the necessary financial means were secured from EU Structural and Investment funds. Out of these there are three key lessons learned for the preparatory period preceding the real MSP work: secure necessary legal basis, as well as human and financial resources. In 2013 the real planning work was started. It will be continued till 2021. This work (up to the current stage) has resulted in several important insights with regard to the MSP methodology. Those insights are related to the importance

of careful collection of various types of context information, top importance of proper design of the stakeholder engagement based on understanding their minds (problems, concerns and expectations) as well as need to give proper attention to the geographical scales in which the planning is conducted (scale has enormous influence on the scope, ambition, tasks and the methods of the planning process. Another issue is usefulness of scientific support (specific research and modelling) that can be used. for improving quality of the plan and increase engagement of the stakeholders. Polish planning has been conducted as a part of the greater Baltic effort. Therefore the links between the Polish MSP and the Baltic level MSP coordination process has been also discussed in this paper with particular focus on its impact on the design of the planning methodology. Finally the paper is concluded with key observations on sound MSP process. According to Polish experience they are following: ensuring conscious policy effort (planning is only a part of a broader spatial development process or policy), securing sound axiological foundations, making sure that the MSP has been design in line with a long-term horizon requirements, installing cross-sectoral integration and integration within a given sea basin, allowing MSP to cover entire sea space (including its terrestrial part).

The research results were obtained witin the project « Economy of maritime space« 2015/17/B/HS4/00918 financed by the Polish National Science Centre.

Key-Words: Maritime Spatial Planning methodology, Polish MSP. MSP experience

STUDY OF MARITIME SPATIAL PLANNING - VISION - AS A TOOL TO SUPPORT SUSTAINABLE BLUE ECONOMY

Ivana Lukic*

s.Pro - sustainable projects GmbH, Kärntener Str 20 |.
DE-10827 Berlin, Germany, http://www.msp-platform.eu/
**E-mail: il@sustainable-projects.eu*

MSP visions can take many forms and serve a range of purposes, depending on who is initiating the vision process, who is involved in drawing up the vision, for which purpose the vision is drawn up and how the vision is expected to be used. Vision-related processes are currently ongoing in some Member States as part of statutory MSP processes. Furthermore, ongoing transnational MSP projects are also working on future visions with emphasis on transnational

sectors like shipping and energy. Visions for maritime space have also been created outside of Europe, and they also play a role in other spatial planning contexts, such as participatory urban planning for example. Even though all of them can be 'classified' in one way or another to be a vision, they show significant differences. Clarification has been made on what formats MSP-related visions can take; which format (vision, scenarios, strategies, forecasts, etc.) may be better suited for a given purpose, how they can be drawn up in different contexts, what information and resources might be needed, and how they can be effectively linked to marine policies and spatial management options. Desk research and interview results have been used to draw up a typology of visions for MSP. This served to illustrate the range of visions and approaches that have been taken in MSP contexts, as well as their impacts on and use in the actual MSP process. Results have also been used to highlight current practical needs and obstacles to drawing up a vision. Based on existing experiences, and taking into account current practical needs, a number of good practices for wider application are presented. The intention was to illustrate a palette of possibilities for working with visions in the handbook/manual style publication, showcasing options and ideas rather than being prescriptive. The overall objective was to encourage planners to consider a variety of factors when planning for/designing a vision development process, and help them to make decisions more systematically. Good practices include, for example, different formats of visions, timescales, resource needs, ways of overcoming particular issues, processes, and outcomes. In addition to looking into the design of the actual vision process, the analysis also looked into ways of how it can be best ensured that the vision is then also used in the follow-up MSP process ('implementing the vision').

The study is related with http://www.msp-platform.eu/ and DG MARE Project *Assisstence in Maritime Spatial Planning*, EASME/EMFF/2014/1.3.1.7/ SI2.721508, SERVICE CONTRACT #320-4

Key-Words: Marine Spatial Planning, MSP visions, Blue Growth, MSP practices, MSP methodology

MARITIME SPATIAL PLANNING INDICATORS

Aneta Kovacheva*, Daniel Nigohosyan

Ecorys South East Europe, Bulgaria, 1421 Sofia, 1, Cherni Vrah Blvd.
**E-mail: Aneta.Kovacheva@ecorys.com*

The main objective of the presentation is to show how indicators can support the MSP process and later the implementation of the Maritime Spatial Plan. Indicators are usually defined as the measurement of an objective to be met, a resource mobilised, an effect obtained, or a context variable. It should be noted that there is no uniform understanding on the structure and definition of indicators. For example, the Guide to Evaluating Marine Spatial Plans (Ehler et al. 2014) makes a distinction between inputs, process, outputs, and outcomes. Due to the difficulty of discerning between inputs and processes these two levels could be merged, which is in line with the practice of the World Bank and the EC guidance (EVALSED).

As regards MSP dimensions, building on previous work by Ehler 2014, the indicators could be systemised into three main types: for measuring the MSP process (following the key MSP stages), socio-economic (reflecting socio-economic benefits of human activities), and ecological indicators (monitoring key characteristics of the marine environment). It is noteworthy that these dimensions are not strictly delineated, i.e. they could partially overlap. The presentation will provide a number of example indicators, measurement units, link to the MSP cycle, and sources of verification.

The study is related with http://www.msp-platform.eu/ and DG MARE Project *Assisstence in Maritime Spatial Planning*, EASME/EMFF/2014/1.3.1.7/ SI2.721508, SERVICE CONTRACT #320-4

Key-Words: Maritime Spatial Planning, indicators, monitoring

ECOAST PROJECT: SPATIAL PLANNING FOR FISHERIES IN THE ADRIATIC SEA

Fabio Grati[1]*, Luca Bolognini[1]*, Francois Bastardie[2]

[1]CNR-ISMAR, Italy, [2]DTU-Aqua, Denmark
**E-mail: fabio.grati@an.ismar.cnr.it, luca.bolognini@an.ismar.cnr.it*

ECOAST project (ERA-NET COFASP, 2016-2019) aims to identify, develop and test new methodologies for spatial and temporal management of fisheries and aquaculture in coastal areas. Building on previous methodologies and

experiences the project will evaluate marine spatial planning in seven coastal case study areas having different ecological and socio-economic characteristics: Adriatic Sea, Ionian Sea, Black Sea, Tyrrhenian Sea, Baltic Sea, Norwegian Fjords and NE Atlantic Coasts. In this study we present the preliminary results concerning possible alternative spatial restrictions for trawlers in the central and northern Adriatic Sea (GSA 17). The analysis of the baseline and the effects of the potential future scenarios have been performed using two tools: GRID and DISPLACE.

GRID (Georeference Interactions Database) is a web-based flexible database and tool to analyze interactions between human activities in marine coastal areas. GRID has a GIS (Geographical Information System) module which allows investigating spatial overlaps and level of interaction between current and future activities (i.e. fisheries, aquaculture, etc.). In this study we used GRID to assess the spatial interactions between fisheries and other human activities in the GSA 17 and to weight the efficiency of management choices for the optimal use of the maritime space.

DISPLACE is an agent-based simulation model developed to support maritime spatial planning and management issues, especially from the perspective of the fisheries. It is a spatially and temporally explicit fish and fisheries model to assess the impact of a suite of spatial plans. The goal of this study was to assess if alternative spatial restrictions for trawlers might reduce the pressure on four demersal stocks of high commercial interest (common sole, hake, red mullet and mantis shrimp) in the GSA 17 and if this could promote space sharing between mutually exclusive activities.

The real added value of the present study is the complementary view of the same spatial planning measure given by the two different spatial tools. GRID can handle a lot of different sea use layers in the same framework together with conflict scores and scenario testing, DISPLACE can contribute to forecast the possible ecological and socio-economic effects of fishery spatial restrictions from accounting for interlinked time and space dynamics.

Acknowledgement: The study has been carried out under technical and financial support of ERA NET/COFASP Program, the ECOAST Project 45/2016, *New methodologies for an ecosystem approach to spatial and temporal management of fisheries and aquaculture at Romanian coastal zone*

Key-Words: marine fisheries and aquaculture, spatial and temporal planning, conflicts evaluation, Georeference Interactions Database - GRID, DISPLACE, Adriatic Sea, Ionian Sea, Black Sea, Tyrrhenian Sea, Baltic Sea, Norwegian Fjords and NE Atlantic Coasts

COLLABORATIVE ASSISTANCE FOR SPATIAL-TEMPORAL COHESION (CAST) - COHERENT COLLECTION OF PARTICIPATORY METHODS IN MSP DIRECTIVE IMPLEMENTING – RESULTS OF SF. GHEORGHE CASE STUDY

Iulian Nichersu*, Marian Mierlă, Iuliana Nichersu, Cristian Trifanov

"Danube Delta" National Institute for Research and Development
300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: iuliannichersu@ddni.ro*

CAST is a coherent collection of methods (analyzing existing data, archival research and expert debates) for studying various classes of systems and their relational properties, and for solving issues problems, that became from economic activities and its anthropic impact, and which deal with the relational aspects. This is where creative brainstorming techniques like SKETCH-MATCH (SM) and Morphological Analysis can help. This tool helps you generate ideas for new products by encouraging you to think about how you could improve existing ones. Morphological Analysis was used in the second phase to generate concepts for redesigned Spatial Planning Map. The morphological map is a method to generate ideas in an analytical and systematic manner - the term "system" stands, a set of some *"things/objects"* and a *relation* among this. The term "relation" was used in a broad sense to encompass the whole set of kindred terms such as "constraint", "structure", "information", "organization", "cohesion", "interaction", "coupling", "linkage", ""interconnection", "dependence", "correlation", "pattern" and the like. So, a class of objects system can basically be introduced by one of two fundamentally different criteria:

1. By a restriction to systems that are based on certain kinds of things.
2. By a restriction to systems that are based on certain kinds of relations.

This is an unconventional approach near qualitative using debates between groups of experts on encounter problems that was collect during SM in our Case Study of Sf.Gheorghe and presented on GIS Mapping process. The results of CAST demonstrate that we can provide a cogent rationale for the decisions that we made to minimize the impact of any problems that arose and a step in structural and process-tracing schema, hereafter named choremes analysis to establish socio- economic gravitational axes. Directly interpretive spatial knowledge, which can be useful to users, can be found in possible arrangements supported by geographic objects. So far, the meaning of

geographic information has been revealed through the user's eye-brain appliance. The objective of the choremes analysis is to capture such meaning by finding the significant dimensions that structure the diversity of the information space and which are used to perceive, and as far as possible explain, the spatial arrangements and the very significant organizations that have their own significance.

This study is related with MARSPLAN-BS Project - Cross border maritime spatial planning in the Black Sea - Romania and Bulgaria (EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1)

Key-Words: analyzing existing data, archival research, expert debates, SKETCH-MATCH (SM), Morphological Analysis, stakeholders involvement

Session V - Sustainable Development and Ecological Education

PUBLIC ENGAGEMENT - A STEP TOWARDS RESPONSIBLE RESEARCH AND INNOVATION

Anca-Maria Gheorghe*, Angelica Paiu, Mihaela Mirea Cândea, Marian Paiu

Mare Nostrum NGO, Bvd. 1 Decembrie 1918 no. 3, 900711, Constanta, Romania,
**E-mail: anca_gheorghe@marenostrum.ro*

Responsible Research and Innovation (RRI) is implemented as an action that includes multi-actor and public engagement in research and innovation, enabling easier access to scientific results that take up of gender and ethics in the research and innovation content and process, and formal and informal science education. Public engagement in RRI is about co-creating the future with citizens and civil society organisations and also bringing on board the widest possible diversity of actors that would not normally interact with each other. Mare Nostrum NGO has over 20 years of experience in engaging the public in its activities, as the public is the main actor in changing behaviors. Involvement of various actors (researchers, policy-makers, teachers, students, non-governmental organisations, civil society, citizens) in local and national awareness activities like campaigns and public events and workshops on various topics dedicated to all stakeholder categories that creates a bridge between research area and the needs and espectations of the civil society in the Black Sea coastal area. Also, beach litter monitoring and activities to protect the marine environment and coastal areas in particular dolphins and promoting issues facing cetaceans among the local population, fishermen and tourists at the Romanian seaside of Black Sea, represent a participatory process of exchanges and dialogues between all stakeholders, contributing to sustainable development in the coastal area. Mare Nostrum public engagement activities proved that the citizens involvement have an increase ownership of actions leading to a better implementation of environmental measures. Public engagement in RRI can help in bringing decisions closer to society, making them more focused on the needs of society, guaranteeing a transparent and transdisciplinary approach.

Key-Words: public engagement, RRI, environmental, civil society, education

AIR POLLUTION FROM THE MARITIME TRANSPORT IN THE ROMANIAN BLACK SEA COAST

F. Nicolae[1]*, I. Roman[2], A. Cotorcea[1]

[1]Mircea cel Batran Naval Academy, Constanta, Romania
[2]Military Technical Academy, Bucharest, Romania
**E-mail: nicolae_florin_m@yahoo.com*

The economic activities carried out in the area of Romania's jurisdiction, in the Black Sea, are numerous and diverse. The water transport activity is highlighted by the important quantities of goods transiting the Romanian ports in the trade between Africa, Asia and Europe. In recent years, it was added to the exploitation of marine resources on the continental shelf. These activities will permanently involve water transport as an integral part of the logistics chain associated with offshore activities (platform supply, operation and maintenance work etc.). In this context, the latest reports from the International Maritime Organization show that these activities are an important source of air pollution, ship-borne emissions affecting human health and the environment. Literature points out that more than 70% of ship emissions, especially greenhouse gases, occur in the coastal area, in a "band" of up to 20 nautical miles from the coast. Considering this, present paper analyzes the implementation of an innovative solution for the monitoring of ship gas emissions, which will allow the management of this problem in the Western Black Sea area. The research carried out has a mathematical model and a software solution developed within SIMEN project and other previous research. It is proposed a complex approach in which, in the first stage, a database has been created, with the vessels that have conducted the voyage in the analyzed area, a database that can be permanently updated. Centralized information in the database is the input for the software solution, which determines the fuel consumption and emissions of pollutants from the vessels in the area for various periods. All these measures, related to the monitoring of emissions from ships, allow "footprinting" for each polluting ship. The results obtained can be used both for environmental impact assessment and for setting environmental standards by national regulators, depending on a set of predefined parameters that characterize the ship: tonnage, propulsion power, engine type, etc.

Key-Words: air pollution, maritime transport, monitoring, Black Sea.

BEACH LITTER OCCURRENCE IN SANDY LITTORAL: A CASE STUDY ROMANIAN BLACK SEA COAST

Mihaela Mureşan, Tatiana Begun*, Cristiana Voicaru, Daniela Vasile[1], Adrian Teacă[1]

National Research and Development Institute for Marine Geology and Geoecology - GeoEcoMar, Constanța Branch, 304 Mamaia Bvd., RO-900581 Constanța, Romania
**E-mail: tbegun@geoecomar.ro*

More than 75% of litter found in the ocean and especially on the beaches originate in land being constituted of non-biodegradable plastic along with paper, glass, rubber, textiles and others. The pillar European legislation for the marine waters concerning the waste monitoring and management is the MSFD, which represents a major contribution to the Integrated Marine Policy of the European Union. This paper presents the results of seasonal monitoring campaigns of marine litter carried out in the period 2014 - 2017 within 8 sandy beaches of the Romanian littoral of the Black Sea situated in front of Mangalia (4 beaches), Venus – Saturn resorts (2 beaches), Tuzla (1 beach) and Eforie Sud (1 beach). The work methodology for collecting, qualitative sorting and quantitative estimation of each type of litter was done according to the EU MSFD TG10 "Guidance on Monitoring of Marine Litter in European Seas (2013). The campaigns from 2014 and 2015 were conducted within the FP7 Perseus project and in 2016-2017 within national program PN 16 45 05 01. Plastic and polystirene and cigarettes buts and filter out of 22 waste types monitored made up the highest amount with more than 50% in all years. In 2016-2017 the results of surveys performed on beaches in front of marine protected areas The submerged sulphorous springs from Mangalia (ROSCI0094) and Marine area from Tuzla Cape (ROSCI0273) in custody of GeoEcoMar, evinced an increasing tendency of litter amount comparative with the previous years. Touristic activities and urban development proved the major sources of waste since plastic and cigarettes were the most present items found in all locations. These findings bring out the great ecological risk that beach litter may pose to marine ecosystem and the marine protected areas from Mangalia and Tuzla, in special.

Key-Words: litter, sandy beaches, marine protected area

GREEN POLICING IN THE DANUBE DELTA BIOSPHERE RESERVE

Mădălina Sbarcea[1]*, Peter Hislaire[2], Marian Tudor[1], Iuliana Nichersu[1], Carmen Naşcu[1]

[1]*Danube Delta National Institute for Research and Development, 165 Babadag st, Tulcea, Romania*
[2]*Independent consultant, chemin des Uttins 4a, Mont sur Rolle, Switzerland*
**E-mail: madalina.sbarcea@ddni.ro*

On a global scale, practices that promote the concept of environment-oriented police have been acknowledged as increasingly important in the endeavours to cease the deterioration of the environment and to protect the natural capital of each country. Moreover, adjusting different government bodies' activities to a low-impact and even a restorative paradigm is imperative in a natural protected area and is a responsibility of each organisation operating within the boundaries of such a territory. Based on the findings of the research mission in the Danube Delta Biosphere Reserve commissioned by the General Inspectorate of Romanian Police in the context of a Swiss - Romanian cooperation, the present paper aims to introduce several tools for increasing the effectiveness of the community police against eco-crimes in rural settlements, while reducing the impact of their own actions on the environment. The proposed framework was founded on the analysis of community policing activities and objectives' correspondence with the Danube Delta Integrated Strategy for Sustainable Development, as well as on the results of the interviews conducted in the field mission and of the workshops with stakeholders, processed through expert judgement. A conceptual model for mapping the relationships between actions to be implemented and reaching the Green Policing objectives using Consideo iModeler software has been developed. Addressing mostly the prevention and mentoring functions, the design for a strategy of community policing oriented towards the environment in protected areas includes recommendations related to Training, Information materials, Physical infrastructure, Transport and mobility, Communications, Recruitment, Partnerships and Stakeholder cooperation. The paper concludes with reaffirming the relevance of further developing frameworks and implementing projects for a policing activity that supports the protection of natural assets and underlines the importance of empowering local communities for a participatory management of natural resources.

Key-Words: sustainable development, community policing, wetland, local empowerement, environmental management

SOLVING THE PROBLEMS OF GAS FLOW EXTERNAL RESISTANCE THROUGH THE BREATHING APPARATUS OF DIVERS USING COMPUTATIONAL FLUID DYNAMICS

Tamara Stanciu[1]*, Andrei Scupi[2], Dumitru Dinu[3]

[1]"Diving Center", Constanta, Romania, Tel. 0723297983
[2]"Constanta Maritime University", Romania, Tel. 0241664740/205
**E-mail: tamara.stanciu@navy.ro*

The resistance to inhaling is the highest gas flow external resistance through the second stage respirator. The simplest formula for determining external resistance to inspiration is the one obtained by dividing the inhalation depression to the volume flow of gas. It can be influenced by the geometric factors of the device. We checked the variation of the gas volume flow in three constructive variants of the gas inlet in the pressure chamber by simulation with the Computational Fluid Dynamics. We made the geometric modeling of the three variants. After the meshing of the obtained fluid models, the required flow conditions were set. The mass flow rate, the gas density at the outlet of the pressure reducing mechanism and the fluid velocities were calculated. For the same flowing conditions and the same inhalation depression, we determined the external resistances in three chosen geometric variants of the gas intake mechanism. It can be concluded that the best shape of the inlet ports in the medium pressure hose in second stage regulator is the one with the circle section. For the piston, the recommended airflow direction port is the conical section one. To optimize gas flow through the restrictor, in the design of the breathing apparatus, we recommend that the inlet mechanism geometry be in variant 1, with 6 cylindrical slots, but the hole in the piston body to be conical, as in variant 3. Using Computational Fluid Dynamics we can run other simulations with different geometrical characteristics until we obtain an optimal shape.

Key-Words: gas flow, external resistance, breathing apparatus, Using Computational Fluid Dynamics

SCIENTIFIC SESSIONS - POSTER PRESENTATIONS

Session I - Oceanography and Coastal and Marine Engineering

P.1.1. WATER FLOW AND BATHYMETRY - SENSORS INTEGRATION FOR PRECISE MEASUREMENTS

Dragoș Niculescu[1,2]*, Eugen Rusu[2]

[1]National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
[2]University of Galati 'Dunarea de Jos', Department of Mechanical Engineering, 111 Domneasca Street, Galati, Romania
**E-mail: sady_2k@yahoo.com*

The growing interest in water flow dynamics for both scientific and general public, is encouraging the use of better and better measuring techniques. The general public needs to be aware of the dangerous currents and the places where to expect them, so the measuring techniques need to be more certain. For scientific reasons, the water flow and bathymetry sensors need to be well calibrated in order to ensure a starting point when it comes to model various parameters, as currents, waves and sediment transport.
In this case, the measurement technique is tested by comparing different situations in which the results obtained may be better, or worse, as the instruments are specifically crafted to measure one thing. Because of this, a combined solution, as proposed in the present work, should offer a better result with the integration of an ADCP - workhorse sentinel with a single-beam Echotrac CVM sensor.
Key-Words: coastal zones, spatial data analysis, ADCP, single beam

P.1.2. METHODOLOGICAL APPROACH TO IMPLEMENT COPERNICUS TASKS FOR EUROPEAN LAND MONITORING

Ienică Hanganu*, Adrian Constantinescu
Danube Delta National Institute for Research and Development
**E-mail: hanganu@ddni.ro*

This work details methodological approach and management activities to implement Copernicus tasks for the period 2017-2018 in Romania. Tasks to

be implemented are: Verification of 2012 reference year local component products and enrichment of Urban Atlas, Production of the CLC for the 2018 reference year and post-production verification of the High Resolution Layers (HRL's) for the 2015 reference year. Our verification steps to identify systematic classification errors of local component products include: a) data preparation, b) stratified random sampling of LC/LU polygons, c) visual inspection of selected samples, including the possibility to provide comments/feedback and d) evaluation of results. The CLC changes will be mapped through the comparison of the IMAGE2012 with IMAGE2018 in a dual-window environment using a macro program for generating CLC products and CLC-Changes

Key-Words: land monitoring, Sentinel 2, Eionet NRC, Local components, CLC products

P1.3. ASSESSMENT OF OFFSHORE WIND ENERGY POTENTIAL IN THE NORTH WESTERN PART OF THE BLACK SEA BASIN BASED ON WEIBULL DISTRIBUTION FUNCTION

G. Bandoc[1]*, R. Prăvălie[1], R. Mateescu[3], D. Niculescu, M. Degeratu[4]

[1]University of Bucharest, Center for Coastal Research and Environmental Protection, Faculty of Geography, 1 Nicolae Balcescu Blvd., District 1, 010 041 Bucharest, Romania
[2]Department of Mechanical Engineering, Faculty of Engineering, 'Dunarea de Jos' University of Galati, 47 Domneasca Street, Galati, Romania
[3]National Institute for Marine Research and Development Grigore Antipa Constanta, 300 Mamaia Blvd., Constanta, Romania
[4]Technical University of Civil Engineering Bucharest, Hydraulics and Environmental Protection Department, 124 Lacul Tei Blvd., District 2, 020 396 Bucharest, Romania, Academy of Romanian Scientists, 54 Splaiul Independenței, Bucharest, Romania

Renewable energy technologies have an ability to significantly reduce carbon emission in the electricity and heat sectors, and contribution to global climate change. The ocean energy sector has got a great potential of making an important contribution to the supply of renewable energy and the percentage of electricity that could be produced from offshore wind farms, worldwide, has been estimated to be around 7% by 2050. One of the main characteristics of offshore wind farms is their high energy density, which might even be comparable to conventional power plants in terms of their production capacity. This is because sea surface wind experiences fewer disturbances as there are rarely any obstacles producing turbulence, and therefore better use of the wind for power generation. Offshore wind power is also expected to be

a major component of next generation renewable energies because high wind speeds can be harnessed offshore. The use of offshore wind power is becoming increasingly important towards a sustainable growth worldwide. Therefore, the aim of this paper is to assessment of offshore wind energy potential in the North Western part of the Black Sea Basin based on Weibull distribution function. Within such context, the study presented herein aims at encouraging the deployment of offshore wind farms, by responding to the current need of detailed, applied and consistent evidence of the actual feasibility of wind farms in countries where the exploitation of offshore wind is still being considered only as a possible but not profitable option.

Key-Words: ocean energy, offshore wind farms, potential

P.1.4. GEOINDICATORS OF BEACH VULNERABILITY WITHIN THE DANUBE DELTA BIOSPHERE RESERVE

Dănuț I Diaconeasa*, Silică Petrișoaia, Răzvan-Doru Mateescu, Alina Daiana Spînu, Dragoș Niculescu, Vasile Pătrașcu, Adrian Niculescu

NIMRD "Grigore Antipa" Mamaia Bd. No. 300, Constanta, Romania, C: 900581
**E-mail: ddiaconeasa@alpha.rmri.ro*

The most vulnerable areas to climate change are recognized as coastal zones because of the sea level rise and storms hazard as well. The Romanian coastal area in the Danube Delta Biosphere Reserve is located from the border of Ukraine to Cape Midia, on about 180 km. For the analysis of the geomorphological processes in this area, the geoindicators afferent to the coastal lowlands were calculated: the width of the beach between the sea and the lake, the width of the backshore (beach without vegetation), the slope of the backshore, the granulometric parameters (mean), the grain size fraction of the sand class (fine and very fine gravel, very coarse sand, medium sand, fine sand and very fine sand). Thus, in the study of the geomorphological processes in the coastal area, 5th geomorphological segments of coastal seas were analyzed, with a high risk for sea level rise and sea storms intensification, in the following beach sections: DDI (Câșla Vădanei), DDII (Pen. Sacalin), DDIII (Zaton), DDIV (Portița), DDV (Edighiol), where the following geomorphological aspects are determinated:

- the average width of the backshores, from the shoreline to the vegetation limit, was 16.2 m;
- the average altitude of barrier sands was 1.479 m;

- the sediments of the Sacalin barrier are the finest (over 90% of fine sand on the backshore) and have the smallest mean diameter (beetwin 0.18 - 0.20 mm);
- the sediments of the northern sector (Cârla Vădanei, Sacalin, Zaton) have an mean diameter of less than 0.30 mm, while in the southern sector (Portiţa, Edighiol) the mean diameter is generally greater than 0.40 mm;
- the coarsest sand (very fine gravel - bioclasts, about 60%) was determined at the shoreline on the Zaton section.

The altitude of less than 1.5 m, the very low slope of the backshore, the width of the beach (sea - lake) of several tens of meters, the mobile sediments generally of the sand type often cause in severe storm situations the flooding of the entire beach.

Key-Words: coastal beach, beach width, beach slope, backshore grain size parameters (mean diameter, fractions of the sand class), Danube Delta Biosphere Reserve

P.1.5. APPLICATION OF NUMERICAL HYDRODYNAMIC MODELS IN THE STUDY OF WAVES AND CURRENTS IN THE ROMANIAN BLACK SEA AREA

E. Vlasceanu[1,2,*], N. Buzbuchi[2], E. Rusu[3]

[1]National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
[2]Constanta Maritime University, Dep. of. Engineering Sciences in the Mechanical Field, 104 Mircea cel Batran Street, Constanta, Romania, evlasceanu74@yahoo.com
[3]University of Galati 'Dunarea de Jos', Department of Mechanical Engineering, 111 Domneasca Street, Galati, Romania
**E-mail: enigel108@yahoo.com*

In this paper are presented certain applications of the hydrodynamic numerical models in the study of waves and currents propagation along coastal areas. Through an appropriate analysis of the local and regional of wave and currents regime, taking into account different phenomena such as incident wave transformations, elevation of the sea level during the storms surges and, the longitudinal and transversal sedimentary transport, as well, it is possible to model the evolution of shoreline over a certain period of time. The present study includes a complex approach on the interaction between waves, currents and coastal morphology, including in situ measurements and

process models, in areas where the certain atypical waves are produced, with dangerous impacts on coastal navigation - the Danube river mouths and the adjacent areas of seaports. The results confirm the advantage of using numerical models, and emphasizes its ability to analyze and forecast, in a relatively short time, a various coastal critical hydrodynamic processes, determinant in protection solutions design.

Key-Words: hydrodynamic modelling, wave regime, current regime, maritime ports, costal geomorphology

P.1.6. INITIAL RESULTS ON ADAPTED METHODS, MEASUREMENTS AND DESCRIPTIONS OF UNDERWATER NOISE ON THE ROMANIAN BLACK SEA SHELF

M.E. Mihailov[1]*, A.D. Nicolaev[1], L.F. Constantinoiu[2]

[1]National Institute for Marine Research and Development "Grigore Antipa" Constanta - Romania, Mamaia Blvd. No. 300, RO-900591, Constanta, Romania, www.rmri.ro
[2]Maritime Hydrographic Directorate, Str. Fulgerului, nr. 1, Constanta, 900218, Romania, https://www.dhmfn.ro/
**E-mail: emihailov@alpha.rmri.ro*

The Marine Strategy Framework Directive 2008/56/EC (MSFD) state that for the Black Sea waters, Romania has to develop its environmental assessment and to achieve Good Environmental Status of EU marine waters by 2020. This study presents underwater noise initial data and results gathered during 2016-2017 campaigns within the Romanian Black Sea Shelf using high end pressure transducers. This study improves the knowledge level for underwater sound sources and help to perform a better assessment of recorded sound levels. Underwater sounds are classified under two categories, low and mid frequency impulses and continuous low frequency sounds. The NIMRD noise team adapted specific data acquisition methods for different meteorological, hydrological and vessel conditions for several locations. The results are expressed in peak pressure, peak-to-peak and peak-RMS measurements. The total noise of 132 dB (re 1 µPa) was the highest value from all the measured peak – to-peak of the underwater noise levels on the research vessel on a 3 Beaufort sea state scale. The minimum RMS noise of 106 - 108 dB re 1 µPa was determined in the southern Romanian shelf, 2 Mai – Vama Veche Natural Reservation, on a research ship in anchor.

Acknowledgement: This study has been carried out with financial support from the PROMARE Nucleu Programme, funded by the Romanian National Authority for Scientific Research And Innovation (ANCSI), project no. PN16230102.
Key -Words: underwater noise, Black Sea, sound pressure, Root mean square (RMS) sound pressure level

P.1.7. PRESENTATION OF THE ECOMAGIS PLATFORM FOR THE ROMANIAN COASTAL AREA

R. Mateescu[1]*, D. Niculescu[1], E .Vlasceanu[1], O. Goicea[2], M. Enache[2]

[1]National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania, razvan_doru@yahoo.com
[3] niversity SIVECO Romania S , Victoria ParkSos. Bucureşti-Ploieşti 73-81,Corp C4, Sector 1, cod 013685, Bucharest
**E-mail: razvan_doru@yahoo.com*

In this paper are presented certain results of the ECOMAGIS Project, developed between 2012-2016 by a consortium working operational informational system that can supply meto-hydro-bio- geomorphological data collected near the coastal zone, support at a regional scale decisions in the coastal areas. The study encompass specific approaches on the conditions of the coastal ecosystem, as well as the projection and expansion of a local/pilot monitoring integrated system, of the impact factors against the ecological state of the coastal system. The main result of the project is a system of informational integrated operational that can monitor continuously the coastal zones, developed as a management support IT system based on the ecosystem's dynamic. Identify technical solutions and possibilities of coastal reconstruction /rehabilitation, as well as choosing the optimization measures of the system quality.
Key-Words: coastal response modeling, coastal habitats mapping, vulnerability assessment, IT platform, WebGIS

P.1.8. EASTERNMOST BLACK SEA FORECASTING SYSTEM APPLIED FOR ECOLOGICAL PROBLEMS

A. A. Kordzadze*, D. I. Demetrashvili

I. Javakhishvili Tbilisi State University, M. Nodia Institute of Geophysics, 1, M. Aleksidze str., 0160 Tbilisi, Georgia
**E-mail: akordzadze@yahoo.com*

Ecological security of the Black Sea coastal zone is very relevant not only for Georgia, but also for all the Black Sea riparian countries. Influence of the Black Sea on a socio-economic state of Georgia is very important. Besides that, the Black Sea is a source of biological and mineral resources, It has an essential recreational and transport value. Currently, the Black Sea plays an active role in transportation of oil products and other materials from the East to the West, and in the near future a greater increase in the transport function of the Back Sea is expected. This fact makes it very important to predict in operational mode the pollution of the Georgian coastal zone by various pollutants in accidental situations. This is a complex problem and requires knowledge of the sea circulation parameters. The Black Sea coastal forecasting system developed at Institute of Geophysics of Tbilisi State University within the context of EU projects ARENA and ECOOP and improved within the project of Rustaveli National Science Foundation, provides a 3-day forecast of dynamic fields and distribution of oil and other polluting substances in the easternmost water area with 1 km spacing. Examples of modeling and forecast of dynamic fields in the easternmost water area of the Black Sea and their comparison with space remote sensing data are presented, results of model validation showed the ability of the forecasting system to reproduce really regional dynamic processes in the easternmost Black Sea. Some results of simulation of contemination spreading are illustraded.

Key-Words: coastal area, ecological security, modelling, circulation, forecasting system

P.1.9. A REVISED METHODOLOGY OF BLACK SEA CHEMICAL STATUS UNDER WATER FRAMEWORK DIRECTIVE

Valentina Coatu, Nicoleta-Alexandra Damir, Andra Oros, Luminița Lazăr*

National Institute for Marine Research and Development "Grigore Antipa", NIMRD, Constanta, Romania
**E-mail: llazar@alpha.rmri.ro*

The Water Framework Directive aims to protect and optimize the quality of aquatic ecosystems and their sustainable use so that they reach a "good state". The concept of water status includes both "environmental status" and "chemical status". The paper presents the updated methodology for the classification of the chemical status of coastal and marine transitional waters of the Romanian Black Sea coast, based on general physic-chemical elements, nutrients and specific pollutants (heavy metals, hydrocarbons, persistent organic pollutants). The system was elaborated based on 2009 - 2014 data and the provisions of the legislation in force. The methodology will serve the relevant institutions to assess the ecological status of coastal and transitional water bodies and to develop appropriate management plans.
Key-Words: Chemical Status, Black Sea, WFD

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P.2.1. TOTAL BACTERIAL DIVERSITY OF A SALTERN CRYSTALLIZATION POND IS NOT CORRELATED WITH SALINITY VARIATIONS: THE CASE OF THE "SALINE DI TARQUINIA" MARINE SALTERNS

P. Barghini[1], M. Pasqualetti[1,2], S. Gorrasi[1], M. Fenice[1,3]*

[1]DEB: Dipartimento di Scienze Ecologiche e Biologiche, University of Tuscia, 01100 Viterbo Italy
[2]Laboratory of Ecology of Marine Fungi, University of Tuscia, 01100 Viterbo Italy
[3]Laboratory of Applied Marine Microbiology, CONISMA, University of Tuscia, 01100 Viterbo Italy
**E-mail: fenice@unitus.it*

Marine salterns, as other hypersaline coastal ecosystems, represent a peculiar environment displaying frequent and intense variation of chemico-physical parameters. Among them, wide gradients of salinity and temperature are recorded along the year. Marine salterns comprise a number of shallow pools connected in sequence showing increasing salinity from ca. 35‰ (the first pool served by sea water) up to above 300‰ in the last pools called crystallizers. The "Saline di Tarquinia" salterns are located between the two rivers (Mignone and Marta) on the Tyrrhenian coast (Central Italy). Covering an area of ca. 90 ha (more than 100 interconnected ponds) along a low sandy coast, they are parted from the sea by a dunes array. They were used for industrial salt production until 1997 being converted into a natural reserve since 1980. In this work, diversity of the total bacterial community, obtained from water collected in a crystallization pool of "Saline di Tarquinia" salterns, was evaluated by cultural-independent methods (PCR-DGGE), during a two years sampling campaign, in relation to the pool salinity variations. The studied pool was characterized by general high salt concentrations with significant monthly fluctuations (104‰ - 400‰). Information regarding chemical and physical parameters of the pool (temperature, pH, BOD_5, dissolved oxygen and concentration of chlorophyll pigments) was also obtained. In this perspective, the bacterial community of the pool was investigated by cluster analysis and main ecological and statistical indexes. The results showed that, despite the high salinity reached, the communities varied considerably along the whole sampling period, indicating a noteworthy complexity, not only due to seasonal or salinity variations.

Acknowledgments: Authors wish to thank the staff of "Posto Fisso del Corpo Forestale dello Stato, Riserva Naturale Statale Saline di Tarquinia" for the kind support during sampling.
Key-Words: salterns, bacterial diversity, ecological indexes, PCR-DGGE

P.2.2. HIGH LUTEIN PRODUCTION BY A HALO-TOLERANT STRAIN OF *Dunaliella* sp. (CHLOROPHYCEAE) ISOLATED FROM SOLAR SALTERNS IN CENTRAL ITALY

P. Barghini[1], V. Giovannini[1], M. Fenice[1,2], S. Gorrasi[1], M. Pasqualetti[1,3]*

[1]DEB: Dipartimento di Scienze Ecologiche e Biologiche, University of Tuscia, 01100 Viterbo Italy
[2]Laboratory of Applied Marine Microbiology, University of Tuscia, 01100 Viterbo Italy
[3]Laboratory of Ecology of Marine Fungi, CONISMA, University of Tuscia, 01100 Viterbo Italy
**E-mail: mpasqual@unitus.it*

Dunaliella sp. ST10 is an unicellular green algae (Chlorophyceae) isolated from a hyperaline pond (220 ‰ of salinity) at the "Saline di Tarquinia" marine salterns located on the Tyrrhenian coast (Central Italy). Molecular taxonomical analyses, based on ITS 1 and ITS2; 5.8S and 18S sequences, confirmed the genus attribution. Unexpectedly this strain did not belong to any hyperaline known species of *Dunaliella*. After isolation and purification, stock cultures of the flagellate alga were established under controlled laboratory conditions. The microalgae grew in laboratory conditions in a wide range of salinity from 35‰ to saturation. *Dunaliella* sp. ST10 was cultured in a photobioreactor (Multi-Cultivator 1000 OD). Some cultural parameters, such as nitrogen concentration and light intensity, were studied in relation to the algal growth and its pigment production. Chlorophylls-Carotenoid ratio was monitored along the entire experiments to evaluated the physiological status of the algal cultures. The pigment profile, characterized by HPLC, was particularly rich in carotenoids-xanthophylls. Lutein was particularly high being 77-90 % of total carotenoid content. Cell density recorded for strain ST10 was relatively high if compared to other known *Dunaliella*'s species. The algal strain, cultivated under continuous illumination, showed high intracellular contents of lutein (0.49-0.89 pg/cell) in the late exponential phase. These results indicated that the microalga might have potential for the large scale production of antioxidant xanthophylls and algal biomass.
Key-Words: *Dunaliella*, lutein, photobioreactor, biomass production.

P.2.3. RECENT OBSERVATIONS ON MACROALGAL VEGETATION FROM THE ROMANIAN SECTOR OF BLACK SEA WITH SOME BIOCHEMICAL DETERMINATIONS

Daciana Sava[1]*, Daniela Silviana Dragomir[2], Andreea Anghel[3], Manuela Diana Samargiu[3]

[1]Faculty of Natural and Agricultural Sciences, Ovidius University, Constanta, Romania [2] Student, Ecology and environmental protection specialization, Faculty of Natural and Agricultural Sciences, Ovidius University, Constanta, Romania
[3]Faculty of Natural and Agricultural Sciences, Ovidius University, Constanta, Romania
**E-mail: daciana.sava@gmail.com*

The Romanian Coastal zone of the Black Sea has been subject to severe ecological disturbance, as a result of multiple natural factors and complex anthropogenic pressures. Consequently, there was a reduction of biodiversity, of animal species and also major modifications occurred in the state of macrophytobenthos too, under the influence of harmful factors that disturbed the quality of marine environment in general. The present paper shows the latest data on macrophytic algae from Romanian littoral, after a three year survey along the coast (2015-2017). The macroalgae were collected from various types of hard substratum, several times a year, in both warm and cold seasons. From each sample, algae were identified and also biomass estimation was made. From the most important and abundant species collected, some biochemical determinations were made, in order to investigate the chemical composition and to evaluate the posibility to use some of the species in different areas (agriculture, pharmacy).
Key-Words: macrophytobenthos, Black sea, Romanian littoral

P.2.4. COASTAL VEGETATION DECLINE ON THE SOUTHERN ROMANIAN COAST AS A CONSEQUENCE OF ANTHROPOGENIC IMPACT

Marius Făgăraș[1]*, Răzvan Popoviciu[1], Bogdan Negreanu-Pîrjol[2]

[1]Ovidius University of Constanta, Faculty of Natural and Agricultural Sciences,
[2]Ovidius University of Constanta, Faculty of Pharmacy,
1 University Street, building B, 900740, Constanta, Romania
**E-mail: marius_fagaras@yahoo.com*

The Romanian coastal area has a length of 245 km and it is divided in two sectors. The northern sector between Chilia branch of the Danube and Cape

Midia is an accumulation shore, entirely protected within the Danube Delta Biosphere Reserve. The southern sector between Cape Midia and Vama Veche is formed in the biggest part by a loess cliff or by littoral lakes. In proximity of the wide sandy beaches from the front of these lakes, several littoral resorts were built along the time. Some important harbours (Midia, Constanta, Mangalia) there are also here. In these conditions, the natural habitats and typical littoral vegetation were highly affected by the human activities, especially in the area of the resorts and around the harbours. The decline of the coastal vegetation had beginning after the second war, mainly in the period between 1950 and 1975 when many touristic facilities were built or extended in the dune habitats area or in their proximity. After this intense phase of touristic development, the primary vegetation of the dunes remained mainly between resorts and only as small patches around the harbours and in small resorts. The second big touristic development phase on the southern coast of Romania has beginning after 1990 and continues even presently. As a consequence of this phase, dune habitats were affected on large surfaces and the decline of natural vegetation, especially of psammophilic plant communities was very quick and evident. Along this phase, the natural vegetation of the beaches has been almost entirely destroyed, even between resorts. As a consequence of unfriendly politics related the beaches habitats and the specific vegetation, many psammophilic plant species very rare in Romania due to their limited spread, have disappeared from the southern coast of Romania or even from Romania. Species such as *Ammophila arenaria subsp. arundinacea, Medicago marina, Stachys maritima, Hypecoum procumbens, Euphorbia paralias* etc, have disappeared from the southern coast of Romania, although many botanical references regarding coastal vegetation mention these species from this area, in the period between 1934 and 2006. In the same time with disappearance of some rare plant species, dune habitats and generally all coastal vegetation have suffered a strong decline as a consequence of increasing human activities in the beaches area situated south of Cape Midia. Strong decline of the coastal vegetation is obvious if we compare the present situation of the Romanian beaches south of Cape Midia with that of Durankulak beach, a relatively well protected sandy beach situated very close from the border with Romania.

Key-Words: dune habitats, psammophilic plants, anthropogenic impact

P.2.5. OXIDATIVE STRESS EVALUATION IN ORGANIC POLLUTION CONDITIONS ON SOME MARINE ALGAE SPECIES

Suzana-Elena Birş-Dorhoi[1], Maria Tofană[1], Dan Răzvan Popoviciu[2], Ticuţa Negreanu-Pîrjol[3]*

[1]University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Food Science and Technology, 64, Calea Floreşti, Cluj Napoca, Romania
[2]"Ovidius" University of Constanta, Faculty of Natural Sciences and Agricultural Sciences
[3]"Ovidius" University of Constanta, Faculty of Pharmacy, 1, University Alley, Campus, Corp B, 900487, Constanta, Romania
**E-mail: ticuta_np@yahoo.com*

Marine algae are one of the important factor of the marine environment because of aquatic balance maintaining, various marine organisms feeding and also actioning as environment purificator. The algae developing are due to the amount of nutrients available in the marine environment, means eutrophication. The aim of this study was to assess the effect of organic pollution, represented by usual detergents, against some marine algae species, *Enteromorpha intestinalis, Ulva lactuca, Cladophora vagabunda* and *Ceramium rubrum*, collected along the Romanian Black Sea littoral, in Mamaia and Pescarie area, Constanta County. For accomplish this goal, algae chlorophyll pigments were analyzed by UV-Vis spectrophotometric method and total antioxidant capacity (TEAC) by photochemiluminescence method by ACL procedure using PHOTOCHEM apparatus, Analytik Jena AG, Germany. The algae extracts for chlorophyll pigments determination was performed using fresh algae and 80% acetone solution. The hydro alcoholic extracts were carried out by the cold maceration method in 70% ethyl alcohol for 12 days, at the dark. Various concentrations of algae were mixed with wastewater and detergents, also, in different concentrations. The results emphasize decreasing chlorophyll pigments content due to the detergent pollution. At a higher concentration of macroalgae (10%, 5%) the chlorophyll content was maintained high, even having a higher value than the control sample. The decreasing of the algal concentration leads to the pigment content decreasing. Referring to the xanthophyll and carotene content, some samples showed a higher content, compared to the control sample. Total antioxidant capacity results revealed that the green macroalgae *Enteromorpha intestinalis* (L.) Nees 5% and *Cladophora vagabunda* L. 5% in ethyl alcohol 70% concentration extracts, present the highest antioxidant activity compared with other species. Marine algae species are affected by the organic pollution. The medium values of total antioxidant activity, however indicate a pollution factor. Samples with a low concentration of algae species present also a low concentration of algal pigments.

Key-Words: oxidative stress, organic pollution, marine algae, antioxidant activity

P.2.6. LIFE HISTORY OF THE BLACK SEA LONG-SNOUTED SEAHORSE (*Hippocampus guttulatus* CUVIER, 1829): COLONIZATION PATTERN AND GENETIC DIFFERENTIATION

Elena TAFLAN[1], Magda NENCIU[2]*, Daniela N. HOLOSTENCO[1], Mitică CIORPAC[1], Adrian FILIMON[2], Cristian-Sorin DANILOV[2]

[1]Danube Delta National Institute for Research and Development
Babadag Street No. 165, 820112 Tulcea, Romania
[2]National Institute for Marine Research and Development "Grigore Antipa",
300 Mamaia Blvd.,, RO-900581, Constanța 3, Romania
**E-mail: mnenciu@alpha.rmri.ro*

Marine ecosystems largely preclude direct observation, due to the dynamic of the water currents, water temperatures, or resource gradients. Therefore, the genetics provides a set of tools capable to infer the connectivity among marine populations or to determine the relevant spatial scale of population structure. The long-snouted seahorse is widespread throughout the temperate waters of the Eastern Atlantic Ocean from the south coast of the United Kingdom in North to Morocco in South, including the Canary Islands, the Azores and Madeira and Mediterranean and Black Sea. Despite their wide distribution, long-snouted seahorses are weak swimmers limiting their dispersal potential. Due to their sheltered in particular isolated locations, make them a perfect subject study. Usually, a population with a low degree of dispersion may lead to a much narrower distribution and thus to a reduced population size and gene flow. Over time, could lead to an increased loss of genetic diversity within populations and an increase in the degree of genetic differentiation between populations. To estimate the origins of the long snouted seahorses from the Black Sea, the colonization pattern and the genetic differentiation, we combine available GenBank cytochrome b sequences and 39 new sequences from the Western Black Sea. This paper presents the life history of the Black Sea long snouted seahorse based on dating time and colonization pattern estimations. We observed a lack of gene flow between Black Sea and Mediterranean Sea populations confirming the isolation by distance hypothesis. Our analysis describe the dispersal pattern of the ancestral populations and the demographic history.

Key-Words: *Hippocampus guttulatus*, life history, Black Sea, seahorse

P.2.7. PRELIMINARY DATA ON REAL-TIME PCR DETECTION OF PATHOGENIC *Brucella* IN CETACEANS AT THE ROMANIAN BLACK SEA

Elena Stoica[1]*, Teodora Bucaciuc[2], Romulus-Marian Paiu[3]

[1]National Institute for Marine Research and Development "Grigore Antipa" (NIMRD), Bd. Mamaia no. 300, 900581, Constanta, Romania
[2]University of Cologne, Faculty of Mathematics and Natural Sciences, Albertus-Magnus-Platz D-50931 Köln, Germany
[3] "Mare Nostrum"NGO, Bd. 31 Decembrie 1918, 900711, Constanta, Romania
**E-mail: estoica@alpha.rmri.ro*

The number of dolphin stranding events have been increasingly recorded along the Black Sea coasts, during the last decade. However, there is insufficient information to distinguish between possible causes for the increases in mortality of dolphins in the Black Sea shore. Coastal dolphins worldwide are constantly exposed to different contaminants including pathogens and thus are susceptible to different bacterial infections. *Brucella* bacteria are commonly found in marine mammal populations, including dolphins and are associated with infections that can cause mortality. The study presented here reports preliminary molecular data regarding the presence of brucellosis pathogens in dolphins in Romania. For the detection of *Brucella* species, a SYBR Green Real-time PCR technique was used, targeting the omp2 genes. Tissue samples were collected from 18 juvenile and adult Black Sea bottlenose dolphins (*Tursiops truncatus* spp. *ponticus*) and harbour porpoise (*Phocoena phocoena* spp. *relicta*), both males and females found dead during 2016 - 2017 on the Romanian Black Sea coast. These preliminary data highlight that the real-time PCR assay could be a highly sensitive and specific tool for the diagnosis of *Brucella* infection in Black Sea dolphins.
Key-Words: Brucellosis, *Brucella*, Real-time PCR, dolphins, Black Sea

P.2.8. ASSESSMENT OF METALS IN FISH AND MOLLUSKS FROM THE TURKISH COASTAL WATERS OF THE BLACK SEA

Mürşide Sur* Halil İ. Sur

Istanbul University, Institute of Marine Science and Management, Müşküle Sokak, No. 17, Vefa, 34134, Istanbul, Turkey
**E-mail: mursidesur@istanbul.edu.tr*

In this study, cadmium (Cd), copper (Cu), mercury (Hg) and lead (Pb) concentrations in fish (*red mullet*) and mollusk (*Rapana venosa*) that were collected from the Turkish coastal waters of the Black Sea during autumn

2010 were investigated. Cd, Cu and Pb were analyzed with inductively coupled plasma-optic emission spectroscopy (ICP-OES). Total Hg concentrations were determined by cold vapor atomic absorption spectrophotometry. The results showed that metal concentrations in fish and mollusk decreased in the order Cu>Pb>Cd>Hg. The highest metal value was recorded for copper (4.36 µg/gr wet weight). Additionally, metal concentrations in the fish tissue varied significantly depending on the locations. Metals in fish tissue in the south-western coast of the Black Sea were higher than the south-eastern coast of the Black Sea.

Key-Words: metal, pollution, fish, tissue

P.2.9. EFFECTS OF BALLAST WATER ON BLACK SEA ECOSYSTEM

Muhammet Boran*

Karadeniz Technical University, Faculty of Marine Sciences, Trabzon/Türkiye
**E-mail: mboran@ktu.edu.tr*

The ballast water is called the water taken aboard with the suspended materials to control the vessel for a suitable draft and trim and reduce stresses and improve stability. It may contain a variety of harmful substances, including in certain cases oil contaminants non-native marine animals and plants. Organisms that are carried by ballast water into a new environment can cause major ecological and economic damage to the ecosystem. Approximately 50 000 vessel transits through the Strait to the Black Sea each year. Ship traffic has led to the introduction of new species to the Black Sea that altered the ecosystem of this Sea. This study aims to demonstrate the effects of ballast water on the black sea.

Key-Words: Black Sea, ballast water, exotic species

P.2.10. FIRST BLACK SEA RECORDS OF TWO FREE-LIVING NEMATODE GENERA AND ONE SPECIES (NEMATODA: XYALIDAE)

Derya Ürkmez[1]*, Murat Sezgin[2]

[1]Scientific and Technological Research and Application Center, Sinop University, Turkey
[2]Department of Hydrobiology, Faculty of Fisheries, Sinop University, Turkey
**E-mail: deryaurkmez@gmail.com*

During a meiobenthos survey at the southern Black Sea (Sinop Bay, Turkey) in 2009-2010, several specimens of two xyalid free-living nematode species were recorded. They were identified as *Scaptrella cincta* Cobb, 1917 and

Rhynchonema sp. Xyalidae Chitwood, 1951 is one of the most diverse and usually dominant families inhabiting almost all aquatic habitats but most of the species live in marine environments. The family contains 46 genera and 450 valid species (Venekey et al., 2014). Popular genera of the family are *Theristus* and *Daptonema*, which cover 80% of all the *species inquerendae* in Xyalidae. However, *Scaptrella* is a rare genus with only three valid species. Species in this genus have deep buccal cavity, prominent eversible odontia, circular amphid, a single ovary, and gubernaculum without apophyses. *Scaptrella cincta* was first found in California, USA. It was also described by Wieser and Hopper (1967) from Florida and reported from Brazilian coasts (Venekey et al., 2010). The genus *Rhynchonema* has members with distinctly tapered, beaklike anteriors and thick body annules. It is a cosmopolitan genus with 32 valid species distributed both in cold and warm marine waters. As a result of the seasonal analysis of the material obtained in Sinop Bay, specimens of *S. cincta* was recorded in winter samples and *Rhynchonema* sp. in summer and spring samples. Some morphological features, measures and photographs of the nematodes were given within this report. To our knowledge, this is the first report of *Scaptrella cincta* and also the genera *Scaptrella* and *Rhynchonema* from the Black Sea. These also constitute first records of these two genera and one species from the Turkish waters. The study is a part of the Ph.D. thesis of the first author and supported by TÜBİTAK project no: 108Y340.

Key-Words: Monhysterida, *Rhynchonema*, *Scaptrella cincta*, Black Sea, Turkey

P.2.11. DETERMINATION OF METALS AND METALLOIDS LEVELS OF STRIPED VENUS (*Chamelea gallina L., 1758*) IN THE SOUTHERN BLACK SEA COAST

Ali Alkan[1*], Nigar Alkan[2], Ufuk Akbaş[3], Murat Dağtekin[4]

[1]Karadeniz Technical University, Institute of Marine Science and Technology, 61080, Trabzon, Turkey
[2]Karadeniz Technical University, Faculty of Marine Science, 61530, Sürmene, Trabzon, Turkey
[3]Karadeniz Agricultural Research Institute, 55300, Tekkeköy, Samsun, Turkey
[4]Central Fisheries Research Institute, 61250, Yomra, Trabzon, Turkey
**E-mail address: aalkan@ktu.edu.tr*

Striped venus has an important role in the Turkish fisheries. Recently, the average amount of catching has about 20000 tons in the Black Sea. In this study, concentrations of B, V, Cr, Mn, Co, Ni, Cu, Zn, As, Se, Mo, Cd, Pb were

determined in economically important bivalve species (*Chamelea gallina* L., 1758) distributed throughout the coasts of the southwestern Black Sea. Samples were collected five sampling sites from Sinop (Türkeli, Ayancık, Sarıkum) and Kastamonu (İnebolu, Cide). The elemental compositions of the striped venus were determined by ICP-MS after freeze drying and digestion of microwave system. Average length, height and width of samples measured as 18.01±2.45 cm, 9.47±1.21 cm and 16.26±2.18 cm respectively. Metals and metalloids concentrations were measured as for B:4.86±2.05; V:3.45±0.84; Cr:6.84±3.88; Mn:30.35±10.30; Co:2.27±0.36; Ni: 6.92±1.31; Cu:1.91±2.21; Zn:74.54±12.83; As:21.58±4.34; Se:4.31±0.57; Mo:1.14±0.53; Cd:3.99±0.91 and Pb:0.82±0.27 mg/kg dry weight. When wet weight/dry weight conversion ratio was applied, it was determined that the concentrations of all the measured elements were lower than the maximum limits set by European legislation.

Key-Words: striped venus, *Chamelea gallina*, metal, metalloid, Black Sea

P.2.12. ECOLOGICAL ASSESSMENT OF 2 MPAs FROM THE ROMANIAN BLACK SEA COAST

Tatiana Begun*, Adrian Teacă, Mihaela Mureşan, Dan Lucian Vasiliu, Dan Mihai Secrieru, Bianca Ana Pavel

National Research and Development Institute for Marine Geology and Geoecology - GeoEcoMar, Constanţa Branch, 304 Mamaia Bvd., RO-900581 Constanţa, Romania
**E-mail: tbegun@geoecomar.ro*

With increasing of surface of marine protected areas and designation of new ones (Ord. 46/2016) the reevaluation of status of component habitats and of marine ecosystem became a stringent necessity. Moreover, in the last years the revival of tourism, the perspective of coastal defenses works, the development projects of infrastructure of harbors Constanţa, Midia and Mangalia threaten integrity and functionality of the habitats within the marine protected areas and not only. Increasing anthropogenic pressure in the offshore marine environment highlights the need for improved management and conservation of offshore ecosystems. The research performed in 2015-2016 under the auspices of the national program PN 16 45 05 01 project contributed at understanding of complex ecological processes of a 2 MPAs from the Romanian Black Sea Coast (ROSCI0273 Marine Area from Tuzla Cape and ROSCI0094 The submerged sulphurous springs from Mangalia).

The present paper deals with ecological assessment of important and highly conservative value offshore habitats of two marine protected areas, which have been recently identified and mapped within the European project EMODNET-EUSeaMap 2. Their protection/conservation have not been assessed up to the present. These are found in the National List of predominant habitats according to MSFD (The Marine Strategy Framework Directive). Results further show significant values for an increase in species diversity, the protection of certain charismatic species and a restriction in the spread of invasive species across the site. Implications for policy and management with respect to commercial fishing and nature conservation are discussed.

Key-Words: Marine protected areas, benthic habitats, anthropogenic pressure

P.2.13. PHYTOPLANKTON COMPOSITION OF THE TURKISH BLACK SEA COASTS

Fatih Şahin*, Levent Bat, Murat Sezgin

University of Sinop, Fisheries Faculty, Department of Hydrobiology, TR57000 Sinop, Turkey
**E-mail: fsahin@sinop.edu.tr*

The seasonal abundance, biomass and taxonomic composition of phytoplankton of Turkish Black Sea coasts were studied. In the present study one cruise have been organized during the period of July 2014-August 2014. Samples were collected at twenty stations (0-50 m) located on coastal area. Species belonging to 10 classes of algae have been recorded and a total of 104 taxa was determined in the sampling stations. Dinophycaeae was found to be dominant in terms of number of species. *Emiliana huxleyi* was determined to be the most contributing taxa to total abundance (52%) of surface layer. When the total abundance of phytoplankton sampled from all the depths of the stations are evaluated; *Emiliania huxleyi* had 53% of the total abundance, while dinoflagellates accounted for 30% and diatoms 17%.

Key-Words: Black Sea, phytoplankton, abundance, biomass

P.2.14. STATUS OF TOXIC/POTENTIALLY TOXIC PHYTOPLANKTON SPECIES DISTRIBUTED ALONG THE TURKISH COAST OF THE BLACK SEA

Fatih Şahin*, Murat Sezgin, Levent Bat

University of Sinop, Fisheries Faculty, Department of Hydrobiology, TR57000 Sinop, Turkey
**E-mail: fsahin@sinop.edu.tr*

The seasonal abundance, biomass and taxonomic composition of phytoplankton of Turkish Black Sea coasts were studied. In the present study two cruise were organized during the period of March 2015 and August 2015. Samples were collected at twenty stations (0-50 m) located on coastal area. Two diatoms and 16 dinoflagellates species were identified as toxis/potentially toxic on March 2015. The total abundance values of three harmful diatom species determined in this period constitute 61% of total diatom abundance. 10% of the total dinoflagellates abundance values were dominated by harmful species. Three diatoms and 18 dinoflagellates species were determined on August 2015 as toxic/potentially toxic. The abundance and biomass values of three harmful diatoms constitute lower than 1% of the total abundance and biomass values of diatoms. The abundance values of toxic/potentially toxic dinoflagellates dominated 75% of the total dinoflagellates abundances.

Key-Words: Black Sea, toxic/potentially toxic phytoplankton, abundance, biomass

P.2.15. RIVER ECOSYSTEM CLASSIFICATION THROUGH HEAVY METAL ASSESSMENT

Alexandru Amarioarei*, Iris Tuşa, Corina Itcuş, Manuela Sidoroff, Mihaela Păun

National Institute of Research and Development for Biological Sciences, Department of Bioinformatics, 296 Splaiul Independentei, Bucharest, Romania
**E-mail: alexandru.amarioarei@incdsb.ro*

Romania's rivers and springs network is 78,723 km long, of which 13,650 km are in good and very good condition, representing the last portions of natural aquatic ecosystems. One way to classify rivers is based on environmental variables in order to create a structure for reporting the ecological status. The

river pollution signifies the contamination of the river which is an environmental degradation that occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove the harmful compounds. A dataset of 10 rivers from 3 different basins located in the northern region of the country (Maramures and Transylvania areas) was analyzed based on the amount copper and zinc dissolved in water. Several cluster analysis techniques were used in order to investigate if the heavy metal river observations naturally group together in some predictable way. Also, to see if a new observation belongs to one of the groups identified naturally in the cluster analysis step, three supervised classification methods were presented and their accuracy was evaluated. Both partitioning around medoids (PAM) method and hierarchical agglomerative clustering method successfully identified 4 of the 5 heavy metal rivers to belong to a separate group while the k-means method managed to group together only 2 of the 5 targeted rivers. The most accurate classification models were the k^{th} nearest neighbor model with k = 1 and the random forest model.

Key-Words: river, contamination, heavy metals, cluster analysis

P.2.16. STATISTICAL EVALUATION OF THE ROMANIAN THERAPEUTIC LAKES THROUGH THEIR BIOCHEMICAL CHARACTERISTICS

Alexandru Amarioarei*, Corina Itcuș, Iris Tușa, Manuela Sidoroff, Mihaela Păun

National Institute of Research and Development for Biological Sciences, Department of Bioinformatics, 296 Splaiul Independentei, Bucharest, Romania
**E-mail: alexandru.amarioarei@incdsb.ro*

Investigation of the lake systems can provide a variety of information that can lead to the development of general concepts about how lakes function and respond to environmental changes. The purpose of the study was to assess the current classification of therapeutic lakes based on supervised learning methods applied to several biochemical characteristics of these lakes. In order to classify the therapeutic lakes in a separate class, a dataset consisting of 53 observations from 9 different basins and from three different altitude categories was analyzed using clustering and classification methods. The results obtained were consistent with the national classification with an error smaller than 15%.

Key-Words: therapeutic lakes, clustering, biochemical characteristics

P.2.17. *Ulva rigida* FROM ROMANIAN BLACK SEA COAST, A SOURCE OF DIETARY FIBER

Daniela Mariana Roşioru*, Oana Marin

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanța, Romania,
**E-mail: drosioru@alpha.rmri.ro*

Use of seaweed by humans is an ancient practice. *Ulva* or *Enteromorpha* is a green macroalgae genus, widely distributed that raises and cultivates around the world and tolerant to some environmental challenges. Interest in *Ulva* as a "newness food" is expanding especially in Western countries. Until 2013 year, the Romanian seaside was characterized by the abundant development of the *Cladophora* species. Starting with 2014 year (a situation that lasted throughout the study period 2014-2016) dominated the *Ulva* genus, especially the *Ulva rigida* species. Nutritional evidences of *Ulva* algae is recognized by scientists in protein, polysaccharides, mineral, and some vitamins in important percentages. In the green algae, most work has focused by scientists on storage polysaccharides. In *Ulva* genus, these are known as ulvan, which are water-soluble polysaccharides and dietary fiber. Dietary fiber is one of the most essential food component, mainly used to maintain health and balance of digestive system. *Ulva rigida* from Romanian Black Sea coast can be considered a source of algal material, with the potential to be exploited, given their high reproductive capacity, ecological preferences and easy collection (develops at small depths up to 3 m). Biochemical composition of *Ulva rigida* indicated a high content in carbohydrates among other opportunistic species, green algae such as *Cladophora vagabunda* and *Ceramium virgatum*. Laboratory analyses showed a high content in ulvan, extracted from *Ulva rigida* collected from the Romanian Black Sea coast and that can be of interest for an economic agent in pharmaceutical or medical domain.
Key-Words: *Ulva rigida*, dietary fiber, ulvan, Black Sea coast

P.2.18. MULTI YEARLY VARIATION OF CS-137 CONTENT IN FISH CATCHES FROM ROMANIAN SECTOR OF THE BLACK SEA

Vasile Pătrașcu

National Institute for Marine Research and Development „Grigore Antipa" ,300 Mamaia Blvd., 900 581 Constanta, Romania
**E-mail: vpatrascu@alpha.rmri.ro*

Fish is an important marine resource with economical utility but also of great ecological value. Marine biodiversity includes fish between vulnerable

components, with threatened species due to anthropogenic impact. The main threat to fishery resources comes from overfishing, which can greatly reduce fish stocks. A parallel concern is related to the quality of the living marine resource. Due to economic activities, there is, first of all, a physico-chemical pressure on the marine environment, which is a risk factor for living resources, with a potential human impact. Therefore, the surveillance of the radioactivity of the marine environment has been a constant concern of the NIMRD, especially after the 1980s. If we live with natural radioactivity, artificial radioactivity can be controlled. Among the more significant artificial components, considering radiotoxicity and volume, is the Cs-137 fission product. This radionuclide remain present in the marine environment, following the exploitation of nuclear power reactors, military nuclear tests (especially before the 60's) and accidentally. Collective memory is still marked by the two major nuclear accidents: Chernobyl (1986) and Fukushima (2011). Chernobyl produced a stronger impact in the north - western part of the Black Sea. The paper presents the last decades results of Cs-137 measurements, before and after this accident, over. The radionuclide is still present, reaching today relatively low levels, even compared to those prior to 1986. The MFSD's objective, to achieve a level of artificial radioactivity close to background, is approaching.

Key-Words: Cs-137, Black Sea, marine radioecology, fish

P.2.19. ROMANIAN BLACK SEA ZOOPLANKTON AND ITS ROLE IN THE DIET OF *SPRATTUS SPRATTUS* IN 2016-2017

Elena Bişinicu*, George Emanuel Harcotă, Aurelia Ţoţoiu, Florin Timofte, Gheorghe Radu

*National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania, *E-mail: ebisinicu@alpha.rmri.ro*

Sprat, a small pelagic species, plays an important role in the trophic chain, being a major predator on zooplankton. This research shows the role of zooplankton and indicates the main mesozooplanktonic groups found in the stomach content of the analyzed samples. A number of 100 sprat individuals were analyzed, collected from stations along the Romanian Black Sea coast. Researches made in 2016-2017 revealed high values of fodder zooplankton, both as density and biomass. Copepods represented the major bulk of mesozooplanktonic organisms in the analysed years, the maximum value of

density 11836 ind.m^3 being recorded in 2017. Meroplankton recorded the highest values of density in 2016, reaching 12772 ind.m^3. Cladocerans were better represented in 2016, with a maximum value of 1.2124 ind.m^3 , other groups reaching higher values of densities and biomass in 2017, with a maximum value of 2522 ind.m^3.After analyzing the stomach content, sprat's diet composition was dominated mainly by Copepoda and meroplankton. The aim of this paper is to show the role of zooplankton in sprat feeding and to provide information regarding the trophic basis in the Romanian Black Sea area.

Key-Words: sprat, zooplankton, stomach content, trophic basis, Copepoda

P.2.20. SPATIO-TEMPORAL DISTRIBUTION OF MESOZOOPLANKTON COMMUNITY ALONG ROMANIAN SHELF DURING 2013-2016

Elena Bişinicu, Florin Timofte*, Cristina Tabarcea, George Emanuel Harcotă, Luminița Lazăr

National Institute for Marine Research and Development 'Grigore Antipa', 300 Mamaia Blvd., 900 581 Constanta, Romania
**E-mail: ftimofte@alpha.rmri.ro*

Mesozooplankton plays an important role in the marine ecosystem, as a link between primary producers and higher trophic levels. During 2013-2016, a number of 197 samples collected from the Romanian Black Sea area were analyzed, the number of collected samples showing variations between 17 samples in 2013, 79 samples in 2014, 42 in 2015, and 59 samples in 2016. The mesozooplanktonic fauna was represented by 24 Taxa belonging mainly to Copepoda (8 species), followed by Cladocera (7 species), meroplankton (5 species) and other groups (3 species), all representing the fodder zooplankton. Non fodder zooplankton was represented by *Noctiluca scintillans*, the only quantitative evaluated species. In the analyzed period, fodder zooplankton in the Romanian Black Sea coast presented fluctuations, from the main groups, meroplankton reaching high values of density and biomass, being followed by Copepoda and Cladocera. Regarding the non-fodder zooplankton, *Noctiluca scintillans* varied, reaching the minimal value of density in 2013, the highest value in 2015 and presenting a decrease in 2016. Distribution of mesozooplankton is strongly influenced by environmental variables (temperature and salinity), which control the structure of the zooplankton community composition.

Key-Words: mesozooplankton, Black Sea, distribution, *Noctiluca scintillans*

P.2.21. GELATINOUS ZOOPLANKTON ALONG THE ROMANIAN SHELF - QUALITATIVE AND QUANTITATIVE DISTRIBUTION DURING 2010-2013

George Emanuel Harcotă*, Florin Timofte*, Cristina Tabarcea, Elena Bişinicu

National Institute for Marine Research and Development 'Grigore Antipa', 300 Mamaia Blvd., 900 581 Constanta, Romania
**E-mail: gharcota@alpha.rmri.ro, ftimofte@alpha.rmri.ro*

Gelatinous plankton plays a key role in the marine area, abundance and biomass fluctuations leading to understanding the ecosystem functions and pressures. In 2010-2013, a number of 111 samples were collected from the Western part of the Black Sea, including Romanian, Bulgarian and Turkish waters. Sample analysis was performed in order to determine the qualitative and quantitative structure and spatial distribution patterns of gelatinous zooplankton. The identified species were represented by the scyphozoan *Aurelia aurita* and the ctenophor *Pleurobrachia pileus* and non-indigenous ctenophores Mnemiopsis *leidyi* and *Beroe ovata.* The species that recorded the highest value of density was represented by *Pleurobrachia pileus,* with a maximum value in 2012, the minimal value being recorded by *Mnemiopsis leidyi* in 2010. Maximum value for biomass was recorded in 2013 by *Aurelia aurita, Beroe ovata* presenting the smallest values. The scyphozoan *Aurelia aurita* is a large species, therefore it reaches high values of biomass. Spatial distribution was influenced by the environmental factors like temperature and salinity.
Key-Words: gelatinous zooplankton, Black Sea, density, biomass, 2010-2013

P.2.22. ECOSYSTEM SERVICES ASSESSMENT WITHIN DANUBE DELTA BIOSPHERE RESERVE

Marian Mierlă*, Marian Tudor, Silviu Covaliov, Cristian Trifanov, Mihai Doroftei

Danube Delta National Institute for Research and Development from Tulcea, ROMANIA, Babadag Street no.165, Tulcea Town, Tulcea County, zip code 820112
**E-mail: marian.mierla@ddni.ro*

Danube Delta is one of the most valuable deltas within Europe due to the fact that it is rich in biodiversity. This paper presents an assessment of the

ecosystem services in order to establish and to observe the spread of the most valuable ecosystems. For this it was used the Map of the Danube Delta Biosphere Reserve Ecosystems as a base, starting point, using the 30 ecosystem classes that were identified. Quantification of these ecosystems taking into account their services is very difficult, on the one hand because ecosystems are very diverse and difficult to compare, and, on the other hand because of the diversity of services these ecosystems can provide. For the Danube Delta Biosphere Reserve, 10 ecosystem services based on biological expertise were identified and studied. The ten services had been grouped into the four major categories of services: supporting, providing, regulating and cultural. Quantification of ecosystem services is not easy, especially if the study area is such a complex and extensive area as the Danube Delta Biosphere Reserve (D.D.B.R.). Such studies require long and detailed researches. But for the brief knowledge of ecosystem services on the territory of D.D.B.R. it has been used the presence of the services identified in the present study for each type of ecosystem and has been summed up resulting in a service presence map. From the map, easily can be highlighted the fact that more than 77% of the total area of the Danube Delta Biosphere Reserve is occupied by ecosystems with at least 7 services identified in this study. The remaining 23 percent of the total area is represented by poorer ecosystems in services.

Key-Words: ecosystems, ecosystem services, map, Danube Delta

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P.3.1. CETACEAN STRANDINGS BETWEEN 2010-2016 AT THE COAST OF ROMANIA

Marian Paiu*, Angelica Paiu, Mihaela Mirea Cândea, Anca-Maria Gheorghe

Mare Nostrum NGO, Bvd. 1 Decembrie 1918 no. 3, 900711, Constanta, Romania
**E--mail: marian_paiu@marenostrum.ro, romulus.marian@gmail.com*

Stranded cetaceans have long intrigued naturalists because their causation has escaped singular explanations. Regardless of cause, strandings also represent a sample of the living community, although their fidelity has rarely been quantified. The present study, conducted over a period of 6 years, between May 2010 and December 2016, in the frame of Mare Nostrum NGO program Monitoring and Conservation of Black Sea Cetaceans. Program that developed a Stranding Monitoring Network and conducted an active pathological examination activity in order to assess the cause of death shows the irregular trend of stranding events at the Romanian coast (245 Km). The highest pick was registered in 2012 when 177 cases were recorded, more than double of the average events/year. The paper presents a summary of the 585 cetacean strandings involving all the 3 species from the Black Sea (*Delphinus delphis ponticus, Tursiops truncatus ponticus and Phocoena phocoena relicta*), as well as 134 strandings not included in the previous correlation by Paiu (2016). Average number of events per year was 83.57 and the most common species was the harbor porpoise (*Phocoena phocoena relicta*) with 80%. Stranding events occurred throughout the year, with the lowest frequency occurring in the winter (December–February).

Key-Words: Black Sea; Harbour porpoise; Bottlenose dolphin; Common dolphin Stranding; Distribution; Monitoring network; Romanian shore

P.3.2. DEMERSAL FISHERIES DYNAMICS AT THE ROMANIAN BLACK SEA COAST DURING 2012 - 2016

Valodia Maximov*, Simion Nicolaev, Gheorghe Radu, Eugen Anton, Cristian Danilov, Tania Zaharia

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., Constanta, Romania
**E-mail: vmaximov@alpha.rmri.ro*

The Black Sea fish fauna underwent major changes in the last 50 years, both in qualitative and quantitative structure and in the behaviour of different species. These changes are consequences of anthropogenic activities, direct

and indirect fishing pressures by deteriorating environmental conditions, particularly in the western part of the sea. Demersal fish species inhabiting the continental shelf located in the part of the Romanian Black Sea are the most important segment of regional fishery potential in terms of commercial interests, domestic and international demand. Of all demersal species, only turbot has a particular interest, which, through appropriate management of recovery operations and a good catch, can ensure the economic recovery of the national marine fisheries, due to the market value of fishery products, whose application is currently poorly met. In Romania, the marine fishing of demersal species enjoys a long tradition, the practice being recorded as an occupation of the fisheries settlements in the eighteenth and nineteenth centuries in Dobrogea and the Romanian marine fisheries. During the twentieth century until the early 2000s, the demersal stocks in the exclusive economic zone of Romania were mostly targeted by illegal fishing practiced by Turkish, Bulgarian or Ukrainian fishermen. Studies by Russian scientists showed that in the north-eastern Black Sea about 166 species are found, out of which 111 species are of Atlantic origin, 29 species Ponto-Caspian, 6 species autoacclimated, 9 endemic species and 23 local species (Nikolski, Svetovidov). Of these, in the Black Sea are reported a number of 23 families belonging to the group of demersal fish, the most important being: *Squalidae, Acipenseridae, Serranidae, Mullidae, Sparidae, Labridae, Gobiidae, Scophthamidae, Pleuronectidae* and *Soleidae* (Maximov, Zaharia, 2002, 2013). Of demersal species, *Psetta maeotica* (turbot), *Merlangius merlangus euxinus* (whiting), *Platichthys luscus flesus* (European flounder), *Acipenser gueldenstaedti* (Danube sturgeon), *Acipenser stellatus* (starry sturgeon), *Huso huso* (beluga), *Dasyatis pastinaca* (common stingray), *Solea vulgaris* (common sole), *Mesogobius batrachocephalus* (knout goby), *Neogobius melanostomus* (rount goby), *Mullus barbatus ponticus* (red mullet) are of commercial interest. This paper presents the current state of demersal ichthyofauna fisheries at the Romanian Black Sea coast and the time evolution of the main fish species. Romanian research results also reflect the work undertaken in Romania, during 2012- 2016. Other issues are presented and analyzed as well: demersal fishing methods and techniques; problems demersal fisheries are facing; the evolution of demersal overall catches and by main species of commercial interest; legal and institutional framework; recommendations on the management of demersal resources.

Key-Words: ichthyofauna, Black Sea, species, demersal, catch, fishermen communities, fishing point, boats, fishing gears

P.3.3. EVOLUTION OF THE TURBOT FISHERY AT THE ROMANIAN BLACK SEA COAST DURING 2014 - 2016

Valodia Maximov*, Simion Nicolaev, Eugen Anton, Gheorghe Radu, Cristian Sorin Danilov

National Institute for Marine Research and Development 'Grigore Antipa" 300 Mamaia Bvdl., Constanta, Romania
**E-mail: vmaximov@alpha.rmri.ro*

Turbot (*Psetta maxima maeotica*), a demersal species that populates the continental shelf under the Romanian jurisdiction at the Black Sea, represents an important segment of the fishing potential under the aspect of the commercial interest, the demand on the internal and international market. Black Sea turbot populations should be preserved for ecological, biological and economic reasons.

The paper is a summary of certain elements related to the turbot fishery in the Romanian marine area, such as:
- dynamics of turbot catches and its share in Romanian marine catches;
- evolution of fishing effort;
- turbot stock status and fishing agglomerations biomass;
- evolution of biological parameters of the turbot;
- management measures in the Romanian marine area.

All of these will support the caracterization of the turbot population from the Romanian Black Sea area.

Key-Words: Romanian Black Sea Coast, turbot, catch, fishing effort, management

P.3.4. BIOLOGICAL PARAMETERS AND STOCK SIZE ESTIMATION OF *M. GALLOPROVONCIALIS* FROM MARICULTURE COLLECTOR LINES

Violin Raykov[1]*, Antoaneta Trayanova[2]*

*[1]*Institute of Oceanology-BAS, 40 Primorski blvd., P.O.Box 152,9000 Varna*
**E-mail: vraykov@io-bas.bg*
[2] Naval Aacademy "N.Y.Vapzarov" Bulgaria, Varna 9026, 73 Vasil Drumev str.
**E-mail: atrayanova@dir.bg*

Samples were taken from the collector ropes on 3 collector lines from mussel farm *Aqua food Ltd.*, in front of Ravda, Bulgarian marine area, to allow the extrapolation of the weight development and the stock of the black mussel to

both the collector and the entire shell installation. All specimens were taken from an eye of the collector with mesh of 240x300 mm. The length of each specimen except individuals under 1 cm was measured by means of an electronic caliper with an accuracy of 0.01 mm. The individual weight was determined by an analytical balance with an accuracy of 0.001 g. The average amount of mussel development recalculated per linear meter is 4,226 kg / m. With the largest share in the average quantitative development by size classes per linear meter they occupy the mussels with an industrial size > 44 mm - 1,556 kg / m, followed by those with dimensions 30-40 mm (1,208 kg / m). The size classes 40-44 mm and 20-30 mm have almost identical quantitative parameters - 0.649 kg / m and 0.633 kg / m, respectively, and the least developed in quantitative terms are the exponents of the 10 - 20 mm size group. The linear dimensions of the mussels ranged from 10.05 mm to 57.73 mm, with the mean values in all three lines being almost equal, the allometric coefficient in all three lines shows a steady increase in size and weight, which means identical increases in normal growth conditions on the explored black mussel farm. The average amount of mussels over 10 mm, which are expected to reach an industrial size and be realized as production in the absence of force majeure and climatic anomalies, per collector amounts to 12,428 tones.

Key-Words: Black mussel, growth, production, mariculture, Black Sea

P.3.5. EVOLUTION OF THE SPRAT (*Sprattus sprattus*, LINNAEUS 1758) POPULATION AT THE ROMANIAN LITTORAL DURING 2008-2016

Aurelia Ţoţoiu*, Mădălina Galaţchi, Cristian Danilov, Gheorghe Radu

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: atotoiu@alpha.rmri.ro*

Sprat is one of the fish species with high commercial importance in the Romanian marine area whose population is heavily influenced by the fishing effort exerted on it and by the evolution of environmental conditions. The paper is a synthesis of long-term data obtained by NIMRD "Grigore Antipa" Constanta mainly through National Data Collection Programs (NDCP) in the period 2008-2016, being partner of the National Agency for Fisheries and Aquaculture (NAFA). The main elements analysed are: dynamics of sprat catches and its share on fishing gears, evolution of fishing effort, distribution and biomass of fishing agglomerations, environmental conditions influence on the status and distribution of fishing agglomerations, structure on size classes

of the catches, evolution of the growth parameters and natural mortality. The presented data indicate seasonal changes of the distribution and biomass values, the fishing agglomerations being very much influenced of environmental conditions.

Key-Words: Romanian Black Sea area, catch, fishing effort, growth parameters, natural mortality

P.3.6. IMPACT OF INDUSTRIAL FISHING GEARS ON THE HEALTH STATUS OF COMMERCIAL FISH POPULATIONS AT THE ROMANIAN BLACK SEA COAST

Aurelia Ţoţoiu[1]*, Eugen Anton[1], Gheorghe Radu[1], Cristi Danilov[1], Neculai Patriche[2]

[1]National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., Constanta, Romania
[2]Institute of Research and Development for Aquatic Ecology, Fishing and Aquaculture, Galati
**E-mail: atotoiu@alpha.rmri.ro*

Ther aim of this paper is to analyse the impact of fishing gears on the health status of commercial fish populations industrially caught at the Romania Black Sea coast. Fishing gears used for industrial capture of fish may negatively impact fish stocks, this impact causing immediate or delayed effects. In the Romanian marine fishery, the following fishing methods are used: water filtering and fish retaining, fish tangling and hanging, blocking the direction of movement and directing the fish in a reduced space, pruning and hanging fish with armed hooks with natural or artificial baits or with unarmed hooks. From all the methods mentioned, the ones with the highest potential negative impact are: longlines, gill nets, hooks, pound nets, beach seine, pelagic trawl, bottom trawl. During the actual operation of fishing gears, fish specimens within their action range can be hooked, speared/punctured or crushed. All these mechanical actions cause skin lesions, thus favoring the penetration of infectious pathogenic agents (viruses, bacteria, fungi). The contamination of these fish individuals may cause the extension of infections to other individuals of the same species, as well as to other marine living resource. Moreover, the overall habitat in the area where fishing gears are deployed and act can be affected, along with other areas where specimens carrying various infections and parasites migrate. The health status of fish populations is highly important for spawning, growth and exploitation of commercial fish species.

Key-Words: fishing gears, health status, industrial fishing, lesions, diseases

P.3.7. DISTRIBUTION AND ABUNDANCE OF SPRAT JUVENILES IN THE ROMANIAN MARINE AREA DURING 2016-2017

Gheorghe Radu*, Aurelia Ţoţoiu, Cristian Danilov, Alina Spînu, Magda Nenciu

National Institute for Marine Research and Development "GrigoreAntipa
**E-mail: gradu@alpha.rmri.ro*

The study of the distribution and abundance of juvenile fish species is an important part of determining the status of the populations of the species concerned. Surveys realized along of the years confirmed that productivity oscillations, namely completion volume, are closely linked with the environmental factors variation, between which decisive are water temperature and quantity and quality of the trophic base. Through modification of the spawning intensity and completion, the fish populations create adaptations of self-control of the shoal size in concordance with degree of food ensuring. A certain coincidence between growth of the fish juveniles and the growth of the trophic plankton sometimes constitute one of the most important factors which determine respective generation productivity. Therefore, the level of completion of the sprat species reserve in the Romanian Pontic waters has been investigated in relation to the dynamics of abiotic environmental conditions and the evolution of the zooplanktonic trophic base. Taking into consideration that in the sampling time with trawl for juvenile fish were observed a high quantity of jellyfish, have been evaluated its biomass in the surveyed area, establishing the influence degree on juvenile agglomerations. In order to determine the intensity of the sprat stock completion at the Romanian littoral, the results of two complex research surveys conducted at sea in May 2016 and 2017 were analyzed by the team of Marine Living Resources Department of the National Institute for Marine Research and Development "Grigore Antipa ", Constanţa. Have been realized 72 sampling haulings with the Danilevski pelagic trawl, designed by the Institute's specialists. In the assessment were used the parameters like: hauling speed; horizontal trawl opening; hauling time and hauling level. The biological samples taken were preserved in formaldehyde 4% and then analyzed in the laboratory to establish the quantitative structure on species. The results were expressed in number of specimens/hauling and specimens/Nm^2 and were used to determine the completion of each fish species reserve. The distribution of the juveniles was done by marking on the distribution maps of the catch values obtained through sampling haulings with the juvenile trawl. Using observations recorded both in 2016 and in

2017, it can be said that the state of the sprat stock is quite unstable, with major fluctuations, from one year to another, of the relative abundance of the sprat juveniles, determined both of environmental modification and fishing pressure on the sprat population, implicitly on spawning stock. So, the causes of this situation are multiple, the effect of each being difficult to be assessed. The estimated abundance for sprat juveniles in May 2017 was lower than in the same period of the previous year. Considering that sprat has a high reproductive capacity and a short life cycle, sprat stocks, although intensely exploited, can be restored more easily than for other species.

Key-Words: Romanian Black Sea area, sprat juveniles, distribution, abundance, completion

P.3.8. BELUGA AND STELLATE STURGEON MIGRATION IN LOWER DANUBE RIVER IN RELATION WITH IRON GATE II DAM

Ştefan Honţ[1], Radu Suciu[1], Marian Paraschiv[1], Ion Marian Iani[2], Lucian Oprea[2]

[1]*Danube Delta National Institute for Research and Development, str. Babadag 165, Tulcea 820112, Romania, Fax: (+4) 0240 - 533 547, web page: www.ddni.ro*

[2]*Lower Danube River University of Galati, str. Domneasca nr.47, cod 800008, Romania, web page: http://www.ugal.ro/*

**E-mail: stefan.hont@ddni.ro*

Before the Danube River was dammed, sturgeons were able to migrate for spawning as far as Komarno (Danube River, km 1810). Beluga and stellate sturgeons used to spawn also in major tributaries upstream the Iron Gates, therefore constructions of hydroelectricity or regulatory dams had a significant impact on natural reproduction of these species. The lack of viable solutions that ensure longitudinal connectivity for migratory species led to a dramatic decline in their number over the years. For a better understanding of sturgeon migration and to identify the spawning sites in Lower Danube River (LDR), telemetry studies were conducted since 1998 using acoustic equipment. Starting in 2011, wild adult sturgeons were implanted with acoustic transmitters and tracked during their downstream and upstream migration between rkm 71 – 864. Migration routes, swimming depths and distances covered during their spawning migration were recorded in adult beluga and stellate sturgeons arriving near the Iron Gate II dams. Studying movements of beluga and stellate sturgeons is essential for understanding their homing instinct, their behaviour downstream the Iron Gate II dams, and their swimming behaviour during upstream and downstream migration in the Lower Danube River.

Key-Words: sturgeon, spawning migration, telemetry, Iron Gate II dams

P.3.9. PRELIMINARY DATA ON BLACK SEA 16S PROKARYOTE DIVERSITY AND VERTICAL DISTRIBUTION

Mariia Pavlovska[1]*, Evgen Dykyi[1], Elena Stoica[2]

[1]Ukrainian scientific center of Ecology of Sea (UkrSCES), Frantsuzsky Blvd. no 89, 65009, Odesa, Ukraine
[2]National Institute for Marine Research and Development "Grigore Antipa" (NIMRD), Bd. Mamaia no. 300, 900581, Constanta, Romania
**E-mail: mawwwa88@gmail.com*

Microorganisms are ubiquitous in marine environment and known to be the drivers of biogeochemical processes, such as carbon and nutrient cycling. Previous research has already uncovered and highlighted important functional roles of microbial communities in Black Sea ecosystem functioning and in carbon, nitrogen and sulphur biogeochemical cycles. However, the previous studies focused either on the specific region of Black Sea or on the specific group of microorganisms. The presented study is the first one of such scale in the Black Sea, and includes data on taxonomy and vertical distribution of various groups of microbes. In total, 69 sea water samples from 12 stations and 30 sediment samples from 5 stations were collected during the Joint Open Sea Survey, which was conducted under EMBLAS-II project in May-June 2016. The samples were taken from the following depths: surface, thermocline, deep chlorophyll-a maximum, nutrient maximum, oxygen minimum and H_2S zone. The DNA was extracted and 16S RNA gene V4 region was sequenced. 30 classes and 61 genera were identified in the final dataset. The distribution of taxonomic groups followed the chemical parameters at sampled depths with strong dominance of Flavobacteria and Cyanobacteria in the upper layers (surface, thermocline and fluorescence maximum), presence of chemolithoautotrophic sulfur oxidizing bacteria of *Thioprofundum* genus and green sulphur bacteria of *Prosthecochloris* genus at oxygen minimum zone and prevalence of *Wolinella* and *Sulfurimonas* genera in H2S zone. This preliminary data highlight the clear vertical distribution pattern of Black Sea microbial communities, and is planned to be followed by the large-scale study of their functional role in biogeochemical cycles.

Key-Words: prokaryote, 16S RNA, phylogeny, diversity, metagenomics, Black Sea

P.3.10. CHANGES IN CERTAIN ACUTE PHASE PROTEINS OF COMMON CARP (*Cyprinus carpio*) EXPOSED TO ORGANOPHOSPHATE INSECTICIDES

Dimitrinka Zapryanova[1]*, Alexander Atanasoff[2], Radostin Simeonov[1], Galin Nikolov[3], Violin Raykov[4], Veselin Ivanov[5], Teodora Mircheva[1]

[1]Faculty of Veterinary Medicine, Trakia University, 6014 Stara Zagora, Bulgaria
[2]Institute of Fishery Resources, 9000 Varna, Bulgaria
[3]Faculty of Agriculture, Trakia University, 6014 Stara Zagora, Bulgaria
[4]Institute of Oceanology, 9000 Varna, Bulgaria
[5]Faculty of Medicine, Trakia University, 6000 Stara Zagora, Bulgaria
**E-mail: zaprianowa@abv.bg*

The acute phase response (APR) is a nonspecific reaction of fish to disturbances in homeostasis. The aim of present study was to investigate quantitative changes that occur in the concentration of acute phase proteins (APPs) in the blood of common carp (*Cyprinus carpio L.*) exposed to organophosphate insecticides during ameliorative activities. Parameters examined were fibrinogen (Fib), ceruloplasmin (Cp) as a positive APPs and albumin (Alb) as a negative APP. The hepatopancreas was chosen for this investigation as it is the primary site of acute phase protein synthesis. APP parameters plasma fibrinogen ($P<0.05$) registered a significantly increased and albumin ($P<0.05$) exhibited statistically declined in treated group. Based on the data acquired in this study, it was concluded that, the carp do not exhibit a strong APP synthesis during the early stages of an APR after spraying with organophosphate insecticides.

Key-Words: Acute phase proteins, fibrinogen, albumin, ceruloplasmin, common carp

P.3.11. VITAL FISH FAUNA OF RIVERS OF MACEDONIA AND THRACE REGIONS (GREECE) AND VALUATION OF FISH SPECIES PROTECTION POSITION

A.K. Kokkinakis *, D. Kiourtidou, P. Miltiadou

Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Wildlife and Freshwater Fisheries, P.O. Box. 241, Thessaloniki, Greece
**E-mail: akokkin@for.auth.gr*

The freshwater fish fauna represents an important factor for the river ecosystems in Greece that are highly valued for their environmental, economic, and social importance. Nowadays the environmental pressure upon

the freshwater fish populations and their habitat in river systems had increased considerably. The aim of this study is to evaluate the rivers of the three regions of northern Greece in relation to their sensitive and endangered species of the fish fauna that colonizes them, and thus the assessment of the overall risk faced by these vulnerable ecosystems. In this paper it was recorded the freshwater fish fauna of the main thirty-four (34) rivers in Northern Greece, in the regions of West, Central, East Macedonia, and Thrace, and it was considered the current protection status for each fish species according the E.U. Regulation for Ecotopes (92/43/EEC), the Bern's Convention, the IUCN 'Red List' of threatened vertebrates, and the Greek Red List of fresh water fishes. Then their threats were categorized and the proper management strategies and legislation needs for its protection were specified. From the recording and categorization carried out in this paper in the above 34 river systems in the tree regions of Northern Greece, it emerged that a total of 92 different fish species were logged among the 154 species recorded for the all country. Fresh water fish species of the rivers in Northern Greece requires more conservation and preservation attention due to their sensitivity. Fish species can be saved from extinction but this requires a combination of sound research and carefully coordinated efforts.

Key-Words: fish fauna, rivers, species protection status, Macedonia, Thrace, Greece

P.3.12. FORECAST AND SENSITIVITY ANALYSIS FOR THE R/SSB RELATIONSHIP IN BLACK SEA SPRAT (*Sprattus sprattus* Linnaeus, 1758).

Gheorghe Sârbu*, Magda Nenciu*, Gheorghe Radu

National Institute for Marine research and Development „Grigore Antipa", 300 Mamaia Blvd., Constanta, 900581, Romania
**E-mail: ghesarbu@gmail.com, magdalena.nenciu@gmail.com*

Environmental fluctuations like temperature, food abundance etc. cause major changes in fish productivity and can lead to rapid fluctuations in fishing opportunities. They are usually not considered by most management advisory frameworks for short-lived species such as sprat, which generally assume environmental stability and constant productivity. The multiple correlations obtained so far in the project "IntelliGent Oceanographically-based short-term fishery FORecastIng applicaTions" (GOFORIT), which identify links between the ecology of short-lived fish species and climatic and oceanographic

conditions at time scales relevant to annual stock assessment and advisory cycles, were used in the short-term forecasts for sprat (*Sprattus sprattus* Linnaeus, 1758). For forecast and sensitivity analysis, the following models were used (multiple linear regression equations): ln(R/SSB) ~ SSB + Phytoplankton, ln(R/SSB) ~ SSB + Temperature, ln(R/SSB) ~ SSB + Zooplankton. The datasets used for temperature were from Romania, CEDA and the Hadley database, and for zooplankton from Romania and Turkey. In order to perform forecasts and sensitivity analysis, for our best multiple correlations, we developed an interactive application, in R language. The essence of sensitivity analysis is to answer to the question: how does the variation of independent variables (SSB and Phyto/Temp/Zoo) affect the dependent variable ln(R/SSB)? We have identified new relationships between ecosystem status (temperature, phytoplankton, and zooplankton) and some parameters like recruitment (R), and spawning stock biomass (SSB) of Black Sea sprat. The highest positive correlations, based on Pearson's r, was: between ln(R/SSB) and SSB with phytoplankton, between ln(R/SSB) and SSB with temperature, and between ln(R/SSB) and SSB with zooplankton. Based on the significance coefficient ($p <= 0.05$) we can conclude that there is a statistically significant correlation between ln(R/SSB) and SSB with phytoplankton, between ln(R/SSB) and SSB with temperature, and between ln(R/SSB) and SSB with zooplankton.

Acknowledgement: The research leading to the results herein presented has been undertaken in the frame of the project "IntelliGent Oceanographically-based short-term fishery FORecastIng applicaTions" (GOFORIT), funded by the Romanian Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI Contract no. 27/2015) through the ERA-COFASP Programme.

Key Words: forecast, sensitivity analysis, correlation, recruitment (R), spawning stock biomass (SSB)

P.3.13. METAL LEVELS IN CARIDEAN SHRIMP SPECIES FROM THE SOUTHERN BLACK SEA

Levent Bat*, Murat Sezgin, Fatih Şahin

University of Sinop, Fisheries Faculty, Department of Hydrobiology, TR57000 Sinop, Turkey

**E-mail: leventbat@gmail.com*

In the present study, accumulation levels of non-essential and essential metals in edible tissues of three commercial caridean shrimp species namely *Crangon*

crangon (Linnaeus, 1758), *Palaemon adspersus* Rathke, 1837 and *Paleomon serratus* (Pennant, 1777) from the Sinop Peninsula of the Black Sea were investigated. Mercury, cadmium, lead, arsenic, copper, zinc and iron concentrations were determined by inductively coupled plasma mass spectrometry (ICP-MS). Hg was not detected in the edible part of all species. There were significant differences in metal amounts among the three shrimp species. Cd and Pb concentrations in the species were the lowest metal levels, while Fe was highest level observed in all shrimps followed by Zn. In general the metal levels in the caridean shrimp species were below the Turkish Food Codex, Commission Regulation (EC) and MAFF allowable limits for human consumption.

Key-Words: *Crangon crangon*, *Palaemon adspersus* and *Paleomon serratus*, Black Sea, metal levels, public health

P.3.14. DESIGN AND DEVELOPMENT OF AN OPEN-SOURCE INFORMATION SYSTEM FOR THE SPREAD OF FRESH WATER FISH FAUNA IN INLAND WATER ECOSYSTEM OF GREECE

K. Panitsidis[1], Z. Andreopoulou[1], A.K. Kokkinakis[2]*, I. Gitas[3]

[1]Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Forest Informatics, 54124 Thessaloniki, Greece
[2]Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Wild Life and Freshwater Fisheries, P.O. Box. 241, Thessaloniki, Greece
[3]Aristotle University of Thessaloniki, School of Forestry and Natural Environment, Laboratory of Forest Management and Remote Sensing, 54124 Thessaloniki, Greece
**E-mail: akokkin@for.auth.gr*

This paper describes the design and development of an open-source information system about displaying the spread of fresh water fish fauna in inland water ecosystems in Greece. The individual technical tasks for creating the online geographic information system was: a) the design of the geographic data portal, b) the data display and, c) the dissemination of information on the internet. The sources of the spatial data used for the information system was from the Ministry of Environment & Energy. Those spatial data files was developed as part of the project "Surveillance and Assessment of the Conservation Status of Community Species of Interest in Greece" (STUDY 6). The creation of species range files was based on existing data and information related to knowledge and understanding of the natural history and ecology of the fresh water fish species in Greece. The application is based on the Map

Server API which is an open source server. According to this, Geoserver software is responsible for the management of cartographic data both at baseline and cartographic level. The programming languages that used for the development was JavaScript scripting language which is suitable for creating interactive webpages. Finally, the integration of spatial data was made by PostgreSQL which is a powerful system for managing relational databases. The main advantage is the compatibility, it constitutes a web application which can be easily expanded to record all fauna's species and types of habitats in Greece. It addresses to simple users which will have the opportunity to gain information, print and explore the range of fresh water fish fauna over the map. Finally the application will be used for environmental projects and reference for research institutes, authorities and organizations dealing with environmental issues and fishery management on similar ecosystems or wetlands.

Key-Words: information system, open source, environmental data, fresh water fish fauna, inland water ecosystems, Greece

P.3.15. DYNAMICS OF MIGRATORY SPAWNING ADULT SHADS IN DANUBE ARMS AND DRIFTING LARVAES TO THE BLACK SEA IN THE LAST COUPLE OF DECADES

Aurel Năstase*, Ion Năvodaru, Irina Cernişencu, George Ţiganov

Danube Delta National Institute for Research and Development,
165 Babadag st, Tulcea, Romania
**E-mail: aurel.nastase@ddni.ro*

The genus *Alosa* (shads) is present only in the northern hemisphere of the earth. Four species exist in North America and others five are found in Europe, one with uncertain status (*Alosa maeotica* - Black Sea shad) and two of this *Alosa immaculata* and *Alosa tanaica* are part of fish fauna from Ponto-Danube basin. Last two species are migratory anadromous species spawning adults go up into Danube River to km. 863 for *A. immaculata* or less, even in adjacent lakes for *A. tanaica*. Environmental conditions from last 20 years favoured a spawning adults start migration earlier in February than the period before this 20 years when ussually migration started in March, also last decades has top migration in April and to the end of May not motivated fishermen to capture shads. As a main causes is increased temperature with 1-2 °C. Regarding drifting larvaes to the sea can assimilate relative abundance

expressed in Catch per Unit Effort (CPUE) of a Larvae Abundance Index (LAI), or "number of shad larvae per 100 cubic meters of filtered water" (larvae /100 m^3) it can analyse the trend in time shad spawning success. Mention is that LAI is different from Juvenile Abundance Index (JAI), which analyses juveniles (age 0+) and which would provide indicative information on the size of future migratory stocks of shads. The analysis of the ten years of larvae drifting shows that the average annual LAI vary within wide limits (2-1,252 larvae /100 m^3) and reproduction in 2017, with an average of 17 larvae/100 m^3 was ranked in line with regular reproductive success, except 1997, of the analysed data series.

Key-Words: Alosae, migration, larvae, adults, Danube

P.3.16. PARAMETERS IN NILE TILAPIA (*Oreochromis niloticus* L.) EXPERIMENTALLY INFECTED WITH *Edwardsiella tarda*

Sertel F. Seçer*, H. Yavuzcan

Ankara University Faculty of Agriculture Department of Fisheries and Aquaculture
**E-mail: sertelsecer@yahoo.com*

In this study, the effects of sublethal nitrite and ammonia on experimentally infected Nile Tilapia's haematological, immunological parameters and meat quality parameters have been investigated. The groups were K: control group, A: ammonia exposed group, AB: infected with *E.tarda* and exposed to ammonia and Group B: infected with *E.tarda*. The LC_{50} value of ammonia and *E.tarda* (ATCC15947) were determined as 1.304 and $1.2x10^7$ respectively. There was a significant decrease in RBC in B on day 7 ($p<0.05$). The erythrocyte sedimentation rate, haematocrit, haemoglobin, MCV and MCH were significantly decreased in AB. WBC increased significantly ($p<0.05$), as did ammonia, plasma lysozyme activity, phagocytosis of the head kidney macrophages, respiratory burst activities and plasma glucose concentration in Group AB was higher than those in Group K. There was slightly higher mean values of plasma lactate and PLT in AB than in K, although they weren't statistical significance ($p>0.05$). In conclusion the results from this study suggest that sublethal concentration of ammonia with bacterial infection have some degree of influence on the hematological, immunological characteristics and meat quality of Nile Tilapia.

Key-Words: *Edwardsiella tarda*, Nile Tilapia, *Oreochromis niloticus*, sublethal ammonia, hematology, immunology

P.3.17. DYNAMICS OF THE FISHING EFFORT RECORDED FOR RAPA WHELK (*Rapana venosa*) HARVESTING DURING 2013 - 2016

Cristian Danilov*, Eugen Anton, Valodia Maximov, Alexandru Nicolaev

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., Constanta, Romania
**E-mail: cdanilov@alpha.rmri.ro*

Since 2009, according to the reporting by the economical agents that carry out fishing activities in the Romanian sector of the Black Sea, catches of *Rapana venosa* resulting from manual harvesting with divers in the southern coast, on rocky facies, started to be recorded. The amounts of rapa whelk harvested by divers have risen steadily from year to year, from 2 tons in 2009 to 588 tons in 2012. Starting with 2013, with the legalization of the use of the beam trawl gear (towed filtering fishing gear), the harvested amounts of rapa whelk have increased substantially. In this situation, the manual harvesting of the gastropod from the rocky facies was joined by the mechanized exploitation with the beam trawl on sandy facies. Under these combined exploitation conditions, the amounts of rapa whelk recorded in 2016 reached 6,500 t, 11 times higher than the quantity harvested in 2012 (588 t). The achievement of these catches was facilitated both by the increase in fishing capacities (vessels boats, etc.) specialized for practicing such activities, as well as the progressive and parallel increase of the fishing effort (fishing days).
Key-Words: Black Sea, fishing effort, fishing capacity, beam trawl, rapa whelk

P.3.18. DETERMINATION OF THE EFFECTIVENESS OF PINGER DEVICES BY TERRESTRIAL OBSERVATIONS

Sedat GÖNENER, Uğur ÖZSANDIKÇI*

[1]Sinop University, Akliman mevkii, Sinop University, Faculty of Fisheries, 57000, Sinop, TURKEY
**E-mail: ozsandikciugur@gmail.com*

The study was carried out in Sinop, Karakum region between 16 July - 22 October 2016. Data file related to densest points of harbour porpoises (*Phocoena phocoena relicta*) sighted in preliminary observation period which was performed before study, was transferred to geographic information system (GIS) and median point of those pre-sightings were determined. In control period, a floater was placed in median point and sightings were

carried out during 26 days (53.2 hour) in control period. Subsequently, pinger was placed on a floater and 28 days (58 hour) of experiment period was performed. During the study, average distances, closest observed approaches (COA) and frequency of porpoise sightings in zone of vulnerability, a 100m buffer around the floater have been calculated and compared between two periods. According to this, average distance in control period increased from 775,35 ± 38,96 m to 1536,05 ± 81,33 m in experiment period ($p<0,05$). Distances of COA were calculated for control and experiment periods respectively, 443,86 ± 94,18 m and 724,34 ± 98,89 m. Porpoises entered the zone of vulnerability were significantly more frequently in the control period compared to experiment period ($p<0.05$). Furthermore, when the change of average distances in experiment period compared to elapsed time, the correlation coefficient of the relationship was found to be -0.837 ($p <0.01$). Pingers used in the study was found to be effective on keeping porpoises away from the area. However, there is still robust suspicions about habitutaion effect can be revealed depending long-term use of these devices.

Key-Words: Behaviour, pinger, by-catch, harbour porpoise, Black Sea

P.3.19. ESTIMATION OF THE GROWTH AND POPULATION PARAMETERS OF THE INVASIVE RAPA WHELK (Rapana venosa) BY THE BHATTACHARYA METHOD IN THE WESTERN BLACK SEA

Süleyman Özdemir[1], Uğur Özsandıkçı[1]*, Ferhat Büyükdeveci[2], Baykal Arıdeniz[2], Zekiye Birinci Özdemir[1], Ercan Erdem[3]

[1]Sinop University, Faculty of Fisheries, 57000, Akliman, Sinop, Turkey
[2]Sinop University, Science Institue, 57000, Osmaniye, Sinop, Turkey
[3]Ministiry of Food, Agriculture and Livestock, 06060, Ankara, Turkey
**E-mail: ozsandikciugur@gmail.com*

Growth parameters and population characteristics of the invasive veined rapa whelk (Rapana venosa) in the Black sea was estimated by the bhattacharya method in the study. Veined rapa whelk (Gastropoda:Muricidae) is the target species of the dredge fishery in the Black Sea coasts of the Turkey. The samples were collected seasonally from the western Black Sea of Turkey in 2013. Empirical dredge was used 3 m in length and 40 cm in height, with a 100 cm in cod-end length, 72 mm mesh sized codend and 36 mm cover-codend. Dredges were towed 30 minutes and towing speed of approximately 1.5-2.0 knots. A total 12 tows were performed at a mean depth of 15 meters

(10-30 m). Shell length were measured with a vernier caliper to the nearest 0.01 mm and total weight and body weight were weighted to the nearest 0.01 g. Growth parameters of veined rapa whelk were estimated to 767 samples after determined the cohorts by the "Bhattacharya" method in this study. Five year classes were distinguished and using the corresponding lengths of these, von Bertalanffy growth and the some population parameters were found to be $L\infty$=131.81 mm, K=0.20, to= -0.92 and Z=0.90 , M=0.53, F=0.37, E=0.41, respectively. This study presents the first data on growth parameters and population characteristics of the veined rapa whelk (Rapana venosa) from western Black Sea coasts of Turkey.End of abstract text

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Key-Words: invasive species, rapa whelk (*rapana venosa*), growth, population, Black Sea

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P.4.1. STUDY OF THE MARITIME SPATIAL PLANNING – INDICATORS - AS A TOOL TO SUPPORT BLUE GROWTH

Daniel Nigohosyan*, Aneta Kovacheva

ECORYS, Rue Belliard 12, 1040 Brussels, www.ecorys.eu,
**E-mail: Daniel.Nigohosyan@ecorys.com*

The main objective of the paper is to show how indicators can support the MSP process and how can be used in a smart way in relation to Blue Growth. It is presented an indicative list and an initial concept of MSP indicators for Blue Growth discussed at the Member States Expert Group (Malta, June 2017). It has been developed as a part of the Technical study on Maritime Spatial Planning for Blue Growth, commissioned by DG MARE in 2017.

One of this study objectives is to define the set of possible indicators, which capture to what extent MSP processes, resulting plans, and the impact of these plans have been able to reach their given objectives in relation to promoting Blue Growth. The literature offers many suggestions for these indicators, but only a few of them have a spatial element. An initial suggestion on the overall structure of the suggested MSP-Blue Growth indicators, which links the levels and MSP dimensions of indicators is presented. This paper focuses on the indicators which are considered to be under the control of MSP authorities, i.e. inputs/processes, outputs, and partially outcomes, additional ecological indicators.

From the beginning there are highlighted the limitations to indicators, particularly in the MSP context:

- Indicators are just one small part of a very complex MSP decision-making system: they are meant to support decision-making and should not become an end in themselves, or simply a policy "*accessory*" with no added value;
- Indicators should be customised to the specific MS needs because each country has different situation in terms of maritime spatial planning needs and cycle, therefore indicators offer support to MSP authorities if interpreted against agreed country-specific objectives and targets (e.g. level of involving stakeholders or neighbouring countries in planning process);
- Thus MSP indicators are not tools for external evaluation: instead, the main objective of the indicators developed under the study is to provide

MSP authorities with a tool for '*self-assessment*' of the extent to which their objectives are achieved;

- In addition, MSP indicators should not be used for cross-country comparisons: indicators are useful as a decision-making support tool, but considering that they should be country specific, they are not meant to provide comparisons between countries on their progress in implementing MSP.

As regards MSP dimensions (Ehler 2014), they can be organised into three types: MSP process (following key MSP stages), socio-economic (reflecting socio-economic benefits of human activities), and ecological indicators (monitoring key characteristics of the marine environment).

Key-Words: Marine Spatial Planning, MSP visions, Blue Growth, MSP indicators, MSP methodology, www.ecorys.eu, EU-MSP Platform (http://www.msp-platform.eu/),

P.4.2. PRESSURES FROM LAND-BASED SOURCES - ROMANIAN BLACK SEA-EUTROPHICATION AND CONTAMINANTS

Luminița Lazăr*, Andra Oros, Valentina Coatu, Nicoleta Damir, Laura Boicenco

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: llazar@alpha.rmri.ro*

The aim of the study was to identify the main land-based pressures at the Romanian Black Sea littoral and to apply the DPSIR methodology to analyse them for the development of pressures indicators for eutrophication and contaminants. Thus, in addition to the major pressure exerted by the Danube, the main anthropogenic pressures identified in the Romanian coastal zone come from the development of many socio-economic activities in the area. The main sources of pollution are concentrated in the central-southern part of the littoral, an area where the main urban agglomerations and the related municipal and industrial activities are located. The comparative analysis of the Danube and other land-based sources (hot spots) flows shows that the aggregate flows of the municipal and industrial sources represent 0.04% of the total discharged in the Black Sea while the Danube flow, 99.96%. However, due to significantly different emissions and concentrations it is very important to quantify the local effect of the municipal and industrial sources on the Romanian coastal area. In the neighbourhood of the land-based sources there

is a risk of not achieving good environmental status (GES) for eutrophication and contaminants due to the pressures from ports (Midia, Constanţa Sud, Mangalia), wastewater discharges in the shallow waters (Gura Buhaz, Eforie Sud) and in the marine area in front of the Danube's mouths (Sulina, Mila 9, Sf. Gheorghe). Increased bioaccumulation was usually observed in the areas under the anthropogenic impact.

Acknowledgement: This study has is related with MARSPLAN-BS Project - Cross border maritime spatial planning in the Black Sea - Romania and Bulgaria (EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1)

Key-Words: marine pollution, anthropogenic impact, bioaccumulation

P.4.3. ASSESSMENT OF THE ROMANIAN LITTORAL SHORELINE CHANGES IN THE LAST TEN YEARS (2007 - 2017). THE CONTEXT OF NEW COASTAL PROTECTION SCHEMES SIGNIFICANT FOR MSP

Răzvan Mateescu[1]*, Dănuţ Diaconeasa[1], Dragoş Niculescu[1,2], Elena Vlăsceanu[2,3]

[1]NIMRD "Grigore Antipa" 300 Mamaia Blvd., 900581, Constanţa, Romania
[2]University of Galati „Dunarea de Jos", Department of Mechancal Engineering, 111 Domneasca Street, Galati, Romania
[3]Maritime University of Constanta, 104 Mircea Cel Batran Street, 900663, Constanţa, Romania
**E-mail: rmateescu@alpha.rmri.ro*

Romanian littoral is in the present an area of intense erosion in continuation of an extended inland arrangement and maritime port ports construction on the shore. The process has different intensities on the two littoral units of Romanian shore.

The present work will presents the assessment of shoreline changes based of precise GPS measurements in combination with digital mapping informatics systems (ArcGIS), thus it will be emphasized the general state of the shore vulnerability and the needs for differentiate intervention for northern and southern sectors of the Romanian shore.

In this general context will be approached the two beach touristic areas of Mamaia and Eforie, represented by two narrow stretch of sand barrier islands that sits between the Black Sea and Sutghiol Lake, and respectively Techirghiol Lake. The similarities and differences will be emphasized as a

grounding research of the complex calculations for implementation a two protection schemes including large sand nourishments, designed to compensate the shoreline retreat due to Midia and respective Constanta ports extension. For both cases the natural sediment drift has been blocked, thus, the beaches of Mamaia Bay and Eforie Bay, were strongly affected by erosion.
The purpose of the study is to evaluate the general state of the Romanian coast and the effectiveness of the new designed protection schemes, after the new equilibrium stage after construction. The complex assessment includes GPS and UAV measurement, GIS and numerical modeling approach on different of the artificial nourishment evolution in the wave climate of two-year post-execution time interval.
For the simulation, the shore response to wave and the currents processes along the shoreline the several models were used, and the results of calculations are presented against in situ measurements. New aerial remote sensing/ UAV technology, used for change detection and rapid mapping within the target zone for better evaluation of the evolution and trends of the shoreline position at different marine hydrological events.
Acknowledgement: This study is related with MARSPLAN-BS Project - Cross border maritime spatial planning in the Black Sea - Romania and Bulgaria (EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1)
Key-Words: Romanian shore, shoreline changes, costal protection, coastal GPS monitoring, UAV

P.4.4. MARITIME SPATIAL PLANNING FOCAL POINT FOR THE BLACK SEA UNDER *EU MSP PLATFORM*

Laura Alexandrov*, Alina Spînu, Magda Nenciu, Elena Vlăsceanu, Tania Zaharia, Mariana Golumbeanu, Dragoș Niculescu, Mădălina Roșca

NIMRD -National Institute for Marine Research and Development "G.Antipa" Costanta, Mamaia Blv. 300, Constanta, Romania
**E-mail: laurenta05@yahoo.com*

During 2016 - 2017 NIMRD "G.Antipa" have been involved in the European PLATFORM MSP activity, as partner of DG MARE/2014/23 Project, *Assistance in MSP,* providing information about Maritime Spatial Planning in Romania and Black Sea Basin (http://www.msp-platform.eu/).
- Under this project umbrella NIMRD was nominated and has developed an activity as MSP Focal Point for Black Sea Basin;
- NIMRD has contributed to the elaboration of MSP Country Fiche, Black Sea Fishe, Romanian MSP Projects Fishes, MSP Practices and other inventories,

with MSP significance (e.g. MSP conferences, workshops, meetings, trainings, etc.);

- NIMRD has spread EU-MSP Platform information and experience at international (European and Black Sea countries) and at national level (national, regional, local level and different through professional communities);

- NIMRD contributed to the study dedicated to "*Evaluation of data and knowledge gaps to implement MSP*" (MSP Data Study) elaborated by EU-MSP Platform team, aiming to provide administrative and technical assistance for the Directive 2014/89/EU, by:

  - Analyse, per Sea Basin, of the data for MSP purposes, actually use, technical and political issues concerning data accessibility and availability;
  - Delivering a basis for common knowledge across Sea Basins, providing Member States experiences and any innovations e;
  - Considering the existing data collection mechanisms, data products and metadata from diverse sources in an uniform way through the European Marine Observation and Data Network (EMODnet), potential EMODnet sea basin portals helping MSP coordination at regional level;
  - Evaluating the potential revisions according INSPIRE specifications for MSP purposes;

- NIMRD started to prepare a Romanian MSP Data Base;

- NIMRD has planned the infrastructure development for MSP Focal Point Development, to have a MSP site and GIS MSP Portal to an active contribution on EU MSP Platform and Romanian MSP Authority;

- NIMRD was involved in the European MSP Platform events, which elaborated MSP programs and documents for MSP Members States Experts Group.

European MSP Platform contribution to the EU/89/89 Directive implementation, can be evaluated also, through:

- *authorities-stakeholders common work, based on understanding of the complex MSP processes,*

- *timescale requiring constraints and opportunities of collaboration within and across borders,*

- *growing complexity of the environmental policy,*

- *flexibility of the institutions in terms of opening up to new issues and partnerships,*

- *stakeholders' involvement with their knowledge as legitimate partners in MSP processes.*

Involved in all of these, NIMRD certainly has answered to these requirements and has contributed on MSP Development in Romania and Black Sea Basin level.

Key-Words: Marine Spatial Planning, EU-MSP Platform (http://www.msp-platform.eu/), Black Sea, MSP Focal Point

P.4.5. THE PRINCIPLES OF SUSTAINABILITY ON THE PROCESS OF SITE SELECTION AND ALLOCATION ZONES FOR AQUACULTURE IN ROMANIA

Tania Zaharia*, Victor Niță, Alina Spînu, Magda Nenciu

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: tzaharia@alpha.rmri.ro*

Nowadays, over 70,000 ha are used in Romania as fishponds and represent a great advantage for the development of aquaculture in Romania. In order to increase the productivity of the fish farms, most of them will be modernized. Particular attention will be directed to the trout culture in mountain areas, to increase the income of local people. In order to assess the real potential of this sector in Romania, the National Agency for Fishing and Aquaculture, together with other competent public services and administrations, will examine all sites proposed for aquaculture (land and water) and will decide on the type of aquaculture and breeding system to be promoted. A relevant Master Plan will then be produced for sustainable development over the next 20 years. This plan will also take into account other factors, like: collective requests for sanitary measures, high quality fingerlings production, and possibility for local fodder processing (imported at the moment, for intensive aquaculture), improved energy use etc. In this context, the present paper tries to underline the importance of integrating aquaculture into Spatial Planning in Romania, presenting step-by-step the requirements for this integration.

Acknowledgement: This study has been carried out with financial support from the PROMARE Nucleus Programme, funded by the Ministry of Research and Innovation (project no. PN16230301) and project ECOAST "New methodologies for an ecosystem approach to spatial and temporal management of fisheries and aquaculture in coastal area", funded by the ERA NET (COFASP).

Key-Words: aquaculture, Spatial Planning, site selection, allocation zones for aquaculture

P.4.6. MARINE FISHERIES UNDER THE MARITIME SPATIAL PLANNING FRAMEWORK IN ROMANIA

Gheorghe Radu*, Maria Yankova, Laura Alexandrov, Tania Zaharia, Alina Spînu, Alexandru Nicolaev, Aurelia Țoțoiu

NIMRD National Institute for Marine Research and Development "G.Antipa" Costanta, Mamaia Blvd. 300, Constanta, Romania
**E-mail: gradu@alpha.rmri.ro*

Marine fish populations are common natural resources for the Black Sea countries. The marine fishery was most affected sector by the dramatic changes produced last decades in the Black Sea ecosystem, due to: 1) free access to the resources and management system individually applied by each Black Sea country, 2) over-fishing and illegal fishing, 3) utilization of the destructive fishing tools and techniques, 4) climate changes.

There are some main problems and interrelation in the Black Sea fisheries, such as: 1) Decline of Black Sea natural resources, 2) Slow development of a regional fisheries management system, 3) Incompatible national practices, 3) Not enough co-operation between Black Sea riparian countries for knowledge and rational management in compliance with the principles of Code of Conduct for a responsible fishing, 4) Fisheries regulatory framework promoted only for migratory species at regional level, not for all species, 5) Increasing of fishing effort in spite of evident decline of fish stocks, 6) Efforts for fishing strategies development according to the environment protection and ecosystem approach implementing.

Our Study Case includes spatial maps of the main important features of marine fisheries adding:

- Inventory of the Black Sea fisheries, national strategy, policy, planning, priorities, laws,
- Current situation of Romania and Bulgaria marine fisheries and space,
- Suitability of spatial planning to regulate fisheries
- Legal frame proposed for integrating marine fisheries into spatial planning
- Methods for Fisheries and Maritime Spatial Planning
- Lesson Learnt

Extremely important information, conclusions and recommendations resulted about a sustainable management of Romania and Bulgaria fisheries under spatial planning and transboundary approach and but also for the whole sea basin, knowing that fish stocks are common exploitable natural resources by all Black Sea countries.

Aknowledgement: This work has been supported by MARSPLAN-BS Project - Cross border maritime spatial planning in the Black Sea - Romania and Bulgaria (EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1).
Keywords: marine fisheries and aquaculture, maritime spatial planning, Black Sea, fish stocks and tools

P.4.7. LAND - SEA INTERACTION IN THE EFORIE CASE STUDY

Alina Daiana Spînu[1]*, Laura Alexandrov[1], Luminița Lazăr[1], Victor Niță[1], Iulian Nichersu[2], Eugenia Marin[2], Florentina Șela[2], Elena Vlăsceanu[1], Mădălina Roșca[1]

[1]National Institute for Marine Research and Development „Grigore Antipa", Constanta, Romania
[2] Danube Delta National Institute for Research and Development, Tulcea
**E-mail: aspinu@alpha.rmri.ro*

Eforie-North-Eforie South is a complex area, with hight touristic potential and natural values which has contributed to the development of important tourist resorts. In the north part of Eforie North sector is developed the South sector of Constanta Port, the Danube-Black Sea Channel; in the southern vicinity is the only salty coastal lake, Tekirghiol enlarging the international significance for tourism. Eforie-North-Eforie South is a complex area, with high touristic potential and natural values which have contributed to the development of important tourist resorts. In the north part of Eforie North sector is developed the South sector of Constanta Port. The Eforie Case Study aimed to follow the land-sea interactions with a special focus on coastal erosion. The study is challenging to emphasize the interactions, conflicts and impacts between stakeholders and uses, both terrestrial and marine domain paying particular attention to – identification of main uses and natural risk (e.g. coastal erosion) and their impacts on the natural, social and economic environment (ex. urban and port development tourism), stakeholder involvement, recommendation and solution for key issues and conflict resolution. One workshop was organise in Eforie in order to bring together all parties to collect information and understand local wishes and interests through Sketch Match method. The Sketch Match is a method that identify and visualize potential development paths facilitating the decision-making process for managers, policymakers and local stakeholders. General objective was to elaborate development plans on Eforie North and South marine and coastal sector, evidencing potential

solutions for integrating protective measures of coastal areas in the context of Maritime Spatial Planning. It was given particular attention on the local economy and on natural resources access. The elaborated Study Case Eforie integrated chapters and information including: 1) general features of the area, 2) built environment, 3) functional–spatial zoning and decision making, 4) socio-demographic processes and economic aspects, 5) quality of environment, 6) pressures on marine environment and possible polluted areas, 7) research and development, 8) analysis of spatial context, etc.

Acknowledgement: This work has been supported by the European Commission through the European Maritime and Fisheries Fund, grand No. EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1 /BLACK SEA/MARSPLAN-BS.

Key-Words: Eforie, land-sea interaction, GIS, Sketch Match, stakeholders

P.4.8. NEW METHODOLOGIES FOR TEMPORAL AND SPATIAL ANALYSES OF FISH STOCKS AT THE ROMANIAN BLACK SEA COAST

Laura Alexandrov*, Simion Nicolaev, Gheorghe Radu, Eugen Anton, Alina Spînu, Dragoş Niculescu, Alexandru Nicolaev, Gheorghe Sîrbu, Mădălina Roşca, Adrian Filimon, Cristian Danilov, Victor Niță

NIMRD -National Institute for Marine Research and Development "G. Antipa" Costanta, Mamaia Blv.300, Constanta, Romania
**E-mail: laurenta05@yahoo.com*

As Member State, Romania has to implement all EU Directives regarding marine space and resources, including Maritime Spatial Planning Directive (24/89/EU) and it's specifically MSP tools, practices, scenarios, vision and management. The ECOAST Project, ERA NET: COFASP, permited to apply at the Romanian Black Sea Coast new methodologies for an ecosystem approach, fisheries and aquaculture management and stategies at regional level, based on temporal and spatial analyses. The Study Case regarding the Black Sea fish stocks have been elaborated, taking into account the Romanian coast specifical natural and anthropogenic features:

- Not many activities carried out on sea space, Romanian EEZ, comparing other EU seas and coasts, due to geographical and climate instability (temperatures, salinity, density extremes), strong winds and waves, coastal erosion, continental floods and freshening impact.

- Coastal and Danube pressures, demography development and maritime activities effects on the marine environment.
- The existence of ones of the most valuable marine species like sturgeons, flatfish, shads, mullets and results obtained during 40 years of fish stocks monitoring, deserve more attention and support for a good management of the natural resources of the Black Sea.

Based on up-dated geographical coordinates have been elaborated maps for the main maritime activities related maritime activities (tourism, navigation, oil and gas extraction and transport, artificial reefs, etc.), marine protected areas, natural resources, fisheries and their locations, different tools, distance from shore (ports) for scientifical services activities, feeding, stocking, maritime traffic etc.Matrix for interconnection and conflicts evaluation have been developed and analysed. For the aquaculture ECOAST project proposed the main objectives linked with new methods based on ecological footprints, spatial assessment of compatibility between fisheries, aquaculture and other human activities. In the frame of these objectives our contribution has been focused on cumulative impact and complex sampling and analyse of water, sediments and biota from the only marine farm MARICULTURE.S.A. Operational modelling framework for stakeholders' behaviour analyse have been also introduced based on INVEST METHOD. Concluding, Romania translated the EU experience from the Mediterranean Sea, Baltic Sea, Norwegian Fjords and NE Atlantic Coasts to the Black Sea.

Key-Words: marine fisheries and aquaculture, spatial and temporal planning, conflicts evaluation, GIS, GRID, DISPLACE

P.4.9. METHODOLOGY MSP AS SUPPORT FOR MSP TRANSBOUNDARY APPROACH ON SHABLA-MANGALIA AREAS

Constantin Chifelea*, Antonio Tache

URBAN - INCERC, Soseaua Pantelimon, nr. 266, 021652, Sector 2, Bucuresti
E-mail: constantinchifelea@yahoo.ro

To develop the spatial planning methodology and to collect the most relevant data, MARSPLAN Project partners actioned on the basis of a common reliable methodology. This study and result has been used in the process of integration with spatial planning tools (such as participatory and designing tools) in order to get scenarios that finally lead to a complete and integrated spatial planning methodology. Because of itscoastal zone, including Danube Delta and the significant tourism and urban - harbours areas and very

important natural, cultural and economic patrimony in continuous change, this project has finalized main future directionsof development, according to the specifications from the spatial planning methodology. Two lists of the main important chapters and approaches were planned and also one of the most important, selected indicators. The MSP methodology elaborated has been used in order to have a unitary approach towards the data collection and analysis and to realise the spatial plan for selected cross-border area Shabla-Mangalia. Four alternative scenarios for the development and respective spatial use of the sea were elaborated in the framework of the MSP, in order to identify the possible maritime spatial development options (alternatives), to perform their strategic assessment and as a result to arrive at an optimal solution for permitted uses of the sea that would be acceptable to different groups of stakeholders. Scenario-building was based on identification of possible development directions (axes) according to the determining factors (driving forces) that affect the marine resources, spatial use and the situation in maritime sectors. Different policy and societal priorities are the possible confronting choices for the development. On the vertical axis, the development is confronted by accounting for local interests and the Black Sea countries and/or EU interests. While the economic (free trade market, profit, competition) and environmental (state of environment, climate change) interests are underlined on the horizontal axis. Depending on the evolution of the determining factors in connection with the policy and societal choices, four distinct development scenarios are identified. Scenarios show radically different alternative development options, which could be realised by choosing one or another policy priority. However, it shall be taken into account that in the real life different policy priorities are usually balanced, therefore such radical scenarios would not be possible.

Key-Words: maritime spatial planning, MSP Methodology, transboundary approach, Black Sea, Romania sea space, Bulgaria sea space, maritime activities, MSP scenarios.

P.4.10. *Rapana venosa* - NEW EXPLOITABLE RESOURCE AT THE ROMANIAN BLACK SEA COAST

Cristian-Sorin Danilov*, Aurelia Țoțoiu, Eugen Anton, Magda Nenciu, Valodia Maximov

National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: cdanilov@alpha.rmri.ro*

Starting with 2009, Romanian Black Sea fishery catches have recorded an increasing trend. Yet, this is not the consequence of a massive restoration of fish stocks or an increase of fishing effort, but the result of shifting the target species. The invasive gastropod *Rapana venosa* (Valenciennes, 1846) has raised the interest of economic operators due to its low exploitation costs compared to other valuable species (turbot, for instance). At the Romanian coast, fishing for *R. Venosa* was first performed only using divers, because this is a method which provide shigh selectivity of the catche sand protection of habitats. Starting with 2013, beam trawls were legalized and started to be used (Order no. 1696 of 11.07.2013, Order no. 400 of 2013). After the legalization of the beam trawl, the catch increased 2.27 times compared to 2012 (from 588 t in 2012 to 1,338 tonnes in 2013), the TAC being carried out at a rate of 23.5%. Many commercial companies in the field have shifted their business towards purchasing or manufacturing this type of gear, corresponding to their vessel capacity. From the selectivity point of view, the gear used for rapa whelk fishing (beam trawl) does not retainim matures pecimens of *R. Venosa* and no juvenile fish belong in gtocertain demersal fishs pecies (gobies, redmullet, whiting). Yet, ther eis some concern on the potential effects of beam trawl on theseabed, which should be investigated in thefuture. Also, as a consequence of exploitation, the drop of *R. venosa* populations was acknowledged, which requires future research meant to determine the actual stock size and total allowable catch (TAC), aiming at underpinning the rapa whelk fisheries on a scientific background and to reconcile these economically valuable activities for coastal communities with nature conservation.

Acknowledgement: This study is related with MARSPLAN-BS Project - Cross border maritime spatial planning in the Black Sea - Romania and Bulgaria (EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1)

Key-Words: rapa whelk, invasive species, resource, beam trawl, catches

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P.5.1. COMPOSITION AND SPATIAL DISTRIBUTION OF MARINE LITTER ALONG THE ROMANIAN BLACK SEA COAST

Angelica Paiu*, Mihaela Mirea Cândea, Marian Paiu, Anca-Maria Gheorghe

Mare Nostrum NGO, Bvd. 1 Decembrie 1918 no. 3, 900711, Constantza, Romania
**E-mail: angelica_iosif@marenostrum.ro*

During the last years, marine pollution with anthropogenic litter has become a worldwide major environmental concern that has no simple solution. Black Sea Romanian coast is also affected by marine debris and thus, Mare Nostrum NGO started in 2014 to apply, each year, the beach litter monitoring methodology included in "The Guidance on Monitoring of Marine Litter in European Seas", a guidance document within the Common Implementation Strategy for Marine Strategy Framework Directive, covering Romania's compulsoriness to monitor Descriptor 10 – Marine Litter for beaches. The surveys covered 8 sectors, totaling 41547 m^2 of beach. Marine litter was classified in 8 categories and 157 types. The results exhibited predominance of artificial polymer materials (80.6%); the most common litter found on the Romanian beaches was the cigarettes butts, reaching 18 836 items. Marine debris left on beaches for a long time is a danger to birds and other animals that can ingest them. Moreover, there is a risk that their decomposition will release harmful pollutants to human health; litter as syringes, diapers, pads are carriers of pathogens. Unless appropriate measures are undertaken to address this problem, the abundance of marine litter in the area is likely to increase.

Key-Words: Romanian Black Sea coast, marine litter, beach monitoring, MSFD

P.5.2. MONITORING OF MARINE BEACH AND RIVERINE FLOATING LITTER WITHIN GEORGIAN BLACK SEA COASTAL AREA

N. Machitadze[1]*, N. Gelashvili[1], V. Gvakharia[1], K. Bilashvili[2], V. Trapaidze[2], N. Gaprindashvili[3], A. Maghlakelidze[3]

[1]Iv. Javakhishvili Tbilisi State University Al. Janelidze Institute of Geology
[2]Iv. Javakhishvili Tbilisi State University, [3]Scientific Research Firm GAMMA
**E-mail: ninomachitadze@gamma.ge*

In June 2014 the EU-Georgia Association Agreement (AA) including Deep and Comprehensive Free Trade Area (DCFTA) was signed signifying a totally new stage of country development, since this document set up numerous rather

strict policy guidelines following which "Georgia commits itself to gradual establishment of the European political, economic, social and legislative standards" (ASSOCIATION AGREEMENT 2014, Georgia's Progress Report 2014) Environmental issues play a prominent role in this document prompting the Ministry of Environment and Natural Resources of Georgia to develop "Roadmaps for EU approximation and climate action fields" in June 2015 (Roadmaps for EU 2015). Nine sector-specific roadmaps have been produced, including (3) Water quality and water resources management (including marine environment, but excluding drinking water). Out of 27 activities outlined in this roadmap, five are directly connected to marine environmental problems, most of them basing on Marine Strategy Framework Directive (MSFD) principles. An article deals with analysis of the results of expeditions conducted in Georgia regarding the Descriptor 10 - Marine litter (beach and floating) within local and international projects during the last years (2015-2017), in particular:

- Observations of marine floating litter during the NPMS GE Cruise on RV Mare Nigrum (within EC-UNDP funded project "EMBLASI/II"). Survey results are send to RIMMEL data base, using tablet computer program.
- Beach litter monitoring data collected on previously selected three sections of Georgian coastal zone held on regular base. The monitoring program included research of macro-litter - 2.5 cm large waste. All items in this size category were collected, identified according the "Master List", recorded and filled in proper forms.
- The riverine floating litter monitoring data observed on the most significant four rivers, within studied area, as follow: Rioni, Supsa, Natanebi and Chorokhi. Obtained data was delivered to the RIMMEL data base.

Further field works on the issue will be continued in 2017 later on.

Key-Words: beach litter, floating litter, riverine litter

P.5.3. COASTAL SUSTAINABILITY INDICATORS FOR THE ROMANIAN BLACK SEA COAST

Mariana Golumbeanu[1*], Alina Daiana Spînu[1], Magda Ioana Nenciu[1], Elena Vlăsceanu[1], Mihail Costache[2]

[2]National Institute for Marine Research and Development "Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania

*[2]Romanian Ministry of Waters and Forests, Water Resources Management Directorate, *E-mail: mgolumbeanu@alpha.rmri.ro*

The paper goal is to identify new methods for the elaboration of a set of indicators specific for the coastal zone, as sustainable tools for a comprehensive assessment of the Integrated Coastal Zone Management

(ICZM) in the Romanian coastal area. By considering these factors and using GIS (a mix of hardware and software digital geographical data acquisition system), an integrated evaluation of the Romanian coastal zone is targeted. With regards to Integrated Coastal Zone Management (ICZM), a set of indicators covering the main priority aspects for coastal areas have been developed both for measuring the sustainability of coastal zone development (Area of built-up space in the coastal zone, Areal extent of coastal erosion and instability, Bathing water quality, Sea level rise) and to describe the economy in coastal area (Selection of specific indicators to describe the economy in the coastal area: Added value for each sector, Employment structure, Number of enterprises relevant to ICZM issues, Economic production sector (turnover), Size and density of the population living in the coastal area). The implementation of the project will facilitate the compliance with national and EU legislation requirements concerning ICZM and MSP policies. It will also contribute to: Elaborating methods and identifying the data for the selection of the most appropriate coastal zone indicators; Drawing-up GIS maps and graphic representations of socio-economic indicators in the coastal zone; Defining a set of national indicators aiming at assessing the sustainability of the coastal zone; Acquiring new data in order to enhance the knowledge required for developing spatial policies in the Romanian coastal zone. By developing Romania's competitiveness in the field of using georeferenced digital spatial data, the project will create the background for supporting the sustainable and integrated development of socio-economic activities along the Romanian Black Sea coast.

Acknowledgement: This work has been supported by PROMARE Nucleu Programme, funded by the Romanian National Authority for Scientific Research and Innovation (ANCSI), project no. PN16230402.

Key-Words: Integrated Coastal Zone Management (ICZM), set of indicators, GIS, spatial policies.

P.5.4. ECONOLOGICAL MODEL TO SUSTAINABLE DEVELOPMENT OF THE MARITIME AFFAIRS

F. Nicolae[1]*, Roman[2], A. Cotorcea[1]

[1]*Mircea cel Batran Naval Academy, Constanta, Romania*
[2]*Military Technical Academy, Bucharest, Romania*
**E-mail: nicolae_florin_m@yahoo.com*

The paper shows that sustainable development of society can be achieved only on the basis of a dynamic model that takes into account the components: ecological, technological and economic. This model is a complex form of

deepening the study of economic and ecological phenomena, which is a useful means of predicting future growth and development. Starting from the principles of sustainable development, the authors introduce the concept of econology, a concept that facilitates a multi-dimensional representation from a multiple perspective: economic, ecological and socio-cultural. In the scientific approach undertaken, the term econology is defined through the relations of the 3E (economy-ecology-energy) but not in the sense of multiplication, but of their power, E^3. The authors emphasize econology as a scientific research-development-innovation branch, in terms of the wealth / capital of a community / entity and self-sustainability. It deals with the optimization of pollution prevention and control policies and the specific consumption of natural capital in conditions of economic efficiency and minimization of energy needs. The proposed Econological Model to Sustainable Development is based on established relationships expressed through a system of quantitative, qualitative and structural factors. The paper proposes the recovery and capitalization of recyclable resources, the promotion of conservation and environmental protection solutions that, even if they engage in additional investment costs, will favor medium and long term economic growth on sustainable principles. Based on these considerations, the authors propose to approach maritime business from an econological perspective, as an expression of the application of the ecological economy theory in this field. The case study presented in the paper reflects aspects related to the implementation of the econological model in the shipbuilding. The paper also highlights the need to adapt any sector of economic development to the principles of sustainable development, by transferring knowledge from the convergence zone between the natural-ecological system and the technological system.

Key-Words: sustainable development, econology, maritime affairs, shipbuilding

P.5.5. ENVIRONMENTAL FACTORS AND PROFESSIONAL EMISSIONS INFLUENCE ON THE SHIP CREW MEMBERS

Gabriela Lilios[1*], Manuela Rossemary Apetroaei[2], Ileana Rău[3], Gabriel Marius Apetroaei[2]

[1]*«Ovidius» University of Constanta, Faculty of Pharmacy, 1 Al. Universitatii Street, Campus -Corp B, Constanta, Romania*
[2]*„Mircea cel Bătrân" Naval Academy Constanța, Faculty of Navigation and Naval Management, Constanța, Fulgerului Street No.1, Constanța, Romania,*
[3] *University POLITEHNICA Bucharest, Faculty of Applied Chemistry and Materials Science, Polizu Street No 1, Bucharest, Romania*
**E-mail: liliosgabriela@yahoo.com*

The aim of this paper is to highlight the danger involved by entering in closed spaces on a ship due to the high risk of combustion gases, the absence or lack of oxygen and the presence of benzene or hydrogen sulphide. In these closed spaces of the ship, people of the crew can enter only if they respect by word every and each point of the procedure and the verifying lists, which are used to measure the temperature and the inflammable vapours content. The crew members also should obey to the supporting team and to respect the communication means, the evacuation and first aid procedures. In order to recognize and to uniformize the procedure for entering in closed spaces on a ship the International Maritime Organization (IMO) adopted on 30 November 2011 the „A Resolution" 1050 (27) and its annex „Recomandations for entering in closed spaces on board ships". It is highly important for the crew members to understand the toxicity effects that are induced by their exposure to the danger of closed space. These toxic effects are caused by the emissions concentrations in the closed spaces and by the amount of time that the human body is exposed to them. A drop in the oxygen concentrations from the breathing air, but not less than 16% would result in the paralysis of the locomotor system while an oxygen concentration lower than 10% of the volume would cause the loss of consciousness. The narcosis effects produced by inhaling the gases that come from oil could lead to headaches or eye irritations. Higher concentrations of such gases can provoke paralysis and even, death (for concentrations higher than 2000 ppm and more than 30 minutes exposure). The threshold limit value (TLV) for benzene and aromatic hydrocarbons exposure is only 10 ppm. Hydrogen sulphide is an inflammable gas, extremely toxic that in low concentrations paralyses instantly the olfactory sense. The exposure to hydrogen sulphide at concentrations of 500 – 700 ppm for 15 minutes can cause headaches, swim, while a concentration higher than 700 ppm may provoke instant death.

Key-Words: closed spaces, cytotoxicity, TLV value, board ship

P.5.6. THE IMPACT OF CONTRAST THERAPY WITH TECHIRGHIOL SAPROPELIC MUD ON THE BLOOD ELEMENTS OF THE ELDER PATIENT

L. E. Stanciu[1], C. Oprea[1,3], E. I. Pascu[2], E. V. Ionescu[1,3], E. Circo[3], M. G. Iliescu[3,4]*

[1]Balneal Sanatorium of Techirghiol, Victor Climescu 34-40 street, Techirghiol, Romania
[2]Sanamed Hospital, sect. 2, str. Viitorului nr. 44, Bucharest, Romania
[3]Faculty of Medicine, Ovidius University of Constanta, 1 University Street
[4]Rehabilitation Hospital of Eforie Nord,63-69 Republicii street, Eforie Nord, Romania
**E-mail: iliescumadalina@gmail.com*

The Techirghiol sapropelic mud is one of Romania's best natural therapeutic factors, being deposited at the bottom of the Techirghiol Lake[1]. The study group contained 54 patients (over 50 years old, hospitalized in the *Balnear and Rehabilitation Sanatorium Techirghiol*), being conducted according to the existing scientific legislation. The evaluation of the subjects included determining the blood count (CBC) at the admission and release of the patient. This difference of the hematologic properties is attributed to the reduced concentration of red blood cells (RBC), to the higher proportion of younger RBC and lower proportion of older RBC in the females' blood[2]. Men and women have different average values of hemoglobin in the venous blood – females have an average level of about 12% less than males[3]. There are no significant differences between the male and the female average values of the white cells and thrombocytes variable but there are significant differences in the hemoglobin and erythrocytes average values for males compared to females. The contrast therapy with sapropelic mud from Techirghiol impacts some figurative blood elements, with scientifically significant variations between the values of males compared to females subjects ($p<0,05$). This highlights the impact of this therapy on the anatomy and physiology of the human blood.

Key-Words: sapropelic mud, elder, blood

P.5.7. STATISTICAL VIEW THROUGH BALNEAL ACTIVITY IN TECHIRGHIOL MEDICAL AREA

E. V. Ionescu[1,2], D. Profir[1]O. Surdu[1,2], V. Marin[1], S. Demirgean[1], R.E. Almăşan[1], L.E. Stanciu[1], C. Oprea[1,2], M.G. Iliescu[2,3]*, D.M. Iliescu[2]

[1]Balneal Sanatorium of Techirghiol, Victor Climescu 34-40 street, Techirghiol, Romania
[2]Faculty of Medicine, Ovidius University, 1 University Street, Constanta, Romania
[3]Rehabilitation Hospital of Eforie Nord, 63-69 Republicii Street, Eforie Nord, Romania
**E-mails: iliescumadalina@gmail.com, dan@anatomie.ro*

The lake Techirghiol represents an ancient golf of the Black Sea, with concentrated salted water with good properties for natural treatments. The Balneal and Rehabilitation Sanatorium of Techirghiol (SBRT) gained its fame over the years, due to the great number of patients treated here with natural cure factors – salted water of the lake and sapropelic mud extracted from the lake, associated with marine climatic characteristics in a combined heliomarin and thalasoterapy cures. In SBRT are treated patients with a wide range of diseases, most of them with a osteoarticular and neurological patology, both adults and children. Aims of the Study are: analysis of epidemiological data (gender, age, somatic features), in order to establish the characteristics of the population that benefits from treatment with natural specific factors; to analyze the types of pathology treated in the sanatorium; to determine the addressability of the patients for balneal treatments; to contribute to a common background for research in this field. The study was performed during two years, between May and April, in Balneal and Rehabilitation Sanatorium from Techirghiol. 6281 patients were examined during this study. The patients were admitted for a period of 12 days up to 30 days and they received complex rehabilitation treatment: hydro-kinetic-therapy in the salted water of the pool, alternated with warm mud baths or hot mud wrapping, or cold mud ointment and then swim in the lake, completed with massage, electrotherapy, kinetotherapy. All patients underwent an initial clinical examination and then the physician filled up a questionnaire, which includes personal data, information about the disease requiring admission, if the patient has in the medical history any balneal treatment and what were the results, and finally the group of affections to which fit the existing symptoms. Data from the questionnaires were statistically processed and plotted. The most frequent reason for admission is by far pain of different causes (96%) and only a small number of patients addressed for a functional deficit. The great majority of patients included in the study presented as main symptom lumbar pain, followed by knee pain and cervical pain. Conclusions. Balneal

treatment in marine climatic field with salted water and sapropelic mud results in alleviation of pain in most of the patients, also for an important part of patients contribute to improvement of life quality. We hope that in the future more patients will address to this modern balneal center, due to beneficial effects of sapropelic mud, demonstrated by studies performed by the research center within sanatorium.

Key-Words: balneal, Black Sea, Techirghiol, research

P.5.8. BUTONEUSE FEVER IN DOBROGEA - CLINICO-THERAPEUTICAL ASPECTS

Simona Claudia Cambrea*

Clinic of Infectious Diseases, Faculty of Medicine, Ovidius University, Constanta
**E-mail: cambrea.claudia@gmail.com*

Rickettsia conorii, an organism that is endemic in the Mediterranean basin is the etiologic agent for Boutonneuse fever (BF), also known as Mediterranean spotted fever (MSF), which is transmitted by the dog tick *Rhipicephalus sanguineus*. This agent is also associated with Marseilles fever, Kenya tick typhus, South African tick bite fever, Indian tick typhus, and Israeli tick typhus. At the site of the bite appears a characteristic rash and a distinct mark which is named tache noire (black spot). *Rickettsia conorii* was first time described in Tunis in 1910, and first time in Constanta in 1935. Since then, due to the climate similar to the one in the Mediterranean region, it is particularly encountered in the warm season in the Dobrogea region. Our retrospective study was made on 64 children and 469 adults which were clinically and therapeutically evaluated in the Infectious Diseases Clinical Hospital in Constanta between January 2006 – December 2015. At the moment of hospitalisation patients presenting fever, exanthema (rash), tache noir (black spot); most of the registered cases were in the summer. From the total of 64 cases in children - 49 % came from urban area and 52.38% were female. In adults 53,9 % where from urban area and 54.37% were male. The black spot was found in 34 cases of children and in 401 cases of adults. The exanthema was present almost in all adults (459 cases) and in 53 cases of children (5 had petechial rash). Serologic diagnosis was performed especially after year 2010 . For the etiologic treatment we used especially Cloramphenicol in first 5 years of studied period in both adults and children. In the last years in children we used more Azitromycine and Claritromycine, and in adults Doxycycline and Fluorquinolone. In the last 3 years there has

been a remarkable decrease of Boutonneuse fever in children and slightly decreased in adults in conjunction with the increase in post-bite prophylaxis.
Key-Words: Boutonneuse fever, dogs, *Ripicephalus sanguineus*, black spot

P.5.9. EVALUATION OF THE RESPIRATORY FUNCTION IN DIVERS BY MEASURING THE RESIDUAL VOLUME

Tamara Stanciu[1]*, Cecilia Adumitresi[2]

[1]"Diving Center", Constanta, Romania, FAX: 0241586952
[2]"Ovidius" University, Faculty of Medicine, Constanta, Romania
**E-mail: tamara.stanciu@navy.ro*

Divers are well trained athletes. Physical activity implies contraction of skeletal muscles including those determining the pulmonary ventilation, first stage of the respiratory function. Divers respiratory function is adapting continously in order to sustain their physiological responses. An optimal internal environment makes the divers organisms face not only external but also internal specific changes. Complex regulatory and compensatory mecanisms make the necessary adjustments to preserve cells and organs functions. Adapting of the respiratory function represents a specific reaction in divers. It involves responses not only to increased physical activity but also to the higher density of the breathing gases that requires a bigger pressure in order to preserve the value of the gas flow in the divers respiratory passages. A simple parameter for use in evaluation of the respiratory function is represented by the Hirtz index. The evaluation of the Hirtz index was performed before and after a simmulated dive with air as the respiratory mixture at 50 mH_2O. An other parameter, the lungs residual volume, also reflects altered mechanisms triggerd by the hyperbaric environment. The decrease of the lung residual volume represents an essential adaptation in athlets that improves their respiratory function. Spirometers can measure the air entering or leaving the lungs but cannot offer any information upon , the residual volume, the amount of air remaining inside the lungs at the end of the forced expiration. The Diving Center of Constanta in collaboration with „Ovidius" University, Faculty of Medicine, applied an original protocol and verified the residual volume of the subjects in experimental determination, on divers, during simulated divings at $18mH_2O$, breathing air in the Hyperbaric Complex of the Centre. The study aimes to offer useful data in preventing the professional diseases of the divers and finding out the limits of adaptation to the hyperbaric environment.
Key-Word: respiratory function, Hirtz index, residual volume

P.5.10. SUSTAINABLE DEVELOPMENT AND THE ANALYSIS OF ENVIRONMENTAL IMPLEMENTATION OF EUROPEAN FUNDS IN ROMANIA

Mihaela Neculiță*, Mihaela Moga

Lower Danube University of Galati, Romania
**E-mail: neculitam@yahoo.fr*

According to the statement from Rio de Janeiro, sustainable development is the development process that responds to today's society's needs without compromising the ability to respond to their own needs of future generations. Therefore, protection of the environmental is an integral part of the development process and can not be approach independent of it. Passing to an ecological balance, in which societies produce, consume, and live in a sustainable way, involves enormous financial resources. The European Cohesion Policy represents an important source of finance. The main purpose of EU funded projects is to increase the quality of people's lives and ensure long-term social, economic and environmental benefits. Central and Eastern European countries are the main beneficiaries of European funds, as there are major disparities in the efficient and sustainable use of resources. The potential for energy savings in these countries is very high. Romania is part of the countries from Central and Eastern Europe. In Romania, the objective of the environmental programs is to improve the living standards of the population and the environmental standards, mainly by respecting the environmental Community Acquis, reducing the difference between the environmental infrastructure that exists between Romania and the EU, both in terms of quantity and quality. The main objective of this paper is to analyse the evolution of the environmental sector in Romania, focusing on European funds supporting this sector.

Key-Words: European Cohesion Policy, environmental standards

P.5.11. THE USE OF VOLCANIC TUFF IN DAIRY FARMS – SOLUTION FOR ENVIRONMENTAL PROTECTION

Monica Marin, Elena Pogurschi*, Carmen Nicolae

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, 59 Marasti blvd., District 1, Bucharest, Romania
**E-mail address: elena.pogurschi@gmail.com*

The volcanic tuff, a natural zeolite, has the ability to make farms a cleaner place by absorbing and neutralizing toxins and pollutants. The volcanic tuff

has the ability to filter, block and retain a multitude of contaminants in absolute safety conditions. It is a mineral, with microcrystalline structure that shows the ability to attract and naturally absorb the positively charged pollutants, being the only mineral on earth known to be negatively charged. The purpose of this paper is to highlight the potential of the volcanic tuff to reduce the polluting effect of the manure obtained in cow farms by using it as a food additive, but also as an absorbent material for bedding. The biological material consisted of 80 Holstein Friza dairy cows, homogeneous in terms of weight and milk production, which were distributed in 4 batches, namely: the control natch, which did not receive any volcanic tuff ratio; the experimental batch 1 to which 200 g tuff/head/day was added in the ratio; the experimental batch 2 to which 350 g tuff/head/day was added in the ratio; the experimental batch 3 to which was tested the amount of 500 g volcanic tuff/head/day. During the experimental period, which lasted 100 days, it was found that cow weight and milk production was not influenced by the use of volcanic tuff. The inclusion in ratios of 350 g/head/day resulted in a qualitative improvement in milk production, being observed the tendency of increase in the protein concentration and decrease in the total number of germs. Also, by using the same average amount of volcanic tuff has resulted in a positive dietary cation-anion difference (DCAD) diet, which is the guarantee for dairy cows to improve milk production and health. The use of the volcanic tuff, 400 g/head/week, increases the absorption capacity of the bedding, which results in a reduction in moisture and an improvement in bedding consistency. Under these conditions, a reduction in respiratory diseases and pododermatitis is ensured, and the manure obtained inside the farm can be used in environmentally safe conditions, as it will reduce the risk of groundwater pollution. At the same time, a goal proposed within the project, in which the research was carried out, was to facilitate the participation of PhD students and master students in the specific activities performed in the field of agricultural ecology, on the segment of dairy cow farming.

Key-Words: volcanic tuff, dairy farm, milk productions, bedding

P.5.12. SOCIO-ECONOMIC ANALYSIS AND DEMOGRAPHIC ASSESSMENT FOR SUSTAINABLE DEVELOPMENT OF D.D.B.R.'S LOCAL COMMUNITIES

Eugenia Marin[1]*, Florentina Şela[1], Marian Mierlă[1], Cristian Trifanov[1]

[1]Danube Delta National Institute for Research and Development, Tulcea, Babadag Street, 145, postal code 820112
**E-mail: eugenia.marin@ddni.ro*

Recognizing the central role of local communities for sustainable development, the critical condition of Danube Delta Biosphere Reserve's natural resources and the need to improve the local communities' awareness represent the premise from which the socio-economic analysis and demographic assessment started to be build. The purpose of this paper is to emphasize the relations between Danube Delta's management policies and local community's evolution trend, relations which had determined an increasing tendency of Danube delta's depopulation, increased migration, and negative population growth. The analysis for the current state was performed for administrative-territorial units of both fluvial and maritime delta comprising 26 villages and 1 town. The materials used were Census of Population and Houses (years 2002, 2006, 2011), the Statistical Year Book (years 2007, 2012, 2013, 2014, 2015, 2016) issued by Tulcea County Department of Statistics. The methods used were questionnaires and semi-structured interviews with local authorities, in order to collect information on: environmental infrastructure, community economic development, human resources, social and communities' development. The results of this research emphasize a decrease in number of population in the last 20 years, with high differences for different periods of management. For all the localities analysed, the decrease in population is driven both by the negative value of the natural grow rate and migration rate. Further, were developed maps emphasizing the spatial distribution of natural growth rate, migratory rate, the map of functional typologies of communities in DDBR with the main types of settlements that converge around the main economic activities (fishing, agriculture, fishing/farming, complex). Sustainable development of Danube Delta's local communities represents a challenge and a priority in the same time, hence this research can be used as a basis for future local strategic actions and development initiatives.

Key-Words: sustainable development, local communities, Danube Delta

BACK-TO-BACK WORKSHOPS

WORKSHOP ON BIO-NANO GENOMICS: ACCELA - OUR STORY

Irina - Valentina Cojocaru*

**E-mail: cojocaru@accela.eu*

The story began in 1997, when BioTech a.s. was founded. Back in 2009 we formed BioTech-Europe as a division of BioTech a.s. Our intention was to create a dedicated team to supply and support Life-Science Technologies in the territory of Central and Eastern Europe. Our credible team has been and still is committed to delivering the first class support to our customers have become accustomed to.
The Story accelerates since September 1st, 2015, when the BioTech-Europe was transformed into a successor company accela. The accela motto is Accelerate your biomedical research!

Our Mission
Our mission is to add value for our customers by providing to them progressive and innovative technologies, which can help to answer their scientific questions. We work hard to always follow new trends and technology development in order to offer relevant advices to our customers.

Our Values
Our commitment to supporting and adding value for our customers drives everything we do. We have built up a team of product managers, who are fully competent to introduce and support particular technologies based on the specific application needs of our customers. Next to application support we provide a technical service support by our technical support team. A warranty and a post-warranty service support is also an integral part of each project.
Recently, accela s.r.o. became a leading supplier of High Tech Innovative Life-Science Technologies in the territory of Central and Eastern Europe.
487 Succesfull projects
17 served countries
36 current suppliers

COPERNICUS TRAINING
BLACK SEA MONITORING AND FORECASTING CENTER

Atanas Palazov[1], Giovanni Coppini[2], Stefania Angela Ciliberti[2], Marilaure Gregoire[3], Joanna Staneva[4], Elisaveta Peneva[5], Emin Özsoy[6], Luc Vandenbulcke3, Andrea Storto2, Benedicte Lemieux2, Tomas Lovato[2], Simona Masina[2], Nadia Pinardi[7], Francesco Palermo[2], Sergio Creti'2, Francesca Macchia[2], Rita Lecci[2], Arno Behrens[4], Veselka Marinova[1], Vasil Donev[1], Violeta Slabakova[1], Mauro Buonocore[2], Paola Agostini[2]

[1]Institute of Oceanology, Bulgarian Academy of Sciences, Bulgaria (palazov@io-bas.bg),
[2]Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Italy
[3]University of Liège, Belgium
[4]Helmholtz-Zentrum Geesthacht – Institute of Coastal Research Germany
[5]University of Sofia "St. Kliment Ohridski", Bulgaria
[6]Eurasian Institute of Earth Sciences – Istanbul Technical University Turkey
[7]Department of Physics and Astronomy, University of Bologna, Italy
**E-mail: palazov@io-bas.bg*

The Black Sea monitoring and forecasting center (BS-MFC) entered the Copernicus Marine Environment Monitoring Service (CMEMS) in October 2016, providing regular and systematic information about the ocean state in the Black Sea in operational mode. The system provides a complete data catalogue for the Black Sea ocean variables such as temperature, salinity, sea level, currents, biogeochemistry and waves through a technologically advanced and resilient service, which is fully interconnected with the other Centers in the Copernicus network. The high level BS-MFC architecture is based on 3 Production Units, for Physics, Biogeochemistry and Waves products respectively, a Dissemination/Archiving Unit for the delivery of the products and their archiving/accessibility, a Local Service Desk connected to the CMEMS Service Desk devoted to support all the operational activities, and backup units for all the main service components. Products consist of analysis/hindcast, 10-days forecast and reanalysis, describing the physical (currents, temperature, salinity, sea level, mixed layer depth and bottom temperature), the biogeochemical state and waves. To implement and improve the service, the BS-MFC has detailed an evolution plan, actually under implementation, devoted to establish, assess and improve the systems and their operational functionalities, providing some improvements from the scientific point of view concerning the modeling components (e.g., the fully aligned Physics, Biogeochemistry and Waves systems, the open boundary conditions at the Bosporus, the state-of-the-art core models and increased

spatial resolution among the major actions) and high quality products, towards an optimal interface between the Mediterranean and the Black Seas. The contribution will present the main operational and research & development activities at the basis of the systems, given an overview on the future plans for improving the service for the delivery of new products.
Key-Words: Black Sea, forecasting, modelling, monitoring, Copernicus

STAKEHOLDER WORKSHOP WITHIN THE MAREFRAME PROJECT ROLE-PLAY FOR IDENTIFYING THE BEST SOLUTIONS FOR BLACK SEA TURBOT MANAGEMENT: MAREFRAME BLACK SEA CASE STUDY

Magda Nenciu[1]*, Tania Zaharia[1], Valodia Maximov[1], Gheorghe Radu[1], Gheorghe Sirbu[1], Kare Nolde Nielsen[2], Michaela Aschan[2], Mika Rahikainen[3]

[1]National Institute for Marine Research and Development Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
[2]The Arctic University of Norway, Norwegian College of Fisheries,
[3]University of Helsinki, Finland
**E-mail: magdalena.nenciu@gmail.com, mnenciu@alpha.rmri.ro*

The aim of the MareFrame Project ("Co-creating Ecosystem-based Fisheries Management Solutions") is to develop new assessment methods and a Decision Support Framework (DSF) for the management of marine resources. The project brings together small and medium enterprises (SMEs), together with research institutions and stakeholders, who have developed and demonstrated the use of innovative monitoring systems and decision support tools for fisheries advice through training actions, role-play and workshops. MareFrame covers seven case studies, one of which is focused on the Black Sea turbot. Turbot (*Psetta maxima maeotica* Pallas, 1814) is a highly valuable commercial species for the Black Sea fisheries, which has been subjected to severe decline in recent decades. The main reason for the decline appears to be overfishing, in particular due to Illegal, Unreported, and Unregulated (IUU) fishing, but the stock development has also been adversely affected by environmental change (including eutrophication and invasive species). The turbot case study associates itself with the ongoing General Fisheries Commission for The Mediterranean (GFCM) initiative to develop a management plan common for the Black Sea stocks. The operational

objectives for the case study are therefore obtained from this initiative, aiming to counteract direct and indirect overfishing in order to ensure the sustainable economic viability of fisheries. Stakeholders are cooperating with Mareframe researchers to propose a management plan within a role-play aimed at selecting the best management alternatives.

Acknowledgement: This study has been carried out with financial support from the MareFrame project, funded by the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 613571 and co-financed by UEFISCDI - Capacities Programme.

Key words: role-play, ecosystem approach to fisheries management (EAFM), Decision Support Framework (DSF), ecosystem models

STAKEHOLDER WORKSHOP WITHIN THE TRASIPESC PROJECT COMPUTING BASED TRACEABILITY INFORMATION SYSTEM FOR FISHERY - TraSiPesc

Liliana Mihaela Moga[1]*, Tania Zaharia[2], Carmen Georgeta Nicolae[3]

[1]Lower Danube University of Galati, 47 Domneasca Street, Galati, 800008, Romania
[3]National Institute for Marine Research and Development Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
[3]University of Agronomic Sciences and Veterinary Medicine, Bucharest
**E-mail: liliana.moga@gmail.com*

The general objectives of the TraSiPesc project are: at scientific level - improving the knowledge in the field of food science by gathering original internationally recognized scientific results, therefore affirming the prestige of Romanian research through scientific publications in high profile journals, and increasing the success of future scientific collaboration with other international research groups; at human resources level–supporting the local research group to allow reaching the critical mass necessary to be competitive in the international arena, and training young researchers for improving their performance in a high level scientific environment; at economic and social level-the development of food with health benefits, to support national programs that promote accurate, safe and beneficial nutrition as a strategy to improve the quality of life, environmental protection..

Project timeframe: July 1, 2014 - September 30, 2017

Partners: "Lower Danube) University of Galati, Softeh Plus SRL, National Institute for Marine Research and Development "Grigore Antipa" Constanta, University of Agronomic Science and Veterinary Medicine of Bucharest
Financed by UEFISCDI by NP II Partnerships in Priority Areas, Collaborative Applied Research Projects
Key-Words: traceability system, supply chain, fish and fishery products, information flow

CONSTANTA STAKEHOLDER WORKSHOP NEW METHODOLOGIES FOR AN ECOSYSTEM APPROACH TO SPATIAL AND TEMPORAL MANAGEMENT OF FISHERIES AND AQUACULTURE IN COASTAL AREAS (ECOAST)

Laurenţa Mihaela Alexandrov*

National Institute for Marine Research and Development Grigore Antipa", 300 Mamaia Blvd., RO-900581, Constanta, Romania
**E-mail: lalexandrov@alpha.rmri.ro*

ECOAST aims to identify, develop and test new methodologies for spatial and temporal management of fisheries and aquaculture incoastal areas.The overall approach will assess the impact of fisheries and aquaculture on coastal ecosystems, including essential fish habitats and conservation priority habitats, as well as synergies and conflicts between human activities. Building on previous methodologies and experiences the project will evaluate marine spatial planning in seven coastal case study areas having different ecological and socio-economic characteristics: 1) Adriatic Sea (ADR), 2) Ionian Sea (ION), 3) Black Sea (BLK), 4) Tyrrhenian Sea (TYR), 5) Baltic Sea (BAL), 6) Norwegian Fjords (NOR) and 7) NE Atlantic Coasts (ATL).The project outcomes will produce case specific evaluation of the ecological footprints of aquaculture and fisheries incoastal areas, maps of optimal areas for fisheries and aquaculture, evaluation of compatibility between fisheries, aquaculture and other human activities in coastal areas, as well as implementation of holistic methods and an operational modelling framework to evaluate and predict stakeholder responses to coastal spatial management options covering marine cross-sector occupation of space. Several methodologies already exist to assess the impacts on the ecosystem and the socio-economic effects of some spatial management measures, as well as to spatially manage some cross sector marine activities, but none of them integrate all relevant management

aspects for coastal areas. Therefore, the holistic methodology will cover in a single system different approaches and management aspects, identifying realistic spatial and temporal potentials and limitations for the integration of fisheries and aquaculture in coastal areas, in order to allow policy makers and stakeholders to evaluate management measures from different points of view and share decisions in a transparent manner on case specific basis. ECOAST results will support the EU and national policies through the provision of tools and data for an ecosystem based allocation of space and sustainable use of marine resources in coastal areas on case specific basis.
Case study 3) Black Sea (Responsible: Laura Alexandrov NIMRD, Romania)
Key-Words: spatial management, fisheries, aquaculture, anthropogenic activities

WORKSHOP
ADDRESSING NATIONAL AND REGIONAL NEEDS BY ENHANCING THE UPTAKE AND RRELEVANT FUNCTIONALITIES OF THE EARTH OBSERVATION PORTALS TOWARDS BUSINESS PERFORMANCE WITHIN COSMOMAR AND ROMANIAN CLUSTER OF EO/ RO-CEO

ROMANIAN CLUSTER FOR EARTH OBSERVATION

Doina Nicolae[1]*, Mircea Radulian[2], Răzvan Mateescu[3], Vladimir Gancz[4], Mugurel Bălan[5], Anca Andreea Popescu[6], Anca Costea[7], Iurie Maxim[8]

[1]National Institute of Research and Development for Optoelectronics, Magurele, Ilfov, Romania
[2]National Institute of Research and Development for Earth Physics, Magurele, Ilfov, Romania
[3]National Institute for Marine Research and Development "Grigore Antipa", Constanta, Romania
[4]National Institute for Research and Development in Forestry "Marin Drăcea", Bucharest, Romania
[5]Institute of Space Science, Magurele, Ilfov, Romania
[6]University Politehnica of Bucharest - Research Centre for Spatial Information, Bucharest, Romania
[7]TERRASIGNA SRL, Bucharest, Romania
[8]S.C. TEAMNET SOLUTION INTERNATIONAL SRL, Bucharest, Romania
**E-mail: nnicol@inoe.ro*

Romania has a long aerospace tradition and has contributed to more than 30 scientific and technological space missions. However, except for the initiatives coordinated by, and involving directly ROSA, most of the contracts with ESA are narrow-scope and targeted, addressing the very exclusive expertise of one or two Romanian institutions. As such, multi-disciplinary and large activities remain inaccessible to the Romanian players. Insufficient access to information about existing capacities and expertise, coupled with a lack of tradition in collaboration has a negative impact on the investments as well,

many institutions building (with significant costs) similar infrastructures, instead of sharing resources. Also, the representation in ESA committees is at a very low level, because the community is still not consolidated and not organized. Although a certain number of clusters exists in Romania, none is related to the specifics of Earth Observation. This, in the context of an increasing availability of EO data, and its huge potential use in various domains (from agriculture to energy, environmental protection, risk and hazards, urban planning, transport, etc.). The scope of RO-CEO project (ROmanian Cluster for Earth Observation) is to increase the capacity of Romanian organizations to contribute to ESA's EO programmes and projects, by setting-up the Romanian Cluster for Earth Observation, a formal association of organizations, with its own statute and agenda. RO-CEO is concentrating 4 out of the 7 Space competence centres set-up in the frame of the STAR programme, all having expertise in Earth Observation, and brings additional expert organizations to cover all important aspects of the domain.
We intend to build on existing capacities and achieve a critical mass of organizations joining the RO-CEO cluster and boosting the development of EO activities in Romania, as well as promoting the use of EO data in different sectors of the economy. The clustering process will help in: a) identification and valorization of relevant competences and infrastructures able to contribute to ESA's Earth Observation missions (science feeders, hardware and software developers, service and data providers); b) improving the networking capacity, collaboration and joint initiatives of the Romanian players in Earth Observation; c) developing a coherent and practical agenda to foster and support inter and intra-sectorial cooperation in the field of Earth Observation. How to find the potential actors for this cluster? The first step is the setup the RO-CEO portal: http://www.ro-ceo.ro.

COSMOMAR "CONSTANTA SPACE TECHNOLOGIES COMPETENCE CENTRE DEDICATED TO THE ROMANIAN MARINE AND COASTAL REGIONS SUSTAINABLE DEVELOPMENT"

Răzvan Mateescu*

National Institute for Marine Research and Development "Grigore Antipa", Constanta, Romania
**E-mail: razvan_doru@yahoo.com*

The overall goal of the Star project with the same name, it is the development of a Competence Center in spatial technologies for the South-East Region of

Romania, having the use of space technologies and remote sensing data as main application area, towards monitoring and rapid assessment of the marine and coastal environment state, development of environmental friendly bio-technologies and materials with applicability in spatial programs, as well for support of local and regional small, medium and big enterprises development in accessing opportunities of the EU spatial programs. The main component of the proposed project herewith (COSMOMAR) is to develop a multidisciplinary remote sensing center for the coastal surveillance as a main tool of ICZM implementation (governance, environmental conservation and protection) on the Romanian coastal zone. The project results, encompassing the development of a dedicated facility for assuring center's activities as well the conditions for the development of devices and experimental set-ups for three pilot projects applications. The project component of the RS center, related to the selection, training and certification of experts and consultants to assist the companies from the region specialized in manufacturing or services for integration in the programs coordinated by ROSA or ESA, it is presented as a complementary one.

Key words: Remote sensing, RS competence center, data flux, center activities, UAVs.

GROUND BASED MEASUREMENTS IN SUPPORT FOR EARTH OBSERVATION MISSIONS

Anca Nemuc[1]*, Dragoș Ene[1], Victor Nicolae[1], Livio Belegante[1], Doina Nicolae[1], Andreea Calcan[2]*

[1]National Institute of R&D for Optoelectronics INOE
[2]National Institute for Aerospace Research Elie Carafoli, Romania
**E-mail: anca@inoe.ro, andreea@incas.ro*

ESA's Earth Explorer missions have been developed in accordance to the priorities identified by the scientific community. Carrying novel technologies, each satellite in the series is developed to improve our understanding of how the planet works as a system and the impact that human activity is having on natural Earth processes. By providing timely and accurate profiles of the atmospheric parameters, the missions contribute to both air quality and climate research and also help improve the weather forecasts. Several campaigns have been designed in the framework of the ESA Copernicus Earth observation programme aiming to test recently developed airborne observation systems dedicated to satellite validation activities and to setup the technological background of future ESA Atmospheric Sentinels. The

Airborne ROmanian Measurements of Aerosols and Trace gases campaign (AROMAT) during 2014-2016, through a large European collaboration, helped the participation of the Romanian scientific community to the ground-based calibration/validation activities through the development and intensification of the Atmospheric Remote Sensing research activities. Current facilities in Romania include active and passive remote sensing instruments measuring various properties of aerosols, trace gases and clouds, but also research aircrafts, UAVs, and ground-based mobile platforms. Many of the instruments participated in the Quality Assurance programs of various continental networks such as EARLINET, AERONET, MWRNET, ACTRIS. The Romanian Atmospheric Mobile Observation System-RAMOS is under implementation and will include new cutting-edge airborne and ground based instruments for trace gases monitoring. Due to the technological improvements RAMOS will be able to assess the required confidence of the different data products of various satellite missions (Sentinel-5P, ADM-Aeolus, EarthCARE).

EYES IN THE SKY - VERY HIGH RESOLUTION IMAGERY FROM UNMANNED AERIAL SYSTEMS

Lucian Ionescu, Florin Iosub*

Teamnet Solutions International, 22 Tudor Vladimirescu Blvd., Bucharest, Romania
**E-mail: florin.iosub@teamnet.ro*

Access to high resolution and high-quality imagery has been greatly improved with the advent and continuous development of autonomous, unmanned flight systems, on platforms popularly known as "drones". Such flight systems are sufficiently versatile and accessible to the open public to be easy to use and deploy. It is a relatively straightforward task to fit a wide variety of sensors aboard these aircraft which allow users to map, measure and record the world around us in new and exciting ways. Ranging from prosumer-level digital cameras with a high pixel resolution, to multispectral imagery or georeferenced live-video stream and thermal sensors, more suitable for scientific or commercial applications, the UAV allows data acquisition like never before. The Hirus U.A.S. is one of the industry defining vectors of development, with a platform that allows aerial, multispectral, live-video and thermal acquisition. The presentation will be centered on the different real-life applications of the U.A.S. system, which was used to acquire raw imagery as well as the workflows required to produce aerial orthorectified image mosaics, as well as digital surface model generation and pseudo-color image mosaics. Up to now, the Hirus system was successfully employed for a number

of field applications such as : emergency management situations, agricultural monitoring, cadastral and urban survey and most recently mapping the sea shores for coastal management activities. Using easily accessible sensors and cutting-edge processing algorithms and software (the Agisoft Photoscan products), users can get very high resolution imagery, up to 3cm/pixel, for wide areas, as soon as the user needs them. Simple modification of commercial products allows the platform to extend the acquisition to multispectral imagery, useful in environmental analysis and monitoring, thus broadening the range of products and activities that can benefit from this technology. The U.A.S. unlike other GIS or remote sensing technologies allows for easy deployment, with a low-cost solution, for immediate data acquisition, regardless of weather conditions, as soon as the user needs the data. This is meant to simplify and enrich data procurement and improve analysis and decision processes.

Key-Words: UAS, very high resolution imagery, mapping, coastal management, Hirrus system

MULTIPLY: DEVELOPMENT OF AN ADVANCED EUROPEAN HSRL FACILITY

Livio Belegante*, Doina Nicolae, Anca Nemuc, Victor Nicolae, Dragoş Ene

National Institute of R&D for Optoelectronics INOE
**E-mail: belegantelivio@inoe.ro*

There are a number of cross-cutting issues relevant for all satellite atmospheric missions which can only be addressed through suitable airborne measurements. The missions include ADM/Aeolus, EarthCARE and Sentinel-3/-4/-5/-5p, as well as a number of future EO mission concepts such as the EE8 mission candidates CarbonSat and FLEX which include products related to atmospheric aerosols. To be effective and accurate, these products rely on independent airborne measurements to develop and test the retrieval methods, and validate mission products following launch. Aerosol characterisation is also needed for non-atmospheric missions, e.g. for atmospheric correction purposes.

There is an objective need to develop a suitable airborne lidar instrument to perform profile measurements of aerosol extinction, backscatter and depolarization at different wavelengths, capable of providing extensive properties (e.g. aerosol optical depth) but also intensive aerosol properties (e.g. particle depolarization, Angström exponent, lidar ratio, colour ratio). Multi-wavelength measurements are required also for aerosol type

characterization and aerosol-cloud discrimination. These properties cannot be derived by conventional backscatter lidars, due to limitations regarding the lidar ratio assumption and lidar equation instabilities.
The aim of MULTIPLY is to develop a novel multi-wavelength HSRL system (3b + 2a + 3d) for airborne operation, capable of retrieving the aerosol extinction, backscatter and depolarization profile distributions. The objectives of the project include: » identification of technical solutions to address the requirements of the instrument » design and develop the lidar system, and to specify the data products » test and validate the complete lidar system » integrate the complete instrument onboard a scientific airplane for cal-val activities in the framework of ESA. The talk will present design and technical challenges encountered during the implementation phase of MULTIPLY (still under development).

EO4SEE: SATELLITE EXPLOITATION PLATFORM FOR SOUTH-EAST EUROPE

Vasile Crăciunescu[1*], Marian Neagul[2], Krzysztof Mysłakowski[3], Rok Mocnik[4], Igor Kratochvil[5], Bartosz Buszke[6], Przemysław Turos[7], Marcin Gil[8]

[1]Terrasigna, [2]West University of Timisoara, [3]Creotech Instruments, [4]Sinergise, [5]GISAT, [6]WASAT, [7]Sigma Games, [8]CloudFerro
**E-mail: vasile.craciunescu@gmail.com*

For decades now, Earth Observation (EO) satellites have provided a wealth of data. The existing missions, along with the future ones, will provide routine monitoring of our environment at the global scale, thereby delivering an unprecedented amount of data. While the availability of the growing volume of environmental data from space represents a unique opportunity for science and applications, it also poses a major challenge to achieve its full potential in terms of data exploitation. The talk presents the technologies used to develop an online platform that can use high satellite data volume to perform operations like information mining, data extraction, time-series analytics and fusion. The fundamental principle of this exploitation platform, called EO4SEE, is to move the user to the data and tools. Users access a platform work environment providing the data, tools, and resources required, as opposed to downloading, replicating, and exploiting data 'at home'. The platform, created by an internationa consortium lead by TERRASIGNA with financial support from the European Space Agency, offers services based on Open Geospatial

Consortium standards for data retrieval (WMS, WCS, WFS) and server-side processing (WPS). The services were built using open source solutions such as GeoServer, OpenLayers, PostGIS, GDAL, OTB, Apache Mesos, Marathon.

REAL TIME DATA PRODUCTS AND SERVICES FOR SOUTH EAST OF ROMANIA AND BLACK SEA

Alexandru Mărmureanu*, Mircea Radulian, Alexandra Muntean, Eduard Năstase, Raluca Partheniu, Constantin Ionescu

National Institute of Research and Development for Earth Physics, Magurele, Ilfov, Romania
**E-mail: marmura@infp.ro*

The Romania-Bulgaria Sout East regions is significantly affected by earthquakes occurred in both territories: on the one hand, produced by the Vrancea seismic source, with intermediate-depth events (3 shocks/century with magnitude greater than 7) and on the other hard, crustal seismicity recorded in the northern part of Bulgaria (Shabla).
Providing earthquake warning notifications several seconds before dangerous earthquake waves arrive at a target site significantly reduces the property damages and the number of lives lost. The study presents the rapid early warning system for earthquakes that may affect the Black Sea coastal area from Romania and Bulgaria together with the tsunami early warning center located in Eforie Nord, center in support of the International Group for Coordination and Early Warning for Tsunami for the Nord-East Atlantic, Mediterranean Sea and Connex Seas (ICG/NEAMTWS).
Key-Words: Early warning, tsunami, Disaster management, ShakeMap, Earthquake source observations

BIG DATA ANALYTICS FOR EARTH OBSERVATION. METHODS AND POTENTIAL

Daniela Faur*

Politehnica University of Bucharest
Faculty of Electronics, Telecommunication and Information Technology
1-3 Iuliu Maniu Bvd., 061071, Bucharest, Romania
Tel: +4021.402.4623 /3807
**E-mail: danielafaur@gmail.com*

With the growing number of Earth observation satellites that are being launched every year, Earth observation has become a valuable tool for monitoring services, able to generate comprehensive, consistent, accurate, and timely information. Given its free, full and open access, Copernicus data and information have successfully attracted a large number of users. The torrent of remote sensing data counting hundreds of Terabytes per day needs to be converted into meaningful information, largely impacting the socio-economic-environmental triangle. CEOSpaceTech's research interests aim to implement and integrate the developed tools for Earth Observation Content Based Image Retrieval into a powerful and ready-to-use Open-Source platform, combine automatic and visual methods empowered through human interaction to gain knowledge from the data and develop a system focused on information extraction in the form of categories of evolution that will comprise general analytical methods for the exploitation of the information contained in Satellite Image Time Series.

IN ORBIT DEMONSTRATION (IOD) SATELLITE PROGRAM UK-ROMANIA SATELLITE ADVANCEMENT STUDY URSA

Mugurel Bălan*, Marius Trusculescu, Claudiu Drăgăşanu, Alexandru Pandele, Silvana Radu, Mihnea Ion, Ion Ciobanu, Costel Cherciu

Institute of Space Science, Romania
**E-mail: mugurel.balan@gmail.com*

URSA is a new ESA funded collaborative project between the Romanian Institute of Space Science (ISS) competence centre in nanosatellite technologies - ROST-CC and the UK- Company Surrey Satellite Technology

Limited (SSTL). The aim of this project is to develop a 10 year in orbit demonstration (IOD) satellite program with a satellite integration every 2 years alternatively from UK and RO. The micro-satellite (30-50 Kg) is based on a SSTL existing platform. It will represent a predictable fly opportunity for the emerging satellite payloads from both UK and Romania. A secondary objective represents the know-how transferred to Romania with respect to Assembly Integration and Testing of small satellites and developing an infrastructure in Romania that supports the URSA Program.

AEROSOL CHARACTERIZATION BY SUN PHOTOMETER IN BLACK SEA REGION

Alexandru Dandocsi[1,2]*, Luminița Mărmureanu[1], Anca Nemuc[1], Livio Belegante[1], Sabina Ștefan[3]

[1]National Institute of R&D for Optoelectronics, [2]Politehnica University of Bucharest, [3]University of Bucharest
**E-mail: alexandru.dandocsi@inoe.ro*

Aerosols play an important role the Earth's radiative transfer budget. The aerosol effects to the total radiative budget can be direct as negative or positive depending of their chemical and optical characteristics. The negative effect is related with the backscatter of the light coming from the Sun which leads to a cooling effect of the ground, while aerosol absorption contribute to a positive budget and atmosphere heating. Indirect effect of aerosols are related with chemical and physical processes in the atmosphere, particles acting as cloud condensation nuclei which leads to cloud formation. Also aerosols concentrations in lower troposphere have an impact on air quality and on human health due to high anthropogenic sources presence that are retained and mixed into the planetary boundary layer. In this study aerosol optical properties are derived from Sun Photometer that provide column information as AOD and Angstrom exponent. Together Aerosol Optical Depth (AOD) that measure aerosol abundance in the atmosphere column and Angstrom Exponent, which is another product derived from the Lambert-Beer law applied to atmospheric column, can provide information about the predominant size of the aerosols in the atmosphere, and information about the type of the aerosols present in the atmosphere. Both products are produced using direct sun measurements from the sun photometer. A global network (AERONET – AErosolROboticNETwork) of these instruments is assuring the data quality. Certain maintenance and calibration procedures of the instruments is applied and data are screened using same algorithms. This

paper presents three year records of AOD and Angstrom Exponent from the sun photometer from Eforie station, 44.075N, 28.632E, 40.0m elevation, part of Dobrogea Seismological Observatory, a branch of the Romanian National Institute for Earth Physics. Seasonal trends analysis is made in order to have an information about the predominant aerosol type present in the region above mentioned area with impact at local and regional level.

*I*NTEGRATED *S*ERVICE FOR *W*ATER QUALITY MONITORING IN *M*AMAIA BAY (ISWIM)

Răzvan Mateescu*

National Institute for Marine Research and Development "Grigore Antipa", Constanta, Romania
**E-mail: razvan_doru@yahoo.com*

The work contains the results of the technical proposal for Lot 11 and 12 - Promoting the demonstration of coastal, operational and existing CMEMS downstream services on the Black Sea of the tender 31-UU-DO-CMEMS-DEM1 – Promotion and demonstration of CMEMS downstream services. The proposed services are related with the maintenance and evolution of an operational system which is operated by the National Institute for Marine Research and Development (NIMRD), Romania for the Romanian Coast and Mamaia Bay (City of Constanta). The overarching goal of this project is to implement a dynamic web-based / mobile-friendly decision support system to enhance the management, monitoring and forecasting of the bathing water quality in Mamaia bay, integrating numerical models (downscaled from CMEMS global solution) with in-situ measured data and CMEMS remote sensing products. Taking advantage of previous work from the partners developing high resolution operational modelling (nested to CMEMS) and web-based technologies applied to coastal areas in the Black Sea and other regions in the world, the operational implementation of the referred service were increased situational awareness in terms of bathing water present and short-term future state, it were enhanced safety, environmental and public health performance in beaches and recreational waters and it were provided valuable, accurate water quality and marine weather information, needed to promote safer recreational activities in bathing waters.
Key-Words: Copernicus Services, marine forecasts, WQ of bathing areas, , in-situ measurements

USE OF SENTINEL 2 SATELLITE IMAGERY IN FOREST MANAGEMENT ACTIVITY - AN EXPERIMENT

Vladimir Gancz*, Gabriel Nedea, Adrian Lorenţ

National Institute for Research and Development in Forestry "Marin Drăcea"
**E-mail: vladimir.gancz@icas.ro*

Use of remote sensing imagery in forest management planning is not new in Romanian forestry. Starting in 50's with analogic film/paper based aerial photograms and, now days, with digital aerial imagery has being used to better delimitate forest limits and forest management units limits. Also very high spatial resolution satellite imagery, such as Ikonos, Quick Bird etc. has been used in different forestry researches. This paper presents several results of an experiment aiming use of relatively new European Sentinel 2 satellite imagery. Very good spectral resolution, high spatial resolution and temporal resolution recommend this imagery. Also, very important, Sentinel 2 imagery is free of charge and may be downloaded from the Internet. Another advantages, based on temporal resolution (revisit frequency) is, on one hand, possibility to have quite recent images and, on the other hand, the possibility to pick up the best moment from phenology (seasonal vegetation status) point of view. This last point is very important for vegetation studies. Within this researches we have established a method to extract from the Sentinel 2 imagery the proportion between coniferous and broad lives species within mixed forest areas. The test area was one subunit (UP 5 "Sebeşel") of Experimental Forest District "Caransebeş". The method is based on automated supervised classification and the results were compared with data from forest planning management collected in classical way (field survey). Result shows a good accuracy of the method and recommend it as a new and effective tool to increase the efficiency and accuracy of management planning activity.

Key-Words: forest management planning, satellite imagery, supervised classification,

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