



Euromarine Foresight Symposium

FUTURE COAST - EUROPE

5th – 7th October 2015

Berlin

Germany

Abstract Book

About the Euromarine Foresight Symposium "Future Coast – Europe"

Objectives

This initiative is based on the recognition that pressure on coastal zones is growing due to conflicts of use (e.g. coastal protection, use/production of biological resources, marine transportation and urbanisation). Scientific data and studies in different disciplines may provide sound and objective information for decision support to balance sustainable use and stakeholders' interests.

The aim of this symposium is to gather scientists from natural and social sciences, economy and law as well as stakeholders in the field in order to share and discuss approaches and to identify actors for joint research in the future to tackle the scientific challenge for sustainable use and management of coastal zones in Europe. At the symposium we will discuss and identify suitable study areas that might be exemplary for specific conflicts of use and already have a good scientific data basis and a scientific background. In the long-term, a network shall develop a collaborative project based on the suggested overarching activities as

- coupled modelling
- evaluation of ecosystem services and good environmental status
- data visualisation and
- marine sciences & society in the 21st Century

The overall objective is to provide a scientifically based tool box or support system for planning and decision making.

Scientific Committee

Christos Arvanitidis, Hellenic Centre for Marine Research, Crete, Greece

Ulrich Bathmann / Nicole Schmidt, Leibniz Institute for Baltic Sea Research Warnemünde, Germany

Nicola Beaumont, Plymouth Marine Laboratory, United Kingdom

Peter Herman, NIOZ Royal Netherlands Institute for Sea Research, Netherlands

Bernard Kloareg / Eric Thiebaut, Roscoff Marine Station, France

Martin Le Tissier, Future Earth Coast (formerly LOICZ), Ireland

David Turner, University of Gothenburg, Sweden

Barbara Zanuttigh, University of Bologna, Italy

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Symposium Programme

Session 1 (5th October 2015): Scientific knowledge in coastal model regions

Venue: Leibniz Hall

Time	Presentation	Speaker*	Affiliation**
7.45 h	Registration		
8.30 h	Welcome Address	<u>Bathmann, U.</u>	Leibniz Institute for Baltic Sea Research Warnemünde, Germany
9.00 h	Mediterranean Sea: MERMEX project results and potential evolution	<u>Sempere, R.</u> , Durrieu de Madron, X., Guieu, C., Pairaud, I.	Aix Marseille University, France
9.15 h	Patterns, trends and management of marine biodiversity in the Tuscan Archipelago and regional coasts	<u>Benedetti-Cecchi, L.</u>	University of Pisa, Italy
9.30 h	The Aquitaine coastline: a set of models for future coastal studies	<u>Grémare, A.</u>	University of Bordeaux, France
9.45 h	A Delft perspective on the State of the art in coastal modelling and the need for data	<u>de Vries, S.</u> , Stive M.J.F., Zijderfeld, A., Wang, Z.B.	Delft University of Technology, Netherlands
10.00 h	COSYNA – an observation system for European coasts and beyond	<u>Brix, H.</u> and the COSYNA Team	Helmholtz-Zentrum Geesthacht, Germany
10.15 h	Submarine groundwater discharge in Europe and effects on coastal zones	Scholten, J., Garcia-Orellana, J., Masque, P., Rocha, C., <u>Schlüter, M.</u> , Stieglitz, T., Van Beek, P	University of Kiel, Germany
10.30 h	Coffee break		
11.00 h	Geographic patterns in European coastal ecosystems as observed through EMBOS	<u>Hummel, H.</u> , Avesaath, P. van, Arvanitidis, C., Juanes, J.A., Frost, M.	Monitor Taskforce, Royal Netherlands Institute for Sea Research & NIOZ, Yerseke, Netherlands
11.15 h	Integrated management of coastal ecosystems: a new approach	<u>Vasileiadou, K.</u> , Pavloudi, C., Arvanitidis, C.	Hellenic Centre for Marine Research, Greece
11.30 h	How to measure and understand the functioning of ecosystem in a vertically layered sea?	<u>Lips, U.</u> , Lips, I., Liblik, T., Kikas, V., Väli, G.	Tallinn University of Technology, Estonia
11.45 h	Transformation of model data to information - experiences with coastDat	<u>Meyer, E.M.I.</u> , Weisse, R.	Helmholtz-Zentrum Geesthacht, Germany
12.00 h	Coastal Skagerrak and Kattegat: where giants meet	<u>Lindegart, M.</u>	University of Gothenburg, Sweden

12.15 h	The Pomeranian Bay - a key area to understand processes at the southern Baltic Sea coast	<u>Borowka, R. K.</u> , Deng, J., Dudzinska-Nowak, J., Dutkowski, M., Furmanczyk, K., Harff, J., Meier, H.E.M., Osadczuk, A., Schneider, R., Soomere, T., Voß, M., Witkowski, A., Zhang, W.	University of Szczecin, Poland
12.30 h	Lunch		
13.30 h	Poster session		
14.30 h	Parallel sessions:		
	Breakout group I "Coupled modelling"		
	<u>Convenor</u> : Kai Wirtz, Helmholtz-Zentrum Geesthacht, Germany		
	<u>Keynote</u> : Markus Meier, Leibniz Institute for Baltic Sea Research Warnemünde, Germany		
	Breakout group II "Evaluation of ecosystem services and good environmental status"		
	<u>Convenor</u> : Peter Herman, NIOZ		
	<u>Keynote</u> : Tiziana Luisetti, Cefas (Centre for Environment, Fisheries & Aquaculture Science)		
16.00 h	Coffee break		
16.30 h	Plenary discussion		
17.00 h	End of Session 1		
19.00 h	Conference dinner		

Session 2 (6th October 2015): The human dimension of integrated approaches of coastal management
Venue: Leibniz Hall

Time	Presentation	Speaker*	Affiliation**
8.50 h	Welcome Address	<u>LeTissier, M.</u>	Future Earth Coasts (formerly LOICZ) Executive Officer
9.00 h	The estuarine management approach in Scheldt- and Ems-estuary, two cases of Integrated Coastal Zone Management	<u>Taal, M.D.</u>	Deltares, The Netherlands
9.15 h	Conflicts of use in the Strait of Sicily illustrate difficulties and opportunities of Marine Spatial Planning in the Mediterranean	<u>Vega Fernández T.</u> , Musco L., Pipitone C., D'Anna G., Badalamenti F.	National Research Council - Institute of Coastal Marine Ecology, Italy
9.30 h	Usage conflicts in coastal areas of the Northern Iberian Peninsula; human activities and environmental health surveillance in the Southern Bay of Biscay and the Galician Rías	<u>Villanueva, A.</u> , Beiras, R., Troncoso, J., Marigómez, I., Soto, M., Cancio, I	Toralla Marine Science Station & ECIMAT University of Vigo, Spain
9.45 h	Projecting impacts, reducing risk: Long-term coastal management under multiple drivers of change	<u>Brown, S.</u> , Nicholls, R.J.	University of Southampton, UK

10.00 h	Implementation of an Adaptation Strategy for Coastal Protection by Applying Results of Research Projects	<u>Berkenbrink, C.</u> , Knaack, H., Weisse, R., Wessels, A., Wurpts, A., Niemeyer, H.D.	Coastal Research Station of Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency, Germany
10.15 h	The cross-border region of Pomerania – a key territory where the socio-economic convergence processes drive coastal zone transformation in the Baltic Sea area	<u>Dutkowski, M.</u> , Balanicka E., <u>Czapliński P.</u> , Dendewicz S., Szydarowski W., Zaucha J.	University of Szczecin, Poland
10.30 h	Coffee break		
11.00 h	On human relations to coastal waters	<u>Stenseke, M.</u>	University of Gothenburg, Sweden
11.15 h	Addressing integration challenges in maritime spatial planning (MSP): understanding approaches and tools in the BaltSpace project	<u>Kannen, A.</u>	Helmholtz-Zentrum Geesthacht, Germany
11.30 h	Integrated coastal and marine planning as a tool for science based conflict resolution	<u>Janssen, H.</u>	Leibniz Institute for Baltic Sea Research Warnemünde, Germany
11.45 h	Working with nature: soft coastal protection in Aotearoa New Zealand	<u>Gesing, F.</u>	ZenTraClim / artec Sustainability Research Center Bremen NatureCultures Lab, Germany
12.00 h	Lunch		
13.00 h	Poster session		
14.00 h	Parallel sessions:		
	Breakout group III "Data visualisation"		
	<u>Convenor:</u> Holger Janssen, Leibniz Institute for Baltic Sea Research Warnemuende		
	<u>Keynote:</u> Belén Martín Míguez, European Marine Data and Observation Network (EMODnet)		
	Breakout group IV "Marine Sciences & Society in the 21st Century"		
	<u>Convenor:</u> Michi Knecht, University of Bremen		
	<u>Keynote:</u> Anna-Katharina Hornidge, Leibniz Center for Tropical Marine Ecology (ZMT)		
15.30 h	Coffee break		
16:00 h	JPI Oceans - Science Support To Coastal and Maritime Planning and Management	Pierpaolo Campostrini	JPI Oceans Executive Committee member CORILA - Consortium for Managing Scientific Research on Venice Lagoon System
16.30 h	Plenary discussion		
17.00 h	End of Session 2		

Session 3 (7th October 2015): Workshop “Demonstration missions and improving knowledge for a fully integrated coastal management”

Venue: Einstein Hall

Time	Presentation	Speaker	Affiliation
9.00 h	Welcome	<u>David Turner</u>	University of Gothenburg, Sweden
9.05 h		N.N. (to be confirmed)	EC DG Research
9.30 h	Blue Baltic	<u>Andris Andrusaitis</u>	BONUS Secretariat (EEIG), Helsinki, Finland
10.00 h	Future Earth	<u>Thorsten Kiefer</u>	Future Earth Global Hub Director-Paris
10.30 h	Greening the blue - sustainability from the perspective of a maritime region	<u>Jessica Hjerpe-Olausson</u> & Anders Carlsberg	Region Västra Götaland, Sweden
11.00 h	Coffee break		
	Foresight Session:		
11.30 h	European Marine Biological Resource Centre (EMBRC) - a distributed European Research Infrastructure	<u>Nicolas Pade</u>	Marine Biological Association, Plymouth, UK
12.00 h	Networking Research, Technology and Capacity Building for future European Coastal Science	<u>Karen H. Wiltshire</u> , Abele, D.; Bathmann, B; Boersma, M.; Brey, T., Burchard, H.; Fische P.; McGrane, P.; Overduin, P Schäfer, A.; Lantuit,H.; Seeyave, S.	Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Germany
12.30 h	The assessment of ecosystem services for coastal areas management: new insights and perspectives	<u>Eric Thiébaud</u> , B. Kloareg, Mongruel, R.	Station Biologique de Roscoff, France
13.00 h	Lunch break		
13.45 h	Synthesis Workshop		
	Convenor: Ulrich Bathmann, Leibniz Institute for Baltic Sea Research Warnemünde, Germany		
16.00	End of Symposium		

* underlined author

** affiliation of the speaker

List of posters

1 - Eutrophication and pollution assessment in Greek coastal areas in relation to different pressures

Pavlidou, A., Hatzianestis, I., Gogou, A., Tsapakis, M., Simboura, N., Parinos, K., Rousaselaki, E.

2 - The Dutch coast: a key region for Future Coast

de Vries, S., Stive, M.J.F., Zijderveld, A., Lodder, Q., van Thiel de Vries, J

3 - Ecosystem functioning in the Gulf of Lions shelf and oceanic areas

Carlotti F.

4 - Biodiversity conservation and larval dispersal: the Gulf of Lions test case

Guizien, K.

5 - Baltic TRANSCOAST – Understanding the coastal ecocline

Böttcher, M. E., Brede, M., Burchard, H., Forster, S., Janssen, M., Jurasinski, G., Karsten, U., Leinweber, P., Lennartz, B., Rehder, G., Schubert, H., Schulz-Vogt, H., Voss, M.

6 - How many shifts are too many: Natural and anthropogenic change at the entrance to the Baltic Sea

Weinberger, F., Holmer, M., Pedersen, M.F.

7 - Organic association of dissolved iron and copper in the subterranean estuaries of a barrier island in the German North Sea

Waska, H.

8 - The Rías Baixas (Galicia, Spain): Coexistence of urban uses and shellfish production in an upwelling-driven, highly productive marine environment

Villanueva, A., Fernández, E.; Álvarez-Salgado, X.A.; Beiras, R.; Ovejero, A. and Méndez, G.

9 - The environmental footprint of shipping

Turner, D.R., Hassellöv, I.-M.

10 - An acidic future for Norwegian fisheries? Assessing the socio-economic vulnerability of the Norwegian fishery sector to the threat of ocean acidification

Heinrich, L.

11 - New Polar Pollutants in coastal environments

Fisch, K., Orlikowska, A., Schulz-Bull, D.*

12 - Sedimentary carbon burial- an overlooked service of the marine environment to the mankind; quantification and evaluation

Pempkowiak J., Pazdro K., Kuliński K., Winogradow A., Zaborska A., Węslawski M

13 - Danish fishermen's future life and profession in ICES transition area 22 – understanding development since 1980

Overgaard, C.R.

14 - JERICO: A European network of coastal marine infrastructure for science and policy

Puillat, I., Farcy, P., Delauney, L., Gremare, A., Petersen, W., Petihakis, G., Perivoltis, L., Nair, R., Sparnocchia, S.

15 - The integrated and multidisciplinary Western Channel Observatory, UK

Torres, R., Smyth, T., Fishwick, J.

16 - The Western English Channel Microbial Observatory

Cunliffe, M., Thiebaut, E., Simon, N., Pade, N.

17 - The German Working Group 'Aquatic Optical Technologies'

Schulz, J., Möller, K.O., Bracher, A., Hieronymi, M., Cisewski, B., Zielinski, O., Voss, D., Gutzeit, E., Dolereit, T., Niedzwiedz, G., Kohlberg, G., Schories, D., Kiko, R., Körtzinger, A., Falldorf, C., Fischer, P., Nowald, N., Beisiegel, K., Martinez-Arbizu, P., Rüssmeier, N., Röttgers, R., Büdenbender, J., Jordt-Sedlazeck, A., Koch, R., Riebesell, U., Iversen, M.H., Köser, K., Kwasnitschka, T., Wellhausen, J., Barz, K., Rohde, S., Nattkemper, T.W., Schoening, T., Peeters, F., Hofmann, H., Busch, J., Niehoff, B., Stohr, E., Winter, C., Herbst, G., Konrad, C., Schmidt, M., Linke, P., Brey, T., Nolle, L., Bathmann, U

- 18 - The Department Maritime Systems, Rostock University
Lennartz, B., Kunz, F.
- 19 - Leibniz ScienceCampus Phosphorus Research Rostock: Towards sustainable phosphorus management
Bathmann, U., Krämer, I., et al.
- 20 - RESOMAR and SOMLIT: two French National Networks
Savoie, N., Grémare, A., Heussner, S., Sautour B.
- 21 - DYNALIT - a French national initiative towards the observation of Coastal Development and Coastline Dynamics
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- 22 - Long-term coastal time series sites in Germany: Helgoland Reede (North Sea) and Boknis Eck (Baltic Sea)
Bange, H.W., Wiltshire, K.H.
- 23 - The guest science programme at the Biological Station Helgoland
Brodte, E.
- 24 - Institute of Oceanology of the Polish Academy of Sciences (IO PAN) activities in the coastal research
Pazdro K.
- 25 - The Hydrobiological Station of Chioggia: a platform to study the coasts and lagoons of the north-western Adriatic Sea.
Vezi, A., Mazzoldi, C., Lanfranchi, G.
- 26 - Towards an integrated view of benthic and pelagic processes in the southern North Sea (German Bight)
Friedrich, J., Janssen, F., van Beusekom, J.E.E., Naderipour, C., Neumann, A.
- 27 - The assessment of ecosystem services in the Gulf normand-breton (English Channel): a case study from the Valmer project
Thiébaud, E., Schoenn, J., Le Mao, P., Dedieu, K., Morrisseau, F., Rolet, C., Cabral, P., Martin, J.C., Mongruel, R.
- 28 - SECOS: The Service of Sediments in German Coastal Seas - Coastal zones meets society
Brodte, E. & Bathmann, U.
- 29 - Integrating meiofauna and biomarkers in Coastal Zone Management
Lampadariou, N., Sevastou, K., Parinos, C., Gogou, A.
- 30 - Isolation of Hydrocarbonoclastes bacteria and study of the effect of pH, temperature and tolerance crude oil on their growth
Khelil, F., Matallah-Boutiba, A., Chemlal-Kherraz, D., Boutiba, Z.
- 31 - On the need for an overarching network of automatic non-invasive underwater observatories continuously monitoring coastal zones
Gröger, J.
- 32 - Survey on the frequency of sea viewings and their psychological effects
Peng, C., Yamashita, K., Kobayashi, E.
- 33 - Coastal information system based on OpenEarth for better understanding and decision making
Zijderveld, A., Hendriksen, G., den Heijer, C., Santinelli, G.
- 34 - A Geo-Referenced Information System for Southern North Sea Benthos - Serving Science and Stakeholders
Brey, T., Gutow, L., Dannheim, J., Holstein, J., Shojaei, M., Wrede, A.
- 35 - KÜNO & IOWMETA - Two approaches for building links to national and international data portals
Feistel, S., Jürgensmann, S., Koldrack, N., Schmidt, N.
- 36 - Coastal research and management needs common data infrastructures

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37 - Visualization of Georeferenced Pollution Data from the Galician Rias for Environmental Coastal Management

Blanco, R., Tato, T., Vidal-Liñán, L., Villanueva, A., Beiras, R.

38 - Spatio-temporal investigations of the shore-sea interface with low-cost airborne imaging

Wellhausen, J., Rüssmeier, N., Zielinski, O.

39 - The International Coastal Atlas Network (ICAN)

Kopke, K., LeTissier, M., Dwyer, N.

40 - eBaltic-Grid – a system for visualization of past, present and future physical state of the Baltic Sea

Jakacki, J., Przyborska, A., Przyborski, M., Białoskórski, M., Nowicki, A., Tylman, R.

41 - Improving surface current forecasts for the German Bight using HF radar measurements

Schulz-Stellenfleth, J., Stanev, E.V.

42 - Integrated numerical models and observations for the coastal ocean: a 10-year perspective in France with Previmer

Ardhuin, F., Pineau-Guillou, L., Garreau, P., Lecornu, F., Charria, G., Marié, L., Redelsperger, J.L., Pianezze, J.

43 - Coupled ice-ocean model of the Baltic Sea

Jakacki, J., Przyborska, A., Kosecki, S.

44 - MOSSCO --- A generic model system for coastal ocean applications

Klingbeil, K., Lemmen, C., Nasermoaddeli, M.H., Hofmeister, R., Kerimoglu, O., Kösters, F., Burchard, H., Wirtz, K.W.

45 - The coupled Modular System for Shelves and Coasts (MOSSCO)

Lemmen, C., Hofmeister, R., Klingbeil, K., Nasermoaddeli, M.H., Burchard, H., Kösters, F., Wirtz, K.W.

Abstracts Oral Presentations

Session 1: Scientific knowledge in coastal model regions

Mediterranean Sea: MERMEX project results and potential evolution

Sempere, R., Durrieu de Madron, X., Guieu, C., Pairaud, I.

*Aix Marseille University, France**

The semi-enclosed nature of the Mediterranean Sea, together with its smaller inertia due to the relative short residence time of its water masses, make it highly reactive to external forcing. This region, which has been identified as a "hotspot" for climate change, is therefore expected to experience environmental impacts that are considerably greater than those in many other places around the world. These natural pressures interact with the increasing demographic and economic developments occurring heterogeneously in the coastal zone, making the Mediterranean even more sensitive. The current knowledge on and expected changes due to single forcing (hydrodynamics, solar radiation, temperature and acidification, chemical contaminants) and combined forcing (nutrient sources and stoichiometry, extreme events) affecting the biogeochemical fluxes and ecosystem functioning are explored within the project MERMEX in the framework of MISTRALS program. MERMEX project based on MERMEX group white book (*) is dedicated to the response of Mediterranean ecosystems and biodiversity to climate changes and anthropogenic pressure. MERMEX aims to deepen the current understanding of the Mediterranean marine ecosystems to better anticipate their upcoming evolution. It is focusing on the response of ecosystems to modifications of physico-chemical forcing at various scales, both in time and space, linked to changing environmental conditions and increasing human pressure. Four years MERMEX results clearly showed that several processes including winter dense surface water convection, surface water stratification, river water discharge and episodic desert dust inputs play a major role on marine productivity as well as on organism community structure. Slight modifications of such processes that will be very likely affected by global change in 21th century can induce significant changes in Mediterranean Sea ecosystems.

Patterns, Trends and Management of Marine Biodiversity in the Tuscan Archipelago and Regional Coasts

Benedetti-Cecchi, L.

*Dipartimento di Biologia, University of Pisa, Italy**

The Tuscan Archipelago (TA) is the largest marine park of Europe. It embraces fully protected islands where all forms of human activities are banned and islands that alternate protected with open access areas. Tourism is a main resource for the TA with more than 8 million of visits per year. This setting offers a unique opportunity to evaluate conflicting options of coastal use and to integrate scientific understanding into the decision-making process of coastal management. We illustrate how long-term biodiversity data on benthos and coastal fish coupled with manipulative field experiments has allowed us to address questions relevant to coastal management, including factors that can trigger regime shifts and how they can be anticipated, the causes and consequences of species invasions and the design of networks of marine protected areas. Complimentary biodiversity data from heavily urbanized coasts of the mainland and the availability of remote sensing data and indices of human impacts have allowed the identification of the most important threats to regional biodiversity. Our research programme is mature to become integrated into transnational and transdisciplinary initiatives aimed at evaluating the impact of global and regional pressures on marine coastal biodiversity, to guarantee the sustainable use of the coastal zone across Europe.

The Aquitaine coastline: a set of models for future coastal studies

Grémare, A.

*University of Bordeaux, France**

The Aquitaine coastline encompasses a set of emblematic ecosystems, which potentially constitute pertinent models in future coastal studies. this includes: (1) The Gironde River (one of the largest "natural" estuary in Europe, (2) the arcachon Bay (which used to host the largest meadow of dwarf seagrasses in Europe, (3) the Aquitaine

sandy coast, which is exposed to both sea level rise and to the increase in the frequency and intensity of winter storms and resulting hazards such as littoral floodings, and (4) submarine canyons (which could be either tightly connected to the coast line (Cap Breton) or fully offshore (Cap Ferret).

All these ecosystems have, and still are, the subject of: (1) intensive observations, and (2) coordinated research actions. The Gironde River is currently monitored within the National Observation project SOMLIT and the regional network of automatized buoy MAREL. The Arcachon Bay is also currently monitored within SOMLIT, whereas the sandy coast is currently monitored within both the national observation project DYNALIT and a local project based on continuous high-frequency video observation. Current research projects are: (1) coordinated via the Laboratory of excellence COTE (which has its two workshop areas within the Gironde River and the Arcachon Bay), (2) coordinated through the Aquitaine region Council (projects currently running in all 4 considered ecosystems), and (3) numerous individual national (ANR, LEFE and EC2CO) projects.

Examples will be given of the kinds of knowledge generated by such a nested approach and their possible transposition/generalization.

A Delft perspective on the State of the art in coastal modelling and the need for data.

de Vries, S., Stive, M.J.F., Zijderfeld, A., Wang, Z.B.

*Delft University of Technology, Netherlands**

TU Delft (in cooperation with Deltares) has developed a strong profile on the mathematical modelling and prediction of coastal processes including coastal hydrodynamics, marine sediment transport but also dune erosion and dune building. The Dutch government uses such models to predict safety levels with respect to the coastal zone. Notable examples of widely used models are ASMITA for tidal basins and estuaries, the Delft3D morphological modelling suite including SWAN for nearshore waves and XBeach for dune erosion.

TU Delft and its partners aim to continue and expand our collaborations to focus on modelling and predicting the evolution of the coastal systems worldwide under both natural and anthropogenic forcing. Recent advances are made in the coupling of models but also in the modelling of specific processes such as dune growth and the effects of ecological development on coastal sediment transport processes. However, most studies are data hungry and we are currently investing in innovative data collection techniques such as data assimilation using video, short term morphology using Jetski and global morphology using crowd sensing approaches to allow morphological analysis and prediction on the medium to long timescales in particular. To meet the future information demands of coastal developments, an integrated approach, bridging monitoring, modelling and predicting of coastal development on different geographical and time scales is needed.

COSYNA – an observation system for European coasts and beyond

Brix, H. and the COSYNA Team

*Institut für Küstenforschung, Helmholtz-Zentrum Geesthacht, Germany**

The automated observing and modeling network COSYNA has been established in order to better understand the complex interdisciplinary processes of Northern Seas and the Arctic coast, to assess the impact of anthropogenic changes, and to provide a scientific and data infrastructure. The principal objective of observations and instrument development is to improve our understanding of the interdisciplinary interactions between physics, biogeochemistry and ecology of coastal seas, to investigate how they can be best described at present, and how they will evolve in the future. Recurrent local and regional issues are, for example, safety of transportation, coastal defense against storm surges, or morphology changes due to sediment transport. These issues are intertwined with global problems such as climate change, sea level rise, and ocean acidification that in turn influence in particular the ecosystems and communities along the coasts. To address these challenges COSYNA has created a network of national and international partners, with whom new technologies are developed, tested and implemented. As part of COSYNA, data and knowledge tools are developed and provided to be of use for multiple interest groups in industry, agencies, politics, environmental protection or the public. Since COSYNA is one of the densest observing systems located in one of the most heavily used coastal areas in the world, it may serve as a role model for other parts of the European and "Global Coast".

Submarine groundwater discharge in Europe and effects on coastal zones

Scholten, J., Garcia-Orellana, J., Masque, P., Rocha, C., Schlüter, M., Stieglitz, T., Van Beek, P

*Institute of Geosciences, University Kiel, Germany**

Coastal zones host some of the most dynamic, diverse and productive ecosystems on earth. These zones experience significant pressure from anthropogenic activities (large cities located along the coastline, tourism, (aqua) farming). Whilst the critical role of surface water discharge from rivers is well documented, the influence of subsurface flow of groundwater to the sea, i.e. submarine groundwater discharge (SGD) - a process observed worldwide - on the functioning of coastal ecosystems is less considered in coastal management and EU policies.

In the past few years research on SGD along European coastlines has provided clear evidence that this transport pathway contributes significantly to the fluxes of terrestrial-derived nutrients, metals and pollutants (e.g. mercury) to coastal waters and is also an important process influencing the management of coastal aquifers. Hence, understanding of SGD and evaluation of the impact of the chemical fluxes associated with SGD in both coastal aquifers and the adjacent marine environments are essential to maintain sustainable coastal water resources and related ecosystem services for the future.

In this context we present important results of SGD research in Europe (Mediterranean Sea; North Seas) that highlight the necessity to include this process in future coastal management programs.

Geographic patterns in European coastal ecosystems as observed through EMBOS

Hummel, H., Avesaath, P. van, Arvanitidis, C., Juanes, J.A., Frost, M.

*Monitor Taskforce, Royal Netherlands Institute for Sea Research, Yerseke, Netherlands**

Marine coastal waters are not restricted by national boundaries. Marine environmental issues are therefore best considered at the large, European, scale. Knowledge of the marine realm is however strongly fragmented between disciplines and nations and in temporal focus.

The COST Action EMBOS on a European Marine Biodiversity Observatory System (a follow-up of the MARS initiatives BIOMARE and MarBEF) was recently initiated, as firm step to overcome this fragmentation by developing a large-scale biodiversity monitoring system using harmonized methods.

In a series of surveys carried out at a range of marine stations along the European coastline, the degree and variation of benthic and pelagic diversity was measured using harmonised approaches and tools. We will show the added value of such an approach and provide examples of large-scale biodiversity patterns.

Community diversity of hard substrata showed a latitudinal (N-S) gradient, whereas in soft substrata the diversity peaked at latitudes around 40 to 50 oN. Trends are related to tidal level, salinity, temperature and grain size. Results indicate that latitudinal trends in diversity are indirect and merely a result of including typical areas, like the Baltic and Mediterranean.

Integrated management of coastal ecosystems: a new approach

Vasileiadou, K., Pavloudi, C., Arvanitidis, C.

*Institute of Marine Biology, Biotechnology and Aquaculture, Hellenic Centre for Marine Research, Greece**

After the establishment of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD), an effort has been made in order to assess the ecological status of aquatic habitats by means of ecological health / biodiversity indices. However, ecosystems' ecological quality is being assessed from a macrobenthic perspective and microorganisms are generally overlooked and not being taken into account, despite the fact that their abundance is orders of magnitude higher than the one of macroorganisms. Microorganisms are instrumental to the structure and functioning of marine ecosystems due to their essential part in the cycling of the elements and in the recycling of the organic matter. Furthermore, in both the aforementioned directives genetic diversity is not being taken into account. A combination of the different levels of biological diversity has been attempted in an lagoonal system taking into consideration the non-random co-occurrence of certain taxa, whether this may refer to species, haplotypes or operational taxonomic units. Positive co-occurrence, i.e. taxa that co-occur more often than expected by chance, may prove to be an important stepping stone towards a more holistic management of such ecosystems. In addition, such an approach could provide more insight in the conservation of vulnerable ecosystems relative to the functional diversity of the taxa.

How to measure and understand the functioning of ecosystem in a vertically layered sea?

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Comparison of observational data and model results has identified some major problems in relation to description of physical processes at scales relevant e.g. to phytoplankton dynamics and short-term transport and dispersion of particles in the sea. In many cases, a proper validation of model results is difficult due to the absence of observational data with the required resolution and coverage in time and space. In order to fill this gap a number of autonomous devices, including moored profilers, ferryboxes and gliders, is applied in the Gulf of Finland. Sub-mesoscale variability in the subsurface layers is mapped by the towed undulating vehicle and glider surveys near the autonomous profiling stations. The conducted surveys have revealed a variety of sub-mesoscale features in the surface and subsurface layer, e.g. upwelling and downwelling filaments and intra-thermocline intrusions. Contribution of ageostrophic sub-mesoscale processes into the energy cascade and their role in the development of stratification and re-stratifying the upper layer after major mixing events is described. It is concluded that a combination of measurement systems has to be applied to make a step forward in understanding of functioning of ecosystem in stratified sea areas such as the Gulf of Finland (Baltic Sea).

Transformation of model data to information - experiences with coastDat

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The idea of coastDat is to improve the data base in sparse observational marine regions and to increase data homogeneity and consistency. In doing so long-term historical model data of e.g. wind (e.g. storms), wind wave and tides surge hindcasts are developed and proofed for regions like North Sea and Baltic Sea. These data-sets are available in hourly resolution and highly spatial resolution to simulate the marine environment from 1948/1958 up to now. Scenarios of potential future developments in a changing climate are also available. The idea of coastDat is compatible in other coastal regions. The coastDat data sets are used for applications e.g. offshore wind industry (design [&] logistics), risk analysis and analysis of pathways of energy transition. More than 80 stakeholders have used coastDat data sets. They are composed of science networks (31%), economic actors (45 %) and administrating policy actors (14%). coastDat is suitable as an information base in order to develop possible future adaptation measures. Here the data set and the history are briefly described, validation is reviewed, and an overview about recent uses of the data is provided.

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Weisse, R., von Storch, H., Callies, U., Chrastansky, A., Feser, F., Grabemann, I., Günther, H., Pluess, A., Stoye, T., Tellkamp, J., Winterfeldt, J., Woth, K.: Regional meteorological-marine reanalyses and climate change projections: Results for Northern Europe and potential for coastal and o@shore applications. *Bulletin of the American Meteorological Society* 90, 849-860 (2009). doi:10.1175/2008BAMS2713.1
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Coastal Skagerrak and Kattegat: where giants meet

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Coastal Skagerrak and Kattegat is a region situated on the border between the low saline Baltic sea and the North Sea with its oceanic conditions. It is surrounded by three countries and subject to actions and guidelines from both the HELCOM and OSPAR conventions.

The area contributes to vital inflows of oxygenated bottom water to hypoxic bottoms in the Baltic Sea and its physico-chemical as well as biological state is strongly influenced by complex interactions among water masses entering from the Baltic and the North Sea. Thus, these coastal areas are highly variable and diverse from an ecological point of view, but also important and challenging from a management perspective.

Due to the traditions for marine biological and oceanographic reserach in the area, the availability of contemporary, long-term and historic data-sets is extensive. The aims of this presentation are to give overview of available data

from the Swedish coastal Skagerrak and Kattegat and to outline potential focal regions and topics where these data and the region can make important contributions to the understanding of coastal systems in northern Europe. The newly formed department of Marine Sciences, a multidisciplinary marine natural science department with strong links to the similarly newly formed "Centre for Sea and Society" and Swedish government agencies, has a wide range of expertise, experience and infrastructural resources to coordinate and carry out such work in a future large-scale initiative.

The Pomeranian Bay - a key area to understand processes at the southern Baltic Sea coast

Borowka, R. K., Deng, J., Dudzinska-Nowak, J., Dutkowski, M., Furmanczyk, K., Harff, J., Meier, H.E.M., Osadczuk, A., Schneider, R., Soomere, T., Voß, M., Witkowski, A., Zhang, W.

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The Pomeranian Bay form a key area to understand interactions of natural and anthropogenic processes and is proposed to serve as a model region of future research on harmonization of nature protection and regional development. The area consists of the open embayment and its coastal zone with highly diverse landforms. The environment is determined by the interaction of sea level rise, coastal erosion and accumulation, river discharge including supply of nutrients, and numerous economic pressure (sea traffic, fishery, tourism, harbour activity, energy production, agriculture in the Odra River drainage basin) causing conflicts between the exploitation of the resources and the sustainable protection of the environment. These conflicts require innovative concepts for regional planning and management not only of the coastal and offshore area, but, also upstream of the drainage basin. A special role play modelling tools for future projection covering natural processes including climate variations on all relevant space and time scales not only for the past and present, but also for future projections. Natural scientists, economists and engineers can rely on excellent research data bases including 200 years of sea level gauge data and results from various national and international research projects. Moreover it is required to set up international co-operations between Poland, Germany and neighbouring Baltic countries affected directly and indirectly by action plans to be elaborated.

Session 2: The human dimension of integrated approaches of coastal management

The estuarine management approach in Scheldt- and Ems-estuary, two cases of Integrated Coastal Zone Management

Taal, M.D.

*Deltares, Netherlands**

The estuaries of Scheldt and Ems are one of the few remaining natural estuaries in North West Europe. Both Dutch estuaries are shared with neighbour countries, are relatively well studied and have a long standing history of projects and a good research data basis. For the Scheldt estuary the cooperation is formalized in a Treaty, including joint research to support policy and management. For the Ems estuary also a tradition of scientific cooperation has evolved.

A comparison of both estuaries is presented with a policy analysis framework as guiding structure. What are prevailing aspects in the problem analysis? Which measures are considered? How is system knowledge used in the accompanying decision making? We will see that all three countries focus on flood protection, port or wharf accessibility s (e.g. Antwerp, Emden, Papenburg) and preservation of natural characteristics. For both estuaries the most important measures seem to be related to sediment management. A striking difference is the strong focus in the Scheldt estuary on morphology and sandy sediments. In the Ems estuary most attention is given to fine sediments.

Finally we will present and combine results of recent research to support Integrated Coastal Zone Management in estuaries. In these special types of coastal zones tidal evolution and salinity intrusion play a more important role. Moreover the systems have extra complexities in water governance and stakeholder involvement due to their geographical extension land inward, settings in which Deltares has ample experience.

The case studies reveal that development of both estuaries must be understood from their geological history and the human interventions, like embankments, polder-creation and maintenance of navigation channels. Objectives for sustainable development in such estuaries must take in account that choices in the past, like situation of settlements and ports, are an undeniable part of the system's history and are only in theory reversible.

Conflicts of use in the Strait of Sicily illustrate difficulties and opportunities of Marine Spatial Planning in the Mediterranean

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*National Research Council - Institute of Coastal Marine Ecology, Italy**

The Strait of Sicily area is presented. It separates Europe from Africa, and links the eastern and western Mediterranean sub-basins. Oceanographic patterns foster biological diversity and production supporting one of the most economically relevant fishing fleets in the Mediterranean. It holds spawning and nursery grounds, some of the last "pristine" habitats in the Mediterranean, and the biggest meadow of the endemic *P. oceanica* seagrass, providing widely acknowledged ecological services. About one third of the world maritime traffic passes through this channel, provoking chemical and acoustic pollution, and prompting the spread of exotic species at growing rate. A substantial amount of gas, as well as war refugees, enter EU crossing this area. No integrated management plan but multiple sectoral ones are in place.

Available data include time series fishery data; bottom topography and geomorphology; benthic biocenosis; fish diversity, spawning and nursery areas; oil and gas licenses and facilities; shipwrecks and untrawlable areas; MPAs; SCIs; SPAs; SPAMIs; projected wind-mill farms; submarine electricity networks, telecommunication cables and gas pipelines. A Marxan analysis is contemplated.

The main conflicts are between fisheries, conservation and tourism, and between the formers and the claims of the oil and wind-energy industries. Institutional overlapping and antagonism are present at different levels. Governance is top-down oriented and uncertainty is generally ignored.

Usage conflicts in coastal areas of the Northern Iberian Peninsula; human activities and environmental health surveillance in the Southern Bay of Biscay and the Galician Rías

Villanueva, A., Beiras, R., Troncoso, J., Marigómez, I., Soto, M., Cancio, I.

*Toralla Marine Science Station & ECIMAT, University of Vigo, Spain**

The Southern Bay of Biscay and Galician Rías harbor unique ecosystems (large estuaries, intertidal mudflats, rocky [&] sandy shores) with presence of important urban areas and industrial [&] farming activities. In Basque Country, river banks in Bilbao estuary have housed for over a century extensive mining/industrial activities that resulted in strong environmental deterioration. The 90s' sanitation plan succeeded in recovering water quality and ecosystem health, which are monitored periodically. Emerging problems now include sewage effluents with foci of persistent and emerging toxicant cocktails (e.g. xenoestrogenic effluents). The Rías host the biggest aquaculture production and fishing port in Europe, with important touristic activities and with one of the only two maritime National Parks in Spain. Long-term studies are performed in such emblematic reserves (Urdaibai, UNESCO MaB; Cies [&] Ons islands) supported by the Biscay Bay Environmental Biospecimen Bank. Maritime transport is also a key economic sector in the region, with some of most important harbors and navigation routes in Southern Europe. This results in frequent accidents such as the Prestige oil spill (2002) that affected the whole Northern Iberian coastline. ECIMAT and PiE-UPV/EHU, active in research in all these fields, constitute the Spanish node of EMBRC. They have long-lasting experience in marine ecosystem health assessment through the application of conventional and high-throughput biomarkers and bioassays.

Projecting impacts, reducing risk: Long-term coastal management under multiple drivers of change

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European coastal zones are at risk from flooding and erosion through rising sea-levels and other changes, unless adaptation is, or continues to be undertaken. Planning and management helps better inform decisions related to these changes. Strategic planning over long-time scales is informed by projections of sea-level rise, for example through the Dynamic Interactive Vulnerability Assessment (DIVA) model which quantifies land, people and wetlands at risk from sea-level rise and their associated costs under a range of sea-level and socio-economic scenarios. Part

of the presentation reports results of impacts and costs at European level from two EU projects (IMPACT2C and RISES-AM).

Projections of long-term impacts do have weaknesses as they often do not take into account the multiple interacting physical, economic and social factors that influence coastal zone management. Local studies are required to determine best practices and avoid antagonisms in reducing impacts. For example, hard protective measures are commonly used to reduce erosion and flooding, but these can induce additional pressures on the coast, particularly to the natural environment, such as greater erosion, overuse of land or degradation of aquatic ecosystems. Yet, these protective measures may become more commonplace in the future unless alternative, innovative management strategies are sought. This part of the presentation explores some of those options, using examples from around the European coast.

Implementation of an Adaptation Strategy for Coastal Protection by Applying Results of Research Projects

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Expected impacts of global climate change like sea-level rise, higher set-up of storm surges and increasing wave energy demand an adaptation of coastal protection. For the coastal lowlands of Lower Saxony a commission recommended the implementation of a strategy basing on results of two research projects A-KÜST and INTBEM. In A-KÜST the strategic options retreat, adaptation and protection have been evaluated for scenarios with a sea-level rise of 0,25 to 1,0 m until 2100 accompanied by an increase of the surge set-up of 0,25 to 0,5 m and a corresponding increase of wave energy. The option protection was differentiated in keeping the line, realignment and combined protection. The hydrodynamic loads due to the distinct scenarios have been analyzed by mathematical modeling of storm surges and waves with a similar accuracy as practiced in state of the art design of coastal structures. The results of the investigations made evident that keeping the line is the superior option in respect of both safety and economics. A comprehensive multi-criteria evaluation among regional key stakeholders based on engineering, economic and cultural criteria confirmed these results and highlighted enormous acceptance of the favored option. The results of INTBEM provided a design procedure allowing a higher overtopping tolerance of structures than nowadays practiced with a potential compensation of a sea-level rise of 0,5 m and more for the boundary conditions at the Lower Saxon coast.

The cross-border region of Pomerania – a key territory where the socio-economic convergence processes drive coastal zone transformation in the Baltic Sea area

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*University of Szczecin, Urban and Regional Studies Unit, Poland**

The cross-border region of Pomerania is spread along the Pomeranian Bay covering the coastal areas of Germany and Poland. However, the dynamic socio-economic convergence processes across the state borders in this part of the Baltic Sea area have resulted in a functional extension of the region to include also the nearby coastal territories of Sweden and Denmark.

Following the globalisation and technology progress trends, the region's traditional profile of maritime economies (fishing, ports, shipping, shipbuilding, seaside tourism etc.) have been gradually supplemented by new branches of economic activity (offshore industries, use of alternative energy sources – biogas, wind, advanced maritime technologies, blue and green tourism). Parallel, new energy infrastructure facilities (new LNG Port in Świnoujście, Nord Stream LNG offshore pipeline to Greifswald) have positioned the region as one of the central supply nodes in the Baltic Sea area.

The vigorous economic transformation of the region poses a challenge to unique ecological assets of the coastal zone, protected through Natura 2000, national park, and natural reserve regimes. The coordinated action to mitigate human impacts on the natural resources in the cross-border region of Pomerania requires a transdisciplinary approach, which would help collect the existing coastal zone research and planning experience from as many as four countries - and thereby provide a solid policy and action base for the sustainable development of the whole area.

On human relations to coastal waters

Stenseke, M.

*University of Gothenburg, Sweden**

Strategies and policies designed to meet the challenges and complexities of more sustainable futures are generally framed as an integration of a human system and a natural system. This tends to reinforce a modernist separationist perspective between nature and culture. Furthermore, the impact of 'people' is often reduced to one or just a few factors, thus concealing the multitude and complexity of approaches, perspectives, ideas and activities within the social sphere. This presentation concerns current efforts within marine and coastal spatial planning to accommodate an increasing set of activities and interest, with a certain focus on marine outdoor recreation. A recent nature conservation planning process in Sweden, the establishment of the Kosterhavet National Park, serve as a case study.

Addressing Integration Challenges in Maritime Spatial Planning (MSP): Understanding, Approaches and Tools in the BaltSpace Project

Kannen, A.

*Helmholtz-Zentrum Geesthacht, Germany**

The presentation will focus on integration challenges in Maritime Spatial Planning (MSP), illustrate these and introduce selected approaches and tools to address them. The presentation will draw on approaches and cases from the recently started BaltSpace project, but also projects like BaltSeaPlan and KnowSeas. After putting the diverse integration challenges into context and identifying mechanisms needed to deal with them, the presentation will focus on selected tools, e.g. the development of timelines to understand the evolvement of institutions, the Bowtie approach which is tested in ICES and in the BaltSpace project for policy analysis in MSP contexts and significance criteria to include cultural ecosystem services into planning.

Integration in MSP has a multidimensional character and includes challenges of horizontal integration across multiple sectors/policy, vertical integration through levels of government, and stakeholder and knowledge integration across diverse interests and epistemologies. In this presentation MSP will be established as a social process embedded in (and aiming to integrate across) political and policy processes of various sectors and at various policy levels. Therefore, the sea needs to be seen by planners as a social space and conflicts rooted in different perceptions, values and attitudes of coastal people can be observed. From the European perspective recognition of regional history, specifics and context may ask for different cooperation approaches in different areas. Overall, maritime spatial planning (and similar tools for integrated planning) need to be recognised as communication processes, supported by approaches which are able to link diverse sets of qualitative and quantitative information and help to span a transparent dialogue between groups of society and across spatial scales.

Integrated coastal and marine planning as a tool for science based conflict resolution

Janßen, H.

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Maritime Spatial Planning (MSP) has been given increased prominence recently in response to the problems of fragmentation of marine regulation, increasing pressures upon the seas and tensions between interests and environmental damage. MSP has also been identified as the central approach to give effect to the EU Blue Growth Strategy that promotes more intensive utilisation of marine resources to facilitate the growth of maritime economies, while improving ecological conditions in line with the EU Marine Strategy Framework Directive (MSFD) and macro-regional strategies, e.g. the HELCOM Baltic Sea Action Plan. An EU Directive on Maritime Spatial Planning was adopted in July, 2014 (2014/89/EU). As stated there MSP has by its nature to be integrated, i.e. including terrestrial, coastal, and marine dimensions. In accord with the MSFD, MSP decision-making should be underpinned by evidence based science while incorporating stakeholder participation in form of horizontal interactions to support Ecosystem Approach to Management (EAM). However, as of today coastal and marine planning face today a variety of challenges. A fundamental question linked to this is if policy approaches and mechanisms can be developed to support win:win outcomes and deliver Blue Growth and at the same time achieve environmental policy targets set by the marine Directives without conflicts. Major challenges are the integration of ecological variables, including e.g. aspects of nature conservation and Marine Protected Areas (MPAs), the ecosystem approach concept, and aspects of fisheries. Various critical assessments have concluded that a large fraction of MPAs are "paper parks". For MSP

it is a major challenge to develop sound spatial management structures if the validity and effectiveness of early building blocks like MPAs remain unclear. Challenges exist also in the integration of economic sectors in public MSP policy (e.g. maritime transports, fisheries, tourism etc.) and in imbalances resulting from insufficient integration between different (geo)political scales (e.g. local, regional, national, international) of MSP across national borders. Partly linked to this further challenges in the integration of stakeholder knowledge, values, interests, critique etc. in MSP with regard to important procedural aspects (e.g. transparency, legitimacy, power, mobilisation, timing, roles). This presentation summarises a review of the state of the art and latest progress in research on MSP and the various open challenges.

Working with nature: soft coastal protection in Aotearoa New Zealand

Gesing F.

*ZenTraClim / artec Sustainability Research Center Bremen Nature Cultures Lab, Germany**

No abstract

Foresight Session

European Marine Biological Resource Centre (EMBRC)- a Research Infrastructure for marine biological sciences

Pade, N.

*Marine Biological Association, Plymouth, UK**

EMBRC is a distributed research infrastructure (RI) with nodes located in marine biological stations and institutes across Europe. Marine biodiversity is a major target for fundamental science and an increasingly important resource for food, energy and industrial applications and therefore constitutes a focus for an increasingly diverse RTD community. EMBRC will provide these communities with comprehensive and complementary services, facilities and equipment to access and study marine ecosystems and biodiversity. EMBRC will represent a hub connecting science, industry and regional socio-economic development. The objectives are to 1) to support fundamental research and deepen knowledge on marine organisms and ecosystems; 2) promote the use of marine experimental models in mainstream science and raise the profile of marine biological sciences; 3) promote the sustainable development of marine biological resources; and 4) to promote the blue bio-economy of marine territories in Europe. EMBRC will deliver training and foster the mobility of researchers in Europe and internationally. EMBRC has started to engage with regional, national and European stakeholders, including the other ESFRI RIs, with the aim of consolidating a pan-European RI, rooted in the maritime regions of Europe and underpinning the blue bioeconomy. Working across the science, industry and socio-economic dimensions, EMBRC will contribute to scientific excellence, economic growth and employment in Europe.

Networking Research, Technology and Capacity Building for future European Coastal Science

Karen H. Wiltshire, Abele, D.; Bathmann, B; Boersma, M.; Brey, T., Burchard, H.; Fischer, P.; McGrane, P.; Overduin, P.; Schäfer, A.; Lantuit, H.; Seeyave, S.

*Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Germany**

The prognosis for human demography is that in the next 50-100 years the majority of the world's population will be living within 50 km of a coast. This poses questions and research challenges of global significance. Shelf seas and coastal zones interfaces of human activity, are already subject to great shifts in environment. This ranges from sea level rise and temperature rise, through- changed hydrography and particulate matter transport, permafrost thaw, changed estuaries and river outflow. Capping this, are shifts in pollutant type and loads, as well as overfishing and changed human economies and culture. The suite of complex processes affecting ecosystem services in coastal and shelf seas prompts the need for a holistic research approach to coastal change. We need new networks for example in contrasting ecosystems in polar and boreal seas. We require new innovative methodologies for example a network of automated measuring devices with excellent data dissemination. We need new forms of education and

capacity Building including the engineering sciences and particularly adjusted to the needs of coastal societies. We need to adjust our efforts to encompass the wide range of players and drivers acting along latitudinal gradients. Here we present new concepts for networking science, technology and building up human scientific capacity in the Coastal Oceans and Shelf Seas

The assessment of ecosystem services for coastal areas management: new insights and perspectives

Thiébaud, E., B. Kloareg, Mongruel, R.

*Station Biologique de Roscoff, France**

No abstract

* affiliation of the speaker (underlined)

Abstracts Poster Presentations

1 - Eutrophication and pollution assessment in Greek coastal areas in relation to different pressures

Pavlidou, A., Hatzianestis, I., Gogou, A., Tsapakis, M., Simboura, N., Parinos, K., Rousaselaki, E.

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The Greek coastal areas are impacted by several human activities such as treated and untreated sewage and industrial discharges, agricultural/livestock farm discharges, aquaculture (both finfish and shellfish), urbanization and tourism. It has been found that industrial discharges, port activities, sewage discharges, aquaculture activities, and fishing are the most important pressures affecting the coastal areas of Greece.

The majority of the Greek coastal areas have been classified into GOOD physicochemical status, based on the physicochemical characteristics of the water column (transparency, percentage of oxygen saturation and nutrients). Nutrient concentrations varied significantly among the Greek coastal areas with the highest values to be recorded in the coastal areas affected mainly by agricultural activities, aquacultures and sewages. The increased anthropogenic pressures have resulted, in some cases, in low nitrogen to phosphorus ratios, thus, in more N-limited coastal areas. High contamination from organic pollutants was identified in specific areas, mostly related to coastal industrial activities.

Long term data, concerning eutrophication and pollution assessment have been used for the implementation of WFD in Greek coastal waters. Saronikos Gulf, influenced from the effluents of Athens, has been monitored for 30 years, whereas a National Monitoring Program for the coastal waters of Greece is undertaken by Hellenic Center for Marine Research and run since 2012.

2 - The Dutch coast: a key region for Future Coast

de Vries, S., Stive, M.J.F., Zijderfeld, A., Lodder, Q., van Thiel de Vries, J

*Delft University of Technology, Netherlands**

The Dutch coastal zone has received much attention due to its importance for protecting low lying hinterlands from flooding. This has resulted in the founding of important national and regional institutes that are responsible for water (and coastal) management as early as the 13th century. Today, universities and research institutes continue to work together with local and national governments on studying and maintaining the Dutch coastal zone. We present the Dutch coast as a key region which is relatively data rich and where a strong alliance of research institutes, universities, industries and governments work together on scientific, commercial and governmental aspects.

The data availability is reflected in national databases containing accurately measured shorelines of the entire Dutch coast for over 150 years. This data collection has evolved over time adapting to advanced technologies resulting in the most comprehensive dataset that is globally available with respect to coastal development.

The strong alliances are reflected in joint research programs such as Building with Nature (<http://www.ecoshape.nl>) and the current activities around the Sand Motor. In the current Sand Motor related projects NATURECOAST (<http://www.naturecoast.nl>) and NEMO (<http://www.nemo.citg.tudelft.nl>) a total of 12 PhD candidates from different disciplines (geography, governance, engineering, ecology) as well as stakeholders are involved and these programs stimulate interdisciplinary research.

3 - Ecosystem functioning in the Gulf of Lions shelf and oceanic areas

Carlotti F.

*CNRS - Aix Marseille Université, France**

This poster presentation aims to provide an overview of the different national and European programs developed over the last three decades in the Gulf of Lion (Northern continental shelf of the Western Mediterranean Sea) to improve our understanding of structure and functioning of pelagic and benthic ecosystems and of the changes induced in them by human and environmental factors. The Gulf of Lions represents a highly productive system because of the Rhone River inputs, coastal upwelling activity, bottom morphology and water circulation on the shelf, as well as the hydrodynamic processes in adjacent oceanic basin and on its deep outer margin. Observation highlights changes in marine biota which could experience a 'cul-de-sac' effect if exposed to climate warming. Other studies suggest that most demersal and pelagic stocks are fully exploited or overexploited, inducing

changes in trophic food webs. Such effects of overfishing amplified by climate warming contribute to changes in pelagic and benthic biota, for instance increasing jellyfish outbreaks. The review will summarize the state of current functioning and responses of marine biodiversity, biogeochemical cycles and ecosystems with respect to key natural and anthropogenic drivers at the regional scale.

4 - Biodiversity conservation and larval dispersal: the Gulf of Lions test case

Guizien, K.

*CNRS, LECOB, Observatoire Océanologique de Banyuls sur Mer, France**

The Strategic Plan for Biodiversity 2011-2020 formulated a conservation objective of 10% of coastal and marine areas by 2020, imposing a scientific basis for designing new Marine Protected Areas (MPAs) to sustain biodiversity and ecosystem services inside and outside the protected area. Both the concept of sustainability (multi-generational persistence) and of linking the inside and outside of protected areas implicitly refer to dispersal processes occurring during the larval phase for most of marine species.

In the Gulf of Lions (NW Mediterranean sea), operational oceanographic models enabled to explore patterns of dispersal for a wide range of larval traits important for dispersal (Pelagic Larval Duration, spawning timing and duration, motility behaviour), summarized into connectivity matrices. These connectivity matrices were subsequently used to explore (1) the conditions of persistence of local populations dwelling in the soft-bottom and hard-bottom habitats of the Gulf of Lions and (2) of the role of regional connectivity in increasing populations resilience to natural and anthropogenic threats.

5 - Baltic TRANSCOAST – Understanding the coastal ecocline

Böttcher, M. E., Brede, M., Burchard, H., Forster, S., Janssen, M., Jurasinski, G., Karsten, U., Leinweber, P., Lennartz, B., Rehder, G., Schubert, H., Schulz-Vogt, H., Voss, M.

*Rostock University, Faculty of Interdisciplinary Research, Department Maritime Systems, Germany**

Baltic TRANSCOAST is a new DFG (German Research Foundation) Research Training Group jointly organized by the University of Rostock and the Leibniz Institute for Baltic Sea Research Warnemünde (IOW). Baltic TRANSCOAST studies the hydrodynamic, biogeochemical, and biological processes at the interface between land and sea, bringing together terrestrial and marine scientists. The overall objective is to deepen our understanding on how the marine coastal zone is influenced by terrestrial processes, and how the terrestrial coastal zone is impacted by marine processes. All investigations are closely interrelated and will be conducted at one common study site, the nature reserve "Heiligensee and Hütelmoor" nearby the city of Rostock, a coastal peatland. Peatlands are a potentially significant source of various compounds transported to the sea, while saline water intrusion may impact the biogeochemical processes within the peat. The research questions will be addressed by 12 PhD students, who will develop a broad and interdisciplinary expertise in coastal systems.

6 - How many shifts are too many: Natural and anthropogenic change at the entrance to the Baltic Sea

Weinberger, F., Holmer, M., Pedersen, M.F.

*GEOMAR Helmholtz-Zentrum für Ozean-Forschung, Marine Ecology Division, Kiel, Germany**

The Belts and Sounds that form the gate to the Baltic Sea are a natural laboratory for the study of environmental change effects on marine organisms and coastal communities. This sea area is characterized by extremely steep environmental gradients and parameters such as salinity, water temperature and pH are subject to frequent change. During the last century these natural environmental shifts have been increasingly superimposed by additional anthropogenic change. Namely, eutrophication has led to more algal blooms, to a reduced vertical extension of the photic zone and to increasing water deoxygenation and acidification. Overfishing and species introductions have caused and still cause shifts in trophic interactions. Global warming is expected to cause more abundant heat waves and storm events in the future. Biodiversity in the Southwest Baltic is relatively low and several species that were present in the past seem to be lost. Such declining coastal biodiversity is usually expected to impair ecosystem functioning and the resilience to external pressures, in particular to warming, acidification, deoxygenation and species invasion. However, the natural species inventory of the Southwest Baltic also comprises winners of environmental shifts, such as calcifiers that can cope with severe levels of ocean acidification. Moreover, new species that are introduced are often particularly capable to cope with frequently shifting environments.

7 - Organic association of dissolved iron and copper in the subterranean estuaries of a barrier island in the German North Sea

Waska, H.

*University of Oldenburg, Germany**

The subterranean estuary (STE) is an underground mixing zone between fresh meteoric groundwater and recirculating seawater. STEs are important biogeochemical reactors which control the fluxes of dissolved organic matter (DOM), and dissolved trace metals such as iron and copper, from land to sea. In this study, solid-phase extraction was used to isolate organically bound iron and copper from groundwater and seawater samples collected from two contrasting beach STEs on Spiekeroog Island, German North Sea. Through sequential elution, the organically bound trace metals were further fractionated into neutral/weak acidic and basic/strong acidic compound groups. Along the well-defined salinity gradient of the south shore STE, the dominant DOM fractions binding iron and copper underwent a change from basic/strong acidic DOM at the landward station to neutral/weak acidic DOM at the low tide waterline. Contrastingly, in the turbulent mixed pore waters of the western shore, weak acidic/neutral organically bound Fe and Cu contributed to the dominant isolated fractions throughout the whole STE. Ultrahigh-resolution mass spectrometry (FT-ICR-MS) analyses of the isolated fractions were processed applying a novel approach to identify metal-binding organic compound groups.

8 - The Rías Baixas (Galicia, Spain): Coexistence of urban uses and shellfish production in an upwelling-driven, highly productive marine environment

Villanueva, A., Fernández, E.; Álvarez-Salgado, X.A.; Beiras, R.; Ovejero, A. and Méndez, G.

*University of Vigo and IIM CSIC, Spain**

The Rias Baixas, located at the northern border of the Iberia-NW Africa eastern boundary upwelling ecosystem, are an incised deep (45 to 80 m maxim depth) valleys originated by the combined action of tectonic and erosive processes. Upwelling events promote a quick renewal (3-4 days) of the volume of water in the Rías, which is replaced by cold, oxygenated and nutrient-rich subsurface oceanic water, giving rise to fertilization of the embayment that translates into high primary production rates. This high productivity allows the development of an important shellfish exploitation activity. The Rias Baixas have more than 3300 rafts where near 250000 tons of mussels are produced annually. This territory has been subjected to an increasing human pressure since the early XX century deriving in an intense landscape transformation. The cities of Vigo, Pontevedra and Vilagarcía de Arousa showed a great increase in the number of inhabitants from 1900 to 2014. The Rias Baixas hold marine habitats in a good conservation state. There are protected areas and a National Park. Landscape is an important tourist attraction. Therefore, urban and industrial activities coexist with local fisheries and shellfish mariculture, economic sector that accounts for ca. 10 % of the Galician GDP. Solutions to the problems and conflicts require management proposals for the activities and spatial planning within the framework of ICZM.

9 - The environmental footprint of shipping

Turner, D.R., Hassellöv, I.-M.

*University of Gothenburg, Sweden**

Shipping has long been viewed as a sustainable transport option due to its relatively low carbon footprint. However, a complete assessment of shipping in the context of marine spatial planning needs to take into account additional environmental impacts, particularly in coastal systems. These include other emissions than CO₂ from the ships' smokestacks ("Ship Plumes"). Sulphur oxides (SOX) are a major focus of current interest, since these emissions are subject to increased regulation in designated control areas, with the allowed sulphur content of bunker fuel reduced from 1% to 0.1% as from January 2015. This new regulatory regime has stimulated strong interest in scrubber systems, which remove SOX from smokestack gases and thus allow ships to continue burning inexpensive high-sulphur fuel. However, the environmental consequences of the release of potentially toxic scrubber effluents to surface waters are largely unexplored. In addition to SOX, regulation of the emission of nitrogen oxides (NOX) is beginning to be implemented, and regulation of particulate emissions (PM) can be expected to follow

10 - An acidic future for Norwegian fisheries? Assessing the socio-economic vulnerability of the Norwegian fishery sector to the threat of ocean acidification

Heinrich, L.

*Lund University, Sweden**

To improve the understanding of potential socio-economic consequences of ocean acidification for the Norwegian coastal fisheries, I conducted a risk assessment among the 19 Norwegian counties applying the IPCC's SREX risk assessment framework. The SREX framework combines information regarding hazard, exposure, sensitivity and adaptive capacity. The results show that the northernmost counties are most at risk as high-latitude oceans are considered to be more threatened compared to lower-latitude regions. Furthermore, the analysis shows that particularly the southernmost counties, which engage in the harvest of crustaceans are more economically exposed due to the fact that these species are more susceptible to ocean acidification and generate a higher catch value. The results of the sensitivity related calculations show that the share of income generated from fisheries is very low compared to the total income. However, direct county comparisons highlight that the northern counties reveal a higher level of sensitivity, as the share of fishermen is substantially higher. Adaptive capacity is considerably lower in the northern counties than in the other counties. Overall, the final risk assessment points out that 13 out of 19 counties face moderate to high risk from ocean acidification. Overall, the SREX risk framework is applicable for evaluating the impacts of ocean acidification. In the case of Norway however, substantial improvements can be achieved by increasing the availability of detailed data, such as long-term monitoring of oceanic conditions, better information regarding the biological impact of species, and more detailed employment and income statistics. Although still in its infancy, integrated risk assessments are an important prerequisite for any form of interdisciplinary ocean acidification research and the development of successful response strategies.

11 - New Polar Pollutants in coastal environments

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Leibniz Institute for Baltic Sea Research Warnemuende

In recent years the occurrences of polar pollutants such as pesticides, pharmaceuticals and personal care products (PPCPs) in the aquatic environment have led to a considerable scientific interest. PPCPs make up a group of different pharmaceuticals such as antibiotic, anti-inflammatories and personal care products such as UV-filters, antimicrobial agents. This new group of pollutants can be seen together with pesticides as ubiquitous contaminants in aquatic environment.

A mayor concern is the unknown fate and the effect of polar pollutants on the marine environment and especially to marine organisms. In particular antibiotics receive special attention due to the potential that persistent occurrence can result in emergence of resistant bacterial strain. Polar Pollutants are relatively high soluble in water and their potential of adsorbing onto particles is low. Little is known about the environmental behavior of new pollutants, e.g. the adsorption to microplastic particles in seawater is less studied. Microplastics itself and toxic substances released from them act as important new contaminants.

The perpetual main input sources of polar pollutants into the aquatic environment are river run-offs and sewage treatment plants [Reemtsma et al. 2006]. Also the direct discharge of treated and untreated waste water are a source for PPCPs. Due to their constant input the concentration of these contaminants result in a steady-state principle in aquatic systems and can be seen as "pseudo"-persistent.

12 - Sedimentary carbon burial- an overlooked service of the marine environment to the mankind; quantification and evaluation

Pempkowiak J., Pazdro K., Kuliński K., Winogradow A., Zaborska A., Węśławski M

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Organic matter in the marine environment draws interest since it influences properties and processes in the marine environment. Moreover, it participates in the carbon cycling, and thus it is directly connected to the CO₂ partial pressure in sea water, and indirectly- to the atmospheric concentration of carbon dioxide. Organic carbon is a measure of organic matter.

Both land and the sea placed sources contribute to the organic carbon in seawater. Independently on the origin a fraction of the aqueous organic carbon is deposited to the sea floor. Part of it is returned to the overlaying seawater as a dissolved organic or dissolved inorganic carbon species flux, while the remaining portion is buried in the

subsurface sediments. This mechanism removes carbon from the immediate carbon cycling, and thus is an important carbon sink- a feature of utmost importance in the 'rising CO₂ in the atmosphere' world.

Data from coastal bays of the coastal seas: Baltic sea, Barents sea, and the Arctic fjords and the coastal seas itself are presented to support and to quantify the burial- a clearly defined service of the marine environment. As prices for CO₂ loads emissions in the international trading are well established, valuation of the service does not pose much problems.

13 - Danish fishermen's future life and profession in ICES transition area 22 – understanding development since 1980

Overgaard, C.R.

*Fiskeri og Søfartsmuseet, Denmark**

I like to present work in progress initiated by members of the Danish fishermen's organisation responsible for the fishing in ICES Transition area, Subarea III b, also called area 22.[1]

The fishermen have chosen area 22 because they feel the authorities know little about the development in fishing, and as a Bill restricting fishing in this area has been discussed in Parliament in 2014, the need for attention accelerated a wish for an analysis adding perspective for negotiations, initiating the work I like to present.

The fishermen suggested the period 1980-2014 as it is a period of decline in fishing. Fishing in area 22 has suffered particularly hard compared to other coastlines in Denmark, and only few fishermen remain today. The quota is now set according to the use of trawl, net and Danish Seine; any use of traditional gear like traps and pound net is not considered. Politicians do consider fishing tourism, not so much because of concern for their fishing gear or the effect of fishing on the fish' habitat, but because of the financial implications for the community. The local communities have lost much of their connection to the sea except for leisure, and many young people have no idea which fish live in their waters or what is a fishing season. They just buy fish in cans in the supermarket. It is very sad, but we must not give up. Then the fishermen in area 22 think the fishermen on the west coast get all the attention from the authorities, which is right. This is an issue among the fishermen themselves, but not an easy one either.

I meet with fishermen from five ports in the area 22 to acquire an understanding of the development in fishing providing for an analysis and a report and possible scientific publications. My work starts next week and lasts this autumn.

[1] See <http://www.fao.org/fishery/area/Area27/en>

vice president Allan Buch, Danmarks Fiskeri og Producent Organisation DFPO

14 - JERICO: A European network of coastal marine infrastructure for science and policy

Puillat, I., Farcy, P., Delauney, L., Gremare, A., Petersen, W., Petihakis, G., Perivoltis, L., Nair, R., Sparnocchia, S.

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The JERICO European research infrastructure is integrating diverse platforms (fixed buoy, ferrybox, glider, HF radar...) and their technologies to observe and monitor coastal European seas. The first steps were achieved in the framework of FP7-JERICO (www.jerico-fp7.eu, 2011-2015) project, co-funded by the European Commission with 27 partners. The work was focused on harmonization of the operation of coastal observatories to strengthen the European observing communities and make the infrastructure usable by a wide community through Trans National Access.

Next steps are driven in the H2020-JERICO-NEXT project, involving 33 partners. The main objective is to establish a Pan European approach for a coastal marine observatory network. This is a dynamic activity going beyond next years in terms of design, operation, maintenance, evolution and extension of the current systems as well as the delivery of data and products to the users. More specifically, the existing network and its possible evolution are continuously assessed taking in account the harmonization effort to be driven, in terms of technology and new methodologies to answer to societal questions. A proof of concept will be shown with 6 Joined activity research projects. Involvement of providers and stakeholders will be organised, both through the Forum for Coastal Technologies and the Trans National access program.

We'll present the work done towards FP7-JERICO and introduce the next steps in JERICO-NEXT.

15 - The integrated and multidisciplinary Western Channel Observatory, UK

Torres, R., Smyth, T., Fishwick, J.

*Plymouth Marine Laboratory, UK**

The coast off Plymouth (UK) has been monitored routinely since the latter decades of the nineteenth century. The more recent Western Channel Observatory (WCO), was established in 2005, and brought under one umbrella the time-series stations at L4 (50 m depth), situated 13 km off Plymouth, and E1 (75 m depth) situated 40 km offshore together with modelling and remote sensing expertise. L4 forms part of the ICES network of time series sites across the North Atlantic seaboard and is a "sentinel" monitoring site for the transitionally stratified regimes, under the European Marine Strategy Framework Directive. Both stations are sampled regularly by boat (L4 weekly, E1, fortnightly), and the observations include both the pelagic and benthic domains. Both stations are also monitored by hourly automated buoys measuring surface meteorology, sst, salinity, oxygen, nitrate, chlorophyll and suspended sediments. More recently, PML has established an atmospheric station at the mouth of Plymouth Sound measuring carbon dioxide, methane, sulphur dioxide, ozone and aerosols. The multidisciplinary characteristics of the WCO time-series means they are regularly analysed as part of the Marine Climate Change Impacts Partnership reporting to policy makers and other stakeholders. Findings from the WCO have also been used in status assessments, like the EU Marine Strategy Framework Directive (Defra, 2012) for which the Plymouth time-series are now included as part of the monitoring strategy (Defra, 2014). The fact that the WCO covers most marine ecosystem components also makes it unique in allowing the analysis of anthropogenic drivers in the context of natural variability.

16 - The Western English Channel Microbial Observatory

Cunliffe, M., Thiebaut, E., Simon, N., Pade, N.

*Marine Biological Association of the UK**

The Marine Biological Association (MBA) has maintained several long-term time-series stations in the Western English Channel for over 100 years, and which now form part of the Western Channel Observatory. The legacy of research undertaken across several decades at the time-series stations has underpinned our understanding of coastal biodiversity, ecosystem functioning and the impacts of global climate change.

Recent and current research activities at the time-series stations have included the application of omics tools, such as high-throughput sequencing, to assess coastal microbial diversity and ecosystem functioning. Examples include linking dynamic fluctuations in bacterioplankton community structure with changes in the availability of phytoplankton-derived organic matter, and seasonal-scale cycles of microbial eukaryote diversity.

In parallel with the UK-side Western Channel Observatory, the Station Biologique maintain different long-term time-series stations on diverse ecosystem components including the SOMLIT-Astan station off Roscoff where similar analysis of microbial diversity is performed. In the future, the stations could be developed in unison to establish a comprehensive Channel-wide observation platform for coastal research to help tackle the scientific challenges for sustainable use of marine ecosystems, assess the response of marine ecosystems to future changes in reaction to human activities and climate change, and management of coastal zones in Europe.

17 - The German Working Group 'Aquatic Optical Technologies'

Schulz, J., Möller, K.O., Bracher, A., Hieronymi, M., Cisewski, B., Zielinski, O., Voss, D., Gutzeit, E., Dolereit, T., Niedzwiedz, G., Kohlberg, G., Schories, D., Kiko, R., Körtzinger, A., Falldorf, C., Fischer, P., Nowald, N., Beisiegel, K., Martinez-Arbizu, P., Rüssmeier, N., Röttgers, R., Büdenbender, J., Jordt-Sedlazeck, A., Koch, R., Riebesell, U., Iversen, M.H., Köser, K., Kwasnitschka, T., Wellhausen, J., Barz, K., Rohde, S., Nattkemper, T.W., Schoening, T., Peeters, F., Hofmann, H., Busch, J., Niehoff, B., Stohr, E., Winter, C., Herbst, G., Konrad, C., Schmidt, M., Linke, P., Brey, T., Nolle, L., Bathmann, U

*Universität Oldenburg, Institut für Chemie und Biologie des Meeres, Wilhelmshaven, Germany**

In both the marine and limnic research various optical technologies are field-tested for a wide range of applications and scales. The recent working group 'Aquatic Optical Technologies' (AOT) documents national competences and offers researchers a platform for inter-institutional knowledge transfer.

In combination with this poster we present the first White Paper on optical technologies and recent developments in German marine and limnic science.

18 - The Department Maritime Systems, Rostock University

Lennartz, B., Kunz, F.

*Rostock University, Faculty of Interdisciplinary Research, Department Maritime Systems, Germany**

In 2007 the Department Maritime Systems was founded at Rostock University aiming at concentrating and promoting the research of various institutions in north-eastern Germany on maritime and coastal processes. The department forms, along with three other departments, the Faculty of Interdisciplinary Research.

The understanding and management of coastal and marine zones will become ever more important in the future because of the demographic and economic development. Within the department, oceanographers, engineers, environmental scientists, economists and lawyers jointly develop scenarios and strategies for the coastal area as habitat and economic space. The general idea is to foster inter-disciplinary, long-term research emphasizing the land-sea transition zone, biogeochemical cycles, sustainable use of marine resources and ecosystem conservation. Members of the department have acquired several coordinated third party funded projects. Noteworthy are the Leibniz Science Campus Rostock: Phosphorous Research, the BMBF (Federal Ministry of Education and Research) funded projects SECOS (The Service of Sediments in German Coastal Seas) and BACOSA (Baltic Coastal System Analysis and Status Evaluation). From 2016 onwards, the DFG (German Science Foundation) funded research training group Baltic TRANSCOAST will substantially contribute to the general aim of the Department Maritime System to deepen our understanding of coastal zones.

19 - Leibniz ScienceCampus Phosphorus Research Rostock: Towards sustainable phosphorus management

Bathmann, U., Krämer, I., et al.

*Leibniz Institute for Baltic Sea Research Warnemünde & Leibniz Science Campus Phosphorus Research Rostock, Germany**

Agriculture and the entire economy are challenged by limited phosphorus (P) availability in the future. Besides, inefficient use of P has severe environmental impacts: When large quantities of P enter coastal waters and seas, it can lead to over-fertilisation with the known effects. Therefore, strategies towards sustainable and more efficient use of P are urgently required in order to prevent the rapid depletion of reserves and to close nutrient cycles.

Five Leibniz Institutes and the University of Rostock have established a research network to intensify collaboration and research around the essential element P and its sustainable management. The Leibniz ScienceCampus Phosphorus Research Rostock brings together the expertise of around 100 scientists, thus creating the basis for a comprehensive exploration of P, its numerous chemical compounds and effects. In addition to the support from the Leibniz Association through a Graduate School and from Ministries of Mecklenburg-Vorpommern by a coordination office, the members of the ScienceCampus are currently involved in more than 30 thematically assigned projects with third-party funds. One focus is P-fluxes and cycles in the environment. Also interactions between the Baltic Sea ecosystem and human activities are investigated. We strive to ensure that the results achieve the policy beyond the boundaries of science to develop the necessary legislative measures and to support their implementation at national and international levels.

20 - RESOMAR and SOMLIT: two French National Networks

Savoie, N., Grémare, A., Heussner, S., Sautour B.

*University of Bordeaux, UMR EPOC; University of Perpignan Via Domitia, CEFREM, France**

The RESOMAR (<http://resomar.cnrs.fr/>) is the French National Network of Marine Stations and Observatories. It is led by the CNRS in collaboration with other national institutions like IFREMER and the National Museum for Natural History. It aims at coordinating common actions of national interest in the scope of observation and data bases, promoting and coordinating structuring research projects, and being a French interlocutor at international level. Disciplines of interest are physics, biogeochemistry, biology and geology in the pelagic and benthic domains.

Linked to the RESOMAR, the SOMLIT, the French Coastal Monitoring Network (<http://somlit.epoc.u-bordeaux1.fr/fr/>) of the CNRS and marine universities, carries out time series of sub-monthly resolution in order to understand the seasonal variability, the long-term changes and their environmental drivers in coastal systems. Eleven ecosystems are monitored since the late 90's for eight of them. Surface water is sampled every two weeks for 16 parameters (temperature, salinity and pH, concentration of dissolved oxygen, nutrients, SPM, chlorophyll a and particulate organic carbon and nitrogen (POC and PN, respectively), and more recently stable isotopes of POC and PN and pico- and nano-plankton). Some of the main findings concern the pronounced sensitivity of the coastal systems to climate variability, and the origin, composition and environmental drivers of the particulate organic matter.

21 - DYNALIT - a French national initiative towards the observation of Coastal Development and Coastline Dynamics

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*Institut Universitaire Européen de la Mer, France**

DYNALIT is a research-driven observatory gathering more than 120 researchers from 18 laboratories and 21 French universities, it aims at:

Collecting environmental data from space-based, airborne, marine and terrestrial monitoring systems along coastlines -26 observation sites on 3 environments: sandy beaches, cliffs, and estuaries, Increasing the knowledge of coastal dynamics processes and interactions, through innovative models and methods, Improving the understanding and the predictions of coastal resilience strategies to anthropic stresses and to extreme weather events, Contributing to a sustainable coastal risks management by assessing the vulnerability of coastal areas, Promoting free and open access to data/metadata. Initiated in 2011, DYNALIT is awarded with certifications from AllEnvi - the French Research Alliance for the Environment, and the CNRS, the National Centre for Scientific Research.

DYNALIT is a remarkable example of scientists pooling together expertises and facilities to address key challenges of coastline dynamics:

- It stimulates research collaborations: observations sites have been chosen to isolate one parameter/stress factor of morpho-dynamism; annual seminars are designed to foster unconventional approaches and transversal research, etc.
- It brings valuable mutualized resources and also provides opportunities to leverage further funding for research worldwide.
- It contributes to ensure long-term sustainability of observation series.

22 - Long-term coastal time series sites in Germany: Helgoland Reede (North Sea) and Boknis Eck (Baltic Sea)

Bange, H.W., Wiltshire, K.H.

*GEOMAR, Kiel, Germany**

The Helgoland Reede (German Bight, North Sea) and Boknis Eck (Eckernförde Bay, Baltic Sea) time series stations belong to the oldest –still operated– time series sites worldwide. Hydrographic measurements off Helgoland and Eckernförde began as early as 1873 and 1876, respectively. Regular biogeochemical/biological sampling (including dissolved nutrients, oxygen and plankton etc.) started in 1962 at Helgoland Reede and in 1957 at Boknis Eck.

The Helgoland Reede time series shows rapid changes in the marine ecosystem on all trophic levels. These can be related to three clear driving factors: (i) the immense shift in water temperature of 1.7 °C in the mean since 1962. (ii) Shifts in hydrographic patterns resulting in clearer more salty water and, (iii) a huge increase of “new species” many of which are warm water in origin.

The long-term trends at Boknis Eck show increasing water temperatures as well as decreasing oxygen and nutrients and are affected by both regional processes (eutrophication) and global processes (warming). The observed increasing frequency of anoxic events results from (i) enhanced summer stratification as well as enhanced bacterial respiration and (ii) the seasonal shift of strong wind events which, in turn, delays the termination of the stratification period.

23 - The guest science programme at the Biological Station Helgoland

Brodte, E.

*Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Germany**

Research on Germany's only island located in the open sea: Scientists at the Biological Station Helgoland (BAH) of the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research study biotic communities in the North Sea. Helgoland is the only German island located in the open sea, approximately 70 kilometers from the mainland. The rocky mudflat and the 35 square kilometer large submarine cliff landscape are home to the richest flora and fauna of the German coast – an oasis. Since 1892 scientists investigate this unique environment.

Guest science team endeavours to support external scientists and university courses in their work at the Biological Station Helgoland. We aim to network our guests to maximize the benefits derived from their research and to facilitate national and international science and education co-operations.

24 - Institute of Oceanology of the Polish Academy of Sciences (IO PAN) activities in the coastal research

Pazdro K.

*Institute of Oceanology of the Polish Academy of Sciences, Poland**

The mission of IO PAN is to conduct research focusing on processes occurring in the marine environment. The results of IO PAN activities support the sustainable use of marine resources and the conservation of the marine environment. The Institute conducts scientific research in the Baltic and European Arctic Seas. Principal strategic research fields are as follows: the role of the oceans in climate change and its effects on European seas, the natural and anthropogenic variability of the Baltic Sea environment, contemporary changes in shelf sea ecosystems, genetic and physiological mechanisms involved in marine organisms functioning and the principles of marine biotechnology. These are broad directions, that are composed of a number of activities likely to persist in the years to come. Examples of current main interests are: thermohaline circulation, sea water-atmosphere exchange processes, carbon cycling, the fate of new emerging contaminants in the coastal seas, the role of biodiversity in the functioning of coastal ecosystems, ecosystem services, investigations into the mechanisms changing the genetic diversity of commercially exploited marine animals, marine bio-optics, remote sensing methods for monitoring the Baltic Sea environment and coupled modelling. IO PAN manages a large database, which includes different oceanographic data gathered by the Institute over many years in the course of scientific expeditions in the coastal seas.

25 - The Hydrobiological Station of Chioggia: a platform to study the coasts and lagoons of the north-western Adriatic Sea.

Vezi, A., Mazzoldi, C., Lanfranchi, G.

*Department of Biology, University of Padova, Italy**

The Hydrobiological Station "Umberto D'Ancona" (chioggia.biologia.unipd.it/en/), founded in 1941 in Chioggia, inside the Venetian Lagoon (northern Adriatic Sea), constitutes an historical field station for researches on marine and lagoon environments. Strongly linked to the local realities, the Station collected several data and built databases over time. Two continuous datasets are freely available and yearly updated. From 1970s data on air and water temperature, salinity, pH, dissolved oxygen are collected inside the Venetian Lagoon. On the other hand a database on monthly landings of several marine species, reported by the local fishery, is maintained starting from 1945. Ongoing researches on coasts include: the relationship between environmental characteristics and fish communities of hard substrates, the spatial and temporal variation in microbiological communities, the effects of climate changes (acidification and temperature) and pollutions on marine invertebrates, fish, microbes and algae, the genetic structure of marine organisms, the relationship between environment and behavior in marine fish. The Station constitutes also a reference for local fishermen for the early warning of invasive species. Here we propose to expand the researches to address the challenges faced by coastal areas including the monitoring of key species (defined as study species with other research institutions), over space and time as sentinel for an earlier management of ecosystem changes.

26 - Towards an integrated view of benthic and pelagic processes in the southern North Sea (German Bight)

Friedrich, J., Janssen, F., van Beusekom, J.E.E., Naderipour, C., Neumann, A.

*Helmholtz Zentrum Geesthacht Center for Materials and Coastal Research, Germany**

The German Bight in the south-eastern part of the North Sea is strongly influenced by continental rivers and tidal forcing. The water column is completely mixed by tidal forcing and wind, largely preventing a simple downward flux of particles. Temporary deposition and resuspension, influence benthic mineralization and complex interactions between pelagic and benthic processes occur. Previous budget calculations indicate that the nutrient inventory has to be processed several times to support observed primary production, and, depending on water depth; only 10-20% remineralisation occurs in sediments of the German Bight whereas about 50% of organic matter is remineralised in the shallower Wadden Sea sediments. We use measurements of pelagic oxygen respiration based on Winkler titration, in-situ benthic oxygen uptake measurements based on flux-chamber landers and ex-situ incubations of intact sediment cores to assess the mineralization activity in the German Bight, the partitioning of benthic and pelagic processes and the factors influencing organic matter mineralization. Our results show that benthic remineralisation rates are almost an order of magnitude smaller than pelagic rates. Hence, our measurements confirm previous budget estimates. Both benthic and pelagic oxygen respiration show a strong seasonality; with higher oxygen uptake in the warm, productive season. During the summer season, oxygen uptake is significantly higher on muddy, organic-rich sediments than on fine sands or gravel. In areas deeper than 35 m with sediments of silty sands however, the lowest oxygen uptake has been measured. Epi- and infauna increase the benthic oxygen uptake and nutrient fluxes irrespective of sediment composition. These findings originate from the projects "NOAH - North Sea: Observation and Assessment of Habitats" and "WiMo – Wissenschaftliche Monitoringkonzepte für die Deutsche Bucht/Scientific monitoring concepts for the German Bight".

27 - The assessment of ecosystem services in the Gulf normand-breton (English Channel): a case study from the Valmer project

Thiébaud, E., Schoenn, J., Le Mao, P., Dedieu, K., Morrisseau, F., Rolet, C., Cabral, P., Martin, J.C., Mongruel, R.

*Station Biologique de Roscoff, France**

While ecosystem services assessment is acknowledged as a tool to support decision-making processes, its effective use remains rare. The InterReg Valmer project seeks to bridge the gap between theory and practice by associating natural scientists, economists and managers. Ecosystem services were assessed in 6 case-study sites on both sides of the Channel through monetary and non-monetary methods to management issues. In the Gulf-normand Breton site, the objectives were to provide an initial diagnosis of ecosystem services delivered by benthic habitats in a context of an implementation of a potential marine natural park. After a brief presentation of the project, the links between habitats, ecological functions and ecosystem services in the GNB will be analysed. Benthic habitats were mapped using the EUNIS typology at level 4 while key ecosystem functions and services were identified and assessed by using different metrics through an exhaustive review of the scientific and grey literature, an analysis of different datasets on human activities, and expert judgement. The importance of some of habitats in terms of ecosystem functioning and ecosystem services delivery was emphasized. Our attempt to analyse the habitats-functions-services relationships highlighted some major gaps: (1) large gaps in functional ecology; (2) a need to move from a static view toward a dynamic system; (3) a need to understand the sensitivity of marine habitats to cumulative effects. Despite these limits, the ESA allowed to develop a common culture on coastal systems among scientists, managers and stakeholders, and to inform on the potential effects of management measures on the socio-ecological system.

28 - SECOS: The Service of Sediments in German Coastal Seas - Coastal zones meets society

Brodte, E. & Bathmann, U.

*Leibniz Baltic Sea Research Institute Warnemünde, Germany**

Coastal and marginal seas serve as natural reaction sites for the processing and accumulation of land-derived discharges. The main location of modification and accumulation of input into coastal and marginal seas are in most cases the sediments. Within SECOS an approach for assessing relevant ecosystem services will be designed that match stakeholder needs. In field campaigns, experiments and with an enhanced sediment model a team of multidisciplinary scientist investigates the role and fate of elements, nutrients and pollutants in marine sediments and pore water. The results will contribute together with information of macro-zoobenthic associations

and their functions on habitat level to the GIS based Baltic Sea Atlas (German sector). This Baltic Sea Atlas (BSA) will in future provide information and rated maps for stakeholders in governance and science.

29 - Integrating meiofauna and biomarkers in Coastal Zone Management

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*Institute of Oceanography, Hellenic Centre for Marine Research, Heraklion, Greece**

To design and implement effective governance strategies and management plans we must understand the natural processes and dynamics of the oceans, the function of the ecosystems and their interconnection. In the context of an ecosystem-based approach for the monitoring and management of marine areas, we propose the use of meiofauna, an integral part of marine food web, as a tool for the assessment and monitoring of the marine environment. Essential to this effort is the complementary investigation of a suite of physicochemical parameters, the oxygen levels and the quality of organic matter, as it is revealed by the study of its chemical characterization (biomarkers) and stable isotopic composition. The use of these tools will help addressing important questions, such as what is the effect of anthropogenic impact on benthic ecosystem and what are the expected changes on their functioning? Can we rapidly assess environmental quality and mitigate for man's impact so as to use the seas in a sustainable manner? Answering these questions will advance the scientific knowledge for the development of a rational Integrated Coastal Zone Management.

Substantial part of our work will build on work already carried out at HCMR, related to:

1. the time-series station M3A
2. the quality assessment and monitoring of selected coastal habitats subjected to anthropogenic impacts, as part of the implementation of the MSFD
3. an extensive fieldwork that was carried out at different aquaculture sites

30 - Isolation of Hydrocarbonoclastes bacteria and study of the effect of pH, temperature and tolerance crude oil on their growth

Khelil, F., Matallah-Boutiba, A., Chemlal-Kherraz, D., Boutiba, Z.

*Environmental Monitoring Network, Algéria**

Our work aims at providing new methodological approaches to characterize microbial communities in marine pollution by oil and to evaluate the influence of some abiotic factors on the activity of biodegradation of oils by bacteria.

We have isolated 09 strains from seawater contaminated by discharges of the Arzew refinery in North- Western Algeria. The phenotypic identification of these strains allowed them closer to *Staphylococcus aureus*, *Micrococcus lylae*, *Acinetobacter* sp, *Flavobacterium breve*, *Pseudomonasaeruginosa*, *Pseudomonas luteola*, *Burkholderia cepacia*, *Burkholderia gladioli* and *Providencia rettgeri*. Five of these strains were identified for their ability to grow better in the presence of oil.

In order to test the capacity degradation of these strains to oil, a study of the evolution of certain parameters such as microbial concentration, pH, temperature and the monitoring of the tolerance of isolated strains to oil was realized. The results show that *Pseudomonas* has a broad spectrum of growth to a pH close to neutrality (6 to 8), while the optimum growth in the majority of species is observed at alkaline pH (10), the optimum temperature growth is observed at 25 ° C. We can see that the hydrocarbonoclastes marine bacteria isolated can tolerate up to 20% oil.

31 - On the need for an overarching network of automatic non-invasive underwater observatories continuously monitoring coastal zones

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The EU Marine Strategy Framework Directive (MSFD) and the recently revised EU Common Fisheries Policy (CFP) require the development of sustainable ecosystem-based management strategies to reach the goal of Good Environmental Status (GES). However, for a number of significant key ecosystem variables particularly of higher trophic species in the food web no homogeneous data series exist so far that allow well founded conclusions about the synergistic impacts of human pressure and climate change on coastal ocean systems. Especially in

German coastal waters, the foreseen construction of several thousand wind mills is expected to have a significant impact on the distribution and population dynamics of fish and other marine organisms. In traditional fish monitoring, state variables embedding the catches in the abiotic environment and processes which drive the distribution and abundance of food were not observed or available. Moreover, the traditional monitoring procedures rely on highly invasive, costly, time and labour consuming ship-survey methodology.

Hence, to foster the implementation of EU directives and the decision support a network of in situ underwater observatories would be required focussing on higher trophic levels in coastal zones. To illustrate this, an automatic non-invasive and continuous opto-acoustic underwater observatory will be presented here. Its overarching design allows monitoring the dynamics and biodiversity of fish, that of other marine organisms (including marine mammals) plus that of further MSFD indicators in coastal marine key areas such as wind parks, protected, spawning and nursery areas to aid in supporting a good environmental status and keeping the ecosystem services of these waters intact.

32 - Survey on the frequency of sea viewings and their psychological effects

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The purpose of this study is to evaluate if different frequencies of sea viewings have a psychological effect on individuals. We selected people, who live near the coast with sea viewings in Japan, to answer a questionnaire survey. The self-administered questionnaire included socio-demographic (gender), questions concerning the frequency of sea viewings, and a psychological effect inventory. 28 question items are classified as either positive or negative effects. A total of 301 respondents were categorized into three groups according to frequency of sea viewings: high frequency (see the sea every day), medium frequency (see the sea once a week or twice a week), and low frequency (see the sea once a month or not at all). People with high frequency sea viewings showed a significant positive effect difference when compared to medium and low frequency viewers. However, there was no negative significant difference between three frequency viewers. Furthermore, the association of different frequencies and males with psychological effects showed a high positive significant difference, but there was no negative significant difference. The association of different frequencies and females with psychological effects showed high positive and negative significant differences.

The findings of this study showed: (1) Different frequencies of sea viewings have a more beneficial psychological effect on individuals as the frequencies of the viewings increase. (2) The high frequency of sea viewings was more beneficial in terms of psychological effects for both men and women, than those with medium and low frequency viewings. Females who see the sea more frequently, showed less negative psychological effects than males. These results suggest that the benefits of frequencies of sea viewings are more strongly associated with increases in positive outcomes, and reductions in negative outcomes.

33 - Coastal information system based on OpenEarth for better understanding and decision making

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The coastal areas in the Netherlands are of immense importance for the Netherlands, protection of various large communities is very important but these areas also serve various other functions like nature, tourism and aquaculture.. The Dutch government is investing heavily in flood protection, monitoring and conservation in order to maintain the functions and enlarge knowledge of this valuable (eco-) system. With the development of an integral data management and information system this knowledge can be disseminated to various stakeholders via Open Geostandards and is easy to view. The technology used is based on the OpenEarth data management approach, which is a joint development of the TU Delft, the company Van Oord, and the knowledge institute Deltares.

The tendency is not only that data volumes rise due to higher spatial as well as temporal resolution but also that demands on derived information increase due to several European legislations and initiatives like MSFD, EMODNet and EuroGOOS. Further improvements to enable multiple usage of OpenData using Open standards are a logical outcome of the ever evolving data availability.

34 - A Geo-Referenced Information System for Southern North Sea Benthos - Serving Science and Stakeholders

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Multi-scale environmental change and increasing human demands turn coastal and shelf areas into complex and dynamic eco-socio-economic theaters. A sound scientific understanding of the principles at work as well as the ability to support sustainable management requires tools that enable us to disentangle these patterns and processes with high spatial and temporal resolution. A unified geo-referenced information system for the southern North Sea benthos constitutes such tool. Our contribution to this system represents almost 50 years of marine benthic research, in particular data on abundance and distribution of benthic species (currently information on [gt]550 benthic species and ±8700 sampling stations), their functional traits and trophic interactions. This information can be coupled with spatially referenced bathymetric, topographic, oceanographic, further biological and human activity data to deal with particular questions or hypotheses. Scientific questions include the spatial distribution and temporal development of benthic key processes such as bioturbation/-irrigation, carbon flow and nutrient recycling. Stakeholder interests focus on goods and services including biodiversity, production of food resources, or impact of offshore installations. Dissemination of results through information portals is seen as an integral part of the overall workflow.

35 - KüNO & IOWMETA - Two approaches for building links to national and international data portals

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In natural sciences, universities, research institutions as well as state authorities carry out research focused on distinct geographical areas delineated by legal or ecological definitions and are geared at mapping or monitoring of the ecological state. Therefore research data is of very heterogeneous nature. Accessing data and data products is difficult and often not standardized. KüNO and IOWMETA represent two approaches to facilitate data management and dissemination.

The purpose of the metadata information system IOWMETA is to provide a comprehensive catalogue and central infrastructure node of research data at the Leibniz Institute of Baltic Sea Research Warnemünde (IOW). Metadata, describing heterogeneous data, can be standardized and thereby facilitate an international exchange of data and metadata. IOWMETA is based on the ISO 19115 standard and incorporates the Open Source Platform GeoNetwork.

The umbrella project "Coastal Research in the North and Baltic Sea" (KüNO) and its data portal at <http://coastal-research.eu/data.html> aim to integrate and disseminate the scientific outcome of the individual KüNO projects and partner institutions including IOW. Furthermore data and metadata of other projects such as MDI-DE and COSYNA can be harvested via the data portal.

Our poster illustrates the different objectives of both systems in data collection as well as their potential to interact with each other and partners on a national or international basis, e.g. EMODnet or MDI-DE.

36 - Coastal research and management needs common data infrastructures

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Marine and coastal research has developed from local and sporadic limited measurements to long-term surveys and monitoring campaigns - consequently to the data-intensive and integrative science of today. The linkage of data and access to data beyond disciplinary boundaries became essential for marine research and coastal management. Therefore sufficient national and international data infrastructures are fundamental for central and easy access to the variety of existing, but distributed datasets in marine and coastal research.

The Marine Network for Integrated Data Access (MaNIDA) provides a national networked approach in accessing and mining of federated marine research data infrastructures together with data management strategies and data workflows. In that course the consortium conceptualized and developed the "Data Portal German Marine Research" for coherent discovery, view, download and dissemination of scientific data and publications.

The data portal is based on a central harvesting and interfacing approach by connecting distributed data sources. Since the German network of content providers have distinct objectives and mandates for storing data and information (e.g. long-term data preservation, near real time data, publication repositories), we have to cope with heterogeneous metadata in terms of syntax and semantic, data types and formats as well as access solutions. Therefore we defined a set of core metadata elements which are common to our content providers and useful for discovery and building relationships. Existing catalogues for various types of vocabularies are being used to assure the mapping to community-wide used terms. The web application allows browsing by e.g. monitoring platforms, vessels and date for exploring data and research gaps. Data-related information is homogeneously presented to the user and adaptable to specific disciplines. Data access and dissemination information is available as data download link, direct access or web services.

37 - Visualization of Georeferenced Pollution Data from the Galician Rias for Environmental Coastal Management

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*Toralla Marine Science Station, University of Vigo, Spain**

Chemical (metals, hydrocarbons, PCBs in mussels and sediments), ecotoxicological (Sea-urchin Embryo Test) and microbiological (Wastewater discharges) information from the Galician Rias obtained by our own coastal sampling campaigns or data published in the literature were gathered, georeferenced and made available to coastal managers through an open access on-line viewer. The application, integrated in the ECOTOX web is part of a Spatial Data Infrastructure (SDI) that meets the requirements of Open Geospatial Consortium, Directive 2007/2/EC (INSPIRE), and Spanish law (LISIGE, 14/2010), and it is included in the Spanish Infrastructure for Spatial Information. Data are used to classify sites in categories of ecological status according to internationally accepted assessment criteria, and visualised according to a colour code similar to that used by the OSPAR Commission in its Quality Status Report and by the Water Framework Directive; from best to worse status: blue, green, orange and red. The map viewer is a 3-tier client-server architecture consisting of a presentation tier (GeoExplorer a map composition tool based on the GeoExt and Openlayers libraries), a logic tier (two Java-based applications, GeoServer and Geowebcache), and a data tier (PostgreSQL server with PostGIS spatial extension to provide support geometry and geography data types and functions). Applications for coastal management within the context of Directive implementation, river basin management plans and 'mussel-watch' monitoring programs will be presented.

38 - Spatio-temporal investigations of the shore-sea interface with low-cost airborne imaging

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This paper presents an imaging hardware and examples of post-processing analysis methods for spatio-temporal investigation of the transition zone between open sea and shore by inexpensive airborne systems.

The transition zone between shore and sea is highly dynamic and prone to strong physical forcings. This zone ranges from far beyond the tidal fronts off-shore towards the dike, beach or dune belt ashore. The investigation of such systems is difficult, as local currents, tidal effects or geo-morphological characteristics impact the small scale on-site situation. Reference stations, like near-shore piles or moorings, are important platforms to gather time series data in such highly complex systems. Due to the spatial variability of the situation, such stations are not capable to map the highly dynamic structures as a whole. In this paper an inexpensive airborne remote sensing system is presented, to derive information to be matched with local observations.

The imaging system consists of an VIS digital camera (Basler acA2040-25gc, 1"CCD, 4 megapixel with Kowa LM6HC lens) and infrared microbolometer (Optris PI450, 382 x 288 px, with telephoto lens) used for nadir aerial imaging out of a light aircraft as carrier. Ground resolutions with 35-80 (VIS) and 35 (IR) cm per pixel, at an average altitude of 600 m. The aircraft is a touring motor glider (TMG), which is easy and cost efficient to operate. Still images are captured during the entire flight time. Additionally, meta-data are recorded. These include GPS position, barometric flight altitude, heading and speed from the FLARM aircraft anti collision system which provides IGC compatible flight recorder data. A time stamp for later matching is assigned to both the images and meta-data.

Research activities focus on three topics: detection of water surface wave properties, segmentation of regions with specified ground soil and multispectral image evaluation using VIS and IR.

39 - The International Coastal Atlas Network (ICAN)

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The ICAN is a community of practice of organisations who have been meeting since 2006 to scope and implement data interoperability approaches to coastal web atlases (CWAs). ICAN is the global reference for the development of CWAs and defines these as “collections of digital maps and datasets with supplementary tables, illustrations and information that systematically illustrate the coast for the purposes of coastal management and planning, oftentimes with cartographic and decision support tools, all of which are accessible via the Internet”. In 2013, ICAN became a project of UNESCO IOC’s International Oceanographic Data and Information Exchange (IODE) Programme. The strategic goal of the IODE ICAN project is to encourage and help facilitate the development of digital atlases of the global coast, based on the principle of distributed, high-quality data and information, at local, regional, national or international scale. ICAN’s over 70 members represent governmental, academic, NGO and private organisations from around the world and ICAN CWAs raise awareness about coastal and marine topics and may play an important role in informing national and regional decision- and policy-making across several themes, such as marine spatial planning, climate change, coastal and marine governance, coastal disaster management, population pressures and resource availability.

40 - eBaltic-Grid – a system for visualization of past, present and future physical state of the Baltic Sea

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The eBaltic-Grid system is a part of the Polish Grid Infrastructure developed under the PL-Grid project. It supports scientific investigations by integrating experimental data and results of advanced computer simulations carried out by geographically distributed research teams. eBaltic-Grid (<http://ebaltic.plgrid.pl>) is a currently developed new computer service dedicated mostly for scientists. The system is based on coupled ice-ocean model of the Baltic Sea driven by atmospheric data from operational Weather Research and Forecasting Model (WRF). The main idea of this service is to make it possible for researchers to access the model results online, without any knowledge about modeling and output data structure. An end-user can only access web service which main task is visualization physical parameters provided as prognostic variables in the model structure. For example the system shows the state of the Baltic Sea as 3D potential temperature and salinity, currents at each model level, sea level, ice thickness, concentration and drift. It also covers surface atmospheric fields such as 2 meters temperature and humidity, wind speed at 10 meters height, atmospheric pressure reduced to sea level, downward-directed short and long wave radiation. It allows for visualization of horizontal fields, zooming on a selected area, making vertical sections and creating animations. The system consists of two main parts. The first one is a model set and it works on a local cluster system. The second one is a web portal that acts as a graphic user interface (GUI) for end users. The main parts of the system are connected through GDAL and PHP tools.

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41 - Improving surface current forecasts for the German Bight using HF radar measurements

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Three HF radar stations located at the islands of Wangerooge and Sylt as well as on the mainland in Büsum are operated in the German Bight as part of COSYNA system. Measurements are merged with numerical model data to optimise state estimates on a pre-operational basis.

The presentation introduces the spatio temporal interpolation (STOI) method, which is a statistical approach to correct data from a free model run using an analysis window of typically one tidal cycle. The scheme is based on

an EOF analysis to estimate the model error background statistics and is capable of providing improved short term forecasts.

Statistics of the free model run, the HF radar data and the STOI analysis are shown for several month. Both the three dimensional primitive equation model GETM and the operational BSH model are used to provide free model run data. GETM setups with boundary forcing from the MYOCEAN North West Shelf model are used. Maps of innovation and residuals are presented. Furthermore forecast errors for different forecast horizons are discussed. Results are also compared to independent measurements taken at the FINO-1 and FINO-2 platforms. The impact of the analysis is, e.g., illustrated by drifter trajectory simulations.

Furthermore, some results concerning the potential impact of existing and hypothetical HF radar systems are presented, which were obtained in the framework of the JERICO project making use of the STOI method as well as statistical OSE and OSSE techniques.

42 - Integrated numerical models and observations for the coastal ocean: a 10-year perspective in France with Previmer

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Since mid-2006, PREVIMER provides through the website www.previmer.org information relevant to the general public and the professionals about the coastal environment, along the French coastlines bordering the English Channel, the Bay of Biscay, and the Mediterranean Sea, but also in overseas regions like La Réunion and New Caledonia. This pre-operational system is based on observation data and numerical modelling which provide users with 4 to 6 day forecasts of sea states, currents, sea water levels, temperatures, salinity, primary production and nutrients. Scales range from the continental shelf to the bay, with a capacity for zooming-in to specific areas. All observations and results are now available on the website. In 2010, large scale models have been upgraded and data access services enlarged (FTP, OpenDAP, Catalogue ...).

A large number of numerical models An increasing number of biological parameters is gradually completing this overview of coastal environment, and a 6-day forecast is already available on some sea state variables. Development of the system has led to questions on the proper representation of current effects of waves and their feedback (e.g. Roland and Ardhuin, Coastal Dynamics 2014, Delpey et al. JGR 2014) and on extreme water levels, in particular on rocky coasts (Sheremet et al. GRL 2014). Research programs are on-going to better understand the coupling of waves, currents and atmosphere around current fronts that can be associated with large temperature gradients, with the developement of coupled ocean-wave-atmosphere model systems.

43 - Coupled ice-ocean model of the Baltic Sea

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Community Earth System Model (CESM) is a recently developed fully coupled global climate model that can be used for modelling past, present and future climate states. The model was adapted for regional Baltic Sea domain. It consists of four coupled components – atmosphere, land, ice and ocean. Ice and ocean work as active components (models), land and atmosphere are implemented as data models that provide only fluxes for the active components. Regional ocean model is a z-coordinate Parallel Ocean Program (POP) and it is configured with ca. 2.3 km (1/48 degree) horizontal resolution and 66 vertical levels (50 levels of 5 meters thickness, thus, nearly the entire Baltic is covered with a resolution of 5 meters). Ice model is based on the Community Ice Code (CICE) that arrived from Los Alamos National Laboratory. The ice model has five categories of thickness and horizontal resolution identical to the ocean model. The model was tested by different atmospheric fields such as ERA40 reanalysis, Era Interim, ICM (Warsaw University Interdisciplinary Modeling Centre) operational UM model and implemented by us in our local Baltic Sea forecasting system based on the Weather Research and Forecasting Model (WRF). The model has been tested and validated and provides reasonable results. The current status, advantages and disadvantages will be also discussed. The presentation will focus on the ice model results. Climatological validation based on probability of ice cover will be presented. Variability and main trends of modeled ice cover will be presented too.

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44 - MOSSCO --- A generic model system for coastal ocean applications

Klingbeil, K., Lemmen, C., Nasermoaddeli, M.H., Hofmeister, R., Kerimoglu, O., Kösters, F., Burchard, H., Wirtz, K.W.

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Coastal oceans are complex ecosystems. Their description requires an interdisciplinary approach. In addition to detailed measurements, realistic computer simulations are necessary, to understand the sophisticated interplay of all relevant processes. Such simulations are only possible with model systems, coupling different discipline-specific models. In the framework of the MOSSCO project a sustainable model system is developed, that integrates existing models and databases as interchangeable system components and realises the data exchange between these components via standardised interfaces. This poster explains technical details by means of the integration of the 3D coastal ocean model GETM into the model system and shows results from a consistent North- and Baltic Seas simulation.

45 - The coupled Modular System for Shelves and Coasts (MOSSCO)

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Data and models for describing coastal systems span a diversity of disciplines, communities, ecosystems, regions and techniques. Previous attempts of unifying data exchange, coupling interfaces, or metadata information have not been successful. We introduce the new Modular System for Shelves and Coasts (MOSSCO, <http://www.mossco.de>), a novel coupling framework that enables the integration of a diverse array of models and data from different disciplines relating to coastal research. In the MOSSCO concept, the integrating framework imposes very few restrictions on contributed data or models; in fact, there is no distinction made between data and models. The few requirements are: (1) principle coupleability, i.e. access to I/O and timing information in submodels, which has recently been referred to as the Basic Model Interface (BMI) (2) open source/open data access and licencing and (3) communication of metadata, such as spatiotemporal information, naming conventions, and physical units. These requirements suffice to integrate different models and data sets into the MOSSCO infrastructure and subsequently build a modular integrated modeling tool that can span a diversity of processes and domains. We demonstrate how diverse coastal system constituents were integrated into this modular framework and how we deal with the diverging development of constituent data sets and models at external institutions. We show different applications realized with the modular approach and demonstrate its feasibility and potential for investigating the integrated coastal system across domains, disciplines and processes.

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