Scientific Highlight reflects on:
‘Resilience, regime shifts and ecosystem services:
The case of offshore wind farm installation in the German North Sea’

LOICZ Affiliated Activities
• News from the FP7 project HYPOX
• New affiliated projects:
  1. Delta Information System for Geo-environmental and Human Habitat Transition;
  2. Coastal Sustainability and Governance.

IPO News: CALL: Hosting the International Project Office

Muscle farmer in the Yellow River Delta       (photo: C. Eisfelder)
Publication details

The LOICZ Newsletter is produced three times per year to provide news and information regarding LOICZ-related activities. The views and opinions in this newsletter do not necessarily represent the position of LOICZ or its sponsoring organizations.

Published and edited by:
Land-Ocean Interactions in the Coastal Zone International Project Office

Printing and layout:
Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research
Germany, LOICZ IPO
Bianca Seth, Barbe Goldberg

Photographs and illustration:
The illustration of the coastal zone on the front page is made by artist Glynn Gorick, UK, 2005 and commissioned by LOICZ/IGBP.

Contact:
Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research
Institute of Coastal Research
LOICZ IPO
Max-Planck-Str. 1
21502 Geesthacht, Germany
phone: +494152 87-2009 · fax: +49 4152 87-2040
e-mail: loicz.ipo@loicz.org · URL: www.loicz.org

Land-Ocean Interactions in the Coastal Zone, Core project of IGBP and IHDP © Copyright 2013

Signs and Symbols

Watch the film on Youtube

Have a look on Facebook

Link to a website

Read more on page...

Listen to the Podcast

LOICZ Web 2.0

Keep me informed! Subscribe LOICZ RSS feed:

LOICZ You Tube Channel:
http://www.youtube.com/watch?v=M8ijtEWtacc

LOICZ Facebook:
facebook.com/LOICZ.org
## Content

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>LOICZ People</td>
</tr>
<tr>
<td>5</td>
<td>Scientific Highlights</td>
</tr>
<tr>
<td>14</td>
<td>LOICZ-Affiliated Activities</td>
</tr>
<tr>
<td>22</td>
<td>Hotspots</td>
</tr>
<tr>
<td>24</td>
<td>IPO News</td>
</tr>
<tr>
<td>25</td>
<td>SSC News</td>
</tr>
<tr>
<td>27</td>
<td>Publications</td>
</tr>
<tr>
<td>28</td>
<td>Have you seen?</td>
</tr>
<tr>
<td>33</td>
<td>Calendar</td>
</tr>
</tbody>
</table>
LOICZ People

LOICZ Scientific Steering Committee

Ramachandran Ramesh (Chairperson) – India
National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Chennai

Julius Ibukun Agboola – Nigeria
Lagos State University, Ojo
Department of Fisheries, Faculty of Science/ Centre for Environment and Science Education (CESE)

Tim Carruthers – Samoa
SPREP (Secretariat of the Pacific Regional Environment Programme)
Apia

Zhongyuan Chen – China
State Key Laboratory for Estuarine and Coastal Research
East China Normal University

Valerie Cummins – Ireland
Coastal and Marine Resources Centre
University College Cork

John W. Day, Jr – USA
Distinguished Professor Emeritus
Dept. of Oceanography and Coastal Sciences
Louisiana State University

Donald L. Forbes – Canada
Bedford Institute of Oceanography
Natural Resources Canada/ Government of Canada
Dartmouth

Marion Glaser – Germany
Center for Tropical Marine Ecology
Bremen

Bruce Glavovic – New Zealand
Resource & Environmental Planning Programme
Massey University

Joan Nymand Larsen – Iceland
Stefansson Arctic Institute; and University of Akureyri

Juan-Chuan Lin – Taiwan
National Taiwan University
Department of Geography
Taipei

Mark Pelling – UK
Department of Geography
King’s College London

Joyashree Roy – India
Department of Economics
Jadavpur University

Eric Wolanski – Australia
Coastal Oceanography Group
Australian Institute of Marine Science

LOICZ Regional Nodes

Southeast Asia Regional Node – Singapore
Beverly Goh
National Institute of Education
Nanyang Technological University

East Asia Regional Node – China
Jianhui Tang
Yantai Institute of Coastal Zone Research
Chinese Academy of Sciences

LOICZ Regional Node South Asia – India
Purvaja Ramachandran
National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Chennai

LOICZ Regional Node South Europe
MENA/PALOP – Portugal
Luis Chicharo
International Centre for Coastal Ecosystems and Economy
Faro

LOICZ Regional Node Latin America
Carlos Eduardo de Rezende (Coordinator); Marcos Antônio Pedlowski (Vice-Coordinator); Luiz Drude de Lacerda (Scientific Supervisor)
National Institute of Science and Technology on Transference of Materials to Oceans (INCT-TMCOcean)

Represented by:
Universidade Estadual do Norte Fluminense
Centro de Ciências Ambientais
Av. Alberto Lamego 2000
Parque Califórnia
Campos dos Goytacazes, Rio de Janeiro, 28.013 – 602, Brazil

LOICZ IPO

Ellen-Barbe Goldberg
Communications Manager
Editorial: LOICZ website and INPRINT
ellen-barbe.goldberg@loicz.org

Christiane Hagemann
Office Administration, Finance
c.hagemann@loicz.org

Address updates and subscription
Please use the LOICZ online database for address updates and subscription to the LOICZ newsletter. If you have any questions, please contact the IPO at loicz.ipo@loicz.org
This newsletter is also available online at www.loicz.org

LOICZ in brief

LOICZ aims to provide science that contributes towards understanding the Earth system in order to inform, educate and contribute to the sustainability of the world’s coastal zone. LOICZ is a Core Project of the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme on Global Environmental Change (IHDP). The LOICZ IPO is hosted by the Institute of Coastal Research at the Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research, which is part of the Helmholtz Association of National Research Centres.

LOICZ research as outlined in the Science Plan and Implementation Strategy, SPIPS, is organised around five themes:
• Vulnerability of coastal systems and hazards to society
• Implications of global change for coastal eco-systems and sustainable development
• Human influences on river-basin-coastal zone interaction
• Biogeochemical cycles of coastal and shelf waters
• Towards coastal system sustainability by managing land-ocean interactions

The Science Plan and Implementation Strategy is available electronically on the LOICZ website and in hard copy at the LOICZ IPO. As a temporary priority the project focuses on scientific hotspots of Earth system change, currently Arctic Coasts, Urbanized Coasts and Megacities, River Mouth Systems including Deltas and Estuaries and Islands.

This newsletter is also available online at www.loicz.org
Resilience, regime shifts and ecosystem services: The case of offshore wind farm installation in the German North Sea

Benjamin Burkhard¹ and Kira Gee²

¹Kiel University, Institute for Natural Resource Conservation, Department of Ecosystem Management, Olshausenstr. 75, D-24118 Kiel, bburkhard@ecology.uni-kiel.de
²Kira Gee, University of Liverpool, Dept of Geography and Planning, Gordon Stephenson Building, 74 Bedford Street South, Liverpool L69 7ZQ, UK, kira.gee@liverpool.ac.uk

This LOICZ scientific highlight presents a summary of the original research article “Establishing the Resilience of a Coastal-marine Social-ecological System to the Installation of Offshore Wind Farms”, recently published in Ecology & Society (Burkhard and Gee 2012)

Abstract

This article considers the resilience of the social-ecological system to the introduction of offshore wind farming in a northern German case study region. A conceptual framework is outlined for tracing change across scales based on the concepts of resilience, regime shifts and ecosystem services. Drawing on empirical results from the research project “Zukunft Küste – Coastal Futures”, we illustrate the system response to OWF introduction at the scale of the marine ecosystem, the seascape and the socio-economic system of the case study region. Shifts in the marine ecosystem are linked to changes in the available ecosystem services, leading to conflicts between new and traditional seascape values. This in turn has impacts on the socio-economic system on the coast. We set out the current system constraints and argue that the future trajectory of the system depends on an internal socio-political shift and willingness to change.

Key words: German North Sea; offshore wind farming; resilience; regime shifts; social-ecological system; ecosystem services

Introduction

Offshore wind farming (OWF) is a recent development with the potential to cause significant impacts on the socio-ecological systems concerned (Punt et al. 2009, Gill 2005). This contribution sets out a framework for tracing socio-ecological system responses to OWF introduction on the German North Sea coast (Fig. 1). We link the concepts of resilience, regime shifts and the ecosystem services approach in order to summarise potential transitions that may result from OWF development at different spatial and temporal scales. Our work is based on the results of the integrated research project Zukunft Küste – Coastal Futures (http://www.coastal-futures.org; Lange et al. 2010, Busch et al. 2011). Effects were found to occur at different spatial and temporal scales, implying the full implications of OWF introduction can only be understood by considering effects across domains.

CONCEPTUAL BACKGROUND: RESILIENCE, REGIME SHIFTS AND ECOSYSTEM SERVICES

The adaptive cycle (Bass 1998) and the concept of transitions (Loorbach & Rotmans 2006) can serve as a basic framework for describing OWF-related change in the ecological and socio-economic systems considered here. The adaptive cycle

Fig. 1: The case study area with the administrative districts of North Frisia and Dithmarschen and the German Exclusive Economic Zone (EEZ). The map shows the offshore wind farm situation in the year 2011. More actual information can be found at: http://www.bsh.de/de/Meeresdaten/Geodaten/index.jsp (adapted from Burkhard & Gee 2012)
describes recurring dynamic behavior in the four characteristic phases of exploitation, conservation, release and reorganization (Gunderson and Holling 2002), each of which exhibits different degrees of connectedness, capital accumulation, functions, flexibility and resilience (Jørgensen et al. 2007). Transition describes a non-linear shift in a societal system from one dynamic equilibrium to another, also acknowledging four phases of change which occur at different speeds and at different levels (Loorbach & Rotmans 2006). Systems moving from the initial exploitation (or innovation) phase to the conservation phase are characterized by growing connectedness, which essentially describes the density of links between the system components. Although this conveys robustness, for instance by enabling communities to solve problems and build up social capital (Janssen et al. 2006), it can also make the system more inflexible, rendering it less and less able to absorb unexpected change.

Resilience has been defined as a system’s capacity to experience shocks while retaining essentially the same functions, structures, feedbacks and therefore identity (Kirchhoff et al. 2010, Müller et al. 2010, Walker et al. 2007). We interpret resilience as resilience to change and the ability to maintain the status quo, which is one potential response of the ecological and/or socio-economic system to OWF arrival. A resilient system would be able to absorb the perturbations arising from OWF introduction without experiencing instability and decline, replacing lost nodes in such a way that the original system identity is maintained. In a non-resilient system, the disappearance or replacement of key system elements would lead to an altered system identity, possibly leading to a regime shift and adaptation to a new state. In the socio-economic system, a non-resilient response could be a negative or positive transition, implying substitution of the existing regime by an equivalent or more diverse regime (Geels & Schot 2007).

To make a regime shift take place, certain thresholds must be crossed and fundamental internal controls and feedbacks altered (Scheffer and Carpenter 2003). This also applies to the socio-economic system, where regime shifts can be triggered by internal and external disruptions of the system including specific shocks or niche innovation (Geels & Schot 2007). The question is whether OWF can trigger a positive system shift towards a new identity or is more likely to lead to gradual decline.

Ecosystem services provide a logical link between ecological and socio-economic system components (Bossel 2000). Changes in ecosystem service supply can be used to trace regime shifts and their possible cascading effects across scales. In our case study, OWF-based regime shifts in local marine ecosystems are seen to impact on provisioning ecosystem services such as food from fishery or mariculture, marine biochemicals and wind energy supply (Punt et al. 2009). At the seascape scale, shifts in cultural ecosystem service supply can lead to changes in aesthetic seascape values, spiritual services, sense of place, identity and inspiration (Gee and Burkhard 2010, MA 2005). Changes in the provision of these services in turn can potentially shift the socio-economic structures of the system and lead to changes in the capacity of that system to contribute to human welfare (Busch et al. 2011, Gill et al. 2005).

For the purpose of our case study we take resilient or adaptive responses to occur at three distinct OWF scales. First is the (local) scale of individual wind turbine piles, which represents the introduction of hard substrate on the sea floor. Second is the (regional) scale of one or several offshore wind farms, where OWF introduction represents a collection of new man-made structures in the sea and an impact on the seascape. Third is the (larger regional/national) scale of OWF as a novel way of utilizing marine space and a new economic regime based on renewable energies. OWF introduction will act directly on all three sub-systems. The question is thus whether OWF introduction forces regime shifts at the respective levels and whether these are interrelated in any way.

CHARACTERISTICS OF THE CASE STUDY AREA

Current plans of the German government schedule a total of about 5000 wind turbines in the German share of the North Sea by 2030 with a capacity to deliver a total of 25,000 MW in electricity (Kannen and Burkhard 2009). If these plans are realized, OWF would cover a large part of Germany’s Exclusive Economic Zone. As the majority of these OWFs still remain to be built (see Figure 1), the Coastal Futures project worked with future scenarios assuming different OWF developments in the case study area (Lange et al. 2010). Different ecological models were used to assess the environmental impacts of the assumed scenarios (Burkhard et al. 2011a). In a parallel investigation, interviews and expert assessments were used to evaluate the potential effects of OWF expansion on seascape values and related ecosystem services, as well as the knock-on effects on human well-being in the case study area (Gee and Burkhard 2010, Busch et al. 2010, Busch et al. 2011).

The districts of Dithmarschen and North Frisia can be described as structurally vulnerable on several accounts. Ranked as some of the remotest regions of the German federal state of Schleswig-Holstein (BBR 2005), unemployment rates are comparatively high and the average household income is relatively low compared to the rest of Germany (Statistisches Amt für Hamburg und Schleswig-Holstein 2007). Demographic factors (a high proportion of older residents) also add structural vulnerability, as does the embeddedness of the region in a hierarchical institutional framework and relatively inflexible, formal modes of governance (Bruns & Gee 2009). Economically, the districts mainly rely on tourism in terms of employment and income generated (Ziesemer and Zahl...
2005), where the special (scenic) qualities of the Wadden Sea coast and seascape represent a key factor in tourism marketing (Hasse 2007). From an economic and demographic perspective, OWF could offer an opportunity for putting the region on a more secure footing, for instance by investing in the growing OWF servicing industry and making the region more attractive for younger people as a place to work.

At the same time, residents perceive life in a remote rural region and the beauty of the land- and seascape as strong contributors to quality of life (Bruns & Gee 2010, Ratter & Gee 2012). A strong sense of identity and attachment to place are also characteristic. This goes hand in hand with a strong sense of independence and the desire to be as self-sufficient in decision-making as possible (Bruns and Gee 2010). Off-shore wind farming therefore not only represents a threat to the visual aesthetics upon which tourism depends, but also to local control as decisions regarding OWF are mainly taken outside the region.

MEASURING OWF IMPACTS

OWF introduces hard structures into the sea, leading to direct impacts on marine ecosystems. Coastal Futures used various ecological models to assess the likely impact of OWF installation on the marine ecosystem in the case study area; key indicators are summarized in Table 1 (for details see Lenhart et al. 2010, Burkhard et al. 2011a).

OWF also introduces new seascape attributes, with potentially considerable effects on existing cultural ecosystem services. Coastal Futures used a customized set of cultural ecosystem services indicators to trace the value shifts that would arise through OWF in the seascape (Table 1).

Socio-economic resilience is a complex entity that includes orientors at the individual level (e.g. personal health, social security, employment, education, culture) as well as system-oriented factors (e.g. effectiveness, freedom of action, security, adaptability, coexistence; see Bossel (2000) on basic orientors of a system’s survival). At the individual level, we use survey results to evaluate the importance of cultural ecosystem services and their significance for subjective quality of life (Busch et al. 2011). Structurally, we work with the premise of existing structural vulnerability (Licht-Eggert 2007), which we take to reduce the system’s buffer capacity against changes in external driving forces.

Results

Marine ecosystem resilience

Results of ecological modelling (for details see Lenhart et al. 2010, Burkhard et al. 2011a) show that some of the selected indicators are sensitive to disturbances during OWF construction. Most parameters indicate resilient ecosystem behavior, meaning that ecosystem processes and structures return to a state comparable to the reference conditions. One exception is seabird species diversity, where permanent habitat loss is likely to result from OWF for selected species (Lenhart et al. 2010, Exo et al. 2003). Further exceptions are storage capacity, abiotic heterogeneity, organization and nutrient cycling which all increase very slightly. This could be taken as a first indication for the emergence of a more complex ecosystem, resulting from the introduction of hard structures. True artificial reef emergence (e.g. with higher animal species abundance) has not yet been found at OWFs, but as long-term studies on artificial reefs have shown, it takes about five years before stable communities are established (Petersen and Malm 2006).

The development of artificial reefs would indicate a regime shift that clearly contrasts with the alternative, a degradation of the existing ecosystem. Once fully realized, the new system state would be characterized by a higher level of ecosystem functionality. If larger-scale effects occur, the development of artificial reefs could have visible and measurable knock-on effects on the linked socio-economic system. For example, several North Sea fish species are known to utilize rocky substrates at some life stages. It is thus imaginable that a provable effect on the recruitment of some commercially important species could develop (Wilhelmsson et al. 2006). This could lead to an increasing food provisioning ecosystem service fish, benefiting the fishery sector’s welfare (Lenhart et al. 2010). Thus, trade-offs between different ecosystem services and values, for instances losses of migratory birds, marine mammals (Lange et al. 2010) as well as seascape values have to be assessed.

Seascape resilience

The introduction of large-scale fixed structures in the sea signifies a shift towards the industrialization of the sea. Survey results from local coastal communities indicate that this industrialization effect is felt irrespective of the visibility of OWF (Gee 2010a). Residents consider the sea as a largely non-industrial space with limited human impact; there is also the view that the sea should be kept ‘free’ of man-made structures and that interests such as nature conservation should have priority.

In terms of regime shifts, this indicates the existence of two distinct seascape states which in their extreme expressions are mutually exclusive. If the sea is considered a ‘non-built-up’ or natural space to begin with, then any expansion of OWF
would constitute a regime shift: The introduction of built-up structures would prevent the seascape from returning to its previous ‘non-built up’ state and thus change its identity. This shift would be all the more pronounced the more of the planned OWFs are realized. Even though the removal of turbines could in theory put the seascape back to its original state, this is an unlikely prospect at least in the medium term, as OWF is a difficult and costly prospect to reverse.

Two possible trajectories thus present themselves for the seascape. Given the fact that no OWF is no longer an option, one is the ‘natural’ seascape’s modification toward a semi-cultural seascape comprising both industrialized and natural elements. This requires limiting the areas for OWF as well as their careful siting, preserving some of the former attributes of the sea so that it can still be interpreted as a largely natural landscape. This option would potentially gain cultural ecosystem services, benefitting from both traditional and novel functions. The alternative is a loss of the natural seascape followed by a shift toward a purely industrial seascape which valorises fewer cultural ecosystem services. Of course, novel cultural ecosystem services could emerge in the industrial seascape, but it is uncertain whether they would offset the losses in terms of ‘natural’ seascape benefits at least in the short term.

Socio-economic system resilience
The socio-economic system in the case study area can be described as a system in a late conservation phase, characterized by low flexibility and high vulnerability to external disturbances. Preserving traditional lifestyle, nature and the existing quality of the landscape are incompatible with openness to large-scale innovation (Ratter et al. 2009, Gee 2010b), but although the region has no significant niches or sets of rules presently facilitating offshore wind industry development, it could conceivably invest in OWF management and servicing or other ancillary services.

This leads to two conceivable system responses, whose extreme expressions are shown in Figure 2. Given the fact

Potential OWF impacts

Supporting ecosystem services indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exergy capture</td>
<td>The insertion of hard structures and substrates into the sea might cause changes in primary production.</td>
</tr>
<tr>
<td>Entropy production</td>
<td>OWF can cause changes in internal energy use (the gross primary production/net primary production ratio would change); thus, entropy production would change.</td>
</tr>
<tr>
<td>Nutrient cycling</td>
<td>Ecosystem alterations around the turbine piles and scour protection will alter nutrient turnover rates around the piles. Additional effects are expected due to wake effects and the settlement of benthic organisms.</td>
</tr>
<tr>
<td>Storage capacity</td>
<td>Ecosystem alterations around the turbine piles and scour protection will change the amount of matter (e.g. organic carbon) stored in the system.</td>
</tr>
<tr>
<td>Abiotic heterogeneity</td>
<td>The insertion of hard structures and substrates in the form of wind turbine piles and scour protection provides new and more heterogeneous habitats for the settlement of e.g. benthic organisms. Additionally, water currents and sediment dynamics are locally influenced.</td>
</tr>
<tr>
<td>Biotic diversity</td>
<td>Ecosystem alterations around the turbine piles and scour protection will change underwater species diversity. Further impacts on above-water species diversity (migrating and resting birds) and impacts on marine mammals are expected. As commercial fishery is not allowed within OWFs due to shipping safety reasons, species diversity will change.</td>
</tr>
<tr>
<td>Nutrient loss</td>
<td>Ecosystem alterations around the turbine piles and scour protection will change nutrient cycling, altering nutrient losses in the surroundings of the OWFs.</td>
</tr>
<tr>
<td>Organization</td>
<td>Ecosystem alterations around the turbine piles and scour protection will change ecosystem organization with regard to matter, information and energy fluxes.</td>
</tr>
</tbody>
</table>

Table 1: Indicators describing potential OWF-related ecosystem development and impacts on cultural ecosystem services (adapted from Burkhard & Gee 2012).
that the region has no direct influence over developments in the sea (Bruns & Gee 2009), the choices are either to accept OWF and embrace it as an opportunity, or to resist it and seek to maintain the status quo. A regime shift toward a new system with greater connectedness is shown on the left (A). This trajectory requires the valorization of traditional ecosystem services (e.g. beauty of the seascape, high value of the marine environment) as well as new ecosystem services (wind energy, mariculture as co-use in OWF; Michler-Cieluch and Krause 2008). Additionally, a structural shift would be required at the mesoscale, such as the development of new institutions, institutional responses to OWF (e.g. incentives, regional development programmes), and new actor networks. Infrastructural investments would be needed to attract companies to the region. A key factor is the case study region’s willingness to embrace a new identity that includes OWF, which means a social shift in values and norms. The new value base could then be represented in a new regional identity (e.g. a renewable energy region) and accompanied by new forms of tourism marketing for example.

![Figure 2: Potential socio-economic system trajectories in relation to offshore wind farming in the German North Sea: A – development of a renewable energy region (left) and B – loss of traditional identity (right) (adapted from Burkhard & Gee 2012).](image-url)

**Cultural ecosystem service indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual aesthetics</td>
<td>If visible, OWFs would add a new element to the seascape, affecting the visual qualities of the sea (wide open horizon)</td>
</tr>
<tr>
<td>Seascape character</td>
<td>OWF shifts the character of the seascape from a largely natural to a more industrial landscape.</td>
</tr>
<tr>
<td>Sense of place</td>
<td>OWF is incompatible with the desire to keep the sea ‘free’ of industrial structures and challenges the traditional view of the seascape/area. Aspects of control and decision-making processes could be important. Indirect impacts, e.g. helicopter flights, could detract from what are now considered essential elements of “Heimat” (e.g. peace and quiet, remoteness).</td>
</tr>
<tr>
<td>Cultural heritage</td>
<td>In the long term, OWFs could become an accepted element of the cultural landscape. Short-term impacts could include the destruction of archaeologically important sites (bad siting of OWFs).</td>
</tr>
<tr>
<td>Habitat and species value</td>
<td>OWF could fundamentally change natural habitats and impact on bird and mammal species. OWF is perceived as a potential threat to intrinsic natural values.</td>
</tr>
<tr>
<td>Regional image</td>
<td>OWF can make a positive contribution to the region’s image in helping it to modernize. OWF can also be negative if it is seen to detract from essential traditional qualities. The nature of the impact depends on the choices the region makes for its future.</td>
</tr>
<tr>
<td>Inspiration</td>
<td>In adding a new element to the environment, OWF can act as a source of inspiration or detract from previous sources of inspiration. The effect is likely to be stronger the more visible OWFs would be.</td>
</tr>
<tr>
<td>Informal education</td>
<td>OWF represents a new topic that can be added to existing informal education issues.</td>
</tr>
<tr>
<td>Knowledge systems</td>
<td>In the mid-to long-term, OWF could bring new local and scientific knowledge to the region (i.e. technology transfer, accumulation of more and different types of knowledge).</td>
</tr>
<tr>
<td>Recreation</td>
<td>Impacts could include new recreational activities such as trips to wind farms. OWF may impact on personal feelings of well-being. If visible, leisure may be affected (e.g. enjoying the open horizon).</td>
</tr>
</tbody>
</table>
Trajectory I: The ecological system reacts resiliently to the introduction of OWF (tipping point 1) in Figure 3. No artificial reefs develop, so there is no added gain in ecosystem service supply besides wind energy. Moreover, no socio-economic benefits are added to the region by OWF. Regional policy-makers continue to resist the opportunities offered by OWF, so that no new identity emerges and no new jobs or infrastructure are created (tipping point 2). Although OWF does not cause a collapse of the overall system, this trajectory results in a gradual system decline because the opportunity to develop further (increase storage and connectedness) is lost and the socio-ecological system remains vulnerable to changing external driving forces.

Trajectory II: The ecological system shows high adaptability to new OWF conditions and artificial reefs develop (tipping point 1). The supply of new ecosystem services emerges, some of which are compatible with existing ones. Several traditional cultural ecosystem services are lost, but these can be compensated for by the active exploitation of alternative services and the region’s vision of a sustainable renewable energy region (tipping point 2). This new identity is encouraged and harnessed by policy makers, actively promoting the region as an investment region to companies. For human well-being, this new system may include greater job diversity (assumed OWF is not incompatible with tourism and fishery), the potential to halt negative demographic developments and positive impact on social and other infrastructure. Thus, the new system would be characterized by greater connectedness, expressed for example by linkages to the national and international electricity grid, internationally appreciated contributions to mitigate greenhouse gases or accumulation of knowledge and capital.

Figure 3: Tipping points for potential system shifts related to offshore wind power development in the German North Sea: 1) ecosystem: artificial reef, resilient behaviour or degradation 2) socio-economic system: acceptance or loss of identity. (adapted from Burkhard & Gee 2012)
Discussion

How likely is it that the region will be able to utilize OWF to its benefit? The factors that need to converge to facilitate a socio-economic transition can be highlighted by comparing the national German situation to that in the case study region. Nationally, the system is currently engaged in a transition involving convergences and trends at the micro-, meso- and macroscale. OWF in Germany is driven by national and international renewable energy policy and societal preference for renewables, indicating a changing value base as an important enabling factor. At the mesoscale, new companies are emerging across Germany, new actor networks and alliances are promoting OWF, and licensing procedures are put into place, sparking the development of new institutional frameworks such as maritime spatial planning. At the micro-scale are individual preferences and actions, including support and investment in renewables.

Similar trends can be noted in the case study region. Here however, the lack of convergence leads to a different outcome. Although the wind industry has led to the development of new links and nodes in the socio-economic system, these have remained fragile. Onshore wind industry companies have moved out of the region, leading to the loss of connectivity. Failure to offer incentives or to make use of investment opportunities has meant that OWF has not been actively used to initiate a take-off and stabilization phase.

Conclusion

Using the OWF development scenarios and the modeling and survey results obtained in the Coastal Futures project, potential regime shifts were identified at three spatial scales. These regime shifts were then shown to have impacts on other system domains, with shifts in ecosystem service supply used as the link between the regime shifts in the sea and the response of the socio-economic system on the coast. Willingness to embrace OWF as a contributor to a new regional identity emerged as a key factor determining the trajectory of the system. This new identity accepts that former seascape-based values will be lost and makes active use of the opportunity OWF presents to reduce its structural weakness and dependence on tourism as the key economic sector.

The respective trajectories and the correlations shown in this paper should be seen as metaphors of extreme developments rather than exact forecasts of what will happen in future (Burkhard et al. 2011b). We emphasize that our assumptions on future dynamics are hypotheses based on many interdependent assumptions (Carpenter and Gunderson 2001). For example, the ecological integrity assessments rely mainly on modeling of dynamic system behavior (Bass 1998). The socio-economic assessments are based on survey results obtained in the region at a certain point in time. Validation of these results over the longer term would be needed for more robust conclusions to be drawn.
References


LOICZ-Affiliated Activities

New affiliated project:

The Sino-German DELIGHT Project:
Delta Information System for
Geoenvironmental and Human Habitat Transition

The Yellow River Delta (YRD) is located in north-east of the province Shandong, China. It covers a total area of 18000 km² with a population of 5.2 million people. The YRD mainly consists of fertile alluvial soils that are the basis for a very valuable arable land. Moreover, the second largest oil field of China – the Shengli Oil Field – is situated in the YRD. The YRD is also rich in valuable minerals, rock salt, and halogens. The favourable geographic location and the resource deposits make the YRD region to one of the most important industrial centres in North-East Asia. On the other hand, the YRD represents one of the youngest wetlands on earth and it is the habitat for numerous species. The area is a particularly important resting place for millions of migrating birds of which many are under protection.

Challenges within the delta primarily include coastal erosion and the change and shrinkage of natural wetlands. Additionally, the permanent dislocation of the main stream, the intensified intrusion of saline water, constant intervention in the nature reserves, the impacts of typhoons, and especially the increasing influence of human activities become noticeable within the natural landscape. The available amount of water within the delta for agriculture, wetlands or the regeneration of the ground water has decreased considerably, and drought phenomena and land degradation have become prevailing characteristics of the past years. Cultivable land salinizes, vegetation health – also of natural vegetation – decreases, and fragmentation of natural and cultural landscapes increases.

Within the Yellow River Delta, economic development as well as high urbanisation rates on the one hand are in direct conflict with necessary conservation of natural resources on the other hand. The potential challenges and the clearly existing need for actions are explicitly described in the “Yellow River Delta Development Plan” (Government of the province Shandong, 2009). The region is explicitly mentioned in the national tenth and eleventh five-year plan, and shall become a model region for an ecologically-economically compliant circular-flow-economy.

Objective of the DELIGHT project is to support the efforts of local stakeholders within the Yellow River Delta to implement the development plan for the delta in the upcoming years, to assist and provide the necessary information tailored to the needs of the important stakeholders in order to substantially support their planning processes.

An already explicitly enquired, innovative, inter- and trans-disciplinary information system for the support of the “Integrated water, land and costal resource management” within the Yellow River Delta will be developed and implemented, customized to the needs of the identified Chinese stakeholders. The information system stands on the one hand for a knowledge cluster, which is built up for the Yellow River Delta based on the research fields of the project and on the other hand it represents a physically existent information system. The information system is a transport medium for all information products, maps, reports, statistics, recommended procedures, and knowledge developed within the project.

In the context of the project DELIGHT, research questions concerning the following fields are addressed:
• Environmental monitoring and dynamics of the Yellow River Delta and lower reaches
• Water quality and pollution threats
• Hydro- and morphodynamics, ground water and flood risks
• Trends and risks of urbanisation
• Capacity development and training
• Information system design and data integration
Goal of the DELIGHT project and its large Sino-German consortium is to jointly contribute to climate protection, Integrated Land-, Water and Coastal Zone Management (ILWRM, ICZM) and the development of innovative services and technologies in the Yellow River Delta. This will be reached through joint work form research institutions as well as small and mediums scale enterprises associated to natural- as well as socio-economic science.

Main Partners:

**Germany**
- German Aerospace Center, Earth Observation Center (DLR-EOC)
- Franzius Institute, University of Hanover (FI)
- Helmholtz Centre Potsdam – German Research Centre for Geosciences (GFZ)
- Centre for Development Research at the University of Bonn (ZEF)
- Brockmann Consult GmbH
- plan + risk consult GmbH
- Hydromod Service GmbH
- Sachverständigenbüro für Luftbildauswertung und Umweltfragen (SLU)

**China**
- Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, CAS (IGSNRR)
- State Key Laboratory of Resources & Environmental Information Systems (LREIS)
- Institute of Remote Sensing Applications, CAS (IRSA)
- Yucheng Comprehensive Experiment Station, CAS
- Hohai University, Nanjing
- Institute of Urban and Environmental Studies, Chinese Academy of Social Sciences, CASS (IUE)
- Dongying Sanming Forestry Industry Development Ltd. Co.

**Contact and Project Lead:**
Dr. Claudia Kuenzer, German Aerospace Center (DLR), German Earth Observation Center (EOC), Oberpfaffenhofen, 82234 Wessling, phone: +498153283280, email: claudia.kuenzer@dlr.de

Further Information on DELIGHT is available on the project website: www.delight.eoc.dlr.de
New affiliated project:

Coastal Sustainability and Governance

Project Name Coastal Sustainability and Governance
Study Region Baltic Sea Coast, Schleswig-Holstein (Germany) and South Coast, New South Wales (Australia)
Principal Investigator Dr. Barbara Neumann, Institute of Geography, Kiel University
Duration January 1, 2013 – October 31, 2017
Funding Cluster of Excellence “The Future Ocean”, Kiel (German Research Foundation DFG)
Project Website http://www.loicz.org/projects/documents/038810/index_0038810.html.en

Abstract

The newly affiliated project “Coastal Sustainability and Governance” takes a social-ecological systems approach to assessing coastal sustainability and governance at regional to global scales. The project aims at conceptualizing and implementing an analytical framework to assess the state and development of coastal zones in terms of sustainability, and to identify hotspots, challenges and chances for coastal sustainability and governance. The framework will be developed from local case studies to be revised and up-scaled for further regional to global applications. It will bring together concepts such as the Ecosystem Services approach and aspects of human well-being for translating relevant coastal issues into descriptive categories and deriving meaningful indicators and benchmarks. The research concept includes methods of participatory knowledge production in order to understand the issues at stake for providing a well-grounded conceptualization of coastal sustainability and drawing possible futures. The project will contribute to the scientific and public discourse on sustainability and sustainable development and connect terrestrial and marine issues of sustainability and governance.

This 5-year postdoctoral research project is funded through the German research Foundation DFG via the Kiel Cluster of Excellence “The Future Ocean” and linked to the cluster’s research area R01 “Our Common Future Ocean”.

Introduction

Coastal zones1 can be conceptualized as complex and dynamic social-ecological systems (SES; cp. Berkes and Folke 1998, Ostrom 2007) or human-environmental systems that are composed of two closely interlinked subsystems: a human system and a natural system (cp. Figure 1). Both subsystems are linked through interactions and interdependencies that stretch from the coastal hinterland into the marine environment. The natural subsystem provides various resources and benefits which have been attracting humans to settle, develop and utilize coastal zones – and will most likely continue to do so (Visbeck et al., 2013, Brown et al., 2013). This special attractiveness and the resulting utilisation of coastal zones has led to significant human interventions and caused serious impacts on the natural coastal system (cp. Figure 1).

Furthermore, coastal zones are subject to socio-economic and environmental changes which exert further pressures on the coastal social-ecological system (SES) and its components. Population growth and urbanization rates, along with the economic development, are significantly higher in coastal zones than in the non-coastal hinterland (McGranahan et al., 2007, Smith, 2011). Climate change-related effects (e.g. coastal inundation and erosion, saltwater intrusion in coastal aquifers or warming of coastal waters) impact coastal zones with their sensitive ecosystems and human settlements, economies and cultural assets in addition (Nicholls and Cazenave, 2010). Natural hazards such as storm surges pose further risks to the coastal SES. However, there is large uncertainty with regard to the future development of human societies and economies and to environmental changes such as climate change and the resulting pressures, impacts and responses.

Research Objectives and Design

The above outlined complex of drivers, pressures, impacts and responses, and the interconnectedness of the coastal subsystems, challenge the sustainable development of coastal zones with their distinctive resources, communities and environments. In order to build sustainable and resilient coastal communities, coastal governance and management must be aware of and responsive to the complexity and dynamics of coastal SES and the key issues at stake. Following this, the core aim of the project is to develop a transferable and adaptive analytical framework of sustainability and governance of coastal SES that allows for comparative assessments of coastal zones in terms of sustainability and governance. Fundamental to the proposed framework is a well-grounded conceptualization of “coastal sustainability” which accounts for complexity and aspects of uncertainty, linking terrestrial and marine coastal issues of sustainability and sustainable de-

---

1 Commonly, coastal zones are understood as the interface or transitional area between terrestrial and marine environments and their mutual influences (Woodroffe, 2002). In this project, “coastal zones” are defined by the key functional linkages and interactions of the coastal SES and its subsystems, stretching from the coastal hinterland (as landward extent) into the EEZ and continental shelf (as seaward extent); significant administrative or natural boundaries are taken into account to match common data aggregation levels with the research questions. (cp. Visbeck et al., 2013)
development and governance. Cummins and McKenna (2010) and Stirling (2010) strongly advocate that co-production of knowledge through participatory and deliberative procedures is essential for deriving useful answers to complex and uncertain issues in sustainability science.

The Research objectives can be summarized as follows:

• Conceptualize and assess coastal sustainability and governance through integration of expert and stakeholder knowledge,
• Identify key issues, challenges and opportunities of sustainability and governance (geographic, thematic); highlight role models,
• Contribute to the scientific and public discourse on sustainability and governance of ocean and coasts.

The main research questions addressed in this project are:

• CONCEPTUAL: (How) can we assess or “measure” sustainability of coastal ecological systems? How can we account for uncertainties of future developments and change?
• DIALOGUE & PARTICIPATION: What notions and concepts of (coastal) sustainability have scientists, experts, stakeholders, and the public? (How) can we make use of public knowledge in evaluating and directing coastal development?
• PROBLEM SOLVING: What is needed in terms of sustainable management and governance of coastal regions? Where are the gaps? What supports/hinders implementation of coastal policies, or social and community engagement?

The research concept includes methods of participatory knowledge production and modelling to elaborate concepts, indicators and benchmarks in a combined top-down/bottom-up approach, as well as GIS-based multi-criteria analyses to implement and test the framework at case study level. The framework will build upon the Ecosystem Services approach (cp. Millennium Ecosystem Assessment; 2005, Costanza, 1999) and concepts of human well-being (cp. Glaser et al. 2012), which will be adapted to the specific characteristics and issues of coastal SES with regard to sustainability and governance. Further, scenarios of possible socio-economic and environmental futures will be developed and included in the indicator-based conceptual framework, as well as an analysis of the coastal governance system. Overall, the framework will be developed from a sub-national perspective through case studies, to be up-scaled for regional to global assessments at the final stages of the project. The case studies will depict a choice of different socio-economic and environmental settings, starting off from two case study regions in Europe and Australia, which are:

• The Kiel Fjord region around the city of Kiel, located at the Baltic Sea Coast of Schleswig-Holstein (Germany), and
• The Illawarra Region around the city of Wollongong, located at the South Coast of New South Wales (Australia).

Though the coastal and societal environments are different in several aspects between the coastal regions, both regions also share similarities: The coastal cities of Kiel and Wollongong both count around 200,000 inhabitants, act as centres of regional importance, are characterized by manufacturing industries as well as by education, retail and trade, and present coastal tourism destinations. And both cities experience coastal urban growth pressures, which are expected to continue into the future. In both regions, in-depth stakeholder analysis will be conducted to develop the conceptual framework through a combined top-down/bottom-up approach. Additional case studies covering specific topics, for example addressing social or cultural aspects of coastal issues, management and community involvement, are planned to be conducted in South America (Buenos Aires Province, Argentina) or Asia (Thailand).
The Future Ocean - Our Common Future Ocean

This 5-year postdoctoral research project, which is funded through the German research Foundation DFG via the Kiel Cluster of Excellence "The Future Ocean", is linked to the cluster’s research area R01 “Our Common Future Ocean” and contributes to the activities and research focus of this topic area. Altogether three postdoctoral research projects and a PhD project from the fields of political sciences, economics, geography and law are funded through the same line and strive to apply the sustainability concept to a range of coastal and ocean issues. The underlying research question followed up by the interdisciplinary R01 research team is: How to conceptualize sustainability of the uncertain future ocean in a way that can be widely agreed upon and that guides responsible decision-making. The conceptual approach is complemented by analysing and actively taking part in the societal and scientific discourse on ocean sustainability, and by experimentally eliciting sustainability views held by society to complement the conceptual approach. As result of the group’s participation in the international discussion on Sustainability Development Goals (SDG), Visbeck et al. (2013) propose a distinctive SDG for Ocean and Coasts as an essential element for protecting the marine environment while ensuring “blue wealth”. And they advocate the definition of a comprehensive set of ocean sustainability targets and indicators as well as the establishment of a global Future Ocean Spatial Planning (FOSP) process to provide information for inclusive, forward-looking, and sustainable ocean governance.

Contact:
Dr. Barbara Neumann
Coastal Risks and Sea-Level Rise Research Group
Institute of Geography, Kiel University, D-24098 Kiel (Germany)
Email: neumann@geographie.uni-kiel.de.
Web: http://www.crslr.uni-kiel.de

Figure 2: The Kiel Canal, which connects the German North Sea with the Baltic, entering the Kiel Fjord at the locks in Kiel-Holtenau (Germany). (Photo: Barbara Neumann)

Figure 3: The city of Wollongong south of the CBD with its industrial Port Kembla (Australia) (Photo: Barbara Neumann)
References


Smith, K 2011 We are seven billion. Nature Climate Change 1: 331-35.


Woodroffe, CD 2002 Coasts: form, process and evolution. Cambridge Univ Pr.
The LOICZ affiliated EU project HYPOX (www.hypox.net) ended in summer 2012. An overview of approaches and exemplary results from three years of hypoxia research in European waters are available at Biogeosciences Discussions (Friedrich, J., Janssen, F. et al., 2013, vol. 10, pp. 12655-12772)\(^4\) and currently reviewed for publication in the Open Access Journal Biogeosciences. Alarmed by the observed and projected oxygen loss in aquatic systems the EU FP7 project HYPOX (EC grant 226213) was started in 2009 for a period of three years. The LOICZ-affiliated project aimed to improve monitoring capacities and knowledge of hypoxia causes and consequences for ecosystems. The HYPOX consortium consisted of 16 partners plus 4 affiliated institutions from universities and research institute in Europe and adjacent countries. The project team investigated hypoxia and hypoxia-effects at numerous sites in open and coastal seas as well as in land-locked water bodies (see map).

Much of the work was centered at the Baltic Sea and the Black Sea. Apart from investigations of seasonal hypoxia in shallow waters the natural deep water anoxia also allowed to use both systems as natural laboratories to test monitoring approaches and to investigate hypoxia dynamics and consequences. Further investigations were carried out in Scottish and Scandinavian fjords, Ionian Sea lagoons and embayments, in Swiss lakes, and in Fram Strait. Monitoring in HYPOX included state of the art instrumentation such as trace oxygen sensors, underwater winches, and cabled observatories. Hypoxia modeling studies focusing on hydrodynamics and biogeochemical processes were carried out to generalize findings and to gain predictive capabilities. Investigations of present-day hypoxia dynamics and spatial patterns were accompanied by investigations of past hypoxia by analyzing existing long term oxygen monitoring time series from Swiss lakes and the Black Sea and by investigations of abiotic and biogenic traces in the sediment record. In order to improve dissemination of project results and to strengthen the in situ ocean observation component in global earth observation initiatives an affiliation with the Global Earth Observation System of Systems (GEOSS) was established and several services provided.

An overview of HYPOX approaches and results is available in Biogeosciences Discussions (Friedrich, J., Janssen, F. et al., 2013, vol. 10, pp. 12655-12772)\(^4\) and currently reviewed for publication in the Open Access Journal Biogeosciences. Temporal dynamics and spatial patterns of hypoxia at a wide range of scales and down to submicromolar oxygen concentrations are presented. Examples of hypoxia effects on benthic fauna and biogeochemical processes in the water column and in sediments are included as well as investigations of past hypoxia and hypoxia modeling studies. Finally, technical aspects are addressed as well as issues of quality control and data dissemination. Further information is found at the project web site (www.hypox.net) as well as the HYPOX section of the LOICZ project portal (http://www.loicz.org/projects/documents/030611/index_0030611.html.en). Data are accessible via the sustained HYPOX data portal that is run through the data archive Pangaea (http://dataportals.pangaea.de/hypox/).


---

**FP7 project HYPOX: overview of three year of hypoxia research now online in Biogeosciences Discussions**

Felix Janssen\(^1\), Jana Friedrich\(^2\), Christoph Waldmann\(^3\), Antje Boetius\(^4\), and the HYPOX project team

\(^1\) Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Am Handelshafen 12, 27570 Bremerhaven, Germany

\(^2\) Helmholtz Zentrum Geesthacht Center for Materials and Coastal Research, Max-Planck Str. 1, 21502 Geesthacht, Germany

\(^3\) Bremen University/MARUM, Leobener Str., 28359 Bremen, Germany

\(^4\) www.biogeosciences-discuss.net/10/12655/2013/bgd-10-12655-2013.html
One backbone of LOICZ: Affiliated Activities

LOICZ aims to provide a framework to encourage the fullest participation of multi-national, regional, and national research activities in its global research. These activities shall contribute to the achievement of the goals, aims and objectives outlined in the LOICZ Science Plan and Implementation Strategy (SPIS). A way we accomplish this is to actively engage with the international research community concerned with natural and social sciences on Global Environmental Change in the coastal zone. LOICZ is a forum to assimilate, synthesize and integrate the outputs of the research community. It provides an opportunity to communicate, discuss and disseminate these outputs making them available to the global audience of scientific peers, the general public, and decision-makers in policy and practice. Information on Affiliated Activities is held in a central database that is accessible online through the LOICZ website. It provides basic information and regular updates to the wider global community as well as to LOICZ for its assessment and synthesis task and its reporting requirements.

We encourage coastal scientists to seek affiliation of their research project/s, PhD thesis or capacity-building activities to LOICZ and to become a member of the global science community and network of researchers and practitioners. Since 1993, more than 400 individual activities from all over the world have already been involved in this LOICZ research portfolio.

Early stage research

We particularly encourage early stage researchers from PhD student to Post-Doc level to seek affiliation of their projects. LOICZ acknowledges that much of the work contributing to coastal Earth System Science is being carried out by young scientists. Therefore LOICZ wants to support these efforts by enhancing their visibility and introduction to scientific peers in the global research community. Affiliated early stage research will thus contribute to the global research portfolio and its products and information will also feed into the global LOICZ synthesis in equal measure with the larger affiliated projects.

Affiliation will give early stage scientists comprehensive information about the variety of scientific activities in their field and allow them to foster their network with senior scientists and the global research community. They may also have easier access to participation in workshops, conferences and meetings organized by LOICZ that relate to their own work. By promoting their individual research on a global platform, early stage researchers will be given the opportunity to contribute to LOICZ aims and objectives directly.

Application for affiliation of scientific work at PhD and Post Doc level needs the same set of principle information and delivery of appropriate documents (e.g. thesis outline instead of a project proposal if applicable). In addition and to guarantee a good conduct in quality control LOICZ kindly asks for a co-signature and professional affiliation details of the supervising scientist. The review conducted by the LOICZ scientific peers will apply the same standards as for senior projects. Detailed information on the affiliation procedure is available on the LOICZ website in the ‘Projects’ section http://www.loicz.org/projects/index.html.en

LOICZ Priorities and Synthesis of Affiliated Activities

Following the evaluation in 2010 and the Open Science Conference in Yantai, China in 2011 new scientific directions are emerging in LOICZ. Future focus will be on hotspots of vulnerable coastal zones and societies mainly in the Arctic, in river mouths and deltas, in islands and urbanized coastal areas. The synthesis is an opportunity to share your related research findings with the global LOICZ community and value your contribution to coastal and global change research. Please notice that we are in the stage replacing the old LOICZ database with a new content management like system.

Call for affiliation of research activities

LOICZ seeks to expand its network of scientists by endorsing research activities concerned with any of its priority topics on a global, regional or national level.

Within these topics LOICZ strives to develop:
- Methodologies or models that allow data assimilation, processing and synthesis, including up and/or down scaling;
- Scenarios of change and/or response to change in socio-ecological systems;
- Scientific context for the evaluation of existing policies and structures;
- Globally applicable tools for scientific synthesis, decision support and structure development; and
- Dissemination interfaces to provide information and assist sustainable coastal development on appropriate scales.

To achieve this, LOICZ is calling for proposals to bring high quality research activities into the LOICZ cluster of Affiliated Activities. As well as fundamental science projects, LOICZ also looks for projects that have a multidisciplinary perspective, especially combining natural and social sciences. Projects can focus on global, regional or local scales and address coastal sciences and/or coastal management questions. Projects that collaborate with other Earth System Science Partnership (ESSP) elements, especially with other Core Projects of IHDP and IGBP, are sought in particular. Also projects that synthesize and analyze already available research outcomes or involve dissemination and outreach that will lead to better public knowledge are welcome. LOICZ particularly encourages affiliation of early stage research at PhD and Post-doc level. Details about projects already affiliated to LOICZ can be found on the LOICZ website.

Although LOICZ cannot offer funding to Affiliated Activities, its endorsement provides the following benefits:
1. Support in the state of proposal for funding
2. Promotion of the project and associated activities, its contributing team, outputs and outcomes through the LOICZ website and/or newsletter
3. Contribution to workshops, conferences and meetings organized by LOICZ and hence establishment of linkages to other projects operating in similar fields and/or addressing similar issues
4. Access to a wide circle of information related to funding and the science community that is available through the LOICZ database
5. Principle Investigators of Affiliated Activities are offered a Corresponding Membership to the LOICZ Scientific Steering Committee (does not apply to PhD level). This appointment is subject to annual review

Researchers whose work fits into the LOICZ portfolio are encouraged to submit proposals to the LOICZ IPO any time. The required form is accessible after registration to the LOICZ project database and additional information can be obtained from the LOICZ website or via contacting the LOICZ IPO.
Coastal Governance: The challenge of more holistic ecosystem-based management of coastal and marine systems

It has long been acknowledged that coastal and marine ecosystems are under increasing pressure of use. More and more people live on or near the coast, and human uses are growing in intensity and diversity. Climate change is an additional factor with potentially detrimental effects. Many coastal and marine ecosystems are currently showing signs of decline.

Against this background, more holistic approaches to coastal and marine management have been called for. The aims of such approaches are threefold: To ensure long-term ecosystem health, to promote sustainable socio-economic development, and to overcome the fragmentation that still characterises coastal and marine governance where responsibilities are commonly split between different administrative units and across spatial scales.

Ecosystem based management (EBM) and maritime spatial planning (MSP) are two such approaches which have recently gained prominence. Both are promoted in current international policy such as the EU’s Integrated Marine Policy, and MSP in particular is being applied as a practical approach to planning in many national contexts and regional seas pilot projects (e.g. BaltSeaPlan, www.baltseaplan.eu). Both EBM and MSP are place-based approaches that aim to ensure ecosystem functioning, not least to enable the supply of a wide range of ecosystem services.

MSP identifies which areas of the ocean are suitable for particular uses and activities; the objective is to reduce conflicts of interest and to achieve ecological, social and economic objectives (Douvere & Ehler 2008). From an ecosystem services point of view, MSP can be understood as an attempt to allocate space to the full range of ecosystem services provided by coasts and oceans (Lester et al. 2013). The challenge inherent in this is that ecosystem services are not independent of each other and that trade-offs are required (Lange et al. 2010). Since not all services can be maximised simultaneously, society must make decisions about their relative preferences for different services to be provided by the ocean (Lester et al. 2013).

Such decisions, however, require knowledge of the full range of ecosystem services provided by coasts and seas. It requires knowledge not only of the ecosystem itself, but also of the exact nature of the services provided and the values placed on them by individuals and groups. Whilst some of the benefits derived from marine and coastal services can readily be expressed as market value, other services and the benefits arising from them are less easily described in monetary terms. This particularly applies to cultural ecosystem services (MA 2005), many of which are not traded in the market. For example, what is the value of recreational, aesthetic or spiritual services provided by the sea? How can we measure the benefits arising from an aesthetic or spiritual experience of the coast, and how are these experiences linked to particular spaces and places? For planners and managers, the key question in this context is how MSP can take account of these immaterial values in a way that is commensurate with ecological or economic values.

The Joint HZG/ICES/LOICZ Workshop: Mapping Cultural Dimensions of Ecosystem Services was organised against this background, drawing also on earlier LOICZ work on changes in ecosystem services caused by offshore wind farm development on the German North Sea coast (see Lange et al. 2010).

References


The Workshop: Mapping Cultural Dimensions of Ecosystem Services (Geesthacht, 17-21 June 2013)

How can we describe cultural values in a marine context? Who should define such values? How can risks and pressures on cultural places of importance be assessed? These and other questions were discussed at the first HZG/ICES/LOICZ workshop “Mapping cultural dimensions of Ecosystem Services” which took place at the Helmholtz Zentrum Geesthacht, Germany, on 17 – 21 June 2013.

Sponsored by LOICZ and HZG, the workshop took forward issues initially raised within the ICES working group “Marine Planning and Coastal Zone Management”. Whilst the sea is commonly regarded as a setting for generating multiple economic values, it is less often regarded as a place defined by cultural meanings and area of convergence of different constructs of place. At the same time, conflicts over sea use often arise over cultural values, and there is growing recognition that cultural values should be put on a par with ecological values when it comes to risk assessment and quality assurance in maritime spatial planning (MSP). For planners, a specific concern is to develop methods for identifying and mapping places that are of particular importance for cultural reasons.

Eleven scientists and planners from Germany, England, Scotland, Canada and Australia including representatives from Canada’s First Nations discussed ways of increasing the visibility of intangible cultural values and including them in the MSP process. Particular focus was on the mapping and assessment stages of cultural values in the marine context, essentially concentrating on the what, where and vulnerability of cultural values. Examples of participative approaches to identifying cultural values and mapping them in space were presented from all countries, indicating many similarities but also practical and conceptual differences, in particular between European and Canadian First Nations approaches. The concept of Cultural Ecosystem Services was discussed as a way of framing cultural values, and deficits in defining and classifying cultural values were raised. Based on ecological criteria of significance, the group then developed criteria that can define ‘cultural significance’. Methods for assessing and rating risk to cultural places of importance were also suggested.

The results of the workshop will be summarised in an initial workshop report. The group plans to take their work forward in an ICES Cooperative Research Report and a scientific paper.

Selected presentations from the workshop and the programme is available for download here:


Contact:
Dr. Kira Gee
Department of Geography and Planning,
University of Liverpool, L69 7ZQ
Gordon Stephenson Building
74, Bedford Street South
Phone: + 44-151 794 31 15
kira.gee@liverpool.ac.uk

Dr. Andreas Kannen
Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung GmbH
Max-Planck-Straße 1
Phone: +49 (0)4152 87-1874
Fax: +49 (0)4152 87-2818
andreas.kannen@hzg.de
Mission accomplished – Marcus Lange

In the last three years I was with LOICZ being scientist at the International Project Office (IPO), hosted at the Institute of Coastal Research at the Helmholtz-Zentrum Geesthacht - HZG, Germany. My background is integrated Geography with a focus on coastal and marine sciences. My scientific interests are on coastal and marine changes, e.g. due to the establishment of renewable energies, the interconnectedness of coasts and seas and human environmental systems.

Before changing to the IPO I had worked as science project manager in the Coastal Futures project which was affiliated to LOICZ. In 2010 I joined the IPO first coordinating the '2010 Storm Surges Congress' in Hamburg together with my colleagues Hartwig Kremer, Barbe Goldberg, Juergen Weichselgartner and Christiane Hagemann. The congress was initiated and hosted by the HZG and organized and supported by LOICZ. A major product of the congress was recently published in the Springer journal Natural Hazards as a special issue (See page 27). It was a great challenge and pleasure for me to work in this initiative because I enjoyed getting insights into this interesting research field and getting to know many scientists from the wide LOICZ network.

In 2011 I supported the coordination of the LOICZ Open Science Conference in China. The event was hosted by the Yantai Institute of Coastal Zone Research (Chinese Academy of Sciences). One year later I joined the North Sea Region Climate Change Assessment (NOSCCA), an initiative carrying out a regional climate change assessment. The final product will be a book released by Springer in 2014. It is also affiliated to LOICZ (www.noscca.org). Besides I got the opportunity to coordinate the first of a kind ‘GEF International Waters Science Conference’ in Bangkok, Thailand. In this initiative I worked together with colleagues from the International Waters network, the Global Environmental Facility (GEF), the United Nations Environment Programme (UNEP) and other international partners on bringing together 200 scientists and policy representatives from more than 45 countries. The conference was co-hosted by the UN Economic and Social Commission for Asia and the Pacific (ESCAP).

From the beginning of my work I was main contact for the LOICZ affiliated projects.

During my work for LOICZ I was always impressed by the open and fruitful way of communication within the network which in my view is a good basis for an effective knowledge generation and transformation of scientific results into science-based decisions. I would like to thank the members of the Scientific Steering Committee, my colleagues from the IPO and the active members of the wide LOICZ network for their outstanding support for LOICZ in general and of my work in detail. It was a great pleasure and always gainful collaborating with and learning from you. I hope to keep in touch with most of you in the future!
SSC News

LOICZ 24th Scientific Steering Committee and Regional Nodes Meeting hosted by the LOICZ Regional Node Latin America

Niterói, Rio de Janeiro, Brazil 19-23 August – highlights and notes on key decisions

This year’s SSC meeting took place at the Campus da Praia Vermelha of the Fluminense University, Niterói. Carlos Rezende and Marcos Pedlowski, representatives of the LOICZ Regional Node Latin America, had invited the LOICZ community. As in the previous SSC meeting, a Regional Nodes day generated room for discussion on Regional Nodes related issues.

At the previous 23rd SSC meeting held in London both Regional Nodes and the SSC had welcomed the developments and opportunities arising with the emerging FUTURE EARTH: RESEARCH FOR GLOBAL SUSTAINABILITY program, in which projects are expected to operate as both a platform for research and scientific agenda setting and as an interface between the research and knowledge user communities. The FUTURE EARTH program has been established to provide knowledge required for societies to face risks posed by global environmental change and to seize opportunities for a transition to global sustainability. LOICZ was seen to play an important role in supporting this overall goal in the coastal zone.

The first day of SSC discussion centered on the benefits and the institutional setting of the ‘LOICZ Regional Nodes’ concept in light of FUTURE EARTH. A new conceptual model, prepared by the IPO, describing Regional Nodes as a co-design and collaboration platform in terms of both network and dissemination functions and of node-specific globally relevant scientific areas of competence was the focus. A major decision was to undergo a critical review of the Regional Nodes concept in 2014 to be prepared for positioning LOICZ to feed in peer expertise from Regional Nodes to inform regional agenda setting and local communities.

The discussion within the SSC centered on the transition period of the project in terms of future scientific priorities and of institutional developments in project administration. It was discussed how this period will be organized under changing conditions with new developments within FUTURE EARTH but also the organization of the IPO e.g. with the termination of the hosting agreement and changing staff at the end of 2014.

The members stressed the pivotal importance of a smooth project transition within this period. Firstly, the meeting agreed to concentrate on major activities and the delivery of science along the lines of the LOICZ Hotspots and on crucial issues within the Cross-Cutting activities, such as Coastal Governance (incl. ICZM and issues of Sustainability), global modeling assessments (such as the Budget Modeling for turbid waters and the IGBP synthesis on coastal Megacities and coastal ecosystem services. Secondly, it was agreed to focus on institutional priorities such as the development of a new Science Plan, an improvement of the Affiliated Project mechanism and the review and further development of Regional Nodes. A new Regional Node for North America is under consideration, to be hosted at Louisiana State University in Baton Rouge, USA. A first proposal for another Regional Node for Africa has also been put to the SSC.

In view of the termination of the current IPO host agreement at the end of 2014 the members decided to launch an ‘International Call for Hosting the IPO’, which in the meantime has been launched asking for expressions of interests as a first step see page 24 and http://www.loicz.org/news/index.html.en

Regional Symposium invites Young Scientists to Niterói

Last, but not least in the programme, as part of the bilateral initiative ‘Alemanha-Brazil 2013-2014’ eight early stage researchers were given the opportunity to present their studies within a Mini-Symposium and to take part in a Field Trip into the Guanabara Bay. Meeting with the LOICZ members and sharing experiences resulted in a series of discussions around different topics of global change in coastal zones.

The upcoming 25th SSC meeting will be held in the first week of May 2014 in Hamburg, Germany.
The Mini-Symposium 2013 for LOICZ Young Scientist in Rio, Niteroi 22-23 August 2013 connected to the 24 LOICZ SSC Meeting

The Mini-Symposium has been funded by the German House of Science and Innovation (DWIH-SP) within the initiative “Germany+Brazil 2013-2014”.

Young Scientists’ experiences from the Mini-Symposium

Andressa Vianna Mansur
The Mini Symposium in Niteroi has strengthened my scientific network, putting me in contact with an expert network worldwide, which enables me to get a scientific possibilities for further researches. Those experiences make me want to pursue my studies and qualifications in the area. Further, my intention is to return my home and disseminate the gained knowledge and experiences among the stakeholders, especially poor coastal communities for their economic benefits and better living.

Susan O’Brien
Participating in the LOICZ Young Scientist Mini Symposium was a great experience. I had the chance to not only share my current work within the social sciences and learning research in a marine science center, but also got to learn an abundant amount and network with many accomplished professionals and new scientist in the natural and social science fields. I was impressed by the apparent direction that LOICZ is taking on integrating the social and natural sciences to address coastal zone development and global environmental change. As a “young” social scientist, it was very refreshing to see the effort and excellent work already taking place (in Brazil and other countries) to incorporate public science communication and social research into the growing movement towards sustainability. I think such integration is essential if the goal is to support adaptation by increasing knowledge and building capacity within the coastal communities.

Leandra Gonçalves
It was a great pleasure to be involved at the LOICZ Symposium. The people who I met there were really committed with ocean conservation and open to share skills and knowledge with us. The presentations I saw there gave me an important background on land-ocean interaction in the coastal zone, and there is no doubt that it will contribute a lot to my work on public policy and advocacy. I really appreciate all the comments I got on my presentation and I hope we can work closely in the near future.

Daniele Vila Nova
Benefits from attending the Mini Symposium: I loved the experience! I was able to connect to other young researchers here in Brazil, hear of their work and discuss possible partnerships. Meeting the LOICZ SSC staff was the highlight of the meeting, it was great to hear of their experiences all over the world and get some very good counsel/insights for the next steps in my career. I am definitely willing to stay connected to this network and to become more involved to the regional node’s work here in Brazil.

View all presentations and read the complete abstracts here:
http://www.loicz.org/calendar/MiniSymposium2013/Presentations/index.html.en
Sustainability and place: How emerging mega-trends of the 21st century will affect humans and nature at the landscape level

John W. Day¹, Matthew Moerschbaecher², David Pimentel³, Charles Hall⁴, Alejandro Yáñez-Arancibia⁵

¹ Department of Oceanography and Coastal Sciences, Louisiana State University, Baton Rouge, LA 70803, USA
² College of Agriculture and Life Sciences, Cornell University, 5126 Comstock Hall, Ithaca, NY 14853, USA
³ Program in Environmental Science, State University of New York—College of Environmental Science and Forestry, Syracuse, NY, 13210, USA
⁴ Network of Environmental Sustainability, Coastal Ecosystems Unit, Institute of Ecology A. C. (CPI-CONACYT), Xalapa, VER 91070, Mexico

Abstract

We discuss the sustainability of natural and human systems in the United States in relation to 21st century threats associated with energy scarcity, climate change, the loss of ecosystem services, the limitations of neoclassical economics, and human settlement patterns. Increasing scarcity and the decreasing return on investment for existing conventional energy reserves are expected to significantly reduce the amount of affordable energy for societal needs and demands. This will also make dealing with the predicted impacts of climate change more difficult and expensive. Climate change will threaten the present sustainability of natural environments, agriculture, and urban areas but these impacts will manifest themselves differentially across the landscape. The impacts of projected climate change will make living in arid regions of the southern Great Plains, the Southwest, and the southern half of California increasingly difficult. Accelerated sea-level rise and increased frequency of strong hurricanes will increase the vulnerability of natural and human systems along the Gulf and Atlantic coasts while making them less sustainable. Ecosystem services provided by natural environments form the basis for the human economy everywhere and are also at risk from climate change impacts and overuse. Decreasing energy availability, climate change, and continued degradation of ecosystem services are likely to make continued economic growth difficult if not impossible. The capacity of neoclassical economics to effectively deal with these growing threats is limited. The areas of the country most compromised by these 21st century trends are likely to be the southern Great Plains, Southwest, southern California, the Atlantic and Gulf coasts, and densely populated areas everywhere, but especially in the northeast, Midwest, and southern California.

Read the complete article on ScienceDirect

http://dx.doi.org/10.1016/j.ecoleng.2013.08.003

Risk and Management of Current and Future Storm Surges


Storm surges represent a major hazard for many coastal regions worldwide. The 1953 and 1962 catastrophes are well remembered in Europe, and recent incidents in Bangladesh and Myanmar caused over 100,000 casualties. Developing innovative responses and overcoming the frequently fragmented discussion about this global phenomenon and its regional implications call for improved knowledge of present risks and future conditions based on sound interdisciplinary approaches.

Read more and buy online

E. Wolanski (2013).

This book is sponsored by LOICZ. It is a synthesis of the environmental status of iconic Australian estuaries and bays by eminent Australian scientists. It suggests what Australian estuaries will look like in 2050 and beyond based on socio-economic decisions that are made now, and changes that are needed to ensure sustainability.

The book addresses the questions: Is Australia’s rapidly growing human population and economy environmentally sustainable for its estuaries and coasts? What is needed to enable sustainable development?

The map shows the study sites used in the synthesis by Eric Wolanski and Jean-Paul Ducrotay.

Final report of the Future Earth Transition Team published
Future Earth has just published the final report of the Transition Team, the group of experts that led the initial design of the research initiative on global sustainability.

The team comprised seventeen members from a wide range of disciplines and countries, and also included ex-officio members representing the main partners of the Science and Technology Alliance for Global Sustainability.

Co-chaired by Johan Rockström and Diana Liverman, the team proposed a vision for integrated and solutions-oriented research that can support a transformation towards global sustainability over the coming decade. The report sets out the initial design of Future Earth, comprising a research framework and governance structure, preliminary reflections on communication and engagement, capacity-building and education strategies, and implementation guidelines.

Structuring the research agenda around three central themes – dynamic planet; global development; transformations towards sustainability – the report details the key research questions that will be addressed in each area. At its core lies a new partnership between science and society to co-design research priorities and co-produce knowledge.

To ensure that the research conducted under the umbrella of Future Earth is actionable, relevant to stakeholders and done to the highest scientific standards, the team also designed a unique governance structure for the initiative. Led by a multi-stakeholder Governing Council, the ultimate decision-making body, Future Earth’s direction will be guided by a Science Committee and an Engagement Committee. The Science Committee will provide scientific guidance, ensure scientific quality and guide the development of new projects. The Engagement Committee will provide leadership and strategic guidance on involving stakeholders throughout the entire research process from co-design to dissemination, ensuring that Future Earth produces the knowledge that society needs.

Have you seen?

Future Earth research for global sustainability

The recommendations of this report are now being taken forward by the Future Earth interim secretariat, and the full initiative is expected to be up and running by the end of 2014.


Future Oceans Open Science Conference
23-27 June 2014, Bergen, Norway

Abstract for a session and a workshop (world café)
Future Oceans Conference, Bergen, June 2014

Delivering Knowledge-Based Governance through the Future Ocean Alliance

How a more interactive and comprehensive Communities-of-Practice approach can strengthen the decision-making process for long-term sustainability of the world’s oceans

Global ocean governance needs to address the sustainability challenges of the 21st century. This requires linking natural and social science knowledge with that of decision-makers and ocean users in business and civil society in order to deliver science and knowledge to the governance process for more timely and effective adaptive management. There is thus a large number of individual and organizational actors engaged in the fields of knowledge generation and governance and management relating to the global oceans. Members of the recently initiated “Future Ocean Alliance” understand effective ocean governance as requiring an operational global social network which effectively links ocean governance actors across sectors, issues, regions, disciplines and interest groups. Our session will also invite the presentation of case examples on how to generate connectivity in ocean governance at various levels of the Earth system from the regional to the global (e.g., Agulhas and Somali Current Large Marine Ecosystems Project, Western Indian Ocean Sustainable Ecosystem Alliance; Caribbean LME project; LOICZ, SPICE). The session will be accompanied by a world café type of participatory exercise in which all will be invited to engage in a digitally supported systematic mapping of ocean governance actors and their linkages. The developing global network will be made visually available during the course of the conference. A final discussion panel will examine first results at the end of the conference. This will set the scene for building a global alliance for ocean governance and also for producing a published analysis of the state of world ocean governance today. Expected number of participants in the world café are 50 at any one time. We expect 3 sessions on days 1, 2 and 3, followed by the panel discussion on day 4.

Newly adopted LOICZ banner: “FUTURE COASTS”.

Preparing for FUTURE EARTH, LOICZ work in the coming year will focus on the development of inclusive processes for developing a global coastal science plan which builds on LOICZ’s achievements in integrated coastal science, links knowledge systems and takes decision-maker’s priorities into account. The integrated science approach for which LOICZ is rightly recognised will remain at the heart of this agenda. A review of the strengths and weaknesses of LOICZ Regional Nodes will be undertaken to inform the development of a more distributed structure of global sustainability science. This structure will also explore opportunities for a deeper engagement with young scientists and with the practice community.
The session with 4-8 speakers would ideally take place in the same space as the world café. A “booth” or other site to present the developing network visually during the conference would be an asset.

### Convenors

**Oran Young**
oran.young@gmail.com
ESG
Bren School of Environmental Science and Management, University of California, USA

**Luis Valdes**
jl.valdes@unesco.org
IOC/UNESCO

**Isabel Torres de Noronha**
itnoronha@gmail.com
Luso-American Foundation (FLAD) Portugal

**David Vousden**
david.vousden@asclme.org
Agulhas and Somali Currents LMEs

**Ruben Zondervan**
Ruben.Zondervan@esg.lu.se
Earth System Governance

**Robin Mahon**
rmahon@caribsurf.com
TWAP
University of West Indies

**Marion Glaser**
marion.glaser@zmt-bremen.de
LOICZ
Center for Tropical Marine Ecology

**Suzanne Lawrence**
suzanne@suzannelawrence.net
Consultant, USA

**Peter Fox**
pfox@cs.rpi.edu
Rensselaer Polytechnic Institute, USA

**Leopoldo Cavaleri Gerhardinger**
leocavaleri@gmail.com
Earth System Governance / Ocean Task Force

---

**Warming of the Oceans and Implications for the (Re)insurance Industry**

A Geneva Association Report

In some high-risk areas, ocean warming and climate change threaten the insurability of catastrophe risk. This is one of the conclusions of a research report issued by the Climate Risks and Insurance working group of international insurance think tank, The Geneva Association (www.genevaassociation.org).

Lead author of the study, Falk Niehorster from the Risk Prediction Initiative of the Bermuda Institute of Ocean Science said, “In the non-stationary environment caused by ocean warming, traditional approaches, which are solely based on analysing historical data, increasingly fail to estimate today’s hazard probabilities. A paradigm shift from historic to predictive risk assessment methods is necessary. As a consequence, today’s hazard probabilities become more and more ambiguous and the report calls for scenario-based approaches and tail risk modelling to become an essential part of enterprise risk management.”

When thinking of global warming, most people think of the atmosphere, not of the oceans. But it is the oceans that are the principle conveyor of energy around our planet. According to the report, the most significant driver of the rising of insured costs is caused by socio-economic factors, not least the increasing wealth of individuals and the increasing concentration of development and therefore risk in coastal areas and on floodplains. However, a lack of historical and observational data coupled with a series of competing theories amongst scientific models means that the return periods for climate-related events are volatile. This creates a difficulty for insurers in pricing risks today based on data from the past adjusted for these dynamic upward cost trends.

The report provides three main drivers of change in loss potentials:

1. **Greater volumes of water, greater risks.** Thermal expansion of the oceans which combined with the melting of continental ice shelves and glaciers has increased global sea levels approximately 20cm over the last century, a rate that is accelerating. Not only do rising sea levels increase the risk of flooding or the potential impact of storm surges, but they also decrease the protective lifespan of coastal infrastructure such as Dutch flood dykes or the Thames barrier. Sea level rise also increases the damage potential from geophysical...
events because the risk of inundation is greater. Whilst the probability of a tsunami is not increased, the damage caused by one is.

2. Drier dry and wetter wet. A warmer ocean also means more water in the atmosphere. A warmer atmosphere contains more water and therefore more energy. This has the potential to increase the intensity of extreme events and associated precipitation. This greater intensity increases the loss potential of natural catastrophes.

3. Effects on large-scale climate phenomena are likely but currently unknown. The warming of the oceans is also likely to be affecting the large-scale climate patterns such as El Niño, various monsoon systems or the North Atlantic Oscillation. However due to the long timescales of ocean dynamics and the relatively short length of observational data, the effects of those changes on catastrophic risk are therefore currently unclear.

The report provides two key areas for addressing this challenge:
Firstly, insurers need to continue the development of modern means of estimating risk. The industry is moving away from using stationary climatological approaches for estimating shorter-term risks into using dynamic modelling approaches to estimate time-dependent medium-term outlooks in combination with scenario based approaches, already widely used for long-term assessment purposes. This process should continue and become best practice.
Secondly, governments and the private sector need to increase the resilience of communities by managing risks through a series of means, in particular building resilient infrastructure.

Contact:
Véronique Martinez, Information Manager
Tel. +41 22 707 66 00
Direct +41 22 707 66 17
veronique_martinez@genevaassociation.org


International Conference on Interdisciplinary Marine Science

Interdisciplinarity is becoming more and more important in research and science. In marine science it is not only a question of interdisciplinarity within natural science, it is crucial to bridge the gap between natural and social sciences as well as humanities.

The Northwest Marine Research Association (in German: Nordwest-Verbund Meeresforschung, NWVM) invites scientists, including junior scientists and PhD students, to the conference „Between use and protection of the marine environment – knowledge generation in interdisciplinary research contexts“ to jointly develop and discuss new, marine environment related, interdisciplinary research topics.
The conference will take place on 18 and 19 November 2013 (from midday to midday) at Hanse-Wissenschaftskolleg – Institute for Advanced Study (HWK) in Delmenhorst and shall be the kick-off for continuing interdisciplinary and international research beyond November 2013, being coordinated by NWVM.
The conference also offers the possibility to network across disciplinary boundaries as such new scientific alliances combine the expertise from the different fields of research, relevant to answer interdisciplinary research questions. During the conference the focus will be on workgroup activities and discussion rather than on presentations. After introducing best-practice examples describing an interdisciplinary project and network we will further discuss and develop each topic in parallel interdisciplinary workgroup sessions, all dealing with the conflicting priorities of use and protection of the marine environment.

The topics of the workgroup sessions are:
• Resources: The Governance of Marine Spaces (chairperson of the session: Marion Glaser, Leibniz Center for Tropical Marine Ecology)
• Practices: Marine Energy (chairperson of the session: Joachim Peinke, University of Oldenburg)
• Images: Marine Awareness (chairperson of the session: Sunhild Kleingärtner, National Maritime Museum of Germany)

To allow for active contributions, the number of participants is limited to 40. The conference is free of charge, the conference language will be English.
For more details and for registration please go to: http://www.nwv-meeresforschung.de/interdisciplinarity

Contact:
Nordwest-Verbund Meeresforschung
Office for Guest Scientists
Britta Stigge
bstigge@nwv-meeresforschung.de
+49 (0) 4221 9160-122
www.nwv-meeresforschung.de
The fifth conference in the annual conference series organized by the Earth System Governance Project. The conference will be co-hosted by the School of International Development, the School of Environmental Sciences and the Tyndall Centre for Climate Change Research. The full Call for Papers will be released soon. Further details as well as background information and updated information will be published on the conference website.

http://norwich2014.earthsystemgovernance.org
Calendar

2013

International Symposium on Connectivity of Hill, Human and Ocean (CoHHO)
Integrated ecosystem management from Hill to Ocean
26 – 27 November 2013, Kyoto 606-8501, Japan
http://fserc.kyoto-u.ac.jp/cohho/en/

Integrating New Advances in Mediterranean Oceanography and Marine Biology
Barcelona, 26-29 November 2013
http://www.icm.csic.es/bio/medocean/medocean.htm

2014

Global Land Project (GLP) 2014
Open Science Meeting (GLP OSM)
19th - 21st March 2014, Berlin, hosted by Humboldt University
www.glp-osm2014.org

Arctic Science Summit Week (ASSW) 2014
Helsinki (Finland) on 7-12 April 2014
include the 2nd Arctic Observing Summit (AOS)

4th iLEAPS Science Conference
Terrestrial ecosystems, atmosphere, and people in the Earth system
12-16 May 2014 Nanjing, China
Conference website: www.ileaps-sc2014.org

Coastal Zone Canada Conference 2014 (CZC2014)
15-19 June 2014, Halifax, Nova Scotia
Halifax, Canada
http://www.czca-azcc.org/

Future Oceans
Open Science Conference
23-27 June 2014, Bergen, Norway

2015

INQUA Congress
(International Union for Quaternary Research)
July 27 to August 2, 2015, Nagoya
Good opportunity to have sessions on deltas and Holocene sea-level changes

8th International Conference on Asian Marine Geology (8th ICAMG)
24 – 28 September, 2015
Seoul National University, Seoul, Korea
If you wish to contribute to LOICZ INPRINT please send an e-mail to: loicz.ipo@loicz.org or visit the LOICZ website www.loicz.org for article requirements.

If you have a project you would like to affiliate to LOICZ please go to www.loicz.org and click on research for detailed information.

Contact:
Helmholtz-Zentrum Geesthacht —
Centre for Materials and Coastal Research,
Institut of Coastal Research, LOICZ IPO
Max-Planck-Str. 1
21502 Geesthacht, Germany
phone: +49 4152 87-2009 · fax: +49 4152 87-2040
e-mail: loicz.ipo@loicz.org · URL: www.loicz.org

Land-Ocean Interactions in the Coastal Zone,
Core project of IGBP and IHDP © Copyright 2013