



Land-Ocean Interactions in the Coastal Zone



INPRINT

- 🌐 **Storm Surges Congress 2010: 2nd Announcement and Call for Abstracts**
- 🌐 **Scientific Highlight: Port Cities and coastal flooding – Future Risk Perspectives**
- 🌐 **PT1:** World Ocean Conference 2009; Human Ecology for an Urbanising World
- 🌐 **PT2:** Sediment Dynamics of Chinese Muddy Coasts and Estuaries; Linking Nutrients, Hypoxia, Fisheries, and Fishes
- 🌐 **PT3:** Governance of Coastal Ecosystems – seeking quality standards; LOICZ Session IHDP
- 🌐 **CCA:** River Deltas sinking due to human activity
- 🌐 **20th LOICZ SSC Meeting and Dahlem-Type workshop**
- 🌐 **New Regional Node in Chennai, India, opening with Deltas Workshop**
- 🌐 **Headways in Erasmus Mundus Joint Master in Water and Coastal Management**
- 🌐 **Coastal Snapshot:** Coastal and Estuarine Research at SKLEC; Research Mission to São Tomé and Príncipe Islands – West Africa
- 🌐 **Miscellaneous:** Two new SSC members start in 2009; three new SSC members will join in 2010
- 🌐 **LOICZ website**

Storm Surges Congress 2010
2nd Announcement and Call for Abstracts



Photo: Ron Mulder, www.stormfoto.nl



Contents

LOICZ People	2
Scientific Highlights	3
An Assessment of the Exposure of Large Port Cities to Coastal Flooding: A Global Assessment	3
PRIORITY TOPIC 1	6
World Ocean Conference 2009, Manado, Indonesia	6
Human Ecology for an Urbanising World – International Conference on Human Ecology, Manchester, UK	9
PRIORITY TOPIC 2	12
Sediment Dynamics of Chinese Muddy Coasts and Estuaries	12
Linking Nutrients, Hypoxia, Fisheries, and Fishes: Interim Report from a Workshop supported by LOICZ	13
PRIORITY TOPIC 3	15
A Certification Programme in the Governance of Coastal Ecosystems	15
Workshop “Responding to Coastal and Marine Change: Comparative Assessment of Coastal Governance Initiatives” at the IHDP Open Meeting 2009	18
Cross-Cutting Activities	20
River Deltas sinking due to human activity, says new study by team of LOICZ Scientists	20
LOICZ SSC News	21
New SSC Members welcome on board!	21
New LOICZ SSC Members for 2010	22
20th LOICZ SSC Meeting in Kjeller, Norway	22
LOICZ News	23
LOICZ Dahlem-Type Workshop Global Environmental Change in the Coastal Zone: A Socio-Ecological Integration, Skjetten, Norway	23
Activity Report	24
Ocean Colour Training Course, Zanzibar, Tanzania	24
LOICZ Website	26
LOICZ Regional Nodes	28
LOICZ: South Asia Regional Node and LOICZ Delta Workshop	28
UGC Award for Excellence in Environmental Science	29
IPO Notes	30
LOICZ and the Erasmus Mundus Joint Master in Water and Coastal Management	30
Young LOICZ	35
Interns at the LOICZ IPO	35
Storm surges Congress 2010 – Hamburg	36
2nd Announcement and Call for Abstracts – Storm Surges Congress 2010	37
Programme News	39
New IHDP Project Transitioning to Sustainability through “Knowledge, Learning, and Societal Change”	39
Publications	40
Have you seen	43
Coastal Snapshot	43
Coastal and estuarine research at SKLEC, East China Normal University, Shanghai	43
Research Mission to São Tomé and Príncipe Islands – West Africa	45
Calendar	47



LOICZ People

LOICZ Scientific Steering Committee

Alice Newton (Chairperson) – Norway

Center for Ecological Economics
Norwegian Institute for Air Research

Felino P. Lansigan (Vice-Chair) – Philippines

School of Environmental Science and Management
University of the Philippines Los Banos

Nancy N. Rabalais (Vice-Chair) – USA

LUMCON – Louisiana Universities Marine Consortium

Zhongyuan Chen – China

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

William C. Dennison – USA

Center for Environmental Science
University of Maryland

Juan D. Restrepo – Colombia

Department of Geological Sciences
EAFIT University

Antonio C. Diegues – Brazil

Research Center on Human Population and Environment
Universidade de Sao Paulo

Marion Glaser – Germany

Center for Tropical Marine Ecology (ZMT)
Bremen

Eva Roth – Denmark

Department of Environmental and Business Economics
University of Southern Denmark

Bernhard Glaeser – Germany

Research Center Berlin (WZB)

Remigius W.P.M. Laane – The Netherlands

Deltares, Delft

Laurence Mee – UK

The Scottish Association for Marine Science
Dunstaffnage Marine Laboratory

Stephen B. Olsen – USA

Coastal Resources Center
University of Rhode Island

Ramachandran Ramesh – India

Institute for Ocean Management
Anna University

Dennis P. Swaney – USA

Department of Ecology and Evolutionary Biology
Cornell University

Eric Wolanski – Australia

Coastal Oceanography Group
Australian Institute of Marine Science

Masumi Yamamuro – Japan

Graduate School of Frontier Sciences
The University of Tokyo

Jozef M. Pacyna (Past Chair) – Norway

Center for Ecological Economics
Norwegian Institute for Air Research

For full contact details of the SSC Members, Regional IPO
Nodes and LOICZ IPO staff, please visit www.loicz.org

LOICZ Regional IPO Nodes

Southeast Asia Regional Node – Singapore

Beverly Goh
National Institute of Education
Nanyang Technological University

East Asia Regional Node – China

Cheng Tang
Yantai Institute of Coastal Zone Research for Sustainable
Development (YIC)

West Africa Node (Associated: START/PACOM)

Chris Gordon
Centre of African Wetlands
University of Ghana

New !!!

South Asia Node

Ramachandran Ramesh
Institute for Ocean Management, Anna University
Chennai 600 025

LOICZ IPO

Hartwig H. Kremer Chief Executive Officer

hartwig.kremer@loicz.org

Juergen Weichselgartner

Senior Science Coordinator

j.weichselgartner@loicz.org

Barbe Goldberg

Communications Manager

Editorial: LOICZ website and INPRINT

ellen-barbe.goldberg@loicz.org

Christiane Hagemann

Office Administration, Finance

c.hagemann@loicz.org

Ines Böttcher

Congress Manager

Contact: affiliated projects

Ines.boettcher@loicz.org

Götz Flöser

Contributing Scientist, Polar Activities

Institute for Coastal Research, GKSS Research Centre
floeser@gkss.de

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

Scientific Highlights

An Assessment of the Exposure of Large Port Cities to Coastal Flooding: A Global Assessment

Susan Hanson¹, Robert Nicholls¹, N. Ranger², S. Hallegatte³, J. Corfee-Morlot⁴, C. Herweijer⁵, J. Chateau⁴

¹ School of Civil Engineering and the Environment and Tyndall Centre for Climate Change Research, University of Southampton, Highfield, Southampton, UK, SO17 1BJ and Tyndall Centre for Climate Change Research (s.e.hanson@soton.ac.uk; r.j.nicholls@soton.ac.uk)

² Grantham Research Institute for Climate Change and the Environment, London School of Economics and Political Science, London UK, formerly Risk Management Solutions Limited, London, UK

³ Centre International de Recherche sur l'Environnement et Développement et Ecole Nationale de la Météorologie; Météo-France, Paris, France

⁴ Organisation for Economic Co-operation and Development, Paris, France

⁵ Price Waterhouse Cooper, London, UK, formerly Risk Management Solutions Limited, London, UK

Thirteen out of the twenty most populated cities in the world in 2005 are port cities and their economic importance in terms of international trade has grown markedly, particularly in developing countries, with the global volume of seaborne trade tripling over the past 30 years. For these coastal cities, many of which have large areas at or below mean sea level, flooding can be catastrophic with widespread and (at the city scale) long-term consequences as illustrated by the landfall of Hurricane Katrina at New Orleans in 2005. Where cities remain in these areas, the potential exposure needs to be carefully evaluated and defence and drainage systems carefully reviewed; this issue is likely to grow in importance through the 21st Century.

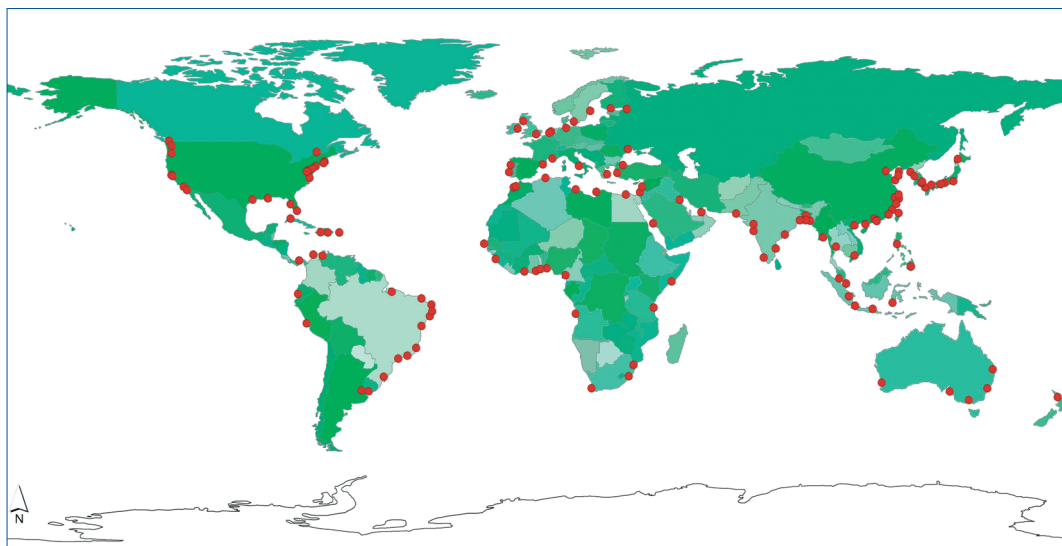
The study makes a first estimate of the current exposure of the world's large port cities to coastal flooding due to storm surge and also investigates how a range of change factors will affect each port city's exposure to coastal flooding by the 2070s. The change factors considered are (1) socio-economic change due to population and economic growth and urbanisation, (2) climate change, and (3) natural and human-induced subsidence, where

appropriate. The analysis focuses on the exposure of population and assets¹⁾ to a 1 in 100 year surge-induced flood event (assuming no defences), rather than the 'risk' of coastal flooding. This is, firstly, because knowledge about flood protection across these cities is too limited for comprehensive risk analysis. Secondly, flood protection does not eliminate risk – protection measures can fail – and it is important to consider the implications of this residual risk. The exposure metric captures this as a 'worst-case' flood scenario.

The assessment provides a much more comprehensive analysis than earlier studies, focussing on 136 port cities around the world that were reported as having more than one million inhabitants in 2005 in the United Nations' World Urbanisation Prospects report 2005 (see Figure 1). Most of these port cities are found in Asia (38%), and many of them (27%) are located in deltaic settings, again mainly in Asia. This is particularly important as deltaic locations tend to be at lower elevations and experience significant (natural and anthropogenic) subsidence, increasing potential exposure to flood events independent of climate change.

Figure 1:

Location of the 136 port cities with populations greater than 1 million in 2005 included in the assessment (University of Southampton)



1) The term "assets" is generally used here to refer to economic assets in cities in the form of buildings, transport infrastructure, utility infrastructure and other long-lived assets. The common unit for monetary amounts in the study is international 2001 US dollars (USD) using purchasing power parities (PPP).



In 2005, a large number of people are already exposed to coastal flooding in large port cities. Across all cities, about 40 million people (0.6 % of the global population or roughly 1 in 10 of the total port city population in the cities considered) are exposed to a 1 in 100 year coastal flood event. The exposure is concentrated in a few of the cities: the ten cities with highest population exposure containing roughly half the total exposure, and the top 30 cities about 80 percent of the global exposure. Of these thirty cities, nineteen are located in deltas. The top ten cities in terms of exposed population are estimated to be Mumbai, Guangzhou, Shanghai, Miami, Ho Chi Minh City, Kolkata, Greater New York, Osaka-Kobe, Alexandria and New Orleans²⁾, representing an almost equal split between developed and developing countries. However, when assets are considered, the distribution becomes more heavily weighted towards developed countries, as the relative wealth of the cities becomes important. The total value of assets exposed in 2005 is estimated to be US\$3,000 billion; corresponding to around 5 % of global GDP in 2005 (both measured in international USD). The top 10 cities in this ranking are Miami, Greater New York, New Orleans, Osaka-Kobe, Tokyo, Amsterdam, Rotterdam, Nagoya, Tampa-St Petersburg and Virginia Beach. These cities contain 60 % of the total exposure, but are from only three (wealthy) countries: USA, Japan and the Netherlands.

Scenarios of socio-economic change, climate-induced sea-level rise and storminess, and natural and anthropogenic subsidence were developed and used to analyse future exposure in these 136 cities for the 2070s. The scenarios were deliberately high-end changes to define the limits to change. The results indicate that, by the 2070s, total population exposed could grow more than threefold to around 150 million people due to the combined effects of climate change (sea-level rise and increased storminess), subsidence, population growth and urbanisation.

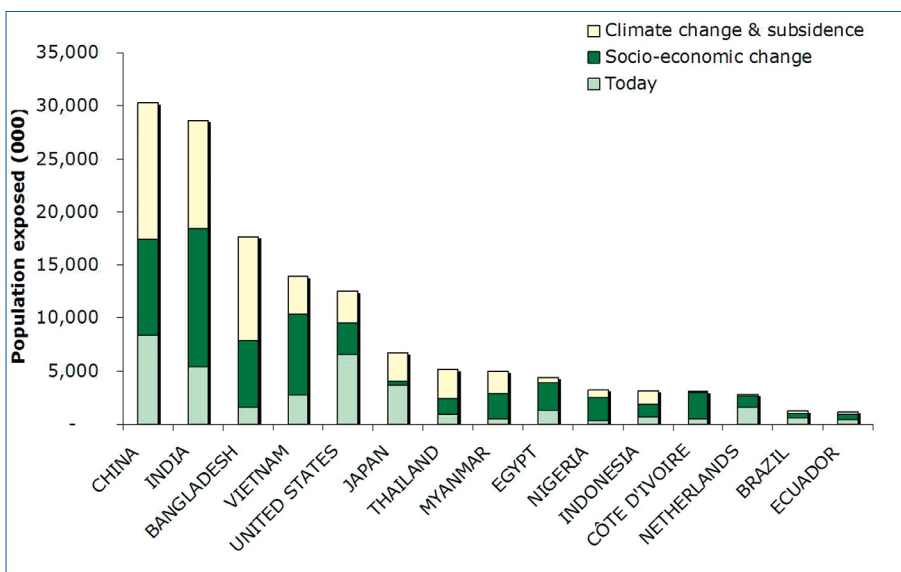


Figure 2: Graph showing population exposure today compared with exposure associated with socio-economic and environmental change in 2070 (University of Southampton)

Total asset exposure could grow even more dramatically, reaching US \$35,000 billion by the 2070s; more than ten times current levels and rising to roughly 9 % of projected annual GDP in this period. Globally, by 2070, two thirds of the increase in exposure for people and assets, under the scenarios considered here, is related to the projected socio-economic change (including population growth, economic growth and urbanisation) with the remaining third related to climatic change and management practices (human-induced subsidence). This is particularly notable in developing regions where socio-economic development is proportionately more important. For developed regions, where population and economic growth are expected to be smaller, environmental factors are more important (see Figure 2). At a national scale, exposure is again concentrated in relatively few countries – 90 % of the population exposure in the 2070s is found in eleven countries (China, USA, India, Japan, Thailand, Vietnam and Bangladesh as well as Myanmar, Egypt, Nigeria and Indonesia). A similar pattern is found for asset exposure – 90 % of the total estimated 2070s asset exposure is concentrated in only eight nations (again, China, US, India, Japan, Netherlands, Thailand, Vietnam and Bangladesh).

For individual cities In the 2070s, the Top 10 for population exposure (including all environmental and socio-economic factors), are Kolkata, Mumbai, Dhaka, Guangzhou, Ho Chi Minh City, Shanghai, Bangkok, Rangoon, Miami and Hai Phòng. All of these, except Miami, are in Asian developing countries. Many smaller cities (both in terms of population and wealth) also experience very rapid increases in population and asset exposure, for example, Mogadishu in Somalia and Luanda in Angola. (see Figure 3).

While the absolute exposure of these cities remains relatively low, the rapid increase expected by 2070s will nonetheless pose significant challenges for local communities. Exposure for individual cities can also be strongly related to one of the environmental factors considered. For example, human-induced subsidence due to shallow groundwater extraction and drainage has the potential to be important in deltaic cities that are rapidly developing such as Ho Chi Minh City. For assets (see Figure 4), the Top 10 cities are Miami, Guangdong, Greater New York, Kolkata, Shanghai, Mumbai, Tianjin, Tokyo, Hong Kong, and Bangkok. These rankings reflect the rapid urbanisation and economic growth expected in Asia, particularly in China, India and Thailand.

²⁾The UN database precedes the landfall of Hurricane Katrina.

The concentration of future exposure to sea level rise and storm surge in rapidly growing cities in developing countries in Asia, Africa and to a lesser extent Latin America, urgently underscores the need to integrate the consideration of climate change into both national coastal flood risk management and urban development strategies. Given the heavy concentration of people and assets in port city locations, and the importance in global trade, failure to develop effective adaptation strategies would inevitably have not just local but also national or even wider economic consequences. In general, cities in richer countries have (and are more likely to have in the future) much better protection levels than those in the developing world. For example, cities like London, Tokyo and Amsterdam are protected to better than the 1 in 1000 year standard, while many developing countries have far lower standards, if formal flood defences exist at all. This

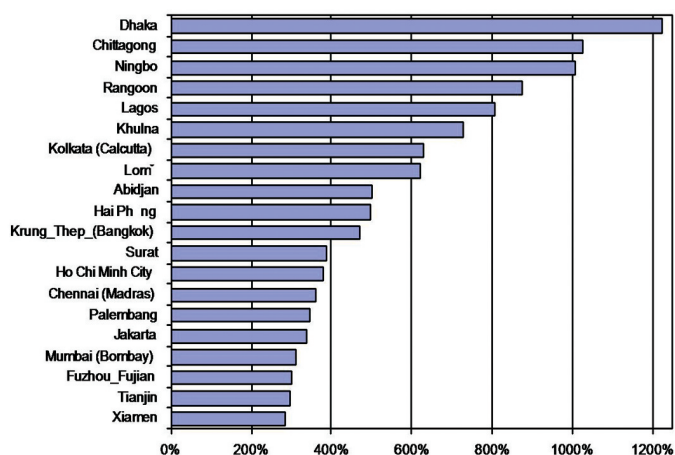
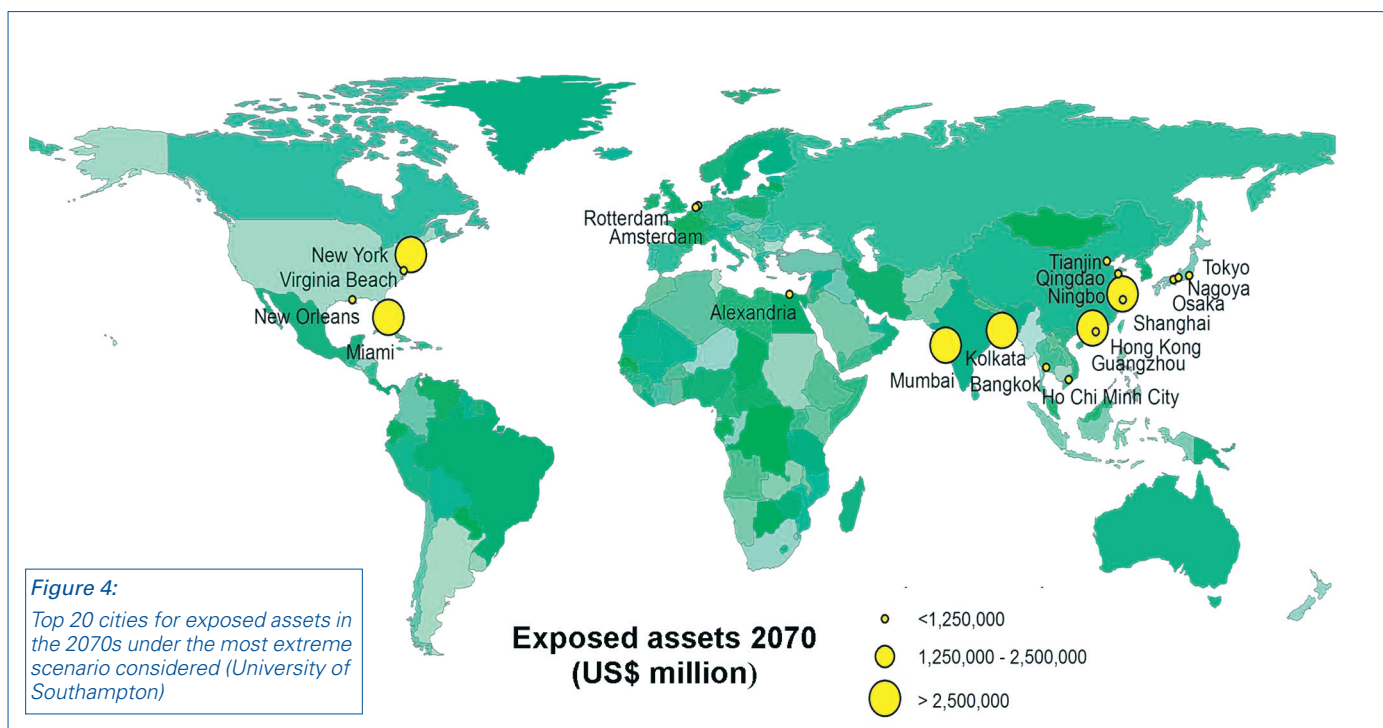


Figure 3: Top 20 cities with the highest proportional increase in exposed population by the 2070s relative to the current scenario, under the most extreme scenario considered (University of Southampton)



is because the high exposed value of wealthy city infrastructures – many billions of dollars for a single city like Hamburg, or even hundreds of billions of dollars for Osaka – justifies a higher protection level. Also important is the higher risk aversion tendency of richer populations that push local and national authorities to reduce environmental or natural hazard risks.

There are exceptions to the general relationship between wealth and protection. For example, Greater New York, despite having a larger GDP than London, Tokyo or Amsterdam, is currently only protected to a standard of roughly a 1 in 100 year flood. Shanghai, a developing country city with a lower GDP than New York and European cities, has nevertheless a protection level similar

to London. These examples highlight that protection levels are also strongly influenced by cultural, political and historical issues. This dependency means that projecting individual city estimates of protection standard in the long-term is difficult. However, at a global level, it can be expected that economic growth will allow a general improvement in protection levels in coastal cities around the globe. The cost-effectiveness and institutional challenges of implementing such protection, however, requires further attention. Of more immediate concern are 11 million people living in port cities today in low income countries that are exposed to coastal flooding. These people have limited protection and often no formal warning systems.



It is also important to note that, even if all cities are well protected against extreme events, large-scale city flooding may remain a frequent event at the global scale as so many cities are threatened and protection is not fail-safe. For instance, assuming that flooding events are independent, there is a 74 % chance of having one or more of the 136 cities affected by a 100-year event every year, and a 99.9 % chance of having at least one city being affected by such an event over a 5-year period. Even considering 1000-year events, the probability of having one of the 136 cities affected is as large as 12 % over one year and 49 % over 5-year periods. So, at the global scale, 100-year and 1000-year events will affect individual port cities frequently. As a consequence, even assuming that protection levels will be high in the future, the large exposure in terms of population and assets is likely to translate into regular city-scale disasters at a global scale. This makes it essential to consider both adaptation as well as what happens when adaptation and especially defences fail. There is a need to consider warnings and disaster response, as well as recovery and reconstruction strategies, including foreign aid, in order to minimize as much as possible the long-term consequences of disasters.

The policy implications of this report are clear: the benefits of climate change policies - both global mitigation and local adaptation at the city-scale are potentially great. As reported in the IPCC Fourth Assessment Report, global mitigation can slow and limit the exacerbating effects of climate change on coastal flood risk, at a minimum buying precious time for cities to put adaptation measures in place. As cities are also responsible for the majority of greenhouse gas emissions, they are also key actors in the design and implementation of mitigation strategies. Coastal cities will therefore face great challenges in managing the significant growth in exposure that will come about from both human and environmental influences, including climate change. The large amount of future port city asset exposure on its own (as much as US\$35,000 billion in the 2070s) argues for proactive adaptation which will require a much more focused effort across scales of governance (global-local and public-private) to advance adaptation measures to manage these risks in port cities.

Locally, adaptation strategies will need to encompass a range of policy options. These should include, as relevant, a combination of (1) upgraded protection/infrastructure, (2) managing subsidence, (3) land use planning to both reduce vulnerability – focusing new development away from the floodplain and preserving space for future flood management infrastructure development, (4) flood warning and evacuation, particularly as an immediate response in poorer countries, and (5) selective relocation away from the most low-lying existing city areas. An appropriate portfolio of these approaches could act to manage and reduce risks to acceptable levels. Relocation would seem a challenging option for valuable city infrastructure and this would take significant and consistent long-term planning. Management of human-induced subsi-

dence will also significantly reduce exposure in those cities affected. This is illustrated in the Netherlands and major cities in Japan and in China where policies on water management have minimised human-induced subsidence in the last few decades. However, these lessons have not transferred globally and active human-induced subsidence is occurring elsewhere, such as in Jakarta and Metro Manila.

However, putting into place effective disaster management strategies, land use practices and protection investments will take time. Previous defence projects (e.g., the Thames Barrier in the UK and the Dutch Delta Project) have shown that implementing coastal protection infrastructure typically has a lead-time of 30 years or more. The inertia of the socio-economic response suggests that action must begin today to protect port cities and to manage flood risk for impacts expected by the middle of this century. Such action in the most exposed cities identified in this study could inform effective management responses and develop a knowledge base that could help to advance action in many other locations in the coming decades.

The full report, including the methodology and some preliminary analysis of wind hazards, is published on line as an OECD Environment Working Paper "Screening Study: Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Interim Analysis: Exposure Estimates", OECD 2007. The full report can be accessed at: www.oecd.org/env/workingpapers and was produced as part of the OECD project on Cities and Climate Change.

Priority Topics

PRIORITY TOPIC 1

Linking social and ecological systems in the coastal zone

World Ocean

Conference 2009 (WOC'09)

11–15 May, 2009, Manado, Indonesia



Bernhard Glaeser (LOICZ SSC) arriving at the WOC'09
(Photo: unknown with B. Glaeser's camera)



Highway Patrol escorted the bus to the conference venue



(Photos: B. Glaeser)

Manado Convention Center

Indonesia had taken the initiative of holding the WOC'09 on May 11–15 in Manado, North Sulawesi. The overall goals of the conference were:

1. To increase the understanding of climate change and its implications for the livelihoods of coastal people and the ecological conditions of the oceans and coastal zones
2. To better understand the role of the oceans in determining climate change
3. To pursue the need for mitigation and adaptation measures concerning climate change.

Within the WOC'09 framework, a number of side events were organised:

1. A symposium on ocean science, technology and policy (in which LOICZ SSC members participated as invited speakers);
2. An international marine exhibition;
3. The declaration of Bunaken as one of the World Natural Heritage Sites in Indonesia;
4. Cooperation in the marine ecosystem conservation between the Sulu-Sulawesi Marine Ecoregion (SSME);
5. A summit meeting of the heads of nations forming the Coral Triangle Initiative (CTI), conceived by Indonesia, the Philippines, Malaysia, Papua New Guinea, East Timor and the Solomon Islands.

1 Contributions

The International Ocean Science, Technology, and Policy Symposium 2009 consisted of 32 sessions. These sessions covered a whole day, each.

Session #30 was organised by A.H. Purnomo, Agency of Marine and Fisheries Research, and by L. Adrianto, Bogor Agricultural University. International speakers covered themes dealing with vulnerability and resilience of ocean and coastal resource system, adaptive and integrated ocean and coastal governance, disaster management, sustainable fisheries and resource uses. The geographical focus was on different regions in Indonesia.

Session #32 was organised by SPICE (Science for the Protection of Indonesian Coastal Ecosystems), a German-Indonesian research project. The SPICE clusters featured Indonesian and German partners as speakers and presented their various scientific themes, including coral reef research, sedimentation, aquaculture, marine geology, and governance and management of coastal social-ecological systems. Project sites are in southwest Java, South Sulawesi and North Sumatra.

Cluster 6, governance and management of coastal social-ecological systems (coordinated by LOICZ SSC member M. Glaser, ZMT Bremen), is the most recent cluster. Its scope is interdisciplinary and links the social and natural sciences. A 20 minute DVD was shown which presented the social science research in Spermonde Archipelago, off Makassar in South Sulawesi. The coral islands featured are threatened by sea level rise and storm surges, by hazardous fishing methods (bomb and cyanide fishing), dying coral ecosystems and by depleted fish stocks.

B. Glaeser contributed a presentation to session #30 "Social ecological systems analysis in ocean and coastal governance" as an invited speaker and to session #32 "Showcase Indonesia – Germany". M. Glaser presented in Session #30, also as an invited speaker.



SPICE group, from the right: Michael Flitner, Luky Adrianto, Bernhard Glaeser, Marion Glaser, Heri Purnomo, and Natasha Stacey (Photo: unknown, camera B. Glaeser)

2 Remarks

Politically, something very important happened. This WOC'09 has become an entirely Indonesian event: hosted, led and inspired by the Indonesian government. This includes explicitly the so-called "World Ocean Conference Side Event: the International Symposium on Ocean Science, Technology and Policy". Indonesia is actually taking the lead in global environmental policy by linking coasts and oceans to global warming and by telling the world that Indonesia is the world's most important archipelagic country. Science is incorporated.

The keynote was presented by E. Salim, former Minister of the Environment. His concluding remarks were: "Indonesia must give the world a sense of direction because it is the largest archipelago. This meeting is the beginning of a changing world." And before: It is necessary to develop an ocean science that answers the questions that relate to the interaction between atmosphere and oceans: what drives the heat and salt thermo-haline circulation?

Selected scientific conclusions: Politics is taking over from small scientific circles/communities, as in similar environmental policy cases previously. This is a challenge and a chance for coastal and coastal management researchers

because LOICZ is now at the forefront of the coast and ocean issues.

Selected political conclusions: Unfortunately, local fishermen and fisher representatives were not invited to participate in any of the conference meetings. They were, in fact, kept out. Fishermen on wooden boats protested because they felt that the World Ocean Conference did not sufficiently deal with the needs of the fisher community. They claimed that it did not touch illegal fishing and the need to protect traditional fishermen from big fish companies (The Jakarta Post, May 12, 2009: 1). Some of the protesters were arrested, among them NGO leaders, e.g. Indonesian Friends of the Earth, and kept in prison for a month. Filipino fishermen were deported whereas Indonesian fishers were sent home (personal communication with several Indonesian conference participants and local observers who prefer to remain anonymous). Such treatment of protesting stakeholders actually is an anachronism. It has become a common procedure in international meetings elsewhere to include stakeholders and minority groups and let them speak out, such as the "first nations" in Canada. Indonesia is a young democracy. Some democratic awareness and practice need to be internalised, as yet.

Human Ecology for an Urbanising World

**International Conference on Human Ecology,
29 June – 3 July, 2009, Manchester, UK**

Bernhard Glaeser

1 Introduction

The 2009 International Conference of the Society for Human Ecology, jointly convened by the Commonwealth Human Ecology Council, the Society for Human Ecology and the University of Manchester in cooperation with the German Society for Human Ecology, took place from 29 June to 3 July, 2009, at the University of Manchester, UK (www.societyforhumanecology.org). It assembled about 250 participants from all continents, representing different disciplines. The programme consisted of a mix of plenary keynotes and a variety of concurrent sessions, divided into smaller symposia and roundtables. The overall atmosphere, at the conference as in the city as a whole, was exuberantly friendly and relaxed while Manchester experienced a sizzling heat wave. The following report is a personal one, reflecting my academic interests.

2 From global to local sustainability

The overarching theme of the conference could be quickly described as social and ecological systems for urban environments with links to mega-cities and climate change. In her opening address, A. Tibaijuka, UN Under-Secretary-General and Executive Director UN Habitat (substituted by Mutizwa-Mangiza), made it quite clear as to who will suffer the most from climate change: people in mega-cities and small islands. The future of our cities should be inspired by "nature" that provides "ecological-social benefits".

The global approach was succeeded by the local approach. Sir R. Leese, Leader, Manchester City Council, gave – in a convincing way – an account of Manchester's progress from industrial revolution and coal driven region towards a sustainable city. By means of retrofitting existing buildings, including Victorian infrastructure, Manchester is on its way to develop into one of the greenest cities on earth, preparing a low carbon road map. In the very near future, this includes a contribution to the upcoming global conference on climate change in Copenhagen December 2009.

3 Connecting systems theory

Systems thinking is needed to bridge the gap between natural and social sciences, a well-known theme in

LOICZ. According to F. Tretter, German Society for Human Ecology, understanding the dynamics of socio-ecological systems is an essential for rational and coordinated management of problem regions. Systems modelling with J. Forrester's method of urban/systems dynamics was, in the 1970s, a very early and important approach to understand processes in urban regions. Social ecological theories did not integrate this methodology of modelling into the field of theoretical social/human ecology. This situation has changed as recent developments, including LOICZ priority topics, have shown. The workshop aimed at discussing the theoretical and practical options of various approaches of systems thinking in human ecology.

Can civilizations collapse? This spectacular question was raised by M. Fischer-Kowalski, Vienna University. What is the difference between collapse and change? Approaching the question by a theory of coupled systems, Fischer-Kowalski presented the Vienna approach to a socio-ecological model of society as a coupling of a communication system and biophysical structures reproduced by social metabolism. She demonstrated for the case of the collapse of the Roman Empire that such a theoretical framing allows to draw a plausible distinction between collapse and other forms of social change – a distinction that may prove to be useful also in characterizing a transformation of current industrial society towards sustainability in contrast to collapse.

W. Serbser, German Society for Human Ecology, continued the discussion by suggesting a systems approach to social change and innovation. According to Serbser, the change of social organisation seems to be a core feature and problem among the 21. Century challenges. After a very long period of a more or less unchanged societal system, based on institutions that forced a string of growing populations, economies, and technologies to exploit the global resources, we now have to face a future defined by limited and shrinking non-renewable resources in societies with shrinking populations. In order to establish future sustainable communities, we have to systematically develop social innovation and social change to find new ways to organize institutions. A real life example illustrated Serbser's approach: how to start social innovation in a local context to encourage the sustainable organisation of a community.

As agent based models were mentioned in the previous lectures, P. Mandl, University of Klagenfurt, Austria, presented spatial agent based models as recent representations of urban human ecological systems to explain time-space variant processes, i.e. mobile behaviour following pre-established rules. This is an approach to



combine modelling with simulation techniques. Urban systems, for example, are complex ecological structures. Many actors, players or stakeholders are interacting in space and time. Multiagent systems have shown to be an appropriate formal approach for describing, simulating and to some extent explaining urban systems. Mandl demonstrated that the computer models used are not only good for visualizing complex ecological processes but also for describing them in an interoperable way. They can be used as laboratories for exploring and simulating the system processes and the system behaviour and applied to human ecological research.

B. Glaeser, LOICZ and German Society for Human Ecology, presented social-ecological systems analysis, "River Health and People's Health", a German-Indonesian SPICE and LOICZ project. He discussed some suggestions on how to develop social-ecological systems (SES) analysis as a framework for interdisciplinary social-ecological research and synthesis and argued that the development of interdisciplinary methods for coastal and marine research may become a main focus in the further development of approaches to SES analysis. In applying SES methodology, case studies on "River Health and People's Health" are being prepared for Riau Province in Sumatra by a German-Indonesian team within the conceptual framework of SES and governance analysis. A focus is on poverty and sustainable development within the Siak River catchment area.

4 Disasters and vulnerable societies: The tsunami aftermath

S. Singh, Social Ecology, Vienna, Austria, who for a long time has studied the Andaman and Nicobar Islands (they are part of India) researched, as a major tsunami outcome, not only the primary natural disaster but – in this lecture "The human ecology of complex disasters: Nicobar Islands in the aftermath of the tsunami" – the secondary social disaster. Economic aid can be a source of social disruption. A theme that, according to Singh, has largely been under-researched is the impact of aid on rural and indigenous communities and what this means in terms of sustainability. Large parts of the so-called "developing world" are caught within a system of aid with the goal to reduce poverty and to bring about development and urbanisation. In effect, these areas gradually become entrenched into a global division of labour serving the urban core via an unequal trade relation and the exploitation of natural resources and human labour. Most of these efforts are undertaken by organisations that operate within structures that impel them to be more

responsive to the needs of the donors rather than the beneficiaries.

Using the case of the Nicobar Islands in the aftermath of the tsunami, Singh's lecture introduced the notion of "complex disaster", understood as a state more complex than what was caused by the disaster itself as a result of inappropriate human interventions. The word "aftermath" has its roots in agriculture, meaning "a second mowing" of grass or crop. Indeed, the aftermath of tsunami is characterized by a second mowing of what has survived the disaster itself. Based on research material from pre-and-post tsunami Nicobars, Singh described the process by which the disaster response contributed to the systematic elimination of the resilient attributes inherent in the Nicobarese society and the subsequent impact this has had on other socio-cultural and ecological variables. Some concrete examples: Food aid was recycled to the black market. Cash was spent on TV sets, junk food, motor bikes, or mobile phones. Social disruptions resulted in split up families, social conflicts, and increased corruption. In short: Aid, as it was performed, produced a "metabolic trap", i.e. new sustainability problems.

5 Ecology in thought and action: ethics and education

During the LOICZ Dahlem-Type Workshop in Kjeller in May 2009, the theme of ethics and sustainability came up and was discussed and made it into one of the resulting papers. W. Throop, Green Mountain College, Vermont, USA, organised, inspired and chaired the session on ethics. His lecture was on strengthening social sustainability and the role of higher education. According to Throop, the social dimensions of sustainability have received much less attention than the ecological dimensions, even though progress on the latter requires reasonably sustainable human communities or a major disturbance. New research on social sustainability tends to be descriptive rather than normative and to explore how patterns of wealth distribution, participation in decision-making, and competition/cooperation have created more or less sustainable communities.

By contrast, Throop described and defended a virtue-based approach to social sustainability, and outlined its implications for the structure of a human ecology curriculum. He argued that the challenges we face in modern western societies – which include the forces that polarize peoples, the nature of leadership in media-saturated cultures, the effects of knowledge-focused educational systems, and the assumption of incremental change – should lead us to emphasize the cultivation of key virtues quite different from those that dominate much current

thinking. Virtues such as adaptability, humility, interpretive charity, emotional intelligence and “group-responsibility” should be at the core of an ethics for global transition. Which are virtues that are socially sustainable? Throop points at the disposition to address problems and to facilitate action to build up trust. These virtues can be taught and lived in college education.

The Importance of education in human ecology was also stressed by D. Hales, President, College of the Atlantic, in his keynote. As humans are the first species on earth to perform with geological power – we may well call this the Anthropocene (IGBP 2001) as LOICZ did in an earlier conference – humans have to shape the world and their destiny. Here comes the importance of education: Be responsible and understand the consequences of what we are doing! We need an ethic to dominate choice and behaviour to save the earth for future generations.

6 Concluding remarks

I noted in an earlier review that coastal topics, including fisheries, gain importance in human ecology meetings.

Perhaps more interesting for LOICZ: quite a few topics discussed in human ecology are of relevance for integrated coastal management. This may, however, not be so surprising as both fields pursue the sustainability goal and rely on inter- and transdisciplinary frameworks.

Different sessions addressed climate change, social change, global transition, ethics and education. Society and catastrophic events are mutually related. Social change may not only lead up to ecological change, including disasters. Social change may be the outcome of a disaster and its secondary aftermath. In the case of the Nicobarese (see above), post-tsunami aid increased vulnerability and decreased resilience. We may point to the deficiencies in the structure of the international humanitarian aid response as the main driver for “complex disasters”. This is a problem that had been dealt with in the 1980s and has been neglected since: the negative aspects of developing aid, often serving the donors more than the recipients. I wonder whether this might not be a LOICZ topic related to coastal development.



Reception in the Manchester Town Hall by the Lady Mayor

(Photo: unknown, camera B. Glaeser)



PRIORITY TOPIC 2

Assessing and predicting impacts of environmental change on coastal ecosystems

Sediment Dynamics of Chinese Muddy Coasts and Estuaries

A workshop on 'Sediment Dynamics of Chinese Muddy Coasts and Estuaries' was held 5–7 September, 2009, in Guilin, SW China. Guilin is famous worldwide for its unique karst landscape. About 50 participants from China attended the meeting, with three colleagues from Australia and India. The workshop was organised by the State Key Laboratory of Satellite Ocean Environmental Dynamics, China, and co-sponsored by LOICZ and the International Center for the Environmental Management of Enclosed Coastal Seas (EMECS). E. Wolanski and Z. Chen are LOICZ SSC and EMECS SPC members and attended the symposium. The thematic presentations focused on:

- 1) Observation and instrument development
- 2) Modelling for sedimentary processes
- 3) Fluid mud transport and behaviour
- 4) Sediment effect on biogeochemical processes,
- 5) Ecological and socio-economic impacts.

In his key-note presentation, E. Wolanski addressed advances in physics-biology links in fine sediment dynamics and their impact, and he also presented the new LOICZ budget methodology for nutrients in muddy estuaries. Z. Chen presented the comparative pattern of heavy metals and eco-health between the Nile Delta and the Yangtze estuary, and warned of significant degradation threats in the mega-estuaries of China from recent huge anthropogenic impacts as well as climate change. The discussions highlighted the LOICZ and EMECS-related targets and concepts, i.e. the socio-economic value of estuaries and wetlands and the role of integrated coastal management in China. A network of collaborators on this topic was established and plans formulated to seek funding sources to study the dynamics and the eco-health of Chinese muddy mega-estuaries from various international/regional organisations.



Eric Wolanski (left) and Zhongyuan Chen (right) attended the workshop

(Photo: Mr. Limin HU, Ocean University of China)

Linking Nutrients, Hypoxia, Fisheries, and Fishes: Interim Report from a Workshop supported by LOICZ

D. Breitburg, L. Davias, K. Limburg, D. Swaney

Hypoxia is an increasing problem worldwide (Diaz & Rosenberg 2008), as human population increases and associated waste effluents and non-point releases are released into receiving water bodies. Increased nutrient loads from these effluents and releases could, at first blush, be associated not only with increased hypoxia, but also with increases in primary and secondary productivity. In a study published earlier this year, Breitburg et al. found that the relationships between nutrient loading, hypoxia, and fisheries landings (a proxy for upper trophic level productivity) were far from simple. While fish landings are often higher in systems with high nutrient loading (Nixon & Buckley 2002), in some instances fisheries appear to decline with increasing nutrient loading if associated with hypoxia or eutrophication (Breitburg et al. 2009), the clearest cases being when raw sewage discharges create hypoxic conditions in rivers and estuaries. Fishing fleet behaviour is sometimes implicated, e.g., when fishers could anticipate fish moving out of hypoxic zones and capture fish as they moved.

These first results, intriguing as they were, prompted us to organize a working group to examine these relationships in more depth. Recognizing that fisheries landings are not simply a function of fish abundance, but also of market forces, gear availability, fuel prices, customs, etc., a better measure of ecosystem response would be changes in biomass among different functional (trophic) groups. Although it is difficult to obtain empirical measures of biomass in coastal marine ecosystems, it is possible to estimate biomass with ecosystem-based models. We decided to work with output from existing models built under the ECOPATH/ECOSIM (EwE) framework. The main advantages of EwE for our purposes include its widespread use, the fact that source data and parameter uncertainties are well-documented and quantified (Plagányi 2007), and because of its established utility in performing cross-systems comparisons (Megrey et al. 2009; Morissette et al. 2009). A major goal of the exercise was to link the output of Ecopath models to nutrient loadings from continental watersheds, atmospheric and oceanic sources – a clear application of the LOICZ focus.

An initial workshop, supported by LOICZ, was held at the ASLO Ocean Sciences conference in Nice, France in January 2009 (reported in INPRINT 2009/1). At that time, we invited participation of the community at large, with special focus on locating researchers who had developed ECOPATH and/or ECOSIM models in areas that experienced hypoxia at one time or another. As a result, a second workshop was recently held (30 September – 2 October, 2009) at the Smithsonian Environmental Research

Center in Edgewater, Maryland, USA. By this time we had started to amass a database of over 40 published ECOPATH models that could be arrayed against a gradient of nutrient loading and hypoxia. Though participation was limited by available funding, the workshop participants represented an assortment of scientists from five countries who brought together expertise in nutrient budgeting and loading, fisheries modelling, and ECOPATH/ECOSIM as well as network analysis (a closely related analytical method that is also incorporated in ECOPATH).

Over the two-day meeting, we debated and discussed which metrics could and should be included in the analysis. We developed criteria for classifying systems (e.g., based on size, residence time depth, and other physical criteria). We discussed from first principles what we could expect in terms of system responses to nutrients, hypoxia, and nutrients + hypoxia (figure 1)). We broke the problem down conceptually into a set of linked relationships for greater tractability, and developed sets of system responses that could be translated readily into ecosystem services, as we expect this could be useful in developing future policy. We designed critical approaches to analyse the data, and identified existing gaps in the databases. Conceptual linkages to LOICZ nutrient budget methodology, and in some specific cases, to existing LOICZ budgets (<http://nest.su.se/mnode>), were discussed, as was the utility of providing nitrogen load estimates from global models and databases, such as Global News (<http://www.marine.rutgers.edu/globalnews/>). We were particularly fortunate to have researchers who had worked extensively with numerous systems around the world and had developed ECOPATH/ECOSIM models. Their experience and knowledge helped greatly both in terms of conceptual approaches and data access.

As in previous efforts at synthesis, issues of scale and data resolution (in both space and time) emerge for some systems, as there are tradeoffs between global dataset coverage and local resolution, but with increasingly abundant data, it appears possible that signals may emerge from the noise. Work has begun toward integrating data from the existing LOICZ budget database, Global NEWS estimates of terrestrial nutrient fluxes, and ecosystem and fisheries variables from existing ECOPATH models.

The participation in the workshop was active and enthusiastic, and we were able to make significant progress on a database containing fisheries, marine biomass, nutrients and hypoxia for estuaries and coastal seas globally, probably doubling the number of systems for analysis beyond that in Breitburg et al. (2009), while increasing the number of variables to analyse. The next steps are to complete a version of the database and some analyses based on its contents. Our goal is to complete the process through a third workshop in the first quarter of 2010.

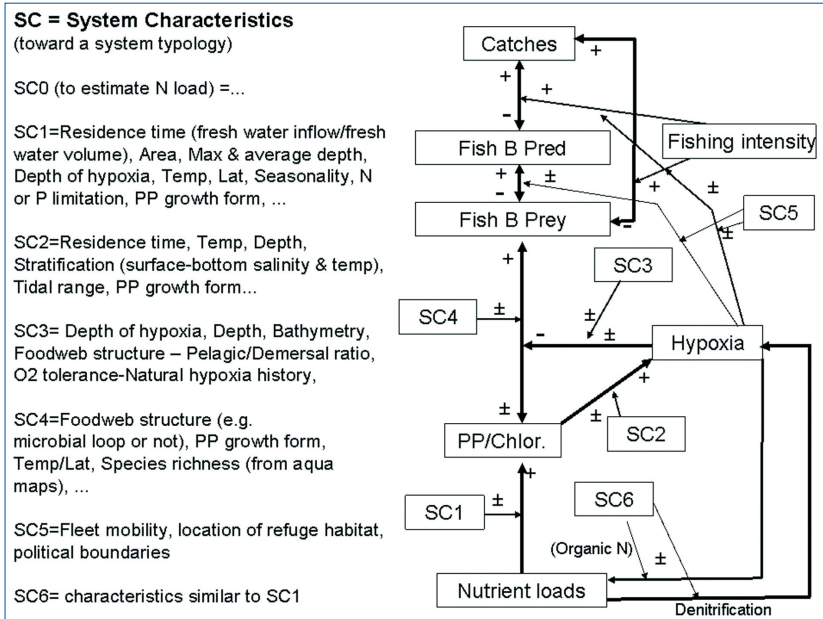


Figure 1:
Conceptual diagram of interactions between nutrients, hypoxia and fish populations, initially developed by Olle Hjerne, with contributions from the other participants – a work in progress. The transfer of nutrients from external loads through primary producers and up the food chain is not a simple unidirectional cascade – it is itself complex, and further complicated by the direct and indirect effects of hypoxia and fishing pressure. The characteristics of each individual coastal system (represented by groups of variables labelled SC) can be critical to understanding these interactions, and suggest that some preliminary classification or typology is appropriate to the analysis.



Figure 2:
Participants in the workshop included (front row, from left): Bob Christian (Eastern Carolina U, USA), Bill Mulligan (CEFAS, UK), Dave Chagaris (Florida Fish and Wildlife Conservation Commission, USA), Behzad Mahmoudi (Florida Fish and Wildlife Conservation Commission, USA), Sheila Heymans (SAMS, Oban, Scotland), Denise Breitburg (SERC, USA), Karin Limburg (SUNY ESF, USA) & David Kidwell (NOAA, USA); (back row, from left): John Harrison (Washington State U, USA), Roman Zajac (U New Haven, USA), Howard Townsend (NOAA, USA), Lori Davias (SERC, USA), Libby Jewett (NOAA, USA), Olle Hjerne (U Stockholm, Sweden), Dennis Swaney (Cornell U, USA), Lyne Morissette (UQAR-ISMER, Quebec, Canada), Marta Coll (ICM-CSIC, Barcelona, Spain), Ken Rose (LSU, USA) and Michael Frisk (SUNY Stonybrook, USA). Not shown: Carrie Byron (U Rhode Island, USA) & Darryl Hondorp (SERC, USA)

(Photo: Smithsonian Environmental Research Center)

References

Breitburg, D. L., D.W. Hondorp, L.A. Davias & R.J. Diaz (2009): Hypoxia, nitrogen, and fisheries: integrating effects across local and global landscapes. *Annual Review of Marine Science* (1): 329–349.

Diaz, R.J. & R. Rosenberg (2008): Spreading Dead Zones and Consequences for Marine Ecosystems. *Science* 321(5891): 926–929.

Megrey, S., J. Link, G. Hunt & E. Moksness (2009): Comparative marine ecosystem analysis: Applications, opportunities, and lessons learned. *Progress in Oceanography* (81): 2–9.

Morissette, L., T. Pedersen & M. Nilsen (2009): Comparing pristine and depleted ecosystems: the Sør fjord, Norway vs the Gulf of St. Lawrence, Canada. Effects of intense fisheries on marine ecosystems. *Progress in Oceanography* (81): 174–187.

Nixon, S.W. & B.A. Buckley (2002): “A strikingly rich zone” – nutrient enrichment and secondary production in coastal marine ecosystems. *Estuaries* (25): 782–96.

Plagányi, É.E. (2007): Models for an ecosystem approach to fisheries. *FAO Fisheries Technical Paper No. 477*. FAO 477, 108 pp.

PRIORITY TOPIC 3

Linking
governance and
science in coastal
regions

A Certification Programme in the Governance of Coastal Ecosystems

Stephen Bloye Olsen, Stella Maris Vallejo, Emilio Ochoa,
Pam Rubinoff

1 The Capacity Building Imperative

The Millennium Assessment (2005) is one of many that documents that the goods and services that are generated by ecosystems and benefit humanity are being degraded and destroyed. The pace of such losses is particularly evident along coastlines in low income nations in the tropics. A major reason for this disturbing reality is that the capacity to practice forms of governance that can successfully influence and redirect the forms of human behaviour that are the root causes of these negative trends is weak or absent. This does not mean that we do not know how to do better. It does mean that there is an urgent need to codify what has been learned from what is now a rich body of experience in various forms of integrated coastal management and to make a far greater investment in building the necessary capacity in both individual contributors and the institutions through which they operate. The Coastal Ecosystem Governance (CEG) Certification described in this article is one strategy for defining the competencies that are required and developing the mechanisms by which they can be disseminated and applied.

A recent global review and analysis of past and current approaches to building capacity for ocean and coastal stewardship (National Research Council 2008) found that capacity building efforts for the management of oceans and coasts are typically fragmented, lack standards for monitoring and evaluation, and are usually too short term to achieve and sustain effective ocean and coastal planning and decision making. The report emphasizes the need to anchor all investments in thorough needs assessments that feature the governance dimensions of trends in ecosystem condition, current issues and future challenges. It underscores that the capacities and traditions of the existing governance system in a given locale or region must be carefully assessed when identifying the needs for strengthening abilities to respond effectively to problems and opportunities. Further, the Research Council recommends that needs assessments and the subsequent design and execution of capacity building strategies be tailored to the specific features and needs of different world regions. The CEG certification programme we describe in this article recognises these realities and has worked to respond to them.

2 An Initiative undertaken in contribution to LOICZ Priority Topic 3

The CEG Certification is one element of a five year effort undertaken by the LOICZ Priority Topic 3 working group that has addressed the linkages between governance and science in coastal regions. The working group invited by Stephen B. Olsen (University of Rhode Island), further included Val Cummings (University College Cork), Jeremy Gault (University College Cork), Patricia Gallagher (Simon Fraser University), Timothy Hennessey (University of Rhode Island), Andreas Kannen (GKSS Research Centre), Hartwig Kremer (GKSS Research Centre, LOICZ IPO), Michael McClain (Florida International University), Mark Mellett (Irish Naval Service), Jon Sutinen (University of Rhode Island), Liana Talaue McManus (University of Miami), and Juergen Weichselgartner (LOICZ IPO).

A major focus of this effort has been to develop methods that assess, from a long term perspective, how the governance systems in a specific locale have responded – or failed to respond – to change in coastal socio-ecological systems. The strategy has been to select for methods that can be applied by practitioners operating with a diversity of technical backgrounds (biologists, economists, engineers, lawyers). The methods are organised as a step-by-step process of documentation and analysis of long term trends in key environmental and societal variables, the major governance issues posed by these changes and a careful analysis of how the institutions of government, civil society and market forces have responded to such issues. This process is described as the assembly of a “governance baseline” that benchmarks the maturity and the strengths and weakness of a coastal governance system at a defined point in time. The methods have been summarised in a handbook published in 2009 and distributed as LOICZ Reports and Studies Vol. No. 34 (available online).

The certification programme was designed to complement a two year “proof of concept” application of the governance baseline methods carried out by through teams working at sites in twelve Latin American countries. This phase was carried out in Spanish as the working language. Materials generated through this effort are becoming translated into English as well. Both the governance analysis methods and the certification programme are now considered sufficiently mature to be applied in other regions, an effort LOICZ aims to continuously support.

3 Why a Professional Certification?

Certification is a form of quality assurance and quality control. When applied to individuals it requires setting standards for specific competencies and defining the mechanisms by which such competencies can be objec-



tively assessed and verified. Certification is a critical feature of many professions since it requires the codification of good practices and sets explicit standards that professionals must meet. Professional certification programmes can play an important role in promoting the further development of a field's professional standards. They also provide government and nongovernmental agencies and organisations, private firms, courts, and the general public with standards of experience and education for qualified professionals. A certified professional signals that an individual is educated, experienced, and ethical, and can be expected to act in the best interest of the society and the public.

The CEG Certification Programme has been designed to attract professionals from two groups:

1. Professionals engaged in the planning and decision making that addresses needs for both development and conservation in coastal regions. This group includes those who design, administer and evaluate coastal management projects and programmes sponsored by international donors, national, state and municipal government officials and professionals associated with non-governmental organisations engaged in aspects of coastal management and governance.
2. Natural and social scientists and other professionals who wish to contribute effectively to projects and programmes that integrate across the societal, economic and environmental dimensions of management and be effective members of interdisciplinary teams.

The CEG certification programme distinguishes between two levels of certification. Level 1 are senior professionals (senior project managers, senior government officials, senior scientists) who seek to strengthen their abilities to practice the ecosystem approach and integrate the dimensions of governance into their work. Level 2 candidates are associate managers with not less than three years of experience as a contributor to a coastal governance initiative (including junior professionals, community organizers, and extension officers).

4 The Four Pillars of this CEG Certification

Four complementary conceptual frameworks, or pillars, are the basis for the certification programme. First, practitioners certified by the CEG programme recognise that the goals of a coastal management initiative must address both the environmental and the human dimensions of a given locale. The first pillar is therefore ecosystem-based governance (or, the governance of socio-ecological systems) that is emerging as the dominant paradigm for managing natural resources and the environment. Central to this world view is that people are seen as an integral element of ecosystems. An often quoted definition of this approach is as follows: "Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The

goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors" (McLeod et al. 2005).

In practice this requires integrating across traditional sector-by-sector forms of planning and decision making. It also requires the visualization and promotion of nested systems of governance that united actions at the local level with actions on similar issues and goals at the national, regional, and ultimately global scales.

The second pillar of the CEG is a definition of governance that encompasses the values, policies, laws and institutions by which a set of issues is addressed (Juda 1999; Juda & Hennessey 2001; UNEP/GPA 2006). Those holding a GCE certification must be capable of identifying the formal and informal arrangements, institutions, and mores that structure and influence how resources or an environment are utilized. Such analysis documents what behaviours are deemed acceptable or forbidden, and what rules and sanctions are applied to affect how natural resources are distributed and used. In all cases and at all scales the challenges of the Anthropocene (Steffen et al. 2007) urgently call for a paradigm shift from traditional governance to reformed forms of governance that can respond effectively to the challenges of globalized economies, cultures that encourage consumption and waste generation, and climate change. Certified practitioners recognise that there are three principle sources of governance: the marketplace, governments, and the institutions and arrangements of civil society. The manner and the mechanisms by which these three sources of governance interact with one another is complex and dynamic. The certified practitioner has the knowledge and skills to understand how power and influence is allocated among these three sources of governance and how the distribution may need to be altered if coastal stewardship is to be achieved.

While this definition of governance suggests the scope of the knowledge, skills and attitudes of the certified practitioner, the third pillar is also required provides the practitioner with methods to trace the processes of coastal management through the sequence steps that link planning to implementation and evaluation as set forth by (GESAMP 1996) and further detailed by Olsen et al. (1999) and UNEP/GPA (2006). Since many projects fail to make the transition from issue analysis and planning to the sustained implementation of a plan of action, certified practitioners must also demonstrate their ability to use the Orders of Outcomes framework to disaggregate the distant goal of sustainable forms of development into a sequence of more tangible outcomes (Olsen 2003; UNEP/GPA 2006; National Research Council 2008; Olsen

et. al. 2009). This is the fourth pillar of the CGCE programme. Worksheets for these analyses are a feature of LOICZ Reports and Studies No. 34.

5 The Six Standards for CEG Certification

The competencies that must be demonstrated by each candidate for the certification encompass an array of knowledge and skills that span assessment and analysis, communication skills, and skills in the design and negotiation of a programme that applies the ecosystem approach.

The order in which the competencies are presented traces the process of characterizing a site or a region, the analysis of the responses of the governance system to ecosystem change through time, to strategic planning, and on to monitoring and evaluation. Leadership, facilitation and mediation are themes that weave through all six competencies. The four pillars of the CEG certification programme are the unifying conceptual frameworks that integrate across the six competencies.

Competency 1: Analysis of Long-term Changes in the Condition and Use of Coastal Ecosystems. This competency requires the knowledge and skills to: a) gather, display and analyse information on the trends in the changes in the goods and services generated by coastal ecosystems, in response to natural and human-induced forces; and b) to identify how the interests of different groups and institutions have influenced such trajectories of societal and ecosystem change.

Competency 2: Analysis of governance structures and processes that encompass values, policies, laws and institutions that determine how ecosystems are conserved and used. This competence is grounded in the knowledge and skills needed to characterize the defining features of each source of governance (markets, government and civil society), and assess their relative power in shaping responses to changing the condition of the socio-environmental system in a specific locale.

Competency 3: Leadership required to build the “political will” to design, adopt and implement plans of action that address complex challenges posed by ecosystem change. The certified practitioner is an effective integrator and communicator who can navigate the process of assembling support for a course of action. This competence addresses abilities to manage the internal dynamics within interdisciplinary teams and the ability to select appropriate strategies to generate the effective participation of a diversity of stakeholders.

Competency 4: Strength in facilitation, mediation, stakeholder engagement and public education. In a time of accelerating global change the certified practitioner must design programmes that educate the public and stakeholders about the activities that are changing eco-

systems, the implications of such changes for society, and on the options for addressing the issues of concern.

Competency 5: Strategic Design of a Coastal Ecosystem Governance Programme. The design of a coastal ecosystem governance programme and its strategic plan of action requires defining issues and their causes, assessing potential solutions, articulating a vision, setting goals and selecting the partners and strategies by which desired outcomes may be attained.

Competence 6: Design and implementation of monitoring and evaluation in support of adaptive governance. The certified practitioner must define the sequence of outcomes that will mark the attainment of a programme's intermediate objectives and progress towards its long-term goals. Progress will be monitored by these markers and, through periodic assessments, the programme's design will be adapted as conditions and learning evolves.

The CEG Programme details the knowledge skills and attitudes that are associated with each of the six competencies.

6 The First Class of Certified Practitioners

The refinement and first application of the CEG programme was undertaken through a partnership between the Coastal Resources Center at the University of Rhode Island and EcoCostas, a regional NGO based in Ecuador. In addition to the core funding from LOICZ, contributions to this effort were made by the AVINA Foundation, IHDP and the United States Agency for International Development. Three workshops were held familiarize the candidates for certification with the methods and guide them through a practicum that designed to assess their abilities as practitioners of coastal ecosystem governance. The first workshop was directed primarily at Competency 1 – methods for assembling an analysis of long-term changes in the condition and use of coastal ecosystems and Competency 2 – analysis of governance structures, processes and outcomes. The second workshop centred upon Competencies 3, 4 and 5 that address strategies for building the necessary “political will”, skills in facilitation and mediation and the abilities required to design a programme based on the principles of ecosystem approach. Here the first step was to and lead the candidates through the process of defining a long-term vision for the action arena, identifying current and anticipate future expressions of ecosystem change – including specifically climate change. This analysis set the context for selecting the issues that a future ecosystem based project or programme in each action arena would address. The third and final workshop was directed at refining the designs of new initiatives that emerged in the second workshop with particular attention to Competency 6 – what to monitor and how to feature an adaptive, learning based approach in the



design and the administration of a programme. This final training event featured a transverse analysis across the 12 sites to identify lesson specific to each category of sites and to the portfolio as a whole. The first application of the programme has resulted in the certification of eight senior and five associate coastal managers from eleven nations.

7 In Summary

The design and initial application of the CEG certification programme has underscored the value of a performance-based approach to capacity building. A major strength of this effort is that it provides a set of competencies against which the capacity to practices integrating forms of coastal governance can be assessed. As pointed out by the analysis of capacity building for the stewardship of oceans and coasts conducted by the National Research Council (2008) the structure and content of this certification offers a means for combating the fragmentation and ad-hoc nature of many capacity building programmes. It can be adapted to degree granting programmes and offers a way for academic programmes in both the social and natural sciences to integrate their approaches to knowledge generation through the examination of case studies.

Future applications of the CEG programme will require adjusting the trainings and the practicum to the needs and capacities of the applicants. The standards of competency, however, are anticipated to remain constant for the two levels of certification. The programme promotes high standards of competence, professional growth and ethical conduct. It can be offered to both young professionals at an early stage in their careers and senior practitioners with wide experience. The programme offers additional benefits through opportunities for dialogue among peers, analysis of experience in a diversity of settings and networking. An additional benefit of certification programmes is that they set explicit criteria that can be applied when making a capacity building needs assessment for an individual and a programme. The standards also provide a common reference point when comparing across practitioners, programmes and other initiatives that work to apply the ecosystem approach.

References

- GESAMP (1996): The Contributions of Science to Integrated Coastal Management. Reports and studies No. 61. Food and Agriculture Organisation of the United Nations, Rome.
- Juda, L. (1999): Considerations in developing a functional approach to the governance of large marine ecosystems. *Ocean Development and International Law* (30): 89–125.
- Juda, L. & Hennessey, T. (2001): Governance profiles and the management and use of large marine ecosystems. *Ocean Development and International Law* (32): 43–69.

McLeod, K. L.; Lubchenco, J.; Palumbi, S. R. and Rosenberg, A. A. (2005): Scientific consensus statement on marine ecosystem-based management. Signed by 219 academic scientists and policy experts with relevant expertise and published by the Communication Partnership for Science and the Sea.

Millennium Ecosystem Assessment (2005): *Ecosystems and Human Well-Being: Synthesis*. World Resources Institute, Washington, D.C., 160 pp.

National Research Council (2008): *Increasing Capacity for Stewardship of Oceans and Coasts*. The National Academies Press, Washington D.C.

Olsen, S. (2003): Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean and Coastal Management* (46): 347–361.

Olsen, S.; Lowry, K. and Tobey, J. (1999): *A Manual for Assessing Progress in Coastal Management*. Coastal Management Report No. 2211. University of Rhode Island, Coastal Resources Center, Narragansett, USA.

Olsen, S. B.; Page, G. G. and Ochoa, E. (2009): *The Analysis of Governance Responses to Ecosystem Change: A Handbook for Assembling a Baseline*. LOICZ Reports & Studies No. 34. GKSS Research Centre, Geesthacht, 87 pp.

Steffen, W.; Crutzen, P. J. and McNeill, T. R. (2007): The Anthropocene: are humans now overwhelming the great forces of nature? *Ambio* 36 (8): 614–621.

United Nations Environment Programme/Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (2006): *Ecosystem-Based Management: Markers for Assessing Progress*. The Hague, Netherlands, 49 pp.

Workshop “Responding to Coastal and Marine Change: Comparative Assessment of Coastal Governance Initiatives” at the IHDP Open Meeting 2009

Andreas Kannen (GKSS Research Centre)

The IHDP Open Meeting in April 2009 in Bonn included more than 100 sessions related to human dimensions research along the themes “Demographic Challenges”, “Resources and Technological Innovation”, “Social Equity, Cohesion and Sustainable Adaptation”, and “Adaptive Institutions and Governance”. But despite the importance of coastal and marine systems within the natural and social dynamics of Global Change, the LOICZ workshop (constituted as a double session) was the only one which specifically looked at coastal governance structures and the experiences from coastal and marine planning. The workshop discussed coastal governance from a set of global case studies, covering examples from the Arctic, Latin America, New Zealand and Europe.

The workshop started with an introduction by A. Kannen, discussing the focus of coastal governance research on place based approaches, coasts as social-ecological systems, the relation of scales, perceptions, beliefs, discourses and policies, the related importance of power structures and finally the governance baselines approach.

S. Olsen illustrated the governance baselines approach using case studies from the Latin American EcoCostas network and specifically the case of the Upper Gulf of California. He illustrated the case study area, past environmental trends and cycles of policy development. Until very recently the governance system of the Upper Gulf has tolerated corruption and inefficiency and worked without a long term vision with which stakeholders could identify. This situation resulted in competition and conflict among agencies of government that serve different interests and did not involve the local communities in decision making. This situation led to unregulated economic growth with unintended consequences. In 2005, the Peñasco Agreement provided a foundation for ecosystem-based governance creating a fresh approach based on consultation, involvement, collaboration, and building trust. It can build on the commitment of key representatives of fishing communities, seafood buyers, national and international NGOs and key government agencies who signed the agreement.

R. R. Krishnamurthy analysed community – based Coastal Zone Management in the aftermath of the December 2004 tsunami event in Tamil Nadu, India. Specifically he looked into the contributions of science and research and the cooperation between universities, government and NGOs. He concluded that government interventions ignored local specifics, traditional wisdom and indigenous knowledge are not fused with scientific data and on the other hand local communities are not in a position to cooperate with the government, especially in relocation issues. In a very inspiring presentation B. Glavovic looked at experiences from New Zealand's Fiordlands. The Fiordland experience demonstrates that unsustainable practices can be reversed by innovation, dedication and collaboration. Drawing on this experience and insights from diverse literatures, B. Glavovic developed a conceptual framework to provide guidance for designing governance systems that promote the sustainable development of oceans and coasts. This framework points out that prevailing governance efforts are fundamentally mismatched in relation to the distinguishing characteristics of ocean and coastal systems. It further recommends imperatives and priority actions for the future.

J. West looked at governance challenges in coastal fisheries using the remote area of Lebesby, Northern Norway, as an example. She linked the local characteristics of fisheries with national fisheries management, regional environmental change and socio-economic context like global market integration and changing values towards work and family life. The message out of this example is that new or modified institutions and governance forms may be needed to assist coastal fishing communities and actors in Lebesby and Northern Norway to prepare for and respond to climate change. A. Kannen used the case of offshore wind farm development in the German North Sea to illustrate the need for a paradigm shift in the way

governance systems work. This paradigm shift includes a move from individual activities to use patterns, from species to ecosystems and from individual spatial scales to multiple nested scales. The case study specifically illustrates that at national, regional and local scales the same issue can be looked at in different frames, e.g. off-shore wind energy is seen from climate change policy and energy policy in national debates and from employment perspectives and regional development in regional debates. Locally, aesthetical (the sea as a wide open space), symbolic (the sea as a wilderness) or ethical (protection of birds and marine mammals) arguments lead to controversial and sometimes emotional debates. Coastal and marine governance structure therefore need to be able to deal with multi-stakeholder environments, multi-level decision making, analyse risks as well as opportunities and identify trade-offs between areas and arenas.

Following these presentations of area specific cases, F. Biermann introduced the analytical approach chosen in the Earth System Governance Project (ESG) of IHDP. The research framework of the ESG focuses on a) the problem of architecture (e.g. vertical and horizontal linkages), b) the problem of agency (e.g. non-governmental actors), c) the problem of accountability/legitimacy (of actors and decision making), d) the problem of adaptiveness, and e) the problem of allocation (who gains, who loses) and access (to areas/resources). Similar to LOICZ the ESG is primarily a network of researchers working along an agreed research framework and science plan. Future cooperation between ESG and governance related research in LOICZ was discussed following the presentation. Finally, B. Ratter discussed the importance of complexity theory in the context of coastal planning and management. With the science of complexity a new understanding of systems is emerging. A complex system often has a number of attributes not observed in simple systems, including nonlinearity, uncertainty, emergence, scale, and self-organisation. As a conclusion we have to abandon the belief that even the most profound knowledge of the system's components can result in "good" planning. Unexpected system reactions will always occur. But while complex systems can not be controlled, they can – despite all uncertainties and missing knowledge – be tickled with the aim to move social-ecological systems into a more sustainable future.

Overall, the presentations within the workshop provided not only a thorough state-of-the-art overview of the current experiences with coastal and marine governance, but forced a lively critical and self-critical discussion concerning complexity, analytical frameworks and the role of scales and actors in area based management. The workshop served as an excellent step towards further development of Priority Topic 1 and governance related research within LOICZ. As well as basis was developed to explore further cooperation with IHDP projects like the ESG.



Cross-Cutting Activities

River Deltas sinking due to human activity, says new study by team of LOICZ Scientists

Irina Overeem

A LOICZ workshop conducted jointly with CSDMS and GWSP in late 2007 brought together a team of scientists who just published a new study which indicates most of the world's low-lying river deltas are sinking from human activity, making them increasingly vulnerable to flooding from rivers and ocean storms and putting tens of millions of people at risk.

While the 2007 Intergovernmental Panel on Climate Change (IPCC) report concluded many river deltas are at risk from sea level rise, this study indicates other human factors are causing deltas to sink significantly. The researchers concluded the sinking of deltas in Asia and India to the Americas is exacerbated by the upstream trapping of sediments by reservoirs and dams, man-made channels and levees that whisk sediment into the oceans beyond coastal floodplains, and the accelerated compacting of floodplain sediment caused by the extraction of groundwater and natural gas.

The study concluded that 24 out of the world's 33 major deltas are sinking and that 85 percent experienced severe flooding in recent years, resulting in the temporary submergence of roughly 250,000 km² of land. About 500 million people in the world live on deltas.

Published in the September 20 issue of *Nature Geosciences*, the study was led by J. Syvitski, who is directing a \$4.2 million effort funded by National Science Foundation to model large-scale global processes on Earth like erosion and flooding. Known as the Community Surface Dynamic Modelling System, or CSDMS, the effort involves hundreds of scientists from dozens of federal labs and universities around the world.

The *Nature Geosciences* authors predicted that global delta flooding could increase by 50 percent under the current projections of about 43 cm in sea level rise by the end of the century as forecasted by the 2007 IPCC report. Coastal flooding will increase even more if the capture of sediments upstream from deltas by reservoirs and other water diversion projects persists and prevents the growth of the deltas, according to the study.

"We argue that the world's low-lying deltas are increasingly vulnerable to flooding, either from their feeding rivers or from ocean storms," said CU-Boulder Research Associate A. Kettner, a co-author on the study and member of the CSDMS team. "This study shows there are a host

of human-induced factors that already cause deltas to sink much more rapidly than could be explained by sea level alone."

"It's a new and "holistic" way of looking at the deltas, says H. Kremer, Chief Executive Officer of LOICZ. Rather than looking exclusively at climate-driven sea-level rise, he explains, "the authors actually have looked into what we call the 'water continuum,'" which tracks the "historic struggle between traditional [river] management and coastal management." As a result, "in many of the major deltas worldwide we currently see much stronger signals of changing [delta] dynamics driven by [human activity] rather than global sea-level rise."

Other study co-authors include CU-Boulder's I. Overeem, E. Hutton and M. Hannon, G. R. Brakenridge of Dartmouth College, J. Day of Louisiana State University, C. Vörösmarty of City College of New York, Y. Saito of the Geological Survey of Japan, L. Giosan of the Woods Hole Oceanographic Institute and R. Nichols of the University of Southampton in England.

The team used satellite data from NASA's Shuttle Radar Topography Mission, which carried a bevy of radar instruments that swept more than 80 percent of Earth's surface during a 11-day mission of the space shuttle Endeavour in 2000.

"Every year, about 10 million people are being affected by storm surges," said CU-Boulder's I. Overeem, also a CSDMS scientist. "Hurricane Katrina may be the best example that stands out in the United States, but flooding in the Asian deltas of Irrawaddy in Myanmar and the Ganges-Brahmaputra in India have recently claimed thousands of lives as well."

The researchers predicted that similar disasters could potentially occur in the Pearl River delta in China and the Mekong River delta in Vietnam, where thousands of square miles are below sea level and the regions are hit by periodic typhoons.

"Although humans have largely mastered the everyday behaviour of lowland rivers, they seem less able to deal with the fury of storm surges that can temporarily raise sea level by 3 to 10 meters," wrote the study authors. "It remains alarming how often deltas flood, whether from land or from sea, and the trend seems to be worsening."

The full article can be found under:

<http://www.nature.com/ngeo/journal/v2/n10/full/ngeo629.html>

LOICZ SSC News

New SSC Members welcome on board!

LOICZ, together with IGBP and IHDP, has appointed four new SSC members, who officially started their term on 1 January, 2009. In INPRINT 2009/1 we already introduced **Remi Laane** and **Masumi Yamamuro**.

In the following we introduce **Zhongyuan Chen** (State Key Laboratory for Estuarine and Coastal Research, East China Normal University, Shanghai) and **Antonio C. Diegues** (Universidade de São Paulo Research, Center on Human Population and Environment).

Zhongyuan Chen is a senior research scientist at the State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China. Z. Chen is geomorphologist and his long-term expertise concentrates on examination of sediment source to sink processes in river-delta systems in response to global change and human impact. This includes analysing sediment budgets, transport, and deposition affected by climate change, sea-level fluctuations and human intervention. Environmental assessment from drainage basin to estuary, as represented by sedimentological, geomorphologic and eco-hydrological processes is the major focus. In addition, Chen's recent study is closely associated with the 3-Gorges dam on the Yangtze River, exploring post-dam delta-coastal development. His research also provides substantial insight into estuarine management, where profound sedimentological and eco-hydrological response to the dam effect. His recent study has approved the estuarine geo-ecological modification in response to the reduced sediment sources and altered hydrography can be observed. Chen serves as

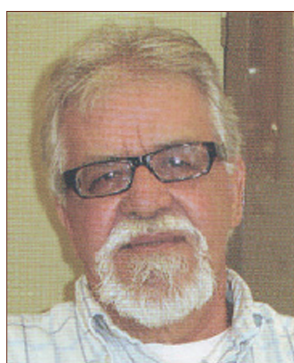
chief guest editor for ECSS, Geomorphology and ESPL, in which rich geo-ecohydrological research results from various large river- estuaries worldwide have been included. Further major studies he is involved in include the Nile, and other Asian river-deltas. He is PI for the APN Asia mega-delta project and Co-PI for the IGCP-582 river-basin project. These will provide a unique research background for his involvement in LOICZ science and related strategic targets, especially in China and Asia.



Please also read the article of "Coastal research of Zhongyuan Chen "SKLEC in the Yangtze estuary, China" on page 43 in our rubric "Coastal Snapshot" and the PT2 article "Sediment Dynamics of Chinese Muddy Coasts and Estuaries" on page 12.

Antonio Carlos Diegues

I started studying coastal zones and their human populations, particularly artisanal fishers during my master dissertation at the University of São Paulo in 1971 and at the Institute of Social Studies in The Hague, in 1973. From 1974 to 1979 I continued my anthropological training at PhD Level at the Sorbonne, in Paris (École des Hautes en Sciences Sociales) and at the University of São Paulo, dealing with the relationships between artisanal and industrial fishing in Brazil. In 1977 I joined the United Nations in Geneva and Rome, dealing with resettlement of refugees and with fisheries planning. Back to the University of São Paulo in 1985, after 14 years of international, experience in several countries in Asia, Africa and Latin America, I have established a research centre on Coastal Wetlands and Human Populations,



(NUPAUB) with the participation of researchers from different academic background, including oceanographers, biologists, economists, anthropologists. As research coordinator and professor at the Graduate Course on Environmental Sciences of the University of São Paulo, was able to initiate various projects and programmes on marine conservation, putting together natural and social scientists. I have participated in the boards of several international academic institutions, and I have published several books and articles in national and international magazines on issues of coastal conservation and social participation, marine protected areas, ethnoscience, etc.



Some of the articles can be found at the research centre's site: usp.br/nupaub



Please also read the article "Research Mission to São Tomé and Príncipe Islands – West Africa" of Antonio Carlos Diegues on page 45 in our rubric "Coastal Snapshot".



New LOICZ SSC Members for 2010

LOICZ, together with IGBP and IHDP, has appointed three new SSC members for 2010:

-  Tim Carruthers
-  Valerie Cummins
-  Bruce Glavovic

Read more about our new SSC members in the upcoming volume of LOICZ INPRINT 2010/1 to be published by the end of April 2010.

20th LOICZ SSC Meeting in Kjeller, Norway

Following the LOICZ Dahlem-Type Workshop on “Global Environmental Change in the Coastal Zone: A Socio-Ecological Integration” (15–19 June, 2009, in Kjeller, Norway), chairperson A. Newton opened the 20th LOICZ SSC Meeting on 20 June. She underlined that the near term goal for the core project is the interim synthesis which is a milestone for both the mid-term evaluation of LOICZ in its second phase and in parallel a scientific evaluation of the current Priority Topics (PT). Thereafter, she welcomed our guests J. Morais (IGBP), F. Schmidt (IHDP) and E. Brévière (SOLAS). Apologies were conveyed on behalf of SSC Members F. Lansigan and Z. Chen. Moreover, the SSC expressed its gratitude to rotating members A. Forbes, W. Huang, J. Saito, and A. Gilbert for their past years service and contributions. The new SSC members M. Yamamuro, A. C. Diegues, and R. Laane briefly introduced themselves.

In the next 12 months, LOICZ will concentrate its efforts on preparing the products of the activities in the past 4 years. With regard to Priority Topic 1 (PT1), project affiliation and investment have already yielded some excellent outcomes including the stream of publications resulting from the EU FP6 project “ELME”. The EU FP7 project “KnowSeas” will ensure that effort on this topic is being maintained. The SPICE project is also yielding publications in peer-reviewed journals and a book chapter soon to be published and a documentary-style film on the project supported by the Lighthouse Foundation have also been produced. Products from PT2 include a new modelling and calculation tool for coastal and estuarine biogeochemical budgets and several papers to be published. A workshop on the relationship between nutrient, hypoxia and fisheries was held earlier this year, and follow-up workshops will be held later this year and in 2010. Investment in PT3 has yielded a series of publications including the LOICZ R&S Report No. 34 on “The Analysis of Governance Responses to Ecosystem Change” and a major report entitled “Increasing Capacity for the Stewardship of Oceans and Coasts: A Priority for the 21st Century” released by the U.S. National Research Council. A number of new projects will ensure continued effort on this PT, e.g., a participation in a project proposal on Arctic

economy and governance and governance baseline evaluations will be extended beyond Latin America including an initial fact finding workshop for the Arctic in December.

LOICZ continues its innovative way of doing global science. For instance, six Erasmus Mundus students will assist ST Coordinators and PT Leaders with their synthesis, staying at the IPO from mid July 2009 until end of February 2010. Completing their master theses, these young colleagues will be co-supervised by ST Coordinator and PT Leader, respectively. During their work a synthesis of LOICZ affiliated projects will be a central element. Several LOICZ SSC members and past SSC members participated in the spring 2009 Master Erasmus Mundus Water and Coastal Management, including N. Rabalais, S. Olsen, D. Swaney, L. McManus, as well as J. Weichselgartner and H. Kremer from the IPO. Furthermore, LOICZ has initiated its series of “Heritage Lectures” with presentations provided by K. Turner, P. Burbridge, L. McManus, W. Dennison, and N. Rabalais (available on the LOICZ website). Another thematic focus of Cross-Cutting Activities (CCA) was “coastal lagoons”. A special issue of *Hydrobiologia* will include a review article on European lagoons, a series of articles on South Asian lagoons, a series of articles on North African lagoons and some articles resulting from the Lagoon conference in December 2009 which LOICZ is co supporting. The next theme for CCA is to be defined. Possible themes include megacities in the coastal zone, the Arctic and deltas. Following collaboration between CSDMS/Boulder, GWSP/Bonn and LOICZ, the LOICZ R&S Report No. 35 on Dynamics and Vulnerability of Delta Systems has been published. It provides a global overview of key issues and risks of deltaic change.

Two other issues worthwhile mentioning are next year's congress on “Risk and Management of current and future Storm Surges” and the IGBP Fast Track Initiative (FTI) on “Megacities and the Coastal Zone: Air-Sea Interactions”. On 13–17 September, 2010, LOICZ and the GKSS Research Centre supported by multiple national and international institutions and the UN will jointly hold a Storm Surge Congress in Hamburg. Key is to overcome the fragmented scientific and community discussion on storm surges as a global natural hazard. Topics include: 1) Contemporary risk and management; 2) History and intercultural perception of risk and response; 3) Driving factors and scales; 4) Future risk and management; and 5) Institutional dimensions. A conference website and flyer is available (see LOICZ website). LOICZ is also proud that IGBP sponsors the SOLAS-IGAC-LOICZ FTI on Megacities and the Coastal Zone. The LOICZ liaison scientist to the IGBP SC is A. Newton; the scientific contact person in charge is former chair J. Pacyna. The LOICZ focus will be on the impacts on human health and well-being. The FTI financially supports a series of workshops on air-sea interactions for megacities in the coastal zone.

The SSC Meeting closed with chairperson and IPO expressing their gratitude to all the SSC members for their active participation in the SSC Meeting, especially after an exhausting, but also exhilarating Dahlem-type workshop. Alice Newton thanked the LOICZ IPO who made sure that both the workshop and the meeting were well prepared and organised, the Regional Node Coordinators

for their continued efforts to spread LOICZ science in their regions, as well as the GKSS Research Centre for the excellent support. According to the evaluation carried out by the SSC Members, the 2009 SSC Meeting in Kjeller was considered exhausting (because of the Dahlem-Type workshop) but successful in terms of science and organisation.



SSC members and guests of the 20th SSC Meeting in front of the Holmenkollen Park Hotel Rica, Oslo, Norway before the LOICZ dinner, hosted by NILU (Photo: J. Weichselgartner)

LOICZ News

LOICZ Dahlem-Type Workshop Global Environmental Change in the Coastal Zone: A Socio-Ecological Integration

Skjetten, Norway, 15–19 June, 2009



Please also read LOICZ Press release
"Between the Devil and the Deep Blue Sea":
<http://www.loicz.org/press/news/index.html>

Between the Devil and the Deep Blue Sea

Gathered here in Norway
We talked for many a day
And we're caught in between
The devil and the deep blue sea

After we all had our say
We learned that the coast is not okay
And we're caught in between
The devil and the deep blue sea

LOICZ brings in science to assist
Natural science, economics, social science and more
With a cross-cutting and integration twist
So that knowledge sharing is at the core

We surely hope and pray
That we find a better way
And avoid being caught in between
The devil and the deep blue sea

William C. Dennison, 21 June 2009,
(LOICZ SSC Member 2003–2009)

Great Barrier Reef (Photo: Julia Struck)



The workshop concept was the systems approach to understanding; seeking innovation as an emergent property of different kinds of knowledge. The overall goal of the workshop was to identify gaps in knowledge, to find new ways in approaching controversial issues, and to define priorities for future research. The discussion-based meeting was not necessarily consensus oriented; controversial discussion and exchange was encouraged to assist LOICZ in passing traditional boundaries and achieve new joined-up thinking in the coastal and human dimensions context. In the typical Dahlem discussion style the workshop focused on four themes: (1) Coastal Innovation: New Methods and Solutions that Integrate Positive Adaptation (Coordinator: W. Dennison); (2) Fractal Coastal Futures: Emerging Global Trends (Coordinator: A. Newton); (3) Scales of Critical Change in the Coastal Zone (Coordinator: D. Swaney); and (4) The Role of Governance in the Coastal Zone (Coordinator: S. Olsen).

Governments at all scales, from local to international have failed to seriously implement integrated coastal zone management. This has placed people at risk of disasters such as hurricane Katrina and the Banda Aceh tsunami. Innovation is needed to solve the widespread problems, if we are to turn the tide of losses. We must enable governance at all scales from intergovernmental engagement to the individual, personal choices that may counteract the tyranny of small decisions. The pace of change is increasing and we are already seeing economic and climate change refugees. In parallel, we see climate entrepreneurs eager to exploit Arctic resources. Climate change is exposing the fragile Arctic coasts and ecosystems as well as their vulnerable inhabitants, who subsist on traditional lifestyles, to increasing risks.

These are some of the conclusions drawn by the 40 international experts – from six continents and wide ranging disciplines – who met for an intensive, five-day workshop near Oslo, Norway, to review the development of coastal zones worldwide in the past decades. Governments and international organisations have failed to implement integrated coastal zone management, claim the scientists. “This puts people at risk from disasters such as hurricane Katrina and the Indian Ocean tsunami,” said N. Rabalais, from Louisiana Universities Marine Consortium.

Scientists were most concerned that the combination of globalization and climate change are the greatest risk to the long-term health of the coasts. “Human accelerated environmental change is affecting all scales of coastal waters, from small lagoons to the continental shelf,” said biogeochemist D. Swaney from Cornell University. “Watersheds which formerly provided nutrients to coastal waters only from within their boundaries now see additional sources from outside their boundaries, due to trade of fertilizer, food and feedstocks. These increased nutrient loads may affect coastal waters differ-

ently at different scales, because the mixing and flushing of coastal waters depends to some degree on their spatial extent. The ecological responses of coastal waters also depend on physical and chemical properties which are related to their size: deep, dark, cold, and nutrient-poor waters respond differently than shallow, warm, nutrient-rich waters.”

Coasts are now in the “frontline of the battleground of global and climate change”, said P. Burbridge, a coastal management specialist at the University of Newcastle Upon Tyne in the UK. “The resources of the coastal environments and the opportunities for the sustainable use of coastal ecosystems are being squandered by overexploitation. Innovation is needed to solve the widespread problems if we are to turn the tide of losses,” said M. Orbach from Duke University in the US. A. Newton, the LOICZ SSC Chairperson, diagnosed that our coasts are suffering from a “global coastal syndrome,” where growing megacities and the addition of hardened shorelines are destroying natural resources.

W. Dennison from the University of Maryland, agrees: “The treatment and cure of coastal syndrome includes renewable energy, recycled water and solid waste, sourcing locally grown foods and attention to social equity issues, especially in education and healthcare.” “By investing in ‘soft’ engineering for coastal defence, spatial planning and managed realignment, we can give our coastal ecosystems a fighting chance,” said K. Turner of the School of Environmental Sciences at the University of East Anglia. “Coastal squeeze is trapping inhabitants between the Devil and the deep blue sea,” said L. Mee of the Scottish Association for Marine Science.

The three-day 20th LOICZ SSC Meeting followed an intensive but successful LOICZ workshop, supported by the GKSS Research Centre, Geesthacht, Germany, the Norwegian Institute for Air Research, and the Research Council of Norway.

Activity Report

Ocean Colour Training Course, Zanzibar, Tanzania, 12–23 October, 2009

Marié Smith, graduate student at the University of Cape Town, Oceanography Department, Rondebosch, Cape Town, South Africa

A 2-weeks training course on “Methods and Applications of Ocean Colour Remote Sensing in African Coastal and Regional Seas” was organised by the EC – Joint Research Centre, and locally hosted by the Institute of Marine Sciences, University of Dar-Es-Salaam, in Zanzibar, Tanzania.

This course was designed to provide the theoretical basis of ocean colour satellite measurements, as well as key applications in monitoring and managing the coastal zone, in protecting the marine ecosystems and their resources. It included a series of lecture sessions chaired by international experts from Europe and Africa, covering a large range of topics, from the physical principles of ocean colour radiometry, atmospheric corrections, in-water optics and algorithms, to specific applications addressing important environmental issues in coastal and marine waters such as the carbon cycle, fisheries and coastal habitats.

The course also contained practical sessions during which we were trained on various image processing and applications software, such as Envisat-BEAM, BILKO, and SeaDAS. Practical sessions continued in the form of 'mini-projects' or case studies during which we had the opportunity to apply knowledge recently gained during the lectures and software demonstrations.

Using satellite data and specifically ocean colour is important for the area of interest for my MSc project; the Natal Bight on the east coast of South Africa. The Natal Bight is an extremely dynamic area – whilst predominantly influenced by the fast-flowing oligotrophic waters from the Agulhas current. This unique environment of riverine influxes, retention mechanisms and topographically induced upwelling makes it highly optically variable and a fascinating and challenging environment for ocean colour applications.

A preliminary assessment and validation of ocean colour algorithms and methods will be completed in the region. This will involve an investigation of the potential use of ocean colour remote sensing to assess the influence of variations in freshwater inputs to coastal ecosystems, with focus on the phytoplankton, coloured dissolved organic matter (CDOM) and sediment dynamics of the area. This would subsequently provide the future ability to quantitatively use ocean colour to assess freshwater impacts on similar marine systems.

The opportunity to join this training course has given me a much broader understanding of how ocean colour remote sensing works and how I will be able to apply it to benefit my MSc thesis work. The experience has been very valuable and has provided me with the necessary knowledge and tools that I will need in order to further my investigations on the dynamics of my area of interest.

Acknowledgements

I am grateful to the LOICZ IPO and R. Doerffer who have financially supported my course participation.



Ocean Colour training Group with R. Doerffer (GKSS, last row in the middle) and M. Smith (first row in the centre)

(Photo: Philippe Simons)



LOICZ Website

Heritage Lectures online:

LOICZ feels that it is important to reach out and include the work of previous SSC members. We have therefore launched the new series of so-called "LOICZ Heritage Lectures" where we usually ask former or rotating SSC members to reflect on LOICZ science based on their past involvement and future perspectives. Now we are very excited that a first set of these Heritage Lectures is available on the LOICZ website:



Please have a look at the LOICZ website:

http://www.loicz.org/mediacentre/heritage_lectures/index.html

We took the opportunity of having several past SSC members with us in Oslo for the Dahlem-Type workshop, who gave their vast experience to LOICZ, on record:

- William Dennison:**
Catalyzing a Paradigm Shift: Sustainability of the Coastal Zone
- Kerry Turner:**
Ecosystem Services and Coastal Zone Management
- Peter Burbridge:**
The "So What" and LOICZ
- Liana Talaue-McManus:**
Plankton, Fluxes and Futures
- Nancy Rabalais:**
Scientist Citizen: Can a Scientist Influence Policy?

Available are: video, PPT presentation, thumbnails, contact details, and a table of content.

The screenshot shows a video player interface. The main content is a presentation slide with the following text:

- Title:** Catalyzing a paradigm shift: Sustainability of the coastal zone
- Presenter:** Bill Dennison, University of Maryland, Center of Environmental Science
- E-mail:** sennison@ca.umces.edu
- Presentation Date:** 15 - 19 June, 2009
- Description:** Heritage Lecture at LOICZ Dahlem-Type Workshop in Kjeller, Norway

 The slide also features the LOICZ logo and the University of Maryland Center for Environmental Science logo. Below the slide, there is a table of contents with 5 items: 1. Catalyzing a paradigm shift: Sustainability, 2. Outline, 3. Proposals, research and publications used to..., 4. Management, monitoring and research needed to..., 5. Study Solve.

To join the videos and the "d-Lectures", the Microsoft Internet Explorer V 6.4 or higher and the Microsoft Media Player are necessary.

If your computer is behind a firewall, ports for video must be enabled!

"Active X" and "JavaScript" must be activated!

Further Heritage Lectures in planning:

- Eva Roth
- Juan Restrepo

LOICZ Affiliated Projects are now embedded in the LOICZ website!

The screenshot shows the LOICZ website's 'Current Projects' page. The main project listed is ENCORA Coordination Action. Details include:

- PROJECT NAME:** ENCORA Coordination Action
- ACRONYM:** ENCORA
- STUDY REGION:** Europe
- PRINCIPAL INVESTIGATOR:** Drinkers
- DURATION:** -
- PROJECT WEBSITE:** [R] Link to project website
- LOICZ PROJECT DATABASE:** [R] Click here for more project information

 The page also includes a 'PROJECT DESCRIPTION' section for ENCORA, explaining its goals and the services it provides to coastal professionals.


The LOICZ Project and Contact Database website provides information about the LOICZ-affiliated projects and activities. The goal is to support you in finding information related to your field of work as well as to foster interdisciplinary research. The database has been set up three years ago and lots of you have used it so far. Currently, our Erasmus Mundus students do a lot of research with this database which is very helpful for them. Furthermore, this will ultimately lead to a first order synthesis of several of the affiliated activities, thus a considerable part of the LOICZ portfolio.

Within the last few months, we developed an initial concept to further enhance the convenience and utility of the LOICZ affiliate platform:

Independent from the database we have started to embed the LOICZ-affiliated projects and activities in the LOICZ website. In this way we are now publishing all

information about the 'current' and 'past' affiliated activities under the new category "Projects". The intention is to enhance attractiveness combined with optimised usability for the website visitors and to increase the visibility of our affiliated projects and research activities. You will find detailed information of the activities, website links, relations to LOICZ Scientific Themes and Priority Topics, contact details of the principle investigators, and, if available, also reports for download. A first example is the website of Coastal Futures where you will find the recently published brochure "Offshore Power in the German North Sea". Gradually, we will add further information, such as brochures and bibliographies of individual affiliated projects. If you have any complementing information or you would like to add your project website, please contact Ms. Ines Böttcher. She will help you to present your affiliated project or research activity on the LOICZ website as informative and attractive as possible.

 http://www.loicz.org/projects/documents/008804/index_0008804.html.en

 Please have also a look at our rubric "Publications". Coastal Futures has published a brochure about Offshore Windpower in the German North Sea.

Contact person for the LOICZ project website and affiliated projects: Ms. Ines Böttcher (ines.boettcher@loicz.org)

Website Statistic:

New record!

The LOICZ website is continuously evolving to a frequently used communication platform. Since LOICZ uses a new Content Management System (CMS) and has published its new internet presence in April 2008 the number of visitors of the LOICZ website keeps increasing.

The new CMS offers a whole set of new possibilities and features:

The website now offers an attractive news area on the right side showing the latest news; the calendar displays all relevant events with further description, venue and continuative links to congress websites; and the Media Centre offers audio-visual content like lectures, podcasts and vodcasts.

More downloads than ever!

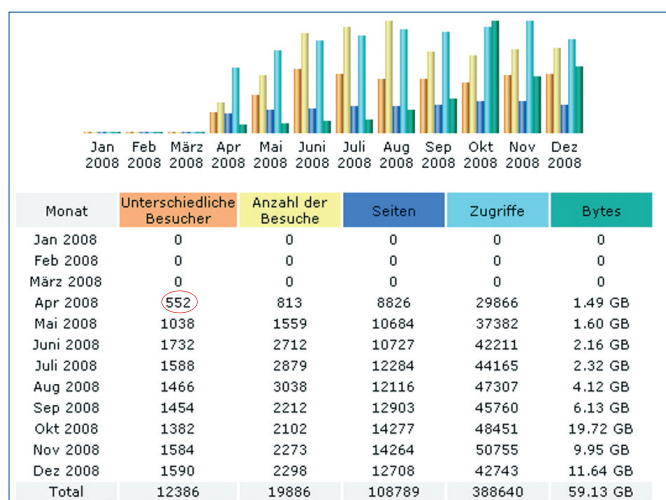
The number of downloads is also continuously growing. Especially LOICZ R&S Reports and the LOICZ newsletter INPRINT are very popular.

Zeitraum: Juni 2009 OK

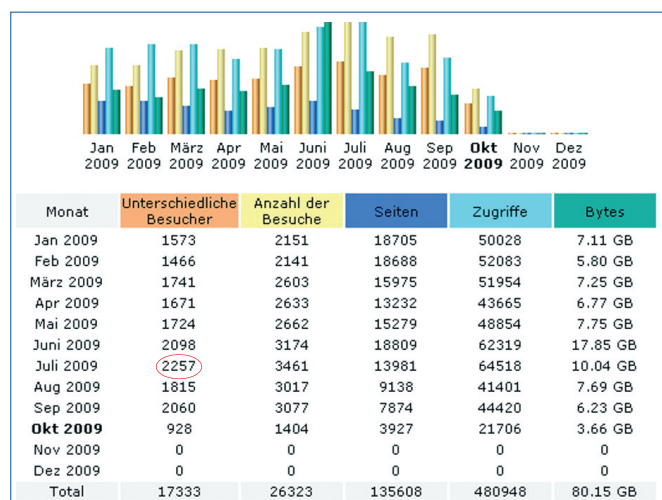
Zurück zur Hauptseite

Filter : Exklusiv-Filter : OK

Seiten-URL					
Total: 624 Unterschiedliche Seiten	Zugriffe	durchschnitt. Größe	Einstiegsseiten	Exit Seiten	
/	2557	28.22 KB	981	564	
/products/publication/newsletter/index.html.en	538	42.97 KB	196	68	
/about_us/index.html.en	414	15.91 KB	16	27	
/internal/dahlem/index.html.en	370	14.42 KB	41	9	
/internal/index.html.en	322	12.41 KB	10	6	



In April 2008, LOICZ redesigned its web presence and the websites had 552 visitors. The number continually increased and had its peak in August 2008 with 1732 different visitors.



In 2009, the highest number of visits was July with 2257 visitors, and also the other summer months June, August, and September show continuously high access rates despite the vacation period.



New on LOICZ website: RSS feed What is RSS?

RSS is a notification system used to alert subscribers to changes made to their favourite web sites, blogs, music sites etc. The favourite site must offer this free service in order for people to add it to their lists. It is easy to discern that the site is RSS-enabled because of the orange rectangular button that is labelled with either RSS or XML somewhere on the page.

An RSS feed is a text-based headline with a link, and usually a short summary, that is shot over to you as soon as it leaves your favourite news site's clutches. If you're interested in reading the whole article, just click on the RSS feed link, and you will be directed to the full article, simply and efficiently. Think of a feed as being pulled and delivered to you, as opposed to you reaching out to find it.

Subscribe LOICZ RSS feed: <http://www.loicz.org/rss/rss.xml>



SPICE (Science for the Protection of Coastal Marine Ecosystems) Film is online:



Documentary: "Sangkarang, people by the sea", year of production 2009, 20 min. Indonesia, South Sulawesi, Spermonde Archipelago.

Documentary about a joint research excursion of Indonesian and German scientists to four islands of the Spermonde archipelago of coral reef fringed islands.

The excursion analyses coastal social-ecological change in Indonesia. The participating researchers of the SPICE programme focus on fishing practices, environmental degradation, local livelihoods and options for the future. The major question is how to ensure a sustainable future for coastal ecosystems and the people who depend on them.

Keywords:

participatory research and management, fishing practices, degradation of coral reefs, social networks, resilience, livelihood analysis, mariculture, seasonality, social networks, sustainable future, marine protected areas.



http://www.zmt-bremen.de/movie_sangkarang/sangkarang.html

Requirement to see the film is: Adobe Flash Player

LOICZ Regional Nodes

LOICZ: South Asia Regional Node

In August 2009, LOICZ and the Indian partners arrived at the agreement to have the South Asia Regional Node of LOICZ at the Anna University Chennai. The focus of the South Asia Regional Node is to bring together a large network of individuals and institutions involved in coastal research under the umbrella of LOICZ in India and other South Asian countries.

Mandate

The mandate of a LOICZ Regional Node is to facilitate a "Synthesis of patterns of change and trajectories in the region's coast and implications to policy and management". A LOICZ Regional Node should develop a Regional Implementation Strategy based on the scientific framework provided by the LOICZ Science Plan and the mid-term Priority Topics.

Development of a dedicated website (<http://www.loiczsouthasia.org>) for the South Asia Regional Node has been initiated and work is currently underway to include land-ocean related information for South Asia. The official opening will be in the context of a scientific workshop on Deltas in December 2009:

LOICZ Delta Workshop

Jointly organised by

- Land-Ocean Interaction in the Coastal Zone (LOICZ), Geesthacht, Germany
- Department of Science and Technology, Government of India
- Ministry of Environment and Forests, Government of India
- Institute for Ocean Management, Anna University Chennai.

River Deltas are one of most principal coastal landforms and important areas for humans ecologically and economically. Damming rivers has slowed the flow of sediment that would replenish land. Most of the world's major river deltas are sinking, increasing the flood risk faced by hundreds of millions of people, scientists report. Damming and diverting rivers means that much less sediment now reaches many delta areas, while extraction of gas and groundwater also lowers the land. Rivers affected include the Colorado, Nile, Pearl, Rhone and Yangtze.

It is evident that changes are occurring rapidly in the deltaic regions. The purpose of the workshop is to understand the current environmental status of Asian deltas from various viewpoints – e.g., changes in runoff, nutrient and sediment loads, coastal ecosystems, human activities – and to synthesize these data for future assessments and management. The workshop is conducted as a part of series of LOICZ workshops.

The workshop consists of a two-day scientific meeting to be held at IOM, Anna University Chennai, India, with several keynote talks on 7/8 December, 2009, and followed by a three-day excursion to Cauvery Delta for field discussions, where we will visit some stops on 19th–20th irrigation system, coastal erosion, impacts of 2004 Indian Ocean tsunami, and mangrove afforestation.

Themes to be discussed

- Deltas: types, formation and characteristics
- Deltas: human perspective (urbanisation, agriculture, aquaculture)

- Deltas: climate and cyclone risks
- Deltas: sub-surface studies
- Global change impacts on deltas
- Deltas: biogeochemical budgeting for muddy waters (E. Wolanski).

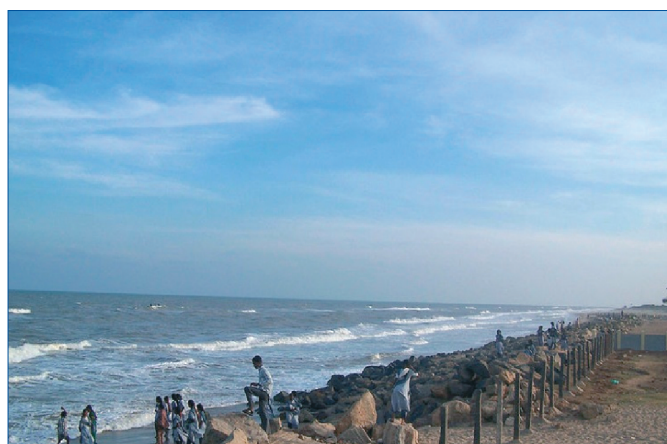
Technical details

International and Indian scientists and researchers working on various aspects of deltas are invited to contribute to this workshop. Invited full papers will be published as a special issue in an international journal.

The Grand Anicut (Kallanai) Dam



(Photos: IOM, Anna University)



Poompuhar Beach (erosion site)



Mangrove Ecosystem at Pichavaram

UGC Award for Excellence in Environmental Science

India's University Grant Commission (UGC) recently bestowed the prestigious UGC National Swami Pranavananda Saraswati Award in Environmental Science and Ecology to Ramachandran Ramesh, Director, Institute for Ocean Management, Anna University, Chennai. This award is presented for his outstanding and scholarly contribution in the chosen field of research.





IPO Notes



LOICZ and the Erasmus Mundus Joint Master in Water and Coastal Management

As part of the Erasmus Mundus Joint Master in Water and Coastal Management, members of the LOICZ SSC and IPO taught different modules at the University of Cadiz, Spain.

In March 2009, H. Kremer and J. Weichselgartner from the IPO started with a module on "Land-Ocean Interactions in the Coastal Zone", introducing LOICZ and its structure, objectives, and current activities. The first part of the module, lectured by Senior Science Coordinator J. Weichselgartner, introduced global environmental change issues and portrayed recent demographic change processes. Using practical examples, he outlined difficulties in global change research on process, system, and practice level. The second part focused on the barriers at the science-policy-practice interface. In presenting results of a case study analysis from the knowledge domains of vulnerability and resilience, the lecture attempted to uncover what gaps and barriers in the science-policy-practice interface limit the use of research-based knowledge. A number of factors were outlined that inhibit the production of applied knowledge and provided empirical evidence for successes and failures in co-producing knowledge.

Thereafter, CEO H. Kremer introduced the concept of the socio-ecological system perspective applied to regional seas and changes we observe and foresee. Based on two examples, the Baltic and the Black Sea, he outlined the multiple coastal scales and key issues of global change across the land-coast-ocean or water-continuum. In both areas socio political changes starting some two decades ago with the break down of the Soviet Union substantially influenced the forcing that affects the coastal and shelf waters. Subsequent drops in national economies and agriculture mainly translated into decreasing fluxes of nutrients and pollutants down the rivers into the coastal seas. In particular in the Black Sea which had seen three major regime shifts over the last decades due to anthropogenic pressures this has resulted in a visible improvement of the coastal water quality in recent years. Many rivers draining to the Black and Baltic Seas have also improved considerably in water quality. Based on these observations the lectures in this section also looked into the advancement of multiple scale modelling and the efforts in LOICZ and various EU

projects to actually come to a true amalgamation of natural and social science parameters in integrated modelling. In the frame of human-environment interactions, i.e. the socio ecological system perspective – the role of scenarios, their boundary conditions in terms of globalization, i.e. economic developments and governance approaches, and how to address the appropriate scales were further issues addressed. Ultimately the discussions centred on the question whether or not the new EU membership of many of the bordering countries around these regional seas would enable a continued improvement or at least maintained positive status of the coastal environment and waters in future. It was obvious that this also includes major challenges for the scientists and their interdisciplinary thinking.

Following the general introduction of March, N. Rabalais provided a detailed module from 30 March through 3 April on "Eutrophication: Causes, Consequences, Change and Cures." The causes of eutrophication should not be confused with the process itself. Eutrophication is the increase in the rate of production of carbon or the accumulation of carbon in an aquatic ecosystem (Rabalais 1994; modified from Nixon 1995). The causes may include changes in physical characteristics of the system such as changes in hydrology, changes in biological interactions such as reduced grazing, or an increase in the input of organic and inorganic nutrients. While the series of causes may include direct natural or anthropogenic carbon enrichment, eutrophication in the coastal ocean and in the 20th and 21st centuries is more often caused by excess nutrients that would otherwise limit the growth of phytoplankton. Human influences in the form of increased loads of nitrogen and phosphorus and indirectly through climate change are increasing the occurrence of eutrophication throughout estuarine and coastal waters and also in reducing the oxygen content of many oceanic low oxygen areas, such as oxygen minimum zones (Rabalais et al. 2009; Rabalais et al. in review).

The students were taken through primary production, nutrient cycling, grazing, carbon flux, stratification, water residence time and other physical and biological processes involved. Understanding of nutrient and carbon cycles is essential to understanding eutrophication itself as well as the potential solutions. Some processes may be reversed; others cannot. Eutrophication is driven by the increase in human population and the related needs for fuel, food and fiber. Particularly since the mid 1850s, with an acceleration since the 1950s, humans have increased the reactive nitrogen and phosphorus in the environment through fertilizers, fossil fuel burning, planting of leguminous plants, while making major changes in landscapes such as conversion of forests and pastures to croplands, draining of wetlands, manipulating hydrology, channelizing and leveeing rivers – activities that diminish the landscape's ability to remove excess nutrients

naturally. Eutrophication does not happen in a vacuum but within a complex of multiple stressors. Many processes, trophic interactions, ecosystem-level responses, and interactions with society, climate, global change, and a global economy remain obscure to scientists and often considered irrelevant by others. The consequences of eutrophication are real and important at ecosystem, societal and global scales, as are efforts to reduce nutrient loads from local, such as edge of field nitrogen and phosphorus losses, to global, such as corn and soybean futures.

During the week of 13–17 April, 2009, D. Swaney presented a module on “Simple Biogeochemical Models in Coastal Science: Nutrient Budgets and Nutrient Accounting for Coastal Waters.” Following on from N. Rabalais' earlier presentation, we initially reviewed various global impacts of nutrient loads to coastal waters, including eutrophication, hypoxia, and changes in fisheries. Over the five days of lectures, readings, discussion, and hands-on modelling, we

emphasized some details of calculating nutrient fluxes in coastal waters and watersheds. Several categories of nutrient load models were discussed before presentation of a more detailed introduction to nutrient accounting methods, i.e., the relationship between inputs to coastal watersheds (fertilizer, N-fixation, atmospheric deposition, and the net transfer of nutrients in food and feed across watershed boundaries) and watershed nutrient export to the coast. This “accounting approach” is formally related to other mass balance approaches used in watersheds, such as the watershed autotrophy/heterotrophy concept (Billen et al. 2007), and in coastal waters, including the LOICZ budget methodology (<http://nest.su.se/mnode>) which was introduced on the second day of the module. More details of the LOICZ budget methodology, including applications to layered and spatially-extensive coastal systems, were discussed on day three. The final two days of the module engaged the students in hands-on analysis of nutrient budgets of coastal systems by introducing the students to the new LOICZ budget calculator toolbox in a university computer lab. Working individually or in teams, students went through the exercise of constructing two nutrient budgets using the budget tool by entering and checking the consistency of relevant data, generating the budget flow diagrams, and summarizing the results. This exercise was the first trial-run of the budget calculator with students in a computer lab setting, and the few minor glitches encountered were able

to be corrected in real time. The toolbox, with the latest revisions and documentation, is currently available for download from the LOICZ budget website:

http://nest.su.se/mnode/Toolbox/LOICZ_Toolbox.htm.

During the same week of 17–21 April, S. Olsen presented a module on the governance of coastal ecosystems. The objective of this module was to provide the students with (1) an introduction to a learning-based approach to the challenges of designing and implementing responses

Multiple Consequences of Eutrophication		
▶Increased primary production, accumulation of carbon, higher chlorophyll biomass	▶Increased or decreased benthos	▶Recreation, tourism, swimming, aesthetics
▶Shifts in phytoplankton community composition	▶Increased or decreased 2D productivity	▶Changes in the structure and functioning of marine
▶Harmful algal blooms (HABs)	▶Behavioral and adaptive responses	▶Altered biogeochemical cycles
▶Macroalgal blooms	▶Reduced habitat complexity	▶Reduced ecosystem services
▶Growth of filamentous macroalgae	▶Reduced ecosystem resiliency	▶Changes in higher trophic levels
▶Reduced water clarity, increased turbidity	▶Regime shifts	▶Increased/decreased fisheries yields
▶Loss of submerged aquatic vegetation (SAVs)	▶Decreased biodiversity	▶Regime shifts
▶Degradation of coral reefs	▶Mass mortality	▶Climate impacts
▶Hypoxia/anoxia	▶Marine mammal, birds, turtle deaths	▶Human health

to accelerating change in coastal ecosystems, (2) techniques for integrating across social and natural sciences, (3) methods for designing a governance process that has the necessary public support to achieve its goals and (4) an appreciation for the need for nested systems of governance and options for how they may be constructed. The module began with a discussion of the fundamental shift in how the problems confronting a practicing coastal manager are being defined. Coastal management began as a form of “environmental protection” and has evolved into a promising vehicle for progressing towards more sustainable forms of development. The processes and outcomes of coastal governance were illustrated by case studies that included the Great Barrier Reef, the Chesapeake Bay and the Wadden Sea. The time required to design a programme, implement it over a sufficient period to generate desired outcomes at a diversity of spatial scales was a major theme of this session. On the second day the benefits of documenting the long term trajectory of coastal ecosystem change and an examination of the responses – or lack of responses – by the existing governance system were examined using the Orders of Outcomes framework. Such an analysis is essential to identifying both capacity building needs and the research that is most essential to addressing priority issues. The students worked in small groups to discuss the different interests of stakeholder groups and how a common set of objectives might be negotiated that addressed issues



of concern to society in a specific locale. The third session examined the implementation gap and the challenges of making the transition from issue analysis and planning to the effective implementation of a plan of action. The fourth session examined the importance of public participation and stakeholder involvement in all phases of a programme. The last session addressed the importance of monitoring progress as a basis for adaptive governance and the challenges of selecting indicators that link changes in human behaviour to desired societal and environmental outcomes. The module featured class exercises designed to address the challenges of integrating across the social and natural sciences an adopting a problem solving approach to the coastal issues.

The interaction this year between LOICZ and the post-graduate students in Water and Coastal Management has been excellent. The students received lectures from the IPO who set the scene for LOICZ science and then members SSC past and present. Erasmus and Erasmus Mundus have funded more than 200 students from more than 40 countries to participate in the Water and Coastal Management course. It has also provided scholarships for past members of the SSC, Maria Snoussi, Gerardo Perillo, Liana McManus, and current members Jozef Pacyna, Nancy Rabalais, William Dennison, Eric Wolanski, Stephen Olsen, Dennis Swaney, Eva Roth, Juan Restrepo, Laurence

Mee and Ramachandran Ramesh. Next year we hope to host James Syvitski and Zhongyuan Chen. This makes the Water and Coastal Management master course a truly "LOICZ" product in world-wide capacity building. On behalf of the course management team Alice Newton would like to thank LOICZ and Erasmus Mundus for making this exciting international programme possible.

References

- Billen, G.; Garnier, J.; Mouchel, J.-M. & Silvestre, M. (2007): The Seine system: Introduction to a multidisciplinary approach of the functioning of a regional river system. *Science of the Total Environment* (375):1–12.
- Nixon, S. W. (1995): Coastal marine eutrophication: A definition, social causes, and future concerns. *Ophelia* (41): 199–219.
- Rabalais, N. N. (2004): Eutrophication. In: Robinson, A. R.; McCarthy, J. & Rothschild, B. J. (eds.): *The Global Coastal Ocean: Multiscale Interdisciplinary Processes, The Sea, Vol. 13*, pp. 819–865. Harvard University Press.
- Rabalais, N. N.; Díaz, R. J.; Levin, L. A.; Turner, R. E.; Gilbert, D. and Zhang, J. (in review): Dynamics and distribution of natural and human-caused coastal hypoxia. *Biogeosciences Discussion* (6): 1–95.
- Rabalais, N. N.; Turner, R. E.; Justić, D. and Díaz, R. J. (2009): Global change and eutrophication of coastal waters. *ICES Journal of Marine Science* (66): 1528–1537.



Erasmus Mundus students attending the module "Land-Ocean Interactions in the Coastal Zone" at the University of Cadiz in March 2009

(Photo: J. Weichselgartner)

Erasmus Mundus Students at the LOICZ IPO

Carlos Francisco Castellanos Perez Bolde, Mexico



My name is Carlos Francisco Castellanos Perez Bolde and I am from Mexico. After attending lectures at top Universities in several European countries, I am currently writing my Erasmus Mundus Water and Coastal Management master's thesis at the LOICZ IPO, GKSS Research Centre, a German Helmholtz research centre in Geesthacht.

Derived from LOICZ Priority Topic 3 "Linking Governance

and Science in Coastal Regions", my project aims to identify and synthesise the different approaches to coastal governance in Integrated Coastal Management efforts in Latin America, including the Governance Baselines methodology, an approach recognised and accepted by international organisations, governments and the academy, that deals with *human* behaviour within communities linking institutions, markets, the society, science and communication for generating and improving governance conditions and strategies. At least two national ICM policies incorporate experiences resulting from governance baselines: since every place's historic, cultural, socio-economic and political background and present situation render it unique, four main points are being considered: 1) the major coastal issues addressed, 2) the ICM projects' and programmes' focus, 3) their evolution over time and by geographic situation, and 4) their outcomes.

I am very grateful to Erasmus Mundus, the Universities of Plymouth, Cadiz and Algarve, LOICZ, the GKSS, and the programme's lecturers and supervisors – without neglecting colleagues, classmates and staff that enriched it – for allowing me to take part in such a magnificent scientific, cultural and human experience!



Jonelle René Jones,
Trinidad and Tobago

My name is Jonelle Jones and I come from the twin-island Republic of Trinidad and Tobago in the Caribbean. At the LOICZ IPO, I am working on my thesis for completion of the Joint European Masters in Water and Coastal Management master's programme. My work falls under the LOICZ

Scientific Theme III: Human influences in river basin-coastal zone interactions. More specifically, my paper will include an evaluation of the role of the LOICZ Basins approach in coastal zone management and will be done under the supervision of SSC member J. Restrepo, EAFIT University, Columbia.

I currently hold an undergraduate degree in Environmental and Natural Resource Management with Entrepreneurship from the University of the West Indies. This course of study was quite interdisciplinary and provided a good base for branching off into any specific area of environmental management or science. My particular interests lie in integrated coastal zone management as well as environmental impact assessments (EIAs). I have had a variety of previous work experiences ranging from tutoring at my University, to working on EIAs and conducting field work in addition to several volunteer experiences with various environmental NGOs. I hope that during my time here as a part of the LOICZ community I will be able to build on my previous experiences, while adding to the good work that LOICZ and its scientific community has done.



Ivan Sekovski, Croatia

My name is Ivan Sekovski and I come from Split, Croatia. I have a Bachelor's degree in Marine Biology and Ecology. I am currently doing my Masters in Water and Coastal Management, as a part of the Erasmus Mundus Programme. The final part of the research, which will be presented in my Master's thesis, takes place at the LOICZ IPO,

GKSS Research Centre in Geesthacht, Germany.

My thesis focuses on the vulnerability of coastal megacities to climate changes and is supervised by W. Dennison, University of Maryland, and co-supervised by A. Newton, University of Algarve. Vulnerability related to climate changes is particularly important for the LOICZ research, being one of its Scientific Themes. This is why I personally consider the LOICZ IPO as an ideal place to finish my studies, especially because of all the data and information that it can provide me with. The reason why I chose to participate in this particular research is the complexity of understanding all the interrelations in the human environment in this era of climate change, which I find extremely challenging. Communities living in coastal mega-cities are much more vulnerable to climate change effects due to the vicinity of coastline and, hence, greater exposure to climate threats, such as sea-level rise, storms, floods etc. Mega-cities are also places of rapidly growing population, hence resulting in vulnerability of an ever increasing number of people. That is why I will take a



deeper look into all the management strategies and adaptive policies related to the above mentioned issues, and try to comprehend which could be the best way to deal with these emerging threats.



Clarissa Cavalheiro Skrepnek, Brazil

My name is Clarissa Cavalheiro Skrepnek and I am from Brazil. I have a bachelor degree in Oceanography and a postgraduate degree in Environmental Management. I am currently an Erasmus Mundus student of the Joint European Masters in Water and Coastal Management where I am developing my master thesis at the LOICZ IPO, Institute of

Coastal Research, GKSS Research Centre.

The theme of my master thesis is included in the LOICZ Scientific Theme V "Towards Coastal System Sustainability by Managing Land-Ocean Interactions". I am supervised by LOICZ SSC chairperson A. Newton and past SSC chair J. Pacyna from the Norwegian Institute for Air Research. The aim of this theme is to promote sustainable development in the coastal region through the management of the interactions between the human activities (industry, commerce, government and civil society itself) and coastal ecosystems. In other words: to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. My project reviews the progress of LOICZ-affiliated projects in relation to my theme. Therefore, I study the management options proposed by each project and evaluate the strengths and weaknesses of them. Consequently, my results will aim at promoting good solutions for sustainable coastal management.

My personal objective of doing this master thesis is to gain a better understanding of sustainable development as well as providing science that is useful to coastal managers to promote sustainability.



Christina de Souza, India

My name is Christina de Souza, and I am from Goa, India. I have a postgraduate degree in microbiology. I got interested in environmental science while working on a research project in my home university, and thus I applied for the European Masters in Water and Coastal Management. I am currently working on my thesis for this programme at the LOICZ IPO in Geesthacht, Germany.

My thesis is supervised by A. Newton, University of the Algarve, Portugal, and D. Swaney, Cornell University, USA, and it is related to Scientific Theme IV, which is about the biogeochemical cycles that occur in coastal and shelf waters. The focal point of ST IV is the cycling of nutrients, especially carbon, and sediments in coastal and shelf waters. Benthic processes are recognised as being especially important because of their influence on ecosystems in these waters and in the global biogeochemical cycles. My aim is to familiarise myself with the research that has been conducted in this aspect in the various projects under this theme. Moreover, I comparatively study sets of nutrient budget data from coastal systems from both a developed and a developing country. I expect to gain insights into the management of such systems and indications for further improving them.

Jeneen R. Garcia, Philippines

I am Jeneen R. Garcia from Davao City in southern Philippines. I finished my bachelor's degree in Environmental Science and had almost completed a master's in Marine Biology in the Philippines when I came to Europe for this MSc in Water and Coastal Management. Between my bachelor's and master's, I worked for a watershed governance project and thereafter with an NGO assisting marginalised fisher folk communities. At the same time, I also worked as a freelance writer, editor and photographer.



Here at the LOICZ IPO, my research is related to Priority Topic 1 "Linking Social-Ecological Systems in the Coastal Zone". The primary aim of this topic is to provide decision support by projecting the state of the marine environment under different social and economic scenarios and at different spatial scales. It seeks to synthesise existing knowledge and information on ecology, policy, and socio-economics by coupling models of ecological and social systems. The studies under this topic ultimately show us that how our society functions affects the health of our environment, and that the health of our environment ultimately affects how our society functions.

My research specifically seeks to investigate how the management interventions in coastal social-ecological systems can be transferred across scales from local to global, and global to local. I plan to study the case of Apo Island in central Philippines, the world's oldest successful community-based marine protected area, and how the management strategies have been scaled up to the municipal, provincial and national level.



Interns at the LOICZ IPO

Christian Dorsch

I am studying geography at the University of Marburg, Germany. As coastal geography is the major field of my studies, the LOICZ IPO was the ideal internship for me. I liked particularly the interdisciplinary thinking between the physical and human dimensions of coastal change and the approach to questions from different kinds of view. The preparative support of the GKSS Research Centre's Open Day was a first focus during my internship. Therefore, I designed posters that dealt with coastal megacities in scientific way understandable for the general public. It was nice to see how children and especially adults showed interest in the final product. Currently, the planning of the Storm Surges Congress 2010 in Hamburg is a big topic at the LOICZ IPO. It was interesting and useful to get an insight in the preparation of such a huge event and to contribute to it: as part of my internship, I am writing a background paper that introduces the key topics to be addressed during the congress. The main focus is on regional differences in storm surge management. I received support by the members of the Steering Committee, who assisted me very much with literature hints and feedback. I am planning to finish the paper in December.

Even though I did my internship in my home country, my English language skills benefited a lot from the international focus of LOICZ. Not at least the enjoyable Erasmus Mundus students were the reason for that. There was always the opportunity to chat and cultural exchange.

Overall I got an impression about the work at a research institute with nice and helpful people. The internship was a very useful experience I would not want to miss.



Steffi Ehlert

I am a 26-year-old B.Sc. geography student from Hamburg University and I joined the LOICZ IPO in July 2009 for a nine-week internship (excluding a short break to visit the German Geographers Day in Vienna). After two years of studying at the university, I decided that it was time to get some practical experience. Before I started to study geography, I did a three-year apprenticeship in a company. This position gave me insights into how the economy functions. I then decided that I would like to gain another experience; this time in an international environment. Consequently, I successfully applied at the LOICZ IPO and joined the team, having three specific objectives:

1. Supporting the work of the IPO
2. Doing some research for my Bachelor thesis
3. Improving my English language skills.

1. Supporting the IPO

When I started my internship, one of the main working tasks I was given was supporting the Open Day of the GKSS Research Centre. In order to achieve this, we had several meetings and discussions in order to collect ideas on how we will present the work of LOICZ. Finally, we decided to prepare some interactive stations with informative posters and final quizzes. My part was the preparation of a series of posters about coastal change, mega-cities in coastal areas and some quizzes like a "Delta-Quiz" and a quiz about coastal change.



Interactive poster station „Coastal Megacities“

(Photos: E.-B. Goldberg)



Interactive poster station „Changing Coastal Systems“

2. Research for my Bachelor thesis

My focus of interest is based on the rapid development and the transition process in the Arabian Gulf region, especially Dubai and Abu Dhabi. I did a lot of desk research in order to get an overview of the development of the two Emirates and what strategies they pursue to reduce their dependency on oil. Dubai is well known for its luxury tourism and massive land reclamation. But what is about Abu Dhabi? Very few people really know about Abu Dhabi, the capital of the United Arab Emirates (UAE), which is located on an island and has also announced a number of mega projects to enforce their position as the national capital and an international hub. The city is part of the same named Emirates, which is the biggest of the seven emirates and possesses nearly 94 % of the UAE's total oil reserves. Compared to Dubai, where oil reserves will be largely depleted in 2010, Abu Dhabi's reserves are expected to last for the next 90 years. As a result, Abu Dhabi has the opportunity to develop itself in a more sustainable way than Dubai did. For instance, Dubai has been promoted as a travel and tourism destination; something they seek to achieve by increasing their original coastline of approximately 70 km to nearly 900 km through massive land reclamation in shapes of palms and the world. In contrast, Abu Dhabi would like to upgrade its attractiveness to tourists though several cultural developments like museums, event locations and proximity to the islands. It will be interesting to see what similar strategies they will pursue in such a different way.

3. Improving my English language skills

After an intensive desktop study and reading hundreds of pages in books and on the Internet, I now feel well prepared for reading articles and doing presentations in English like I did on my last day. Thanks to all Erasmus Mundus students who made my nine-week internship so international and assisted me in improving my English.

Also a special thanks to Hartwig, Juergen, Barbe, Ines and Christian for all the new input, and of course the nice time at the LOICZ IPO!

Storm surges Congress 2010 – Hamburg

An introduction by Christian Dorsch



Photo: Ron Mulder, www.stormfoto.nl

Storm surges are the major geophysical risk in low coastal areas, frequently causing substantial losses of lives and economic damages. They are the result of a rise in the water level which occurs when the thrust of the wind forces water towards the land (MuRe 2009). There are two types of storms which can result in a storm surge: tropical and extra-tropical storms. In the course of the discussion on global warming the direction of change for storms in the coming century has been explored but has not yet been completed, especially in the case of tropical storms. However, some climate models suggest that both kinds of storms will increase in intensity over the next century (Nicholls et al. 2007). At least the base level of storm surges will swell due to the rise in sea level and therefore larger coastal areas will be flooded more frequently. The problem is exacerbated by anthropogenic forcing factors including intensive land and sea use along the river-coast continuum. A main reason for the increase in very high storm surges in Hamburg, for example, can be ascribed to improved coastal defence and the dredging of the shipping channel (von Storch & Woth 2008). Many of the major coastal cities, such as Shanghai or Bangkok, have problems with subsidence due to groundwater withdrawal (Nicholls 2006).

There are different approaches to deal with storm surges and to reduce the vulnerability of coastal populations and assets, such as flood protection and flood-warning systems. These strategies and their success vary in different parts of the world. Bangladesh and the Netherlands, for example, are very experienced in the management of floods due to their high exposure to storm surges. A knowledge exchange can help other countries to prepare in regions where vulnerability increases currently. The management of storm surges involves various stakeholders who are directly concerned, such as governments, harbour authorities, coastal communities, insurances, accommodation providers, coastal land use and development planning, marine planning and many more. Furthermore diverse fields of science contribute, such as climate research, oceanography, coastal geology, engineering, city planning and coastal zone management. Although all these protagonists plus social informal networks work towards the same purpose, the knowledge about storm surges is mostly fragmented without collaboration. An interdisciplinary approach is required that overcomes the traditional borders in scientific and coastal user discussions to deal with the current and future risk.

References

- Munich Re (2009): Natural Hazards Research: Flood. Munich.
- Nicholls, R.J. (2006): Storm surges in Coastal Areas. In: The World Bank Hazard Management Unit: Natural Disaster Hotspots. Case Studies. Washington D.C. pp. 79–108.
- Nicholls, R.J.; Wong, P.P.; Burkett, V.R.; Codignotto, J.O.; Hay, J.E.; McLean, R.F.; Ragoonaden, S. & Woodroffe, C.D. (2007): Coastal systems and low-lying areas. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. In: Parry, M.L.; Canziani, O.F.; Palutikof, J.P.; van der Linden, P.J. & Hanson, C.E. (eds.): Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, pp. 315–356.
- von Storch, H. & Woth, K. (2008): Storm surges: perspectives and options. *Sustainability Science* (3): 33–43.



2nd Announcement and Call for Abstracts

Storm Surges Congress

*Risk and Management
of current and future Storm Surges*

13–17 September, 2010, Hamburg, Germany

Storm surges represent a major type of environmental and social threat regularly associated with losses of lives and substantial economic damages.

In 1953, the Netherlands and the UK were hit, in 1962 Germany; in 1970 Bangladesh, in the 1990s China three times, and in 2008 the tropical storm Nargis impacted Myanmar. Hurricane Katrina in 2005 showed the disastrous interplay of a storm, with heavy rainfall and vulnerable coastal protection. Lives lost in such events reach the order of 100,000; economic damages may approach 100bn US\$.

Besides climate change, storm surges are exacerbated by anthropogenic forcing including intensive land and sea use along the river-coast continuum. A recent OECD study of extreme floods in 136 port cities foresees an increase of population and asset exposure of between 2–3 times, and 10 times, respectively, by 2070.

Two scientific and social questions are critical:

1. How do we deal with the present level of risk?
2. How do we respond to changing future conditions?

Answers require interdisciplinary approaches and a coupling of scientific and coastal user discussions. **Overcoming fragmented views on a global concern on short and long-term time scales** by a joined up thinking is needed involving the assessment of threats and opportunities emerging across the social-ecological system scale of coasts.

Multiple stakeholders to be involved comprise:

- Coastal engineering, and harbour authorities
- Coastal zone and river basin management
- Urban, coastal and marine planning
- Disaster and risk management
- Social development organisations
- Economic planning and insurance business
- Operational oceanography
- Storm surge modellers
- Coastal geoscientists (erosion, subsidence)
- Weather and forecasting services and
- Climate research.

The **Storm Surges Congress 2010** aims to engage the relevant actors and to serve as an enabling forum for exchange of state-of-the-art expert knowledge and practitioners' views.

The objective is to work towards a common perception of key concerns including options of mitigation and adapta-

tion. Practitioners and researchers are invited to delineate future challenges for science, and dialogue across science-policy-practice interfaces.

The goal is to foster our mutual understanding of relevant spatial, temporal as well as institutional scales that need to be considered in response to current and future storm surge risks.

Congress structure

The congress will be organised in plenary and moderated poster sessions. Parallel sessions will be avoided; cross-disciplinary exchange is encouraged. Plenary sessions will be organised along thematic subjects, introduced by key notes.

Poster sessions will be introduced to plenary as oral summaries by selected SC experts. They will subsequently be organised in marketplace format where thematic contributions can be reviewed.

Moderated concluding round tables are planned to foster discussions and a synthesising statement.

Abstract Submission Guidelines

You are invited to submit an abstract for oral or poster presentation. Abstracts need to be submitted and organised in a way to feed into the thematic sections.

The SC and LC will take responsibility to blind review and select abstracts for oral or poster presentation. If your abstract is accepted for the Storm Surges Congress you will receive a notification until 1 April, 2010.

Abstracts must follow the format suggested and must be submitted online (see link below) by 28 February, 2010. We encourage you to submit early to ensure prompt confirmation and processing.

- The body of the abstract is limited to 500 words (excluding headings)
- Your Abstracts should contain Title, Author/s, Affiliation and
- the following content sections: Background, Objectives, Methods (including type of data collected), Results, Conclusions, and Support (if applicable)
- 3–5 keywords referring to sessions are obligatory.

After an abstract has been accepted, regular papers of about eight to ten pages including all figures, tables and references have to be submitted to the steering committee in order to be reviewed for potential publication in the conference products.

Important Dates:

- * **Abstract Submission and Registration:** starting December 1, 2009
- * **Abstract due February 28, 2010**
- * **Paper Acceptance: April, 2010**
- * **Storm Surge Congress: September 13–17, 2010**

Submission for abstracts and registration is soon available on: www.loicz.org/storm2010



Suggested session outline

Regions should cover all relevant areas such as polar regions, temperate to sub-tropical and tropical systems, deltas and tidal estuaries.

a) Driving factors and scales of storm surges

- Does climate change matter?
- How does surge hazard vary globally?
- Why are so many coastal cities sinking?

Papers in this theme might address:

Climate and climate change
Variable storminess
Sea level rise
Geological processes
Water works and coastal defence
Oil, gas and groundwater extraction – anthropogenic subsidence
Urbanisation, demographic change in coastal areas and deltas

b) Contemporary risk and management

- What are the present risks?
- What are the differences between tropical and extra-tropical storms and surges
- People and assets: who pays for the risks?

Papers in this theme might address:

Risk assessment
Coastal urbanisation and assets at risk
Damage and insurance issues
Managing extra tropical storm surges
Managing tropical storms surges

c) History and intercultural perception

- What did our ancestors do: retreat, protect or advance?
- Acts of God or acts of nature: what was the historical experience of surges?
- How do the media see extreme surge events?

Papers in this theme might address:

Historical accounts of storm surge risk
Awareness of storm surge risk
Perception of dynamics and drivers of storm surges
Media coverage and presentation of natural risks, storm surge events, responses, and predictions
Future perceptions of surge risks

d) The role of scientific information – dealing with uncertainty

- What is the state of the art in modelling/predicting and projection
- What do we need to know to plan for the possibility of increased storminess in some regions?
- Should we protect or retreat against increasing surge risk?

Papers in this theme might address:

Information needs of coastal stakeholders
Defining the bottom line – reference water levels and current and future flood protection
Dealing with uncertainty

Current capacity of modelling, predictions, and forecasting
Expected level of future (5–10 years horizon) modelling, forecasting and projections

Knowledge gaps, e.g. hydrodynamics and bathymetry
The role of remote sensing
Scenarios of future tropical and extra tropical storminess
Scenarios of sea level rise
Vulnerability and risk assessment
The role of managed realignment
Usage of scenarios for adaptation and planning
Calculation of the design level

e) Institutional dimensions – dealing with uncertainty

- How do our institutions, civil society and public actors respond to storm surges?
- What is the role of warning systems?
- Can good governance handle the risks?

Papers in this theme might address:

Institutional dimensions of storm surge response
Civil society as organisational force
Public bodies as organisational force
Management scales
Warning systems: Present and future
Technological progress to improve the information basis
Effectiveness of hazard lines or set back lines
Current reflection of risk and response in governance
Institutional response to uncertainty

International Scientific Committee, SC (*Italics tbc*):

Paolo Ciavola (Department of Earth Sciences, University of Ferrara, Italy),
Ping-Xing Ding (State Key Laboratory for Estuarine and Coastal Research, ECNU, China),
Bruce Glavovic (Resource & Environmental Planning, Massey University, New Zealand),
Karel Heynert (DELTA RES, NL),
Kevin Horsburgh (Proudman Lab., Liverpool, UK),
Pavel Kabat (Wageningen University NL),
Hartwig Kremer (LOICZ International Project Office, Institute for Coastal Research, GKSS, Germany),
Boram Lee (IOC-UNESCO, Paris, France),
Jason Lowe (Met Office Hadley Center, UK),
Nobuo Mimura (Center for Water Environment Studies, Ibaraki University, Hitachi, Japan),
Il-Ju Moon (Cheju National University, College auf Ocean Science, S. Korea),
Sylvin Müller-Navarra (Federal Maritime and Hydrographic Agency BSH, Hamburg, Germany),
Robert Nicholls (University of Southampton – School of Civil Engineering and the Environment, UK),
Mark Pelling (King's College London, UK),
Ramesh Ramachandran (Anna University, Institute for Ocean Management, Chennai, India)
Steven Solomon (Geological Survey of Canada)
Hans von Storch (Institute for Coastal Research, GKSS, Geesthacht, Germany, and Climate Campus, Hamburg, Germany)
James Syvitski (*Community Surface Dynamics Modeling System, University of Colorado-Boulder, US*)
Keith Thompson (Dept. of Oceanography, Mathematics, Statistics, Dalhousie University, Canada)
Georg Umgiesser (Institute of Marine Sciences, ISMAR-CNR, Venice, Italy)
Craig Donlon (ESA, ESTEC, European Space Research and Technology Centre, Noordwijk, The Netherlands)

National / Local Organising Committee, LC:

Heinz Glindemann (Hamburg Port Authority, Leiter Strombau),
Gabriele Gönnert (Landesbetrieb für Straßen, Brücken und Gewässer, LSBG – Agency for Roads, Bridges and Waters)
Harro Heyer (Bundesanstalt für Wasserbau, BAW – Federal Waterways Engineering and Research Institute)
Thomas Bruns (Deutscher Wetterdienst, DWD – German weather Service)

The Congress is organised by the LOICZ IPO and the Director Hans von Storch of the Institute for Coastal Research of the GKSS Research Centre in Geesthacht.

Support by:

UNESCO/IOC (United Nations Educational, Scientific and Cultural Organization/Intergovernmental Oceanographic Commission)

ESA (European Space Agency)

BSH (Bundesamt für Seeschifffahrt und Hydrographie, Federal Maritime and Hydrographic Agency of Germany)

HPA (Hamburg Port Authority)

Klima Campus Hamburg

Universität Hamburg (University of Hamburg)

IASC (International Arctic Science Committee)

BAW (Federal Waterways Engineering and Research Institute)

LSBG (Landesbetrieb Straßen, Brücken und Gewässer, Agency for Roads, Bridges and Waters)

DWD (Deutscher Wetter Dienst, German Weather Service)

**New Colleague on board for Storm Surge Congress**

Since June 2009, **Ines Böttcher** has joined the LOICZ IPO, taking over responsibility as a Congress Manager and Contact Person for the LOICZ-affiliated projects and research activities.

Ines is in charge for the maintenance of the project databases and the organisation of the upcoming Storm Surge Congress 2010 in Hamburg, planned by LOICZ and the GKSS Research Centre.

After her apprenticeship as a Media Technical Assistant, Ines studied Information Management at the University of Applied Science in Hannover with a focus on internal information and communication. During her time at University, Ines has studied and worked at the University of Witwatersrand in Johannesburg, South Africa for 5 months. She wrote her diploma thesis on knowledge management for a commercial enterprise.

As a certified Information Manager, she found her first job at the Open Access Project of the Helmholtz Association (<http://oa.helmholtz.de>). Within the project, Ines was responsible for building and maintaining the project website, information management, internal and external communications, and event management, among others.

Her office was based at the Alfred Wegener Institute in Bremerhaven.

After a two-year site trip in the pharmaceutical industry as Manager for Corporate Communication and Knowledge Management, Ines now works for the LOICZ IPO. In addition to the aforementioned tasks, she also assists our Erasmus Students in all organisational matters here in Germany since August 2009.

Programme News**New IHDP Project****Transitioning to Sustainability through “Knowledge, Learning, and Societal Change”**

The global community is facing unprecedented challenges in sustaining society and the global ecosystem on which it depends. For the first time in human history humans influence earth systems on a world-wide scale. The Intergovernmental Panel on Climate Change (IPCC) warns that we are on a path of rapid global warming that is likely to result in major and possibly severe disruptions to the existing climate system. The consequences can include loss of fresh water, desertification, shifts in weather patterns, more frequent occurrence of extreme weather events, and the concurrent problems these changes are likely to cause: hunger, starvation, loss of life, disease, greater conflict over limited resources, and involuntary migration. We are also facing mass extinctions, with large numbers of species of plants and animals being lost annually to human encroachment, development, and climate change. And despite decades of global economic development, there are still billions of people living in abject poverty without resources and chances to improve their condition substantially. Present ways of functioning of many societal systems have to change in order to develop a sustainable human society, in better harmony with the supporting earth systems.

If society is to act in considered and constructive ways in response to this urgent need, then there are significant questions that must be addressed to guide that response. What are the links between societal changes, knowledge, and learning and what are the positive and negative determinants of change at different degrees of aggregation of individuals in society and at different geographical, institutional, and temporal scales? What knowledge, from what sources, in what forms, subject to what kinds of control or access, and what ways of learning and using knowledge promote or hinder adaptive societal change? What knowledge and learning emerge from changes thrust upon or generated within society? Can appropriate innovation, sharing of knowledge of “best” practices, melding formal and traditional knowledge and practice, nurturing creativity and adaptive thinking, and



building the will to adopt new practices lead to societies that are better prepared to meet the urgent challenges of climate change, biodiversity loss, and poverty?

These questions will be considered in the context of three perspectives that are central for KLSC. These perspectives give KLSC a unique research agenda and role. One is the focus on understanding the complex connections and interrelationship between producing, communicating, learning, and using knowledge on one hand and changes in attitude and behaviour on the individual and societal levels on the other. The second is the examination at multiple scales of aggregation – individual, community, institutional, regional, and global – of the drivers and barriers to societal change and adaptation in relation to knowledge and learning. The third is the recognition that the objectives of the KLSC project include not only rigorous scholarship yielding deeper insights, but also design research that develops and tests successful strategies for fostering changes to sustainable practices on multiple time and geographical scales.

KLSC is focused on how societal change occurs through knowledge and learning, rather than primarily on economic incentives, political sanctions, manipulation or coercion. However, KLSC will consider these other drivers of change in relationship to and basis in knowledge and learning, particularly in regard to policy making and grass-roots movements.

KLSC is an IHDP cross-cutting theme and as such looks forward to collaborating with, drawing from research results, and providing insights to other IHDP and partner projects, including LOICZ.

The four closely-linked core elements of the project are:

1. Knowledge in its forms, origins, production, movement, control, and access to it across cultures and geographical scales.
2. Mechanisms and dynamics of learning by individuals, communities, and institutions in the context of the challenges of global change.
3. Positive and negative determinants and mechanisms of changes in attitudes, thinking, and behaviour in moving to sustainable societal practices on individual and aggregated scales.
4. The relationship and interactions between policy-making and knowledge, learning, and changes in societal behaviour in the process of moving toward a sustainable future.

In analogy to the concept of “learning organisations”, we are aiming to identify and catalyse ways to foster true “adaptive learning societies” that can lead the transition to a sustainable future.

Contact

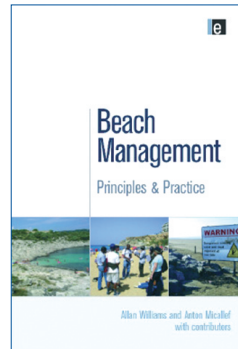
Ilan Chabay
Chalmers, Lindholmen Campus, Göteborg, Sweden
E-mail: ilan.chabay@chalmers.se

Publications



For further LOICZ recommended literature please have also look at the LOICZ website:

<http://www.loicz.org/news/literature/index.html.en>



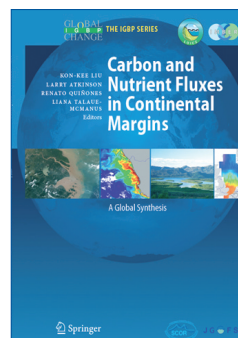
Beach Management

Part I covers beach management principles and theory and addresses practical management tools and guidelines, including how to determine the best management strategy for different beach types (linear, pocket, resort, urban, village, rural and remote) as well as how to include user preferences and priorities in effective management plans.

Part II provides a wealth of case studies of best and worst practice, authored by a cast of international beach management experts from the UK, USA, New Zealand, the Mediterranean and Latin America. The emphasis throughout the book is on optimizing economic, social and environmental outcomes, and reconciling competing needs in management planning for beach areas. This book is an indispensable tool kit for all professionals in beach and coastal/beach zone management, including local and regional authorities, planners, park and protected area managers, societies, resort beach owners and managers. It is also a comprehensive primer for university under and post-graduate students of land, coastal zone and beach management, coastal geography as well as tourism and conservation planning and management.

Allan Williams is a Professorial Research Fellow at the Swansea Metropolitan University, Wales, UK and has published more than 250 academic papers on coastal science and geography and has extensive experience in working on coastal problems in Europe, the Far East, the USA, Africa and New Zealand.

Anton Micallef is a full-time senior lecturer at the International Environment Institute of the University of Malta and has consulted and published on many aspects of the coastal environment. He is also Director of the Euro-Mediterranean Centre on Insular Coastal Dynamics, a specialised Centre of the Council of Europe's Open Partial Agreement on Major Natural and Technological Hazards.



Carbon and Nutrient Fluxes in Continental Margins

The book provides best estimates of carbon and nutrient fluxes in seven types of continental margins. In each type, these fluxes are reported in detail individually for 3–7 representative geographic regions, each of which is characterised by concise descriptions of the physical and biogeochemical settings.

Drawn from the regional syntheses, a global synthesis is put together for carbon fluxes exchanged between continental margins as a whole and the atmosphere and between that and the open ocean.

Global syntheses on sediments and nutrients discharged to the ocean from land are also provided in the book. To guide future research on continental margin biogeochemistry, the book also elaborates on a few critical themes that emerged in recent years.

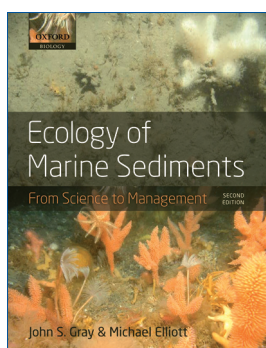
One of these is the human impact on the continental margin biogeochemistry, which accentuates the need to include human perturbation of the system in future research. Thus the book represents the state-of-the-art knowledge on the subject, which will be needed for all researchers on continental margin environmental issues.

Ecology of Marine Sediments

From Science to Management

John S. Gray & Michael Elliott

Marine sediments provide the largest habitat on planet earth, yet knowledge of the structure and function of their flora and fauna continues to be poorly described in current textbooks. This concise, readable introduction to benthic ecology builds upon the strengths of the previous edition but has been thoroughly revised throughout to incorporate the new technologies and methods that have allowed a rapid and ongoing development of the field. It explores the relationship between community structure and function, and the selection of global examples ensures an international appeal and relevance. The economic value of marine sediments increases daily, reflected in the text with a new emphasis on pollution, fisheries and management. This accessible textbook is suitable for both advanced undergraduate and graduate students who have had a general ecology course, but no further training in benthic ecology. It will also be of relevance and use to professional researchers and consultants in marine ecology and environmental science who seek a compact but comprehensive introduction to benthic ecology.

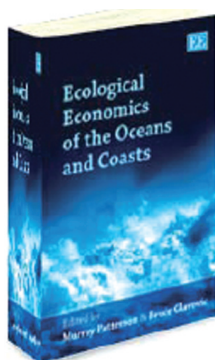


Ecological Economics of the Oceans and Coasts

Published by Edward Elgar, 2008

Editors: Murray Patterson and Bruce Glavovic,
NZ Centre for Ecological Economics,
Massey University

This book offers a fresh view on how oceans and coasts are, and should be, managed. The urgency of this issue is increasingly being recognised, as critical limits to the economic exploitation



of our oceans and coasts are reached. The authors argue that Ecological Economics is in a unique position to address this problem, given its particular focus on interconnected ecological and economic systems.

Four 'cornerstones' of this ecological economics approach to the oceans and coasts are presented. Most importantly, sustainability is the overarching policy goal, rather than economic efficiency as is emphasised in mainstream economics. Secondly, recognising the biophysical limits and thresholds of marine systems is fundamental. Thirdly, a complex systems view is adopted, which has profound implications for managing marine systems in the face of intrinsic uncertainty, irreversibility and inter-dependent behaviour. Finally, the approach is necessarily methodologically pluralistic, given the complexity and multi-faceted character of marine ecological-economic systems.

Contributing Authors: Murray Patterson, Bruce Glavovic, Chris Batstone, Anthony Cole, Mark Gibbs, Derrylea Hardy, Garry McDonald, Shuang Liu, Ben McNeil, Keith Probert, Matthias Ruth, Basil Sharp, Nicola Smith, Charlotte Sunde and Matthew Wilson

Global Loss of Coastal Habitats

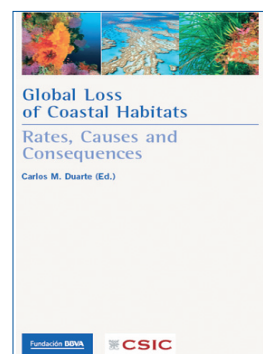
Coastal habitats, including coral reefs, sea grass meadows, and macro-algal beds, salt marshes and mangrove forests, are key ecosystems in terms of their role in supporting marine biodiversity and the functions they deliver to society, which include shoreline protection, carbon burial and their role as a nursery for living resources. Because of these and other important services such as nutrient cycling – also a result of their high production and metabolic rates – coastal habitats have been acknowledged to rank amongst the most valuable ecosystems on Earth. Yet these habitats are being lost globally at alarming rates, exceeding by between four and ten times the global loss of rainforests. This volume sets out to increase awareness about the damage being done to coastal ecosystems by providing detailed analyses, global in scope, of the rates of loss, and their causes and consequences, for individual types of habitats.

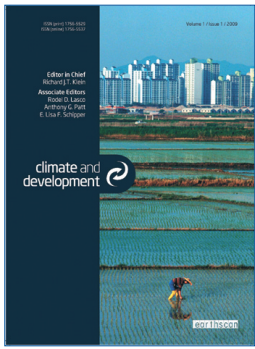
This book draws its contents from the third in a series of debates organised jointly by the Spanish National Research Council (CSIC) and the BBVA Foundation around the work of the Cap Salines Coastal Research Station (Mallorca, Balearic Islands). In its pages, leading international experts review and synthesise the current state and coastal habitats and the causes of consequences of current losses.



Direct link to the English website of the book:

<http://www.fbbva.es/TLFU/tlfu/ing/publicaciones/libros/fichalibro/index.jsp?codigo=411>





Climate and Development: A new journal for an emerging field

Over the past decades climate change has increasingly been framed as a development issue as well as an environmental concern. *Climate and Development* is the first academic journal dedicated to the range of issues that arise when climate variability, climate change and climate policy

are considered along with development needs, impacts and priorities. It aims to make complex analysis of climate and development issues accessible to a wide audience of researchers, policymakers and practitioners, and to facilitate debate between the diverse constituencies active in these fields throughout the world.

The idea for *Climate and Development* originated from the IPCC Fourth Assessment Report, which was published in 2007. The report contains several chapters that assess climate change in the context of development, including a chapter on coastal systems and low-lying areas. When preparing text on the links between climate and development, the authors were struck by two issues: (i) there is no single journal in which relevant papers are published, and (ii) most of the relevant papers were written by experts from the developed world.

Climate and Development aims to address both of these issues. First, its Aims and Scope bring together research interests that were previously dispersed over a range of different journals focusing on either climate change or development. The members of the journal's editorial board have been carefully selected to represent the full spectrum of conceptual, policy-analytical and empirical studies of the interactions between climate impacts, mitigation, adaptation and development, on scales from local to global.

Second, the journal actively encourages submissions from developing-country experts. It seeks to present empirical evidence both grounded in theory and 'straight from the field'. For example, it has introduced a manuscript category 'case studies', which allows for the publication of project findings that do not necessarily have to be grounded in a theoretical research framework. These project results might otherwise only be published in internal project documents, and therefore remain publicly invisible, including to IPCC authors. In addition, the journal has initiated a capacity-building activity known as 'writeshops', which provide training and mentoring to developing-country experts with limited experience in academic publishing.

The first issue of *Climate and Development* came out in March 2009. It was well received, and was followed by a large number of new submissions, securing sufficient material to sustain the publication of at least four issues a year.

The publication of *Climate and Development* is supported by the Swedish International Development Cooperation Agency (Sida) and the Stockholm Environment Institute, which also hosts the editorial office. Collaboration with the Global Change System for Analysis, Research and Training (START) provides contact with a large network of developing-country experts, and is key in the organisation of the writeshops.



Website:

<http://www.earthscan.co.uk/journals/cdev/>



Coastal Futures

The brochure is presenting preliminary results of the German project cluster and LOICZ-affiliated project Zukunft Küste – Coastal Futures (2004– 2010). The project outlines patterns of marine and sea use changes which are largely driven by a number of drivers, such as economic growth and increasing human demands for coastal resources and space. To

understand complex system behaviour and human-environmental interactions the scientists linked a series of existing concepts and methods (DPSIR and Ecosystem Services Approach, scenario techniques, modelling etc). The special focus of the project is upon the developments for offshore wind farming in the German North Sea.

The first part of the report focuses on changes in coastal and marine areas in general. It points out the need for adaptation to marine challenges, e.g., climate change. Afterwards, the use of offshore wind power as a response to challenges and a driving force to reduce CO₂ emissions is being introduced. The second part describes the Coastal Futures approach and the applied concepts and methods. As part of an integrated impact analysis, the third part outlines the main results by showing risks and opportunities associated with offshore wind energy. Possible responses are discussed as part of an integrated management approach and new forms of governance (e.g., ICZM and participatory approaches).

The brochure is published in German with a foreword in "Fering", a Frisian dialect that is spoken in the focus area. It is available online at

www.oekom.de/broschueren/nachhaltigkeitsforschung/nachhaltigkeitsforschung/broschuere/64.html



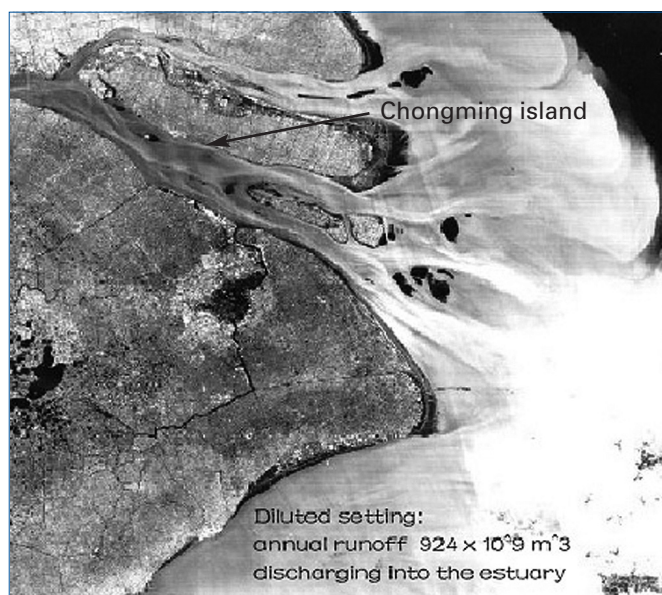
Further Websites for download:

<http://www.coastal-futures.de/>

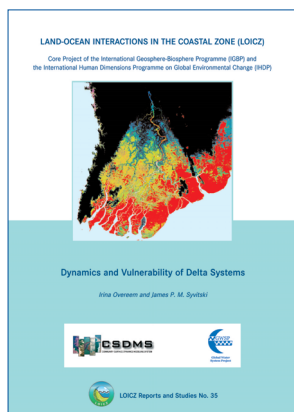
http://www.loicz.org/projects/documents/008804/index_0008804.html.en

Have you seen

- 🌐 Web Page of Asian Delta Project has moved: New URL is here at:
<http://unit.aist.go.jp/igg/sed-rg/ADP.html>
- 🌐 Coming Delta meetings in Asia of the Coastal and Urban Geology Research Group:
http://unit.aist.go.jp/igg/sedrg/ADP/ADP_E/a_what's%20new_en.html
- 🌐 Fluvial flux of nitrogen from Great Britain 1974–2005 in the context of the terrestrial nitrogen budget of Great Britain
 Worrall, F.; Burt, T. P.; Howden, N. J. K.; Whelan, M. J. *Global Biogeochem. Cycles*, Vol. 23, No. 3, GB3017
<http://www.agu.org/pubs/crossref/2009/2008GB003351.shtml>



The Yangtze estuary, showing the location of the three large estuarine islands (modified after Chen et al. 2001)



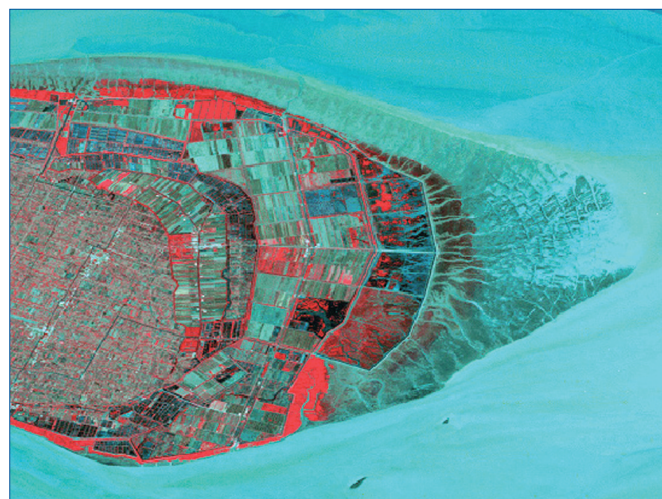
LOICZ Reports and Studies No. 35

Dynamics and Vulnerability of Delta Systems

Irina Overeem and
James P. M. Syvitski

Download:

<http://www.loicz.org/products/publication/reports/index.html.en>



Chongming Island, a rapidly growing island in the Yangtze estuary (Photo: C. X. Yun)



Coastal Snapshot

Coastal and estuarine research at SKLEC, East China Normal University, Shanghai

By LOICZ SSC member Zhongyuan Chen,
State Key Laboratory for Estuarine and Coastal Research,
East China Normal University, Shanghai

Located on the eastern coast of China, the Yangtze estuary serves as a huge ecological breadbasket and supports the daily activities of a population of more than a hundred million people. The river mouth is about 50 km wide and extends some 60 km inland. Mean annual runoff exceeds 900 billion cubic meters, with an annual sediment load, prior to the construction of dams in the catchment, of 470 million tons. Three large estuarine islands have built up over the last 2000 years. The largest is Chongming Island, 120 km long and 30–40 km wide.



Dikes along the Yangtze coast designed to prevent coastal erosion from reduced sediment input, typhoons and high tides (Photo: M.T. Li)



In order to meet the challenges produced in recent years by climate warming and human interference, the State Key Laboratory of Estuarine and Coastal Research (SKLEC), East China Normal University, Shanghai, has been actively involved with in-depth ecological and sedimentological research on the estuary. Research results have been extensively applied in integrated coastal management, and have contributed to policy development.

Monitoring coastal erosion

Transport of sediment to the coast by the Yangtze River causes the coast to prograde naturally. In the last half century, more than 30,000 dams have been constructed in the Yangtze basin, including the recently completed Three Gorges Dam, and this has caused a reduction in the annual sediment load into the estuary from >470 million tons to <150 million tons, a situation complicated by climate fluctuations. Monitoring the processes of sediment transport and sediment flux/load in the estuary is a major focus of research at SKLEC. Understanding coastal sedimentation and erosion in response to the reduction in sediment load is urgent, because of the proximity of the megacity of Shanghai to this coast. Sedimentation along the coast has long been beneficial: for instance, the new airport of Shanghai Pudong is built on reclaimed coastal land; and coastal sedimentation has caused Chongming Island to enlarge by 50 % in the past half century. The island is now protected as a 'green base' for the metropolitan city of Shanghai. To mitigate potential risks from coastal erosion following from a reduction in sediment load and driven by typhoon storm events, staff from SKLEC have painstakingly researched these issues for national and local governments.

Saltwater intrusion

Active research at SKLEC includes intensive monitoring of saltwater intrusion into the estuary, especially during the winter season of low flow. A major concern is the extremely low discharge to the estuary when climatic conditions are dry at the basin-wide scale. A representative case was saltwater intrusion into the estuary in 2006/07. A long duration (~8 days) saltwater intrusion event occurred in the estuary, due to a basin-wide drought that lasted about 3 months, from late 2006 to early 2007. This severely reduced freshwater supply to the megacity of Shanghai, where there was 10 days of fresh water available for the Drinking Water Company. On the basis of intensive on-site field observation, staffs at SKLEC have simulated freshwater circulation in the estuary under various physical settings (Figure 1). Modelling results have been extremely useful in helping the local government develop plans for integrated coastal management.

Basin-estuary ecological health

Like most large estuaries, environmental degradation has occurred in the Yangtze estuary driven primarily by indus-

trial development beginning early last century. Large areas of coastal land have been used for industrial development. Researchers at SKLEC have directed their attention to ecological restoration through physical and biochemical studies dating from the early 1980s. New-methods of GIS-related analyses incorporating remote sensing approaches have been widely applied to the Yangtze estuary, aiming at: 1) investigating spatial distribution of vegetation along the coast, 2) monitoring nutrient flux into the estuary from terrestrial sources, and 3) understanding changes in the bio-ecological diversity of the estuary in response to climate warming and human impacts. Recent research results at SKLEC have shown that dissolved silica fixation in the upstream dams and increased N and P input from fertilizers has intensified the occurrence of red tides in the estuary by reducing the proportion of the siliceous alga *Skeletonema costatum* in favour of the non-siliceous alga *Prorocentrum dentatum* which is now the dominant species of the red tides in Yangtze estuary and neighbouring coastal waters. The number of big dams in the Yangtze River basin will double in the next 30–50 years, a situation likely to be complicated by climate warming. This will significantly influence the patterns of nutrient fluxes in the river basin and estuary, with consequences for the management of the ecological health of the estuary and adjacent coast.

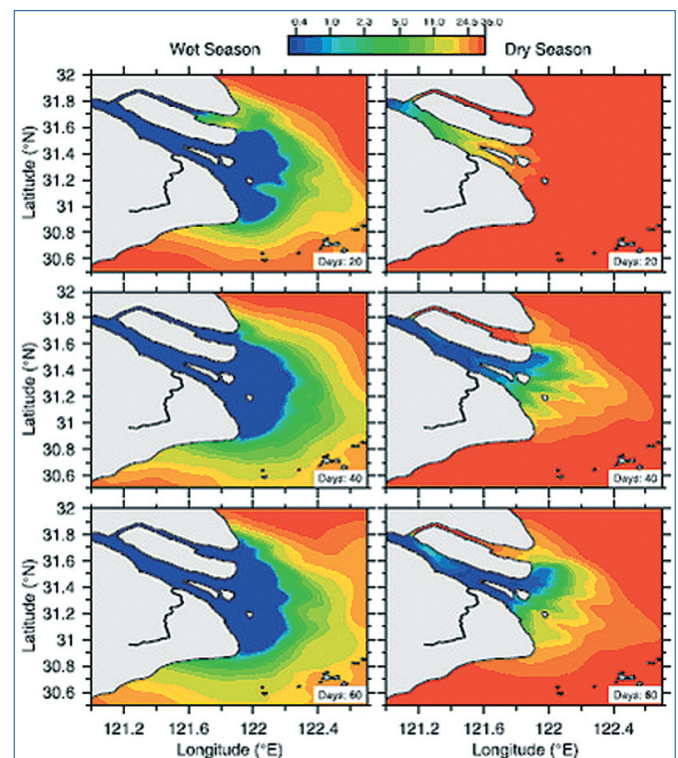


Figure 1: Distribution of tidally averaged surface salinity (in parts per thousand) for model runs under wet (left panels) and dry (right panels) season conditions for various durations

(Source: Xue et al. (2009): Saltwater intrusion into the Changjiang River: A model-guided mechanism study, *J. Geophys. Res.* 114)

Integrated coastal management – socio-economic assessment

SKLEC has also been actively involved in the recent development of the metropolitan city of Shanghai, in terms of socio-economic assessments for estuarine and coastal management. This key lab has undertaken many national key projects on these issues during recent decades. Local government and other stakeholders have been provided opportunities for consultations on sustainable usage and the planning of natural resource exploitation. Strategic freshwater resource provision remains as the highest priority in the estuary and is a challenge for the future, particularly in relation to the extreme climate and marine hazards. Policy modifications have been proposed, which have been effective in improving coastal management. In order to develop further, SKLEC has set up long-term international exchange programme for inter-institutional collaboration.

This snapshot feature is linked to Priority Topic I:
Linking social and ecological systems in the coastal zone.

Research Mission to São Tomé and Príncipe Islands – West Africa

Antonio Carlos Diegues

From 19–26 July, 2009, some days after the Dahlem-Type workshop in Oslo, I joined an exploratory research mission, organised by the Federal University of São Carlos and supported by the Brazilian Ministry of Foreign Affairs. The goal was to provide a preliminary assessment of the impact of climatic changes on artisanal fishing communities in the Democratic Republic of São Tomé and Príncipe.

This small island state is formed by two main island, São Tomé, the largest and Príncipe, covering 1.001 square kilometers, with a population of 150.000 inhabitants mainly concentrated at the capital, São Tomé and along the coast, presenting a high cultural and biological diversity.

The colonisation of the island started with the Portuguese at the end of the XV Century with sugar plantation and later, with coffee and cocoa, becoming independent in 1975. Since the 80ties there is a strong migration trend from rural to urban areas, mainly to the capital, resulting in decreasing food production. The population depends today mainly on artisanal fisheries, responsible for 70 % of protein intake, from small-scale agriculture and services and over 50 % of the inhabitants is below the poverty line (around 350 USD/year in 2003). Being among the least developed countries, São Tomé and Príncipe has a high illiteracy rate, poor health and education services, insufficient infrastructure such as roads, water and sewage system being very dependent on some export of commercial crops (cocoa, coffee), external aid and cooperation.

Artisanal fishing provides not only food, (the fish consumption is around 30 kg a year) but it is the main source of employment and income in the coastal villages. Around 2.500 fishers and 2.050 female traders depend directly from this activity that generates income for 20 % of the overall population. The artisanal fishing sector produces around 4.000 tons/year, using mainly some 1224 dug-out sailing canoes, 339 out board engine canoes and a variety of fishing gears. There is also a small semi-industrial sector employing 10 in-board engine powered boats (12–14 meters) employing 160 fishers that operate further in the sea.

Trade is done by the “palaiês”, local name for a large group of women fish traders who bring the fish to the market and play an important economic and social role. Some of them participate in women's groups assisted by local NGOs.

The main objective of the exploratory mission was to assess the social and environmental vulnerability of the poor coastal communities. In the field visit the mission was assisted by technicians of the Agriculture and Fisheries Ministry, by local NGOs and it was able to make a quick survey on the living conditions of fishers in several coastal communities. The State is almost absent in the fisheries sector and most of the activities, such as female fish traders organisations, ice and storage, boat building, etc is undertaken with the help of a local NGO (Marapa), funded by the European Union. Fishers associations that were supported by the Government in the socialist period (1975–90) ended with the neo-liberal policies of the mid-90ties when an important state-owned fishing industry, providing cheap fish, was privatised and collapsed.

Today, the coastal communities are the most vulnerable social groups and this vulnerability is becoming higher as result of some extreme climate events that are occurring nowadays: longer dry periods in some areas resulting in decreasing agricultural production and out of season heavy raining in others, causing flooding and landslides. There are indications of rising coastal water temperature, fish migration to more distant waters, forcing artisanal sailing canoes to travel longer distances without appropriate navigational equipments (GPS, security etc) and resulting in more frequent loss of human lives and fish equipment. Fishers have consistently claimed that sea resources are becoming more rare and distant. In addition to that, in recent years, waves higher than 6 meters (as it occurred in Pantufo and Melão beaches in 2008) have devastated some fishing villages in the west coast, destroying wooden houses and dug out canoes of the already poor fishers. Some beaches are already suffering of erosion that becomes more serious as result of the use of beach sand for housing construction in urban areas.

The main question is: how able are poor coastal communities to adapt to these environmental/climatic changes? At present, the possibility of adaptation is limited by the

above mentioned social vulnerability that results from poverty, few alternative employment and lack of investment capacity of the government.

In 2006, the government (mainly the Ministry of Environment and Natural Resources) and local institutions produced a National Plan for Adaptation to Climatic Change and has designated a focal point for the UN Convention on Climatic Change at the National Meteorology Institute. The document is a result of extensive consultation with different social sectors, including the most vulnerable coastal communities, aiming at minimising human live losses, poverty alleviation and reduction of vulnerability. Some important measures are proposed in the document such as: the establish-

ment of an early warning system, training of fishers, firemen, to deal with climate change (storms, sea disasters), amelioration of fishing infrastructure (fish landing piers etc), amelioration of water supply and sewage, of the health/education system etc).

At the end of this interdisciplinary mission and of the previous one (in 2008), meetings and workshops were held to discuss some results and recommendations, including the implementation of early warning system, strengthening of local organisations (fishers and fish women traders), improvement of fish storage, amelioration of boat navigation, reduction of human induced processes of beach erosion, educational cooperation with Portuguese speaking countries etc).



Typical fishing beach with sailing wood canoes



Daily catch

(Photos: A. Diegues)



Fishers village



Beach erosion and boats on the street

Further articles of 'Coastal Snapshots' can be found here:  <http://www.loicz.org/Snapshot/index.html.en>

If you also want to become a "LOICZ Snapshot Reporter" please send your "Snapshot article" to: b.goldberg@loicz.org

Calendar

2009

SPICOSA SETNET Training Workshop: Improving ICZM Using a Systems Approach

24th–25th November, 2009, Stockholm, Sweden
To register, please contact Hania Ladkowska
e-mail: mocehl@ug.edu.pl

LOICZ workshop on Deltas: Vulnerability and Coastal Management

7–13 December, 2009, Anna University, Chennai, India

Deltas and other Sedimentary Basins: Their Resource Potential & XXVI Convention – IAS 2009 of Indian Association of Sedimentologists

16–18 December, 2009, Visakhapatnam, India, hosted by Delta Studies Institute, Andhara University
Contact Dr. D. Rajasekhara Reddy.
e-mail: m.tech.audsi@gmail.com

4th European Conference on Coastal Lagoon Research

Research and Management for the Conservation of Coastal Lagoon Ecosystems, South-North comparisons
14–18 December 2009, Montpellier, France
<http://www.ecolag.univ-montp2.fr/lagoon-conference>

2010

Energy transitions in an interdependent world: what and where are the future social science research agendas?

25–26 February 2010, University of Sussex, Brighton, U. K.
<http://www.sussex.ac.uk/sussexenergygroup/conference>

ICCCM'10 International Conference on Coastal Conservation and Management in the Atlantic and Mediterranean

April 11–17, 2010, Estoril, Cascais, Portugal
<http://icccm.dcea.fct.unl.pt>

International Symposium on Coastal Zones and Climate Change

Assessing the Impact and Developing Adaptation Strategies.
12–13 April, 2010, Monash University, Gippsland, Churchill, Victoria, Australia
<http://www.monash.edu.au/cemo/czcc2010/>

Climate Change Conference

21–23 April, 2010, Humboldt University Berlin, Germany
<http://www.hu-berlin.de/climatechange2010/>

Fifth Global Conference on Oceans, Coasts and Islands –

Global Oceans Conference 2010 Advancing Integrated Ocean Governance at National, Regional, and Global Levels
3–7 May, 2010, 9 UNESCO Paris, France
http://www.omrnrro.ca/bulletinBoard/GOC2010_Flyer.pdf

ICES Symposium on the Collection and Interpretation of Fishery Dependent Data

23–26 August, 2010, Galway, Ireland
<http://www.marine.ie/fisherydependentdata/>

ASLO-NABS 2010 Meeting

Global Changes from the Center to the Edge
6–11 June, 2010
Santa Fe, New Mexico, USA
<http://www.aslo.org/forms/santafe2010.html>

38th Conference of the International Association for Danube Research (IAD)

“Large River Basins – Danube meets Elbe – Challenges – Strategies – Solutions”
22–25 June, 2010, Dresden, Germany.
www.iad-dresden-2010.de

11th International Meeting on Statistical Climatology

12–16 July, 2010, University of Edinburgh, Scotland
<http://cccma.seos.uvic.ca/imsc/11imsc.shtml>

LITTORAL 2010 "Adapting to global change at the coast: Leadership, Innovation, and Investment"

21–23 September, 2010, Royal Geographical Society, London, United Kingdom
<http://www.coastnet.org.uk/Littoral2010>

Deltas in Times of Climate Change

September 29–October 1, 2010, Rotterdam, The Netherlands
www.climatedeltaconference.org/

XXIII International Coastal Conference – honour of 100 anniversary of Prof. Vsevolod Zenkovich COASTAL EVOLUTION STUDIES: TRADITIONS AND MODERN CONCEPTS

27–30 April, 2010, Saint Petersburg, Russia
<http://www.rshu.ru/IOC50/>

An ICES/NASCO/NPAFC Symposium on Marine Mortality of Salmon

will be held in October 2010 in Europe with Niall Ó Maoiléidigh (ICES), Malcolm Windsor (NASCO), and Jim Irvine (NPAFC) as Conveners. A Scientific Steering Group will be established with members nominated by each organisation to assist the Conveners in planning the Symposium.

2011

International Symposium on Integrated Coastal Zone Management

12–16 June, 2011, Arendal, Norway
<http://www.imr.no/iczm/>



All dates are also available on our website:
<http://www.loicz.org/calendar/index.html.en>

EVENTS UPDATE – for a complete list of the planned events and conferences please visit:

<http://www.loicz.org/calendar/index.html.en>

If you have news, announcements and events of interest for the LOICZ community do not hesitate to contact us!



The backbone of LOICZ: Affiliated Activities

One aim of LOICZ is 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 achieving 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 makes basic information and regular updates available 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 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 likewise 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>

Synthesis of Affiliated Activities

LOICZ is preparing for an interim scientific synthesis in 2010, and as part of the synthesis the Affiliated Activities will be evaluated in the context of the LOICZ scientific framework. The synthesis is an opportunity to share your research findings with the global LOICZ community and value your contribution to coastal and global change research. We therefore encourage

you to regularly check and update the project information on the LOICZ database

<http://kopc01.gkss.de:7777/loiczdb/faces/app/Welcome.jspx>, including relevant publications and reports on your research findings. In order to edit your project information on-line, you need to log in with your user name and password. If you require any assistance, please contact the IPO.

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 research outcomes already available or involve dissemination and outreach that will lead to better public knowledge are most 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 in the LOICZ Project database accessible through 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 establish 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; and
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.
6. Affiliated Activities will generally feed into the global LOICZ synthesis (Interim Synthesis planned for 2010).

Researchers whose work fits into the LOICZ portfolio are encouraged to submit proposals to the LOICZ IPO as soon as possible. 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.

Dear LOICZ community,

This is the last INPRINT in 2009. We, the LOICZ IPO, wish you and your families calm last weeks of the year and a peaceful Christmas season.

We are looking forward to working with you in 2010 and we like to thank all corresponding scientists and especially our SSC members and Dahlem-Type workshop participants for their great work and contribution for very successful activities in 2009.

Finally, the LOICZ IPO wants to thank Mrs. Gerit Stoffregen for her great work and support for publishing LOICZ INPRINT, R&S Reports and flyers. Since LOICZ is hosted at GKSS Research Center in 2006, she composed and designed most of the LOICZ printed products. Mrs. Stoffregen will retire by the end of the year and we wish her all the best for her new life period.

LOICZ IPO



Publication details

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

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

Design:
Barbe Goldberg
Gerit Stoffregen
Hester Whyte

Printing and layout:
GKSS, TFP – Print Media, Geesthacht, Germany

Photographs and illustration:
The illustration of the coastal zone on the front page is made by the artist Glynn Gorick, UK, 2005 and commissioned by LOICZ/IGBP. The photographs on the front and back page of this newsletter are copyright to Martin Le Tissier.

Contact:
GKSS Research Centre, LOICZ IPO
Institute of Coastal Research
Max-Planck-Str. 1
21502 Geesthacht, Germany
phone: +49 41 52 87 20 09 • fax: +49 41 52 87 20 40
e-mail: loicz.ipo@loicz.org • url: www.loicz.org

© Copyright 2009, Land Ocean Interaction in the Coastal Zone, Core project of IGBP and IHDP

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 GKSS Research Centre which is part of the Helmholtz foundation.

LOICZ research as outlined in the science plan and implementation strategy is organised around five themes:

- Vulnerability of coastal systems and hazards to society
- Implications of global change for coastal ecosystems 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.

Get involved

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.

