

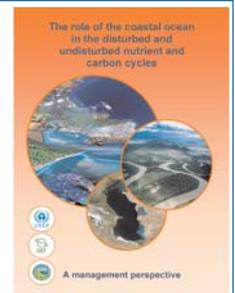


## Land-Ocean Interactions in the Coastal Zone



# INPRINT

**LOICZ gains momentum at new location** – Cutting edge coastal science was presented during a one day national symposium LOICZ held at the new GKSS host Institute for Coastal Research. The international SSC met in parallel and engaged closely with the German colleagues. Read further about international LOICZ research, new global models and capacity building and our steps towards better public relations and science dissemination. New also from LOICZ – UNEP/GEF: The role of the Coastal Ocean in the disturbed and undisturbed nutrient and carbon cycles – A Management Perspective.



### Contents

LOICZ IPO at, GKSS Research Centre – Radio Hydrography	3
Geology, geography and humans battle for dominance over the delivery of fluvial sediment to the coastal ocean	5
LOICZ News: Linkages between German Coastal Research and global LOICZ: Joint LOICZ SSC – Institute for Coastal Research Minisymposium, GKSS Research Centre, Geesthacht, 14 June 2006	6
Results of the LOICZ SSC – national Minisymposium on Coastal Science	7
Arctic coastal monitoring sites: a proposed network to monitor impacts of climate change at community, regional, and circum-Arctic scales - ACCO-Net	8
Distribution sites for the analyses of Delivery Systems in the Mediterranean and Black Sea. A new regional network on land-based material fluxes – joint outcomes for the C-GTOS and LOICZ	9
The LOICZ workshop at the LITTORAL conference in Gdansk, Poland, 18-20 September 2006	12
Sub-aerially exposed continental shelves since the Middle Pleistocene climatic transition INQUA/IGCP 464 field meeting, 13-18 August 2006, Exmouth, WA, Australia	15
Global Coastal Changes and Coastal Zone Management; Joint session of LOICZ and CMRC Cork, Ireland, held as part of the international summer school on Diversity of Coastal Habitats, Sylt 13.09.2006	16
LOICZ booth at the GKSS Open Day – painted visions of the coast	17
The backbone of LOICZ: affiliated projects & call for research proposals	18
IPO Notes; What's on the wwwweb	19
Publications of general relevance to LOICZ and Have you seen	20
Calendar	23



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## LOICZ IPO at GKSS Research Centre – featuring of the hosting Institute for Coastal Research continued

In newsletter 1/2006 we introduced key research groups and topics of the new LOICZ hosting institute, the Institute for Coastal Research at GKSS in Geesthacht, Germany. In this volume we continue this series of feature articles introducing the department of Radar Hydrography. A final one is planned for the next volume displaying the work of the ecosystem modelling group. For more detailed information on the GKSS, the Institute for Coastal Research and the different departments and their staff please also visit [www.gkss.de](http://www.gkss.de).

### Radar Hydrography

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Based on intensive world wide research during the last three decades, radar remote sensing has reached a level of operability that establishes it among the tools routinely used in earth observation. Depending on the instrument platform – satellite, airplane, ship or coastal station – radar-based products provide area coverage on global, regional or local scales. Concerning the ocean and coastal application, the most reliable information that can be deduced from radar data is on wind, waves and currents. In addition, radar maps provide basic information for surveys of pollution and ice coverage; it also supports the detection of local dynamic features in the upper ocean. Beyond these direct observations, indirect field parameters such as bathymetric maps or water flow rates through cross sections in rivers or coastal inlets are deduced by inverse modelling from radar products.

However, further improvement of the operational use of radar still needs the investigation of basic scientific questions. At the GKSS Institute for Coastal Research operational radar observation systems have not only been developed for 20 years, but brought into operation to detect ocean surface wave and current fields or the bathymetry in shallow water areas. Here we present an example of current work of the “*Radarhydrography*” department focussing on the development of cost effective radar tools for the operational observation of small scaled dynamic processes in coastal waters.

The method of simultaneous observation of near shore current dynamics is of fundamental importance in research looking at coastal protection. Particularly in shallow water regions with sandy grounds, the dynamic change reflecting the interplay of erosion, transport and deposition of sand processes is permanently controlled by an invariant current regime. It is overlaid by episodic

events with increased current velocities as well as eddies and with breaking waves acting as local amplifiers of bottom erosion. The radar system was adapted to detect the small scaled current features interacting with the local sand regime and it will be adapted also to observe local wave breaking allowing to assess the flow of momentum extending from breaking waves into the bottom.

Within the chain of radar observations the example given here shows the mapping of the permanent current regime. For this purpose, we acquire geo-coded current maps by ship based scanning. On board a ship two radars with fixed antenna view directions are synchronised to acquire the two orthogonal components of sea surface currents during a single ship track. As the setup is aimed to scan horizontal current profiles we named the system Radar Doppler Current Profiler (RDCP). Used simultaneously with a vertical current scanner like the Acoustic Doppler Current Profiler (ADCP), a three dimensional current observation can be carried out easily. Whereas the technique of coherent data acquisition was solved about three years ago, keeping accurate track of the antenna's position and view direction relative to the moving ship was a particular challenge. In cooperation between the Electrotechnical University St. Petersburg, Russia, and IfK / GKSS, the hardware of a coherent radar system was developed on the basis of nautical X-band radar. Significant changes were necessary to allow the detection of the phase shift of the received radar pulse for each range cell and to steer the antenna to acquire significant complex radar data along the radial scans. Alternating the operation of the two radars, each is triggered to transmit and receive 1000 coherent pulses per second. In order to avoid interferences, one of the radars is switched as master interlacing every second pulse from a common trigger. The scan angle between the two antenna directions is 90°, with one antenna looking 45° ahead and the other one looking 45° aft. The range resolution of each system is about 7.5 m. Storing 250 range bins the full range is about one nautical mile (1852 m). Using the Doppler relation, we calculate the radial velocities from the backscattered signal for each range bin. As we integrate during 1 s over 1000 pulses the radial velocities are detected with an accuracy of 0.03 m s<sup>-1</sup> covering the range of ±7.5 m s<sup>-1</sup>. By automatic quality control, invalid data are rejected.

During the acquisition, a PDGPS navigation system precisely tracks the ship's position and its North orientation to collocate the two current components in a post processing step. Additionally, the navigation data are needed to correct the instantaneous antenna movements. Another correction is necessary to minimise movements directly impacted by the wind. Each resulting component is written into a geo-coded grid. The last



## Geology, Geography and Humans Battle for Dominance over the Delivery of Fluvial Sediment to the Coastal Ocean

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A newly developed *BQART* model (Syvitski and Milliman, in press) predicts sediment flux ( $Q_s$ ) to the coastal zone with accuracy equivalent to observations. When applied to a database of 488 rivers, the *BQART* model shows no ensemble bias across 6 orders of magnitude in observational values, and accounts for 96 % of the between-river variation on the long-term ( $\pm 30$  y) sediment load or yield of 488 test rivers. The model captures geomorphic and tectonic influences (basin area,  $A$ ; relief,  $R$ ), geography (temperature,  $T$ ; discharge,  $Q$ ), geology (lithology,  $L$ , ice cover,  $I$ ), and human activities (reservoir trapping, soil erosion, urbanization) with:

$$Q_s = \omega B \cdot Q^{0.31} A^{0.5} R \cdot T \quad \text{for } T \geq 2^\circ \text{ C}$$

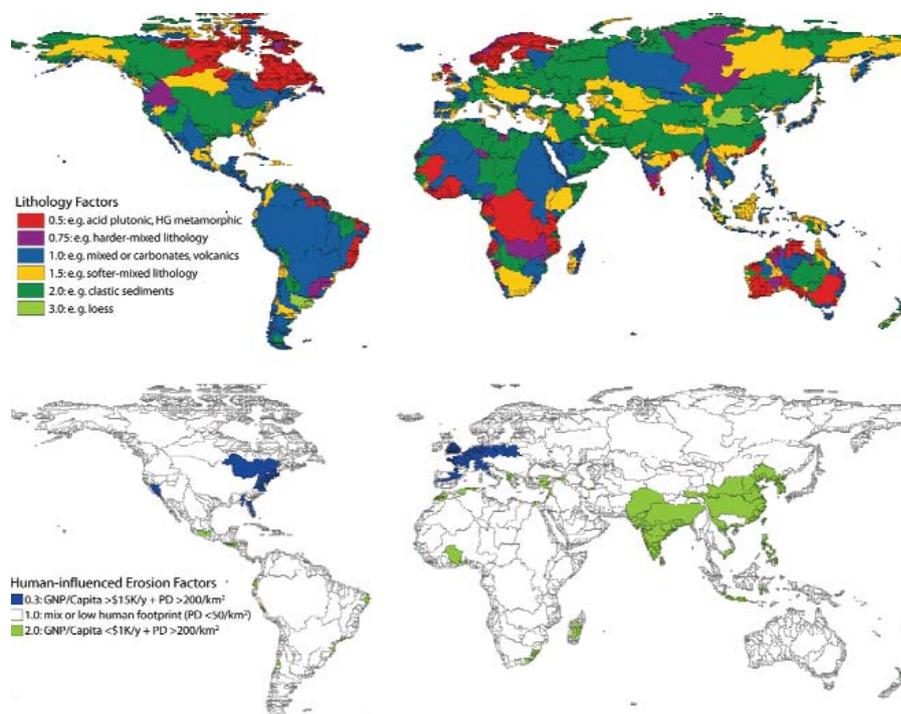
$$Q_s = 2 \omega B \cdot Q^{0.31} A^{0.5} R \quad \text{for } T < 2^\circ \text{ C}$$

where  $Q_s$  has dimensions of  $M/T$  ( $\omega = 0.02$  for units of  $\text{kg/s}$ ,  $\omega = 0.0006$  for units of  $\text{MT y}^{-1}$ ),  $Q$  is in  $\text{km}^3 \text{ y}^{-1}$ ,  $A$  is in  $\text{km}^2$ ,  $R$  is in  $\text{km}$  (Relief is the topographic elevation difference between the highest point in the drainage basin and the gauging station where observations are made),  $T$  is in  $^\circ\text{C}$ , and  $B$  defines unique basin attributes with  $B = I \cdot L \cdot (1 - T_E) E_h$ , where  $I$  captures glacier erosion,  $L$  is basin lithology,  $T_E$  is the trapping efficiency of lakes and reservoirs, and  $E_h$  captures human influences on soil erosion. The glacier erosion factor is simplified to depend on the basin area occupied by active glaciers. Six lithology types are identified, ranging from basins strongly influenced by hard, acid plutonic and/or high-grade metamorphic rocks ( $L = 0.5$ ), to basins with extremely weak substrate ( $L = 3$  for crushed rock or loess deposits).

Reservoirs behind dams trap approximately 26 % of the global sediment delivery to the coastal ocean (Syvitski et al., 2005a), although this magnitude appears to be steadily increasing (Liquette et al., 2004). The actual vol-

ume of sediment being trapped is much greater when one considers that much sediment would be stored in alluvial fans and flood plains, and not normally reach the coastal zone. Developed countries are decommissioning dams, but the number of decommissioned dams remains small.

Humans also disturb the global landscape through competing influences, e.g. urbanization, deforestation, agricultural practices, and mining activities, but disturbance is a moving target with each decade bringing a new environmental situation. Past methods that incorporate human disturbance on sediment erosion (e.g. RUSLE) are designed for plot scales, or at best small catchments, and are not easily adapted to predict the  $E_h$  factor for global rivers. *BQART* uses a simple, a priori method based on population density and GNP per capita. For basins with a high  $PD > 200 \text{ km}^{-2}$ , and a  $\text{GNP/capita} > \$15\text{K y}^{-1}$ ,  $E_h$  is set to 0.3. This identifies rivers from Europe and the eastern U.S. that are well regulated and are contained by stop-banks hardened by raft and concrete. For basins with a low human footprint ( $PD < 50 \text{ km}^{-2}$ ) or a mixture of the competing influences of soil erosion and conservation,  $E_h = 1$ . For basins where the population is high ( $PD > 200 \text{ km}^{-2}$ ), but  $\text{GNP/capita}$  is low



**Figure 1:** Top: Global map of the world's drainage basins in terms of their basin-averaged lithology factors used in the *BQART* model, shown at  $0.5^\circ \times 0.5^\circ$  resolution.

Bottom: Global map of the world's drainage basins represented at  $0.5^\circ \times 0.5^\circ$  resolution, showing human influenced erosion factors used in the *BQART* model. (after Syvitski and Milliman, in press).



(<\$1K y<sup>-1</sup>), E<sub>n</sub>=2.0. Such basins are located in parts of Asia, Africa, the Philippines and Indonesia, where basin deforestation remains near historical peaks, or farming practices are resource limited, or open-pit mining can be intense. The socio-economic impacts of humans on soil erosion or reservoir trapping continue to change. It is truly unfortunate that observational data on fluvial sediment loads are largely no longer collected, when the earth is undergoing such dramatic surface dynamic changes.

Global application of *BQART* suggests geological parameters (basin area, relief, lithology, ice erosion) explain 65 % of the between-river sediment load. Climatic factors (precipitation and temperature) account for an additional 14 %, and the anthropogenic factors account for an additional 16 % of the between-river loads. *BQART* determines the delivery rate of sediment for a river measured at or near sea level. The model does not provide within-basin details on sediment erosion and transport, or information on sediment retention in floodplain, deltas and estuaries. A complete global source-to-sink surface dynamic model remains to be constructed and tested.

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## LOICZ News

### Linkages between German Coastal Research and global LOICZ

**Joint LOICZ SSC – Institute for Coastal Research Minisymposium, GKSS Research Centre, Geesthacht, 14 June 2006**

This years 17<sup>th</sup> LOICZ Scientific Steering Committee (SSC) meeting, the first one at the new host location, was combined with a one-day minisymposium to explore the linkages between German Coastal Research and LOICZ. The symposium was held at the Geesthacht Innovation and Technology Centre (GITZ). With 77 national participants representing 17 different institutions the response was encouraging including also governmental bodies and it provided comprehensive insight

into ongoing research projects with national and regional focus - some of them even with global outreach. Prior to the conference day the three scientific Priority Topics that LOICZ has derived from its Science and Implementation Plan were circulated to the participants forming the frame for discussions. Since not all potential contributions found a slot for oral presentation coffee and lunch breaks provided ample opportunity to review the various posters and other material that was displayed.

Following more detailed introductory key notes of these Priority Topics by LOICZ SSC members the symposium participants split up in three working groups to review and discuss the scientific questions and issues covered under each of the three topics and to explore ways for interaction and collaboration with the global LOICZ community.

LOICZ SSC Chair, Jozef Pacyna, addressed the plenary with conclusions from the working groups, thanked everyone and invited all participants to a reception for further informal discussion and social interactions. The lively exchange and enthusiasm that emerged during the day immediately provided new opportunities for future collaboration between the national research community and LOICZ in multiple activities. In consideration of this fruitful combination of SSC and national science conference it was decided that this concept will be applied as well to following SSC Meetings. We are grateful to our hosts but in particular, to all the participating scientists who made this positive experience a reality.

Key results are presented below and more detailed outcomes of the minisymposium can be found under [www.loicz.org](http://www.loicz.org) where all the presentations and a full conference report are available.



**Figure 1:** The conference day ended with a reception in the GITZ building – starting from left: LOICZ SSC members: B. Gläser, F. Lansigan, W. Huang, I. Koike, Y. Saito, J. Pacyna.

## Results of the LOICZ SSC – national Minisymposium on Coastal Science

Hartwig Kremer (CEO LOICZ IPO), Jozef Pacyna (Chair LOICZ SSC), Franciscus Colijn (Director IfK, GKSS)

For the Land-Ocean Interactions in the Coastal Zone (LOICZ) project the next years will be particularly challenging. In its role as a core project of both, the IGBP and IHDP, its task is not only to integrate land, ocean and atmospheric sciences but also to bring in the human dimensions science in a truly interdisciplinary fashion relating to global environmental change (GEC) in coastal zones. This translates to a comprehensive transition from an originally rather biogeochemistry oriented global research cluster looking primarily at the role of coastal zones in the carbon cycle into an interdisciplinary research project and network aiming to also provide knowledge products for better informed decisions in the realm of integrated management. In the context of the Earth System Science Research, LOICZ is the only global effort with a natural and social science focus on coastal change, its processes and its societal, management and policy implications. The mission statement of LOICZ therefore reads as follows:

*'to provide the knowledge, understanding and prediction needed to allow coastal communities to assess, anticipate and respond to the interaction of global change and local pressures which determine coastal change.'*

This sets the stage to review and discuss ongoing coastal research on global but also on national and regional scales against political commitments to conventions and directives. It also implies that LOICZ is expected to generate continuous iterative discourse within and beyond the science community as to find out where future science needs to go to address key societal information needs. The minisymposium was meant to kick-off this dialogue in the new host country, Germany, in awareness of the high and diverse range and capacity in national coastal research.

With the selection made for oral and poster presentations the objective was to provide a reasonable overview of the multiple highlights featuring current national research on coastal change, dynamics and processes. It was also meant to get insight into new high end scientific approaches and to provide a platform for exchange and discussion about the science priorities and topical directions of LOICZ. Discussion outcomes were picked up internally by the international Scientific Steering Committee which held its 17<sup>th</sup> annual Meeting associated to the Minisymposium at GKSS. Symposium findings can be summarized as follows:

- Humans are an integral part of the coastal domain functioning as drivers of change but also under the impact of change.
- The River-Coast continuum is the scale that needs priority attention.
- Scenarios considering both climate change driven impact on the social and ecological coastal systems as well as anthropogenic forcing can be exploited to promote better informed decision making.
- Long time series of data can provide invaluable historic information for model development and valuation.
- Modeling and prediction of coastal change needs to go across multiple spatial and temporal scales and can benefit considerably from tailored remote sensing techniques.
- Typological approaches to assist up and downscaling and covering data poor areas and those with no primary information are a critical tool and should be complemented by overlaying information on governance and social choice.
- In terms of impact, adaptation, thus social and ecological response, and governance coastal communities need to be involved with appreciation of their complex composition.
- The best meaningful way to bring coastal research into management is still work in progress and needs future scientific attention across the disciplines.

In conclusion to fulfill the LOICZ mandate mentioned above the project needs to promote, facilitate and engage with two aspects of Global Environmental Change science:

- Fundamental research that addresses key issues of coastal change and use in the context of future scenarios of human activity and environmental state change, and
- applied research that synthesises and up-scales scientific measurements both for dissemination within the scientific community and outreach of research outcomes into 'science - policy - public' fora.

With a focus on the national research activities the conference was perceived as a valuable platform promoting exchange and collaboration. Therefore LOICZ was encouraged to facilitate the establishment of a national research umbrella that will enable continued exchange of this kind in the future. For the global implementation of the LOICZ project the Symposium has provided a number of very useful, exciting and encouraging contacts, new impressions and potential for collaboration.



In the subsequent SSC meeting impressions from the symposium discussions were reflected and it was decided that a slight rephrasing of the LOICZ Priority Research Topics would add clarity to the project profile and nice. This would be beneficiary for the science community and science users. The final and approved wording of these three Priority Topics that derive from the LOICZ Research Themes as shown in the Science and Implementation Plan read as follows (see Newsletter 1/2006 for detailed Topic description):

**Topic 1: Linking Social and Ecological Systems in the Coastal Zone**

**Topic 2: Assessing and predicting Impact of Environmental Change on Coastal Ecosystems**

**Topic 3: Linking Governance and Science in Coastal Regions**



**Figure 2:** The LOICZ SSC dinner took place on site and the members had the pleasure to be the first guests on the "maiden voyage" of the new GKSS-Casino restaurant.

### **Arctic coastal monitoring sites: a proposed network to monitor impacts of climate change at community, regional, and circum-Arctic scales – ACCO-Net**

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Climate change and its consequences are expected to be most dramatic in the polar regions and marginal environments are particularly sensitive to change. The margin between the terrestrial and marine environments in the Arctic coastal zone is also where most human activity, in-

cluding habitation, transport and industry, occurs. Currently observed changes in the north include sea level, storm frequency, permafrost temperature, sea ice, coastal erosion and species distribution and they all have the potential to increasingly affect northern peoples and their ways of life (Ford et al. 2005). In addition Hinzman et al. 2005 provide an overview of terrestrial changes. In conclusion, the Arctic coastal zone is the most relevant location to be capturing change from a human point of view. There is no current observational network to standardize monitoring efforts or measure the changes in the Arctic coastal zone (Committee on Designing an Arctic Observing Network, 2006). There exists a need for a network of sites at which standardized measurements of environmental parameters can be obtained which capture the most likely changes and their potential relevance to humans.

As part of the International Polar Year (IPY), a circum-Arctic network of standardized monitoring sites is being planned to measure and track coastal processes in order to better understand how these sites will respond to future environmental changes. These observatories will examine not only physical changes that can affect community and industry infrastructure or historical sites, but also ecological changes that can affect species' habitat or biological diversity. The proposal for this observatory network originates in the Arctic Coastal Dynamics (ACD) project of the International Arctic Science Committee (IASC) and the International Permafrost Association (IPA). ACD is affiliated with the IGBP/IHDP Land-Ocean Interactions in the Coastal Zone (LOICZ) and is led by a joint German-Canadian secretariat. It leads the IPY Coastal Margins Cluster of projects with its proposal for an Arctic Circumpolar Coastal Observatory Network (ACCO-Net).

The current composition of the ACCO-Net cluster includes proposals for national-level IPY projects in Canada, Denmark, England, Germany, the Netherlands, Norway, Russia, Sweden and the United States. ACCO-Net is seeking out ties with global observatory networks, including the US-led Arctic Observatory Network (AON), the Circumpolar Environmental Observatory Network (NEON) and the network of IPA-IPY projects, which includes the circumpolar networks: Circumpolar Active Layer Monitoring (CALM), Carbon Pools in the Permafrost (CAPP), the Tundra-Taiga Interface (TTF), and Thermal State of Permafrost (TSP).

Arctic Coastal Dynamic's first five-year phase was characterized by a focus on physical sciences and in particular, on geomorphodynamic processes directly associated with coastal erosion. In recent years, extending the focus of investigations to include the human dimensions of change in the coastal zone has been identified as an important goal. This extended direction was rein-

forced by the Coastal Working Group report of the second International Conference on Arctic Research Planning (ICARP) in November 2005, which set the course for the next decade of research in the Arctic, and by the goal of interdisciplinarity that forms a cornerstone of IPY activities. The second phase of ACD begins concurrently with LOICZ II, and has adopted this shift in focus, putting it more closely in line with the three LOICZ priorities.

Selection of observatory sites will account for community research needs, the location of sensitive ecosystems and harvesting areas, recent environmental changes, historical data records and logistical requirements. A draft template for monitoring activities is expected to result from a workshop in October 2006. Monitoring will include compilation of existing geological, geotechnical, bathymetric and ecological data to synthesize current knowledge and assess what new information is required. Detailed surveys and mapping of topography, bathymetry, ice dynamics and shoreline change will be conducted using conventional and emerging technologies (including panchromatic and radar imagery). Shore zone processes will be monitored using meteorological stations. Offshore and onshore permafrost will be characterized with geophysics, boreholes, temperature measurements and laboratory analyses. The current roster of observatory sites has been adopted from ACD's key study sites, and includes sites in Greenland, Svalbard, Russia, Alaska and Canada. Observatory characterization will include identification of stakeholders for each site and their potential contributions to and benefits from monitoring activities.

The timeline for development is tied to meetings of representatives and stakeholders from existing and potential observatory sites. The first meeting, in October 2006, is the 6<sup>th</sup> ACD Workshop at the Arctic Centre, University of Groningen in the Netherlands. A goal of this meeting is to define and characterize the initial roster of observatory sites, including an assessment of current monitoring activities. A draft monitoring template will result. In November 2006, two important workshops continue the process: the Discovery, Access, and Delivery of Data for the International Polar Year (DADDI) workshop in New York and the ICARP II follow-up workshop at the Alfred Wegener Institute in Potsdam, Germany.

In 2007, implementation will begin with the first IPY Arctic summer field season. Current plans include the establishment of a Canadian observatory network of core and satellite sites. An August 2007 Arctic coastal workshop in Tromsø is in the planning stages by LOICZ and IASC. ACD will be involved as a LOICZ-affiliated project. The 7<sup>th</sup> ACD meeting is planned for the fall of 2007 to evaluate results from the summer field season, and will

provide a chance for adjustment of plans partway through the International Polar Year. An ACCO-Net meeting is planned to take place in parallel with the Ninth International Conference on Permafrost in Fairbanks, Alaska on June 29 to July 3, 2008.

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## Distribution sites for the analyses of Delivery Systems in the Mediterranean and Black Sea. A new regional network on land-based material fluxes – joint outcomes for the C-GTOS and LOICZ <sup>a)</sup>

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A pilot project is proposed to select a network of sites across a range of geographical, socio-economic and environmental conditions in the Mediterranean and Black Sea to analyse the delivery of nutrients, pollutants and sediments from land to coastal waters. It will provide focused assessment and synthesis for the implementation of the Coastal Global Terrestrial Observing System (C-GTOS) and regional efforts to promote the global topics of LOICZ. The activity will jointly develop the common objectives of both organizations for the region, and thus contribute to the broader goals of the global change community.

The network will take advantage of existing national and regional initiatives, including previous biogeochemical and pollutant investigations (e.g. Giordani et al 2005). Resulting data will be used to enhance integration of



efforts by researchers and practitioners and to identify and fill information gaps. The pilot project will focus on the Mediterranean region, including participants and sites from countries bordering the Mediterranean, the Atlantic Ocean within a Mediterranean climate (i.e., Portugal) and Black Sea. The project is largely being lead by representatives of the LaguNet Network of Italy, in collaboration with Joint Research Centre Ispra (European Commission), other participating EU networks (French – PNEC-RSL, Greek (EINet), Portuguese (PlaNet), and Spanish – RedMarisma) and researchers from regional projects such as DITTY and TWReferenceNet (Fig.1). Steps have been taken to formalize the development of the northern regional component of this network as “Net-Sea-L” – Southern European Arc Lagoon Observational Network.

In the southern Mediterranean region, only a small number of country initiatives exist that can currently support this network. The parallel development of this regional component of the network, and collaboration on technical transfer activities with NetSea-L participants from the north, will significantly aid the development of Mediterranean wide network. C-GTOS and the Food and Agriculture Organization of the United Nations (FAO), in coordination with LaguNet personnel, will take the lead in developing this component of the project. The activities of the expanded network for the northern and southern region<sup>b)</sup> will address identified priority issues of monitoring in an operational context, including:

- (i) EU Water Framework Directive (for relevant countries) and some common standards for all countries, to enable comparable classification of coastal-lagoon systems;
- (ii) Development of a regional Early Warning System for onset of rapid proliferation of algal species of potential risk to natural resource use, aquaculture and human health;
- (iii) Provision of data to international science programmes such as LOICZ; and
- (iv) Provision of data and support of regional and global observing system initiatives including GTOS, GOOS, Global Monitoring for Environment and Security (GMES) and Global Earth Observation System of Systems (GEOSS);
- (v) Provision of data to appropriate international conventions, including the Ramsar Convention on Wetlands and the Convention on Biological Diversity.

Further value can be gained from this initiative through participation of all collaborators in the relevant cross theme activities for LOICZ and pilot projects of C-GTOS. For LOICZ this can potentially address the following

themes from the LOICZ science and implementation plan (Kremer et al 2005):

- Vulnerability of ecosystems (Theme 1);
- Identification of anthropogenic influences on changing fluxes to the coast (Theme 3);
- Biogeochemical cycles in coastal and shelf waters (Theme 4).

For the development of the C-GTOS observing network this pilot project proposes to:

- identify a selected number of sites among those that are available in existing monitoring networks, project networks, core projects, etc.;
- assess the suitability of the selected sites for distinguishing and monitoring variables that depend upon (i) local factors and impacts within the coastal zone; (ii) watershed-based factors and impacts, and (iii) global issues;
- promote common approaches, methodologies and techniques for monitoring the delivery through the coastal system;
- implement a guidance document for carrying out studies and monitoring of the delivery system in the coastal zone;
- develop a common and harmonized database of water quality and quantity parameters that supports assessment and management of system delivery and inherent policy applications;
- promote availability of scientific information to appropriate user groups;

A number of steps have been taken towards this. An inventory of the international projects on coastal systems in the area has been produced. Project coordinators and local researchers were contacted to be involved in the C-GTOS activities and participate in the production of a special issue on the Med coastal systems and development of the coastal section of TEMS (the public GTOS meta database). C-GTOS has begun a list and assessment of Ramsar sites within the Mediterranean region, a number of which are within other networks.

Collaboration between LOICZ and GTOS towards a combined network in the northern and southern Mediterranean regions will be of mutual benefit to both, and to the wider global change community. Links with regional C-GTOS pilot projects and partners provide an operational context for LOICZ research through improved access to capacity building capabilities, new sites and collaborators; and remotely sensed and in situ data sources. LOICZ's contribution in return will provide scientific expertise and research tools including continued

further development and review of flux modelling and validation efforts and typology tools that will assist up-scaling and integration of socio-economic data, as well as access to ongoing collaborations and capacity building within the region and globally.

#### References:

G. Giordani, P. Viaroli, D.P. Swaney, C.N. Murray, J.M. Zaldívar and J.I. Marshall Crossland. 2005. Nutrient fluxes in transitional zones of the Italian coast. LOICZ Reports & Studies No. 28, ii+157 pages, LOICZ, Texel, the Netherlands

Kremer, H.H., Le-Tissier, M.D.A.; Burbridge, P.R. and C.J. Crossland 2005: Land-Ocean Interactions in the Coastal Zone, LOICZ, Science Plan/Implementation Strategy for the second decade 2003-2012 of LOICZ, a core project of the IGBP and IHDP, Texel/Stockholm, The Netherlands/Sweden, pp 78 (see [www.loicz.org](http://www.loicz.org))

a) This summary was extracted from the full project proposal detailed in section 4.6 (pages 67 –76) of the Coastal GTOS Strategic design and phase 1 implementation plan and from the LOICZ Science Plan? (REF):

FAO. 2005. Coastal GTOS strategic design and phase 1 implementation plan. By Christian, R.R.; Baird, D.; Bowen, R.E.; Clark, D.M.; DiGiacomo, P.M.; de Mora, S.; Jiménez, J.; Kineman, J.; Mazzilli, S.; Servin G.; Talaue-McManus, L.; Viaroli, P. & Yap, H.. GTOS Report No. 36, Environment and Natural Resources Series No. 9. Rome, FAO. 93 pp. Also available at <http://www.fao.org/gtos/doc/pub36.pdf>.

b) The northern Mediterranean region includes a subset of European countries participating in Net-Sea-L and contributing to the C-GTOS regional priority product. The southern Mediterranean region includes non-European countries.

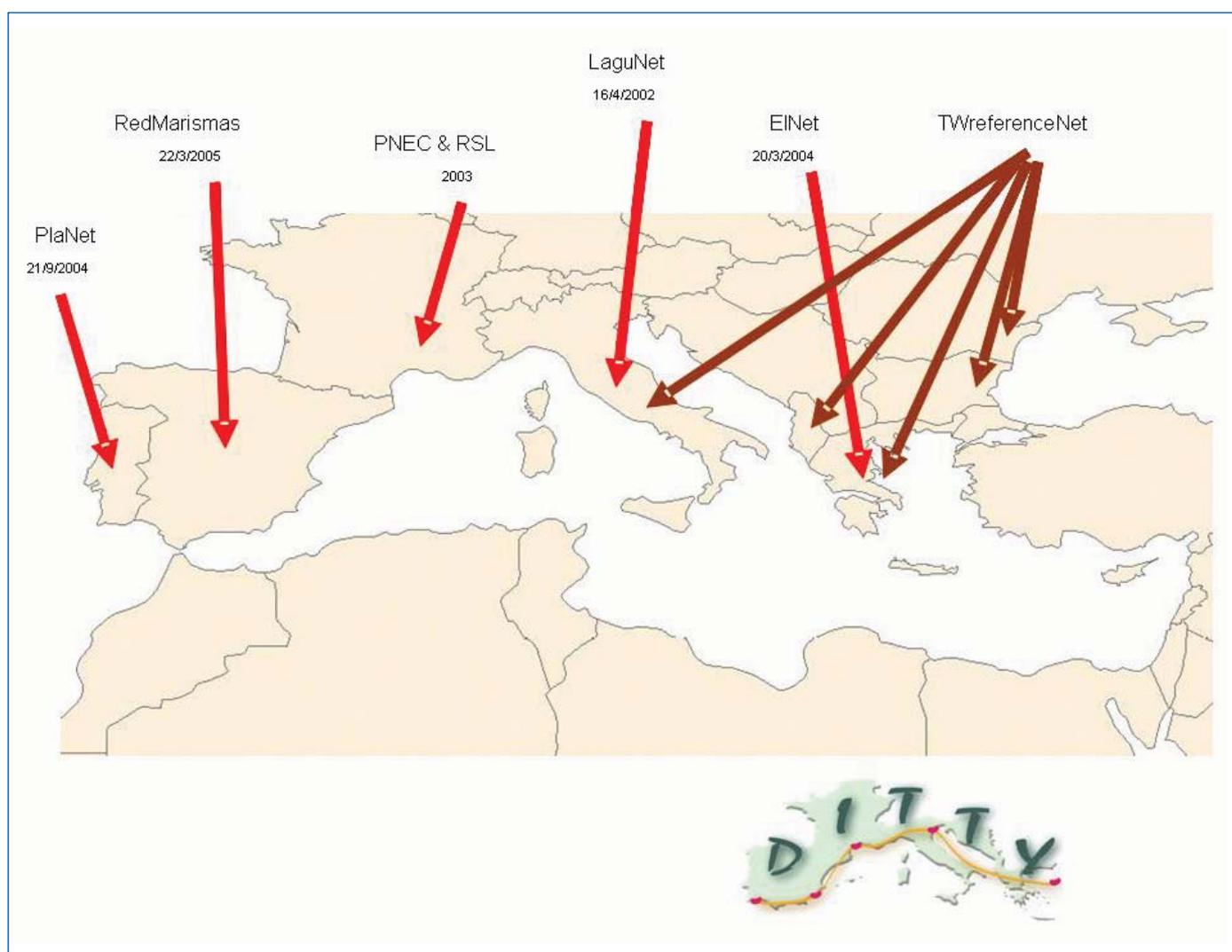


Figure 1: NetSEA-L Networks of Southern European Arc & other regional activities.



## The LOICZ workshop at the LITTORAL conference in Gdansk, Poland, 18–20 September 2006

Alice Newton

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**Figure 1:** Gdansk City Hall and market place – an impressive architectural feature of this old hanseatic City (Foto: Hartwig Kremer).

The LITTORAL conference cycle is jointly held by EURO-COAST ([www.eurocoast.org](http://www.eurocoast.org)) and the EUCC-coastal union, ([www.eucc.nl](http://www.eucc.nl)). The conferences bring together a community of coastal researchers and managers, mainly from Europe but they also attract participants worldwide as in this case from Australia, the USA, Canada, Pakistan and the Middle East.

This year the conference was hosted by the Gdansk Technical University in the beautiful historic city of Gdansk in Poland, on the shores of the Baltic Sea. The LOICZ national contact in Poland helped to organize a specific LOICZ workshop at the conference. The purpose of the workshop was to present the new LOICZ science plan and products.

LOICZ knowledge products were displayed at the booth in the conference atrium and included posters, pamphlets, LOICZ reports (these can also be downloaded from [www.loicz.org](http://www.loicz.org)), the new LOICZ science plan as well as two synthesis books “Coastal Fluxes in the Anthropocene” and “Managing European Coasts”. There was also a questionnaire about LOICZ, which has been developed recently to explore the visibility of the project and its outside perception. This questionnaire will be available also from the LOICZ website at a later stage.

The workshop was well attended. After an initial brief presentation of LOICZ prepared by Alice Newton and Jozef Pacyna, the LOICZ tools were presented in a “hands on, how to” approach. The tools presented in-

cluded Conceptual Diagrams, presented by Jane Thomas and Bill Dennison; LOICZ nutrient budgets, presented by Gianmarco Giordani; LOICZ typology, presented by Bob Buddemeier, and the ASSETS screening model for eutrophication, presented by Alice Newton, Joao Gomes Ferreira and Suzanne Bricker.

It is planned to make presentations available from the LOICZ website. Summaries of the presentations of the LOICZ tools follow below:

### What are Conceptual Diagrams and where to find out more?

Jane Thomas and Bill Dennison

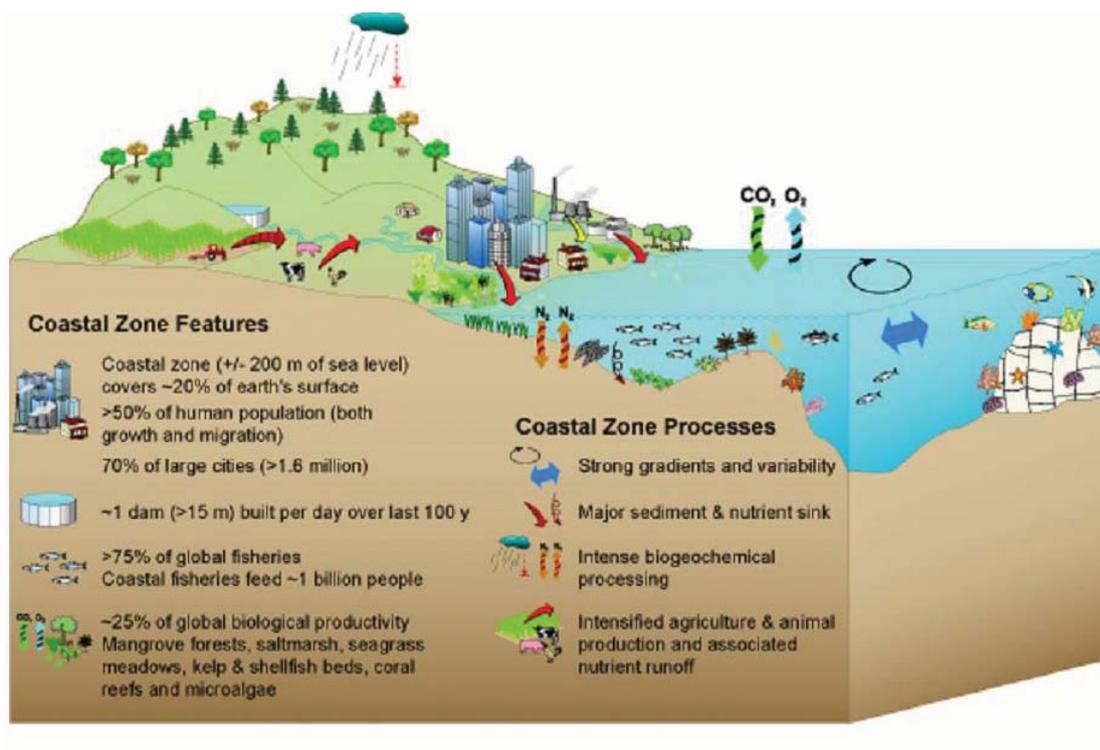
University of Maryland, Center for Environmental Science,  
P.O.Box 775, Cambridge, MD 21613-0775, USA,  
e-mail: [thomas@umces.edu](mailto:thomas@umces.edu), [dennison@umces.edu](mailto:dennison@umces.edu)

Conceptual diagrams or “Thought Drawings” are an effective tool to communicate complex messages in a simple and informative manner. They depict essential attributes of the system, depict processes at different scales and evolve to capture an increasing understanding of the system. Key elements of a conceptual diagram are consistent symbols and a comprehensive legend. Symbols are very powerful communication tools that are information rich and common in everyday life. They are universal and language independent. The size, color, shape, and position of the symbols can all convey meaningful information. A comprehensive legend makes the diagram ‘stand alone’ and self contained so that there is no need to read accompanying explanation.

Conceptual diagrams help to clarify thinking and avoid ambiguity and they provide a communication interface. They combine current scientific understanding with community priorities and environmental values and they provide an approachable representation of the system thereby allowing a shared vision to be created. Such diagrams are useful for integration and application to identify gaps, to establish priorities and to provide a synthesis.

There are numerous applications for Conceptual Diagrams including setting research agendas, developing scientific syntheses, setting up monitoring programmes, identifying management priorities, critical choke and switch points for system adaptation and intervention and they can be included in scientific literature, including peer reviewed journal articles but are particularly strong also in easy language publication reaching out to a wider and usually non scientific audience. An example on the multiple features and scales of a coastal zone is given hereunder.

[http://ian.umces.edu/conceptualdiagrams\\_page.php](http://ian.umces.edu/conceptualdiagrams_page.php)



**Figure 2:** conceptual diagram displaying key natural and anthropogenic features and goods and services of the coastal zone including the river catchment – shelf scale.

### What are LOICZ Budgets and where to find out more?

<sup>1</sup>Gianmarco Giordani, <sup>2</sup>Dennis Swaney, <sup>1</sup>Pierluigi Viaroli

<sup>1</sup>Department of Environmental Sciences, University of Parma, Via Usberti, 33/A, I-43100 Parma Italy, e-mail: giordani@nemo.unipr.it  
<sup>2</sup>Department of Ecology and Evolutionary Biology, Cornell University, E309 Corson Hall, Ithaca, NY 14853, USA, e-mail: dps1@cornell.edu

The original methodology of the LOICZ budgeting approach can be found at pp 23–43 of the LOICZ Reports and Studies Series no. 5 available in pdf format at

<http://data.ecology.su.se/mnode/methods/review%20material/report5.pdf>

Several case studies follow the statement of methodology in this report, and many others can be found in the LOICZ budget website

<http://data.ecology.su.se/mnode>

and in the LOICZ R&S series volumes

<http://www.loicz.org>

which can be considered an extended discussion of the methodology. The essence of the approach is to infer net sources and sinks of nitrogen and phosphorus in coastal ecosystems (estuaries, lagoons, bays, etc) using a mass-balance approach (of water, salinity and nutrients), generally making the assumption of steady-state, and to further infer whether the system is autotrophic or heterotrophic, and whether N-fixation outweighs denitrification in the system. For reasons of LOICZ being chal-

lenged to provide a global picture which means that much of the assessment takes place in rather data-limited areas of the world the approach attempts to do this using a minimum of data, but permitting richer datasets to be used when available. An example of some collective results of the work to date can be found in chapter 3 of Coastal Fluxes in the Anthropocene (Crossland et al (eds), 2005) and on

<http://data.ecology.su.se/mnode/methods/review%20material/smith%20et%20al%202005.pdf>

Several tools were developed to assist the application of this budgeting approach. Most of them are available in the LOICZ budget website

<http://data.ecology.su.se/mnode>

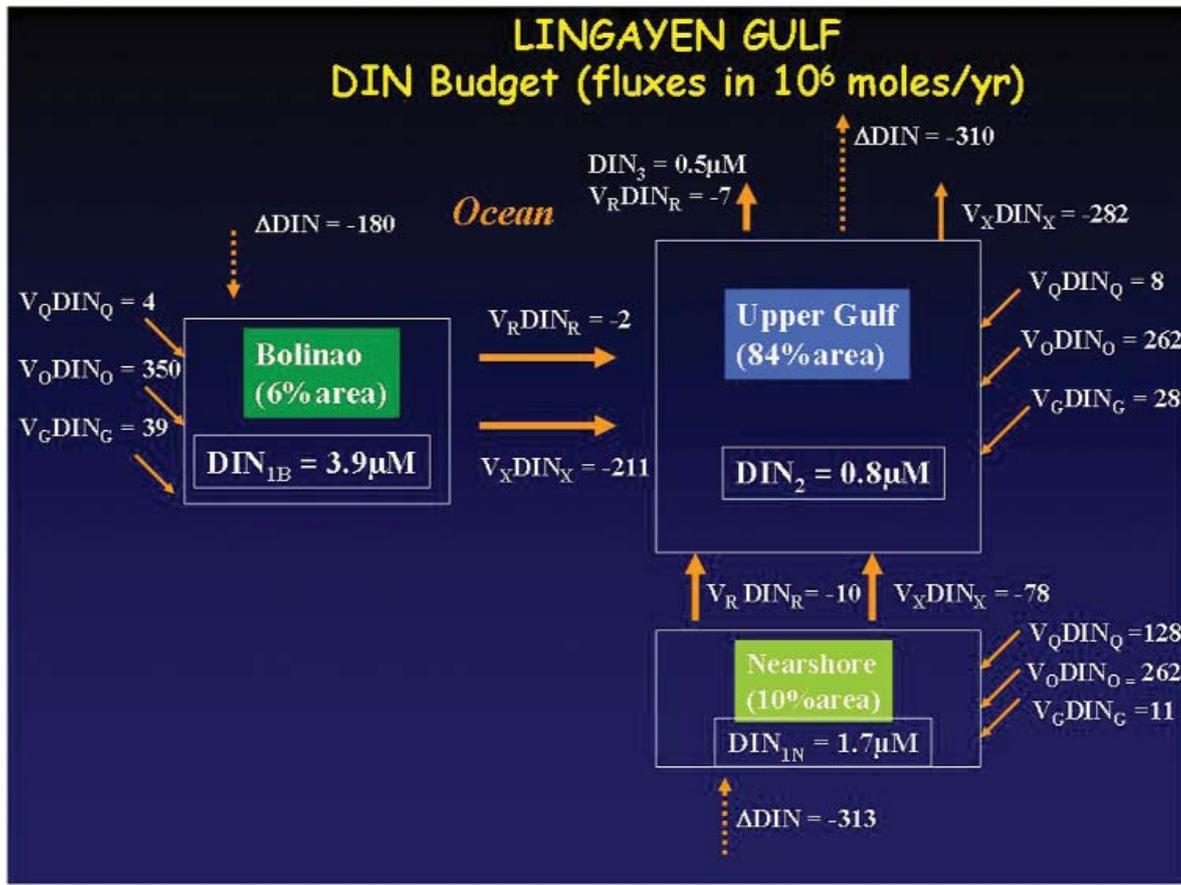
and some others were developed by the LaguNet group and can be downloaded from

<http://www.dsa.unipr.it/lagunet>

and from

[http://www.ecology.unibo.it/LOICZ-Calculator/loicz\\_calculator.htm](http://www.ecology.unibo.it/LOICZ-Calculator/loicz_calculator.htm).

Details of these tools are reported in the respective web-pages. A summary of the former LOICZ biogeochemical budgeting project supported by UNEP GEF has recently been prepared with a focus on management implications and is introduced later in this newsletter.



**Figure 3:** an example of a LOICZ biogeochemical flux box model showing calculations for dissolved inorganic nitrogen (DIN) fluxes in Lingayen Gulf (Philippines).

### What is the LOICZ Typology and where to find out more?

**Bob Buddemeier**

Kansas Geological Survey, University of Kansas, 1930 Constant Avenue, Lawrence, KS 66047 USA, e-mail: buddrw@ku.edu

Typology is the process of classifying objects – most often natural systems or environmental entities – according to their degree of similarity with regard to multiple variables. “A typology” is a specific classification system which can be used to infer other characteristics of the systems classified, to deduce controlling variables or forcing functions, or to facilitate prediction, planning, and management. The techniques used to develop a typology can range from qualitative and descriptive to formal quantitative statistical analysis, and even to modeling. The results are not unique or restrictive, but are dependent on the problem addressed and the data/information available; one of the strengths of the approach is the ability to develop and use multiple concurrent typologies to address different aspects of the systems.

Initial efforts at a global scale during the first decade of LOICZ led to the development of a modified half-degree

grid cell database (incl. LOICZ budget site data), which can be found at

[http://hercules.kgs.ku.edu/hexacoral/envirodata/hex\\_modfilt\\_firststep3dev1.cfm](http://hercules.kgs.ku.edu/hexacoral/envirodata/hex_modfilt_firststep3dev1.cfm).

Also developed were two successive generations of geospatial clustering tools, WebLOICZView

<http://palanir.swarthmore.edu/loicz> and DISCO

<http://narya.engin.swarthmore.edu/disco>.

The typology approach has been adopted by many organizations for a variety of purposes, as a literature or internet search will reveal. Selected links and literature items are accessible at

<http://geoportal.kgs.ku.edu/estuary/resources.cfm>

which is a component of two websites supporting the US National Estuarine Eutrophication Assessment

<http://ian.umces.edu/nea/>

and

<http://geoportal.kgs.ku.edu/estuary/>.

### What is the ASSETS Eutrophication Screening Model and where to find out more?

<sup>1</sup>Alice Newton, <sup>2</sup>Joao Gomes Ferreira and <sup>3</sup>Suzanne Bricker

<sup>1</sup>Faculty of Science and Technology, University of Algarve, Campus de Gambelas, 8000-062 Faro, Portugal, e-mail: Anewton@ualg.pt

<sup>2</sup>IMAR - Centro de Modelação Ecológica, Dept. Ciências e Engenharia do Ambiente, Faculdade de Ciências e Tecnologia, Quinta da Torre, 2829-516 Monte de Caparica, Portugal, e-mail: joao@hoomi.com

<sup>3</sup>Program Manager: National Estuarine Eutrophication Assessment, National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, 1305 East West Highway, Floor 9, SSMC-IV, N/SCI-1, Silver Spring, MD 20910, e-mail: Suzanne.Bricker@noaa.gov

ASSETS is a Eutrophication screening model built in co-operation between NOAA's National Centers for Coastal Ocean Science <http://www.nccos.noaa.gov/> and IMAR, the Portuguese Institute of Marine Research, <http://www.imar.pt/>.

ASSETS stands for Assessment of Estuarine Trophic Status, and builds on the U.S. National Estuarine Eutrophication Assessment (NEEA) developed by NOAA. ASSETS is a highly aggregated model for eutrophication assessment, and has been applied in many parts of the world including the USA, Europe and China. It is based on a PSR framework, and has been proposed as a methodology compliant with the EU Water Framework Directive, for the evaluation of Environmental Quality Standards (EQS).

With adaptations for more localised use at the aquaculture farm scale, ASSETS is a potentially valuable tool for the assessment of the interactions between eutrophication and aquaculture and for the valuation of nitrogen trading. The model has been extensively tested, and is a potentially valuable tool for informing an ecosystem approach to sustainable aquaculture development (<http://www.eutro.org>). The next newsletter will feature the ASSETS approach in an extended scientific article.

### Sub-aerially exposed continental shelves since the Middle Pleistocene climatic transition INQUA/IGCP 464 field meeting, 13–18 August 2006, Exmouth, WA, Australia

<sup>1</sup>Wyss Yim, <sup>2</sup>Lindsay Collins

<sup>1</sup>Department of Earth Sciences, The University of Hong Kong, Pokfulam Road, Hong Kong SAR, China, e-mail: wwsyim@hku.hk

<sup>2</sup>Applied Sedimentology and Marine Geoscience Group, Department of Applied Geology, Curtin University of Technology, GPO Box U1987, Perth 6845 Western Australia

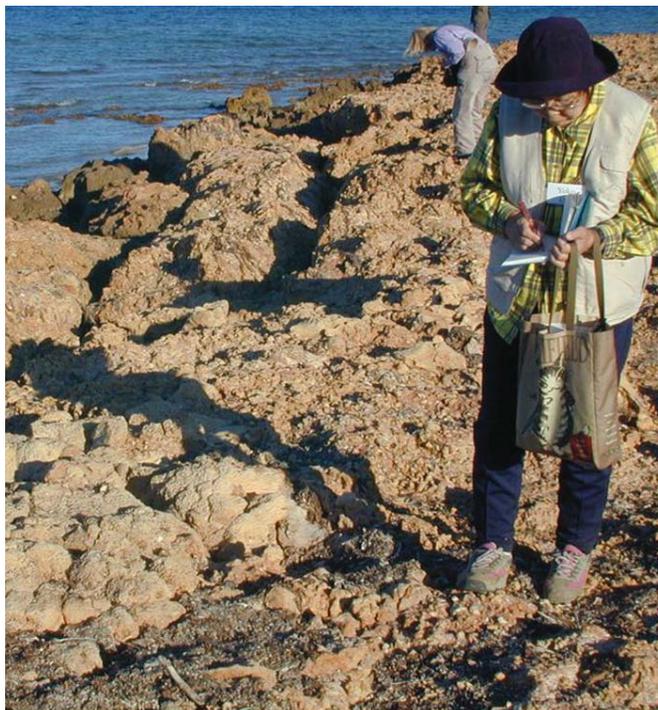
This field meeting, held in the Cape Range region and Ningaloo Reef, northwest Australia was attended by 25 participants from 7 countries including Australia,

Canada, China, Japan, Italy, Sri Lanka and USA. It was the second year meeting of INQUA project 0419 and the extension year meeting of IGCP 464 Continental shelves during the last glacial cycle. The main focus is on the evolution of Tertiary to Quaternary carbonate shelves and to examine their role in the global carbon cycle when they became sub-aerially exposed during glacial periods in the Quaternary.

Karstification and/or soil development was identified on the sub-aerially exposed continental shelf of Western Australia where the windier conditions have led to the formation of aeolianites. In contrast to the glacial periods, marine terraces were formed during the interglacial periods. A total of five marine terraces including the present (Holocene/MIS 1), Tantabiddi (MIS 5e), Jurabi (MIS 7?), Milyering (MIS 9?) and Muiron (MIS 11?) can be identified. (*MIS stands for Marine Isotope Stage – from oxygen isotope measurements of forams*)

Scientific presentations (oral and poster) covered various aspects on the Western Australian coastal region, Antarctic ice core chemistry, human migration, Quaternary climates and sea levels, karstification, shelf and deltaic sediments, tectonics and geochronology.

The project members are planning to present highlights of results in 2007 at the 17<sup>th</sup> INQUA Congress in Cairns. New members are welcome and should contact Wyss Yim.



**Figure 1:** Prof. Yoko Ota note taking on the MIS 5e marine terrace cut into older alluvial fan deposits, Pebble Beach, North West Cape, Western Australia.

## Global Coastal Changes and Coastal Zone Management

Joint session of LOICZ and CMRC Cork, Ireland, held as part of the international summer school on Diversity of Coastal Habitats, Sylt 13.09.2006

Maike Paul and Götz Flöser

Institute for Coastal Research, GKSS Research Centre, Max Planck Strasse 1, 21502 Geesthacht, Germany, e-mail: maike.paul@loicz.org, e-mail: goetz.floeser@gkss.de

From 6. to 19. September 2006, a summer school on Diversity of Coastal Habitats was held on the German islands Sylt and Helgoland. It was jointly organised by the Alfred-Wegener-Institute for Polar and Marine research (AWI), GKSS, the Institute for Baltic Sea Research (IOW) and the University of Gdansk. LOICZ introduced the 16 participants from 11 countries to Integrated Coastal Zone Management (ICZM), and Maike Paul from the LOICZ IPO and Valerie Cummins (CMRC, Cork) representing the LOICZ affiliated project COREPOINT held a morning session on ICZM and the role of scientific information in the management process.

Following a brief introduction to the terminology, the basic principles and needs of ICZM the participants, who mainly had a background in Biology, learned about stakeholder participation as one tool of ICZM. In an interactive role play they were asked to take on different stakeholder positions and to defend and promote their position. The role play was based on the real scenario of the Corrib Gas field case off Western Ireland. Here a high pressure undersea gas pipeline is being planned which will go through a special area of conservation according to the Habitat Directive and on land it will be located in the direct vicinity of people's homes.



**Figure 1:** The "private sector (Investor)" group enthusiastically presents the case of the underwater gas pipeline to the multi stakeholder audience.

In groups of 3-4 the participants identified themselves with their roles quickly and developed arguments for their positions that were presented in form of a fictitious public hearing. During the plenary discussion it became evident how difficult it is to argue against feelings like fear and how important a serious appearance is. Furthermore the role play made clear how essential good quality data and hence the role of science for such a planning process is.

The challenge is to inform a process which is trying to satisfy a so called triple bottom line approach for sustainable development. This means to balance between ecological, economic and social quality and development targets and in doing so to bridge between the different competing interests and cultural backgrounds and expectations of the parties involved. In the end, a variety of management options emerged. This was in some way even surprising since in this case participation was introduced rather reactively. Major decisions in favour of the project had already been made elsewhere on the political level. They were thoroughly discussed and there was consensus in the group about the outstanding significance for proactive planning and early stakeholder involvement as opposed to the example used here.



**Figure 2:** "Environmentalists" make their case of serious concern regarding conservational values of the affected off and onshore ecosystems.

All in all it was a very lively and productive session and the students used the afternoon field trip to detect management needs and dilemmas on the island of Sylt and hence transferred some of their new impressions and knowledge they gained in the morning.

## LOICZ booth at the GKSS Open Day – painted visions of the coast

# View upon the coast

Painting activity at  
GKSS open day, 26th  
August 2006



During the open day at GKSS, which in total saw more than 6000 visitors, the LOICZ booth invited to active participation. Young and old visitors were asked to paint their view upon the coast. On large sheets of paper collective paintings were generated. And thanks to Grandpa's support even the smallest guests showed great enthusiasm.

Hester, Hartwig and Martin from the LOICZ Team had lots of fun during the day and would like to thank Luisa and Linus for their great help and all visitors for taking part.

### The following „LOICZ youngsters“ joined in:

Babett Funk, Christiane Hartkopp, Christoph Howe, Cora-Katja Kerkommer, Felix Howe, Finja-Marie Urbschat, Franklin, Hendrik Wedderien, Janne Rottluff, Jonas Stapelfeldt, Kai-Peter Grasse, Katharina Schardt, Katrin Ganzow, Linus Kremer, Lisa Krüger, Luisa Kremer, Maik Döhring, Marie-Charlot Gerau, Markus Hartkopp, Markus Schardt, Moos Peereboom, Moritz Gerau, Odett Funk, Ole Kröger, Raphael Funk, Sarah Henning, Sarah Schmidt, Sem Peereboom, Svenja Roering, Swantje Fuhr Ken, Timo Schmeling, Tobias Döhring, Tordis Kindt





### The backbone of LOICZ: affiliated projects

LOICZ has a mandate to address key issues of coastal change and use in the context of scenarios of future human activity and environmental change. LOICZ endorses and seeks to support both fundamental coastal zone research and research that synthesises and up-scales results for dissemination within the scientific community, and outreach to policy makers and the public.

This research is partly carried out by groups of scientists, aided and supported by the LOICZ IPO, Regional Nodes and/or SSC, with funds that LOICZ has secured from external funding agencies. Another important part of the LOICZ project is carried out by researchers who affiliate their projects to LOICZ thereby becoming part of the global network of LOICZ. These projects build the backbone for up- and down-scaling of LOICZ results and the LOICZ synthesis. LOICZ has recently restructured the affiliation process so that applications for affiliation will be reviewed by the IPO and the coordinator of the theme/topic they are contributing to most. This new procedure will allow LOICZ to maintain an up-to-date record of global research activity as relates to the LOICZ Science Plan as well as ensure that affiliated projects are given opportunity to fully participate in LOICZ activities such as workshops and joint projects.

LOICZ provides a forum to assimilate, integrate and synthesise the outputs of affiliated projects. Additionally, it provides an opportunity to communicate and disseminate these outputs making them available not only to other scientists, but also the public, decision-makers and managers. Information on affiliated projects is held on a central database that will in the near future be made available on-line so that basic information and regular updates are available to the wider community as well as to LOICZ for its own reporting requirements.

An essential element that applies for all LOICZ interdisciplinary studies within and beyond the project is data sharing and exchange. To facilitate this exchange LOICZ has developed a Data Policy to help affiliated projects and LOICZ to fully benefit from each other. Both documents, the Terms of Reference for affiliated activities and the Data Policy, can be found on the LOICZ website.

### Call for research proposals concerned with Land-Ocean Interactions in the Coastal Zone

As described earlier in this issue, LOICZ has developed three key topics that will form the focus of research interest in the coming years. Within all three topics, LOICZ seeks to expand its network of scientists by endorsing research activities concerned with any of these 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 projects.** As well as fundamental science projects, we also seek projects that have a multidisciplinary perspective, especially combining natural and social sciences. Projects can have global, regional or local scales and be focussed on coastal sciences and/or coastal management. Projects that collaborate with other Earth System Science Partnership (ESSP) projects, especially with other Core Projects of IHDP and IGBP, are sought in particular, as well as projects that synthesise and analyse research outcomes already available or involve dissemination and outreach that will lead to better public knowledge. Examples of projects already affiliated to LOICZ can be found on the LOICZ website under Projects.

Although LOICZ cannot offer funding to affiliated projects, its endorsement provides the following benefits:

- support in proposing for funding;
- promotion of the project and associated activities, its contributing team, outputs and outcomes through the LOICZ website and/or newsletter;
- contribution to workshops, conferences and meetings organised by LOICZ and hence establish linkages to other projects operating in similar fields and/or addressing similar issues; and
- access to a wide circle of information related to funding and the science community that is available through the LOICZ database.

Researchers whose work fits into this LOICZ portfolio are encouraged to submit proposals to the LOICZ IPO as soon as possible. The required form and additional information can be obtained from the LOICZ website or via contacting the LOICZ IPO.

## IPO Notes

### IPO staff changes

Since June 2006 the IPO has the pleasure to have Jian Su as an intern from China in the team.

Jian Su aims to calculate the water and nutrient budgets in Ria Formosa lagoon with respect to eutrophication problems. In this investigation he is using the LOICZ biogeochemical budget method and database. Jian Su participated in the ERASMUS MUNDUS – Water and Coastal Management Masters Programme. He first followed lectures at the University of Bergen, in the main subjects Integrated Coastal Zone Management, Water History and Nature of Water. After finishing all the modules, he began to study coastal management of a lagoon in the south of Portugal.

Jian Su is a post-doc from the Ocean University of China. He received the "He Congben Award", (named by the father of Oceanography in China), for the excellence of his graduate work. His PhD focused on cross-front water exchange in the shelf ocean of the South China Sea and Yellow Sea.



### Hester Whyte leaves the IPO – Parting is such sweet sorrow

After having worked at the LOICZ IPO for almost 6 years I am leaving. I would like to take this opportunity to say goodbye to the people I have come across, live as well as via e-mail, during my time in the IPO. I also would like to say thanks to the LOICZ SSC, current and past members, as well as the wider LOICZ community who I've had the pleasure to work and interact with. I wish everyone success in the future and hope that the new faces that will become part of the IPO will enjoy working for the LOICZ project as much as I have. To my colleagues in the IPO I just want to say I will miss you. It's been a pleasure and sometimes a challenge working with you and I wish you all the best now and for the future. My plans & future are pretty much unknown at the moment but I hope



to find a job equally challenging and interesting as working for the LOICZ project office. It's been an experience and I will be taking home some great memories. Cheers & doe!

Hester.

### A warm goodbye from the IPO and SSC

We all sincerely regret Hester's departure. We will not only lose a great colleague but also an inspiring team member who through her optimistic and innovative thinking has helped LOICZ and us as a team a lot in passing various "mountains". Without her the transition of the last few years would not have been as smooth as it finally was. However, Hester also was a good friend to all of us as well as to the outside LOICZ community. This is something we all hope will not come to an end. The IPO and SSC wish Hester a bright and fulfilling future and we hope that in one way or the other we will stay in touch.

## What's on the wwwweb

**IGOS Coastal Theme Report** is available for downloading at:

[www.igospartners.org/docs/theme\\_reports/IGOS%20COASTAL%20REPORT%20midrez.pdf](http://www.igospartners.org/docs/theme_reports/IGOS%20COASTAL%20REPORT%20midrez.pdf)

**School on coastal dynamics modelling.**

More information at:

<http://lseeet.univ-tln.fr/ecoleete/ecole25eng.html>

**The East Asian Seas (EAS) Congress 2006:**

[http://pemsea.org/eascongress/participation\\_prereg.htm](http://pemsea.org/eascongress/participation_prereg.htm)

**The ACCCA project website** is now on-line:

[www.acccaproject.org](http://www.acccaproject.org).

Please visit the site to learn about the ACCCA project.

**Newly revamped UNEP/GPA website:**

[www.gpa.unep.org/](http://www.gpa.unep.org/)

Find a wealth of information about the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities including: latest information and news about the GPA Programmes, advanced search feature and a documents library.

**The Researcher's Mobility Portal:**

<http://europa.eu.int/eracareers/>

**DIVERSITAS Science Plan and Implementation Strategy:**

[www.diversitas-international.org](http://www.diversitas-international.org)

**Programme ESSP Congress**, Beijing, 09–12 November 2006, and **2<sup>nd</sup> International Young Scientists Conference** (START) 7–8 November:

<http://www.essp.org/ESSP2006/index.html>



## Publications

### **A Guide to the Management of Freshwater Inflows to Estuaries.**

The guide is a tool to further the integration of the planning and science of Integrated Water Resources Management (IWRM) with the planning and science of Integrated Coastal Management (ICM) jointly issued by Nature Conservancy, US AID and Coastal Resources Centre CRC, Univ. Rhode Island.

(The completed Methods Guide will be available November 2006. To order a copy please contact Diedre Paterno-Pai, The Nature Conservancy [dpaterno-pai@tnc.org](mailto:dpaterno-pai@tnc.org).)

A PDF version will be available online at [nature.org/freshwaters](http://nature.org/freshwaters)

For information on this and other projects related to "Impacts of altered freshwater flows to estuaries", see [www.crc.uri.edu](http://www.crc.uri.edu)

### **Ecosystem Based Management: Markers for Assessing Progress**

This publication should be considered a practical tool for assessing progress in integrated coastal and river basin management. It highlights the needs and benefits of integrated management, while at the same time providing guidance in establishing the management link.

The paper offers a framework for disaggregating the goal of sustainable development into a sequence of tangible levels of achievement. The focus is on outcomes rather than management processes. Sets of markers or indicators are offered that can be used to assess progress in integrated management of river basins, coasts or large marine ecosystems and in programmes that link across these systems.

UNEP/GPA 2006 – ISBN 92-807-2707-9

The Hague, The Netherlands, [gpa@unep.nl](mailto:gpa@unep.nl), [www.gpa.unep.org](http://www.gpa.unep.org)

### **A Handbook on the Governance and Socioeconomics of Large Marine Ecosystems**

(University of Rhode Island 2006) – WWW: <http://www.crc.uri.edu/>

The primary purpose of this Handbook written by Stephen B. Olsen, Jon G. Sutinen, Lawrence Juda, Timothy M. Hennessey, Thomas A. Grigalunas, is to serve as a practical guide to innovators of governance and socioeconomics in Large Marine Ecosystem (LME) projects. Based on a Global Environmental Facility IW:LEARN-sponsored workshop for 11 LME programs, the Handbook is designed to be used in short courses and workshops on governance and socioeconomics science to support the ecosystem approach to marine resources management. Information on the workshop can be found at [http://www.iwlearn.net/abt\\_iwlearn/pns/learning/b2-2lme](http://www.iwlearn.net/abt_iwlearn/pns/learning/b2-2lme)

### **Marine Eutrophication in Perspective – On the Relevance of Ecology for Environmental Policy**

Jong, Folkert de, 2006, XII, 336 p., 20 illus., Hardcover, ISBN: 3-540-33647-8, Springer – Berlin, Heidelberg, New York.

Is ecological knowledge relevant for environmental policy and if so, to what extent and in what way? These are some of the critical questions addressed in this book. The book critically reflects the role of scientists and scientific information as well as civil servants in the formulation of the political decision to reduce nitrogen and phosphorus inputs into the North Sea. This decision was the response on several hypoxia events in the 1980ies and approved by the North Sea states.

### **The identification of 100 ecological questions of high policy relevance in the UK**

William J. Sutherland et al., 2006, Journal of Applied Ecology 43, 617-627 (© 2006 The Authors. Journal compilation, © 2006 British Ecological Society)

This list of questions which has been through a process of intensive discussion by hundreds of scientific experts will potentially nourish any debate on ecosystem approaches in coastal zones and sustainable use. It reflects critical issues at the interface between science and policy.

### **In the same context the NEW UNEP/GEF-LOICZ Publication: The role of the coastal ocean in the disturbed and undisturbed nutrient and carbon cycles – A management perspective**

For coastal managers presentation of information in a format they can use is of crucial importance. Information needs to be assimilated and synthesised from original scientific data. The Global Environment Facility of the United Nations Environmental Programme funded the project – "The role of the disturbed and undisturbed nutrient and carbon cycles" – which was implemented by the Land-Ocean Interactions in the Coastal Zone project (LOICZ).

The project outcomes show the link between human dimensions and coastal nutrient dynamics and gives direction for future studies.

This publication translates the scientific findings from the research carried out in the context of this project into their management implications.

This publication is available as a PDF on the LOICZ website under Products

Optional: Those interested can request a hard copy version from the IPO (available Nov. 2006)

## Have you seen

### **Upcoming Meetings with LOICZ sessions:**

#### **Estuarine Research Federation meeting Providence, Rhode Island, USA, November 4–8, 2007**

(More info about the conference can be found at the ERF website, [www.erf.org](http://www.erf.org))

Title of Session: **Nutrient budgets for coastal waters: methodologies and applications**

LOICZ session specifically targeted at nutrient budgets of coastal systems

Organizer/session leader: Dennis Swaney

Type: Scientific session, combined oral and poster

Summary: Nutrient budgets have been fundamental tools for the analysis of estuarine ecosystem dynamics for many years. At least one major international project, Land Ocean Interactions in the Coastal Zone (LOICZ) has used a budget approach to infer the global distribution and regional variation of coastal ecosystem metabolism based on analysis of N & P budgets of individual coastal ecosystems around the world. Other methodological approaches have been used by estuarine scientists for a variety of purposes. Application of the budget approach to address coastal ecosystem management has been less common. This session aims to bring together scientists and managers to report on current approaches to nutrient budgeting, new methodologies, and applications to management questions.

Potential Participants: Broad participation is expected, including members of the LOICZ community and other interested scientists and managers

Title of Session: **Watershed-based nutrient accounting: coupling catchments to coastal waters**

LOICZ session is targeted at estimating nutrient fluxes to the coast from watersheds, and specifically at hydrological modelling and nutrient accounting in watersheds

Organizer/session leader(s): Bob Howarth and Dennis Swaney

Type: Scientific session, combined oral and poster

Summary: Over the last 10 years, relatively simple methods have been developed for relating nutrient sources in watersheds to their delivery to coastal waters. Several lines of research are converging, including the accounting methodology for nitrogen inputs to watersheds developed under the Scope Nitrogen Program (cf. Howarth et al., 1996; Boyer et al., 2002) and the budgeting methodology of the Mid-Atlantic Regional Water Program (<http://www.agnr.umd.edu/users/waterqual/>). These and similar accounting approaches, together with large catchment models, (e.g., Johnes and Butterfield, 2002; Billen and Garnier, 2000; Garnier et al., 2000), and spatially-referenced and other regression models (e.g., Alexander et al., 2001; McIsaac et al., 2001; Turner et al., 2001; Smith et al., 2003; Howarth et al., 2006) improve our understanding of nutrient loading and how climate and land use change affect the resulting loads to coastal waters. Presentations in this session will report on progress to date on methodologies currently under development, and recent applications of such approaches.

Potential Participants: Researchers involved in nutrient accounting and coastal catchment modelling, as well as other interested scientists and managers

### Update us so we can update you

LOICZ INPRINT informs you about the LOICZ Project and its activities. But LOICZ has access to much more information and wants to make this information available to you as effectively as possible. To be able to provide you with LOICZ information that fits your expertise and interests most, we need input from your side telling us what your interests in LOICZ are and how we can contact you.

Please complete the following form where applicable and return by fax, post or e-mail to the LOICZ IPO.  
(An electronic version of this form can also be found on [www.loicz.org](http://www.loicz.org) under Newsletter.)

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Please indicate which LOICZ theme(s)\* you are contributing to:

- Theme 1   
  Theme 2   
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  Theme 4   
  Theme 5

Please indicate which LOICZ key topic(s)\*\* you are interested in:

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\* More detailed information on the LOICZ Research Themes is available in the Science Plan on the LOICZ website ([www.loicz.org](http://www.loicz.org))

\*\* Detailed descriptions of the topics are featured in first issue of INPRINT and on the website

**Please return this form by:**

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- fax to +49(0)4152 87 2040
- mail to LOICZ IPO – GKSS Research Centre  
Institute for Coastal Research  
Max-Planck-Strasse 1  
D-21502 Geesthacht, Germany





## Calendar

*Call for Papers and Announcement:*

### **Remote Sensing of the Marine Environment (AE103)**

Part of SPIE's Fifth International Symposium on Asia-Pacific Remote Sensing, November 13–17, 2006, Marriott Hotel, Panaji, Goa, India  
Conference web site:  
<http://spie.org/conferences/calls/06/ae/>

### **SPICE/LOICZ/SEACORM South-East Asia Coastal Governance and Management Forum:**

Science Meets Policy for Coastal Management and Capacity Building, 14th–16th November 2006, Bali, Indonesia

*Call for papers:*

### **2006 Berlin Conference on the Human Dimensions of Global Environmental Change:**

Resource Policies: Effectiveness, Efficiency, and Equity. November 17–18, 2006, Berlin, Germany.  
<http://web.fu-berlin.de/ffu/akumwelt/bc2006>

### **Sediment key-issues between the river and the sea.**

**SedNet Conference** on 23–24 November 2006, Hosted by UNESCO at the Palazzo Zorzi in Venice, Italy  
<http://www.sednet.org>

### **The International Conference The Humboldt Current System: Climate, ocean dynamics, ecosystem processes, and fisheries**

organized by IMARPE (Peru), IRD (France) with the technical support of FAO and sponsored by CNES (France), CPPS, GLOBEC, ICES/CIEM, IMBER, NASA (USA), PICES, SIMRAD, will be held in Lima (Peru), November 27 to December 1, 2006.  
Contact: [hcsconference@amauta.rcp.net.pe](mailto:hcsconference@amauta.rcp.net.pe) or <http://irdal.ird.fr/hcs-conference.imarpe.fao.ird.php3>

### **Arctic Frontiers Science conference: Balancing Human Use and Ecosystem Protection**

Arctic Marine Ecosystem Research Network (ARCTOS) Ocean. January 21–26, 2007, Tromso, Norway.  
[www.arctic-frontiers.com](http://www.arctic-frontiers.com)

**ERF 2007**, November 4–8, 2007, in Providence, Rhode Island, USA. The Estuarine Research Federation is currently accepting proposals for scientific sessions and workshops for this meeting.

<http://www.erf.org/newsletter/Sp06-ERF07-CFS.html> (details for LOICZ see also under – have you seen)

For more meetings and regular updates please also visit the LOICZ website [www.loicz.org](http://www.loicz.org)



### 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.

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### 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 from the LOICZ IPO.

### Get involved

If you wish to contribute to LOICZ INPRINT please send an e-mail to: [loicz.ipo@loicz.org](mailto:loicz.ipo@loicz.org) and/or visit the LOICZ website [www.loicz.org](http://www.loicz.org) for article requirements.

If you have a project you would like to affiliate to LOICZ please go to [www.loicz.org](http://www.loicz.org) and click on projects for detailed information.

