

LOICZ NEWSLETTER

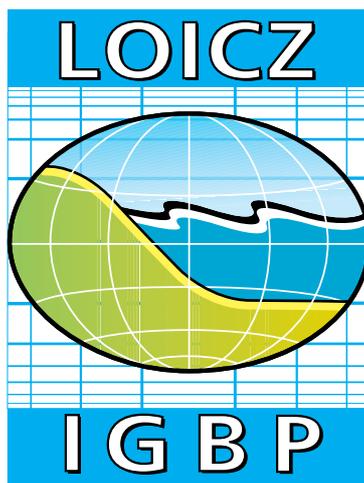
Catchment-Coastal Zone interactions: LOICZ Basins and EuroCat

Wim Salomons, Wietze Liese, Horst Behrendt and Hartwig Kremer

“Basins” is one of the LOICZ core projects bridging into the new decade of LOICZ research. Its aim is to relate observed coastal impact back to catchment activities. Acknowledging that to remedy adverse coastal change, solutions often have to be found and implemented at the catchment level, “Basins” treats the catchment/coast as one continued system. In addition to direct human activities at the catchment level further pressures originate from activities at the global scale resulting in climate change, sea level rise or new population dynamics and trade patterns. For the past four years, interdisciplinary teams of scientists used the Driver-Pressure-State-Impact Response or DPSIR scheme (Turner et al. 1998), as a standardised frame for site assessment of coastal impacts and evaluation combined with the water-cascade system approach. The following issues were addressed:

- Material flow of water, sediments, nutrients and contaminants (past, current and future trends);
- Socio-economic drivers which have changed or will change these material flows;
- Indicators for coastal systems impact, and to derive from them
- a “critical load” for the coastal zone and “critical thresholds” for coastal system functioning.

To date close to 100 catchment-coastal sea systems have been analysed and scaled up coherently via sub-regions to full continental scales. Results are published covering Africa, South America, the Caribbean, Oceania, Asia and (soon to come) the Russian Arctic (Lacerda et al., 2002; Hong et al., 2002;



This is the twenty sixth newsletter of the Land Ocean Interactions in the Coastal Zone (LOICZ) International Project of the IGBP. It is produced quarterly to provide news and information regarding LOICZ activities

Arthurton et al., 2002; Kjerve et al., 2002; Morcom et al., 2002, Gordeev et al. in prep). Earlier summaries of activities can be found in the Newsletters 21 - 23. Currently two major studies are extending the framework. These are AfriCat (see below) and the large EU funded EuroCat (part of the ELOISE cluster) encompassing a variety of land-based issues affecting European catchments and their associated coastal zones.

LOICZ Basins stretches across a multiplicity of scales from global issues on the one hand to those relevant for coastal zone management on the other. Figure 1 locates the various projects and some of their key users in this spectrum of scales. The individual catchment-coast studies are of direct benefit to local and regional environmental management and policy, e.g., the EU Water Framework Directive. Among the main clients for the up scaling efforts are international bodies like

UNEP, UNESCO and the EU (e.g., its Water Initiative).

The EU funded EuroCat project runs for a three-year period until 2004 and involves more than 20 institutes and 60+ scientists. Europe is an ideal place for comparative studies. It has a wide range of climatic conditions influencing catchment hydrology and the coast. Economic conditions over the past two decades have undergone considerable changes drawing a new agricultural and industrial landscape. This is of particular relevance for the Baltic and the Black Sea.

In addition implementation of environmental policy and law in EU countries have resulted in a clean up of rivers. Particularly point sources have drastically reduced their inputs. Hence, research in several regional EuroCat studies also focuses on diffuse sources.

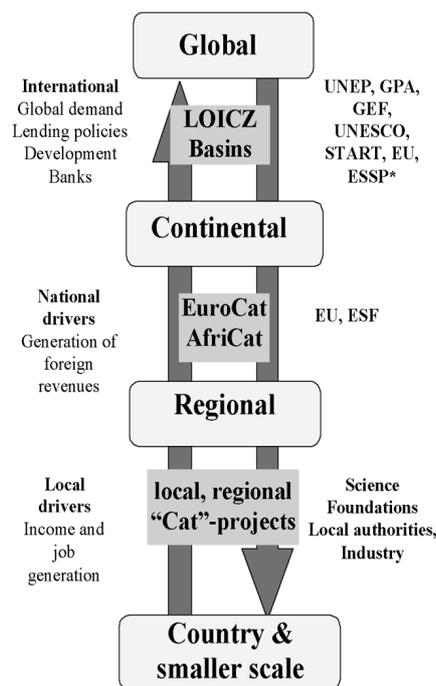


Figure 1. Scales, drivers and potential users at which the various projects in LOICZ Basins operate (* Earth System Science Partnership of IGBP, IHDP, WCRP and DIVERSITAS).

The study originally comprised six catchments draining to the North and Baltic Sea and the Mediterranean. In early 2003 two new catchments were added one of which draining to the Black Sea and with a history of changing political and economic influences and another one located in Slovenia, representing mercury pollution issues originating from past mining activities. Associated are the AFICO project in France (comprising the Seine, Loire, Garonne, Rhône at upper estuarine limit, and the middle Rhine at the French/German border) and the NATO/CCMS Pilot Study “Modeling Nutrient Loads and Response in River and Estuary Systems”. This latter one includes rivers such as the Nemunas (transboundary, Lithuania, Belarus, Poland, Russia) and Daugava (transboundary, Russia, Belarus and Latvia). However, also external projects such as “daNUbs” investigating loads and change in the Danube River and the western part of Black Sea has similar objectives and to a certain extent follows a comparable approach. For a European synthesis in the frame of ELOISE all related elements are expected to provide relevant results.

All regional EuroCat studies follow the DPSIR approach together with the critical load concept in order to allow for the detection of regional differences in the relationship between the drivers, fluxes and biophysical properties of the catchment-coast continuum. The primary focus is on nutrient fluxes, given that all regional case studies are supported by existing and sufficient data sets. Furthermore, nutrients and their effects are an important scientific and socio-political issue at the catchment level and for coastal seas. However, each selected catchment also has its unique characteristics of drivers and coastal issues (Table 1).

Besides nutrients also contaminants are addressed in some of the catchments. Despite a downward trend of most fluxes of toxic substances, in particular heavy metals, in many estuaries and coastal areas in Western Europe the legacy of past industrialisation and absence of regulations on emissions is still present in the sediments. In the Rhine this sediment problem is manifested in the maintenance dredging of harbour sediments contaminated by diffuse sources at the catchment level. In the Vistula catchment large amounts of contaminants are still “stored” and are likely to ultimately end up in the coastal zone. Future industrial

Table 1: Characteristics of the river catchments and primary issues, * Former Yugoslavian Republic of Macedonia

	Characteristics	Primary Issue
Vistula catchment	<ul style="list-style-type: none"> Central to market economy (less rapid as compared to the Elbe) changing industrial and agricultural landscape 	<ul style="list-style-type: none"> Nutrients and the ecosystem. Toxic substances in sediments (industrial legacy)
Elbe catchment	<ul style="list-style-type: none"> German reunification: relatively recent and rapid change in economic conditions in the catchment (central to market economy) – well documented; corresponding rather rapid change in fluxes to the coast; 	<ul style="list-style-type: none"> Nutrients affecting the coastal ecosystem
Rhine catchment	<ul style="list-style-type: none"> Well documented and implemented management plans (catchment level); analysis of past and present behaviour; 	<ul style="list-style-type: none"> Nutrients and the ecosystem. Toxic substances in dredged material
Humber catchment	<ul style="list-style-type: none"> Legacy of past industrialisation 	<ul style="list-style-type: none"> Toxic substances in in-situ sediments
Po catchment	<ul style="list-style-type: none"> Intensive agriculture – limited waste water treatment capacity 	<ul style="list-style-type: none"> Nutrients affecting coastal ecosystem functions and tourism
Idrija catchment	<ul style="list-style-type: none"> Legacy of past mining activity 	<ul style="list-style-type: none"> Mercury pollution affecting coastal ecosystem, fisheries and human health
Axios catchment	<ul style="list-style-type: none"> Complex drivers, agriculture and industry; changing economy in FYROM * (95% of the catchment). 	<ul style="list-style-type: none"> Nutrients, heavy metals, coastal system impact
Proviadijska catchment	<ul style="list-style-type: none"> Central to market economy (less rapid as compared to the Elbe) 	<ul style="list-style-type: none"> Nutrients, coastal ecosystem; legacy of past industrialisation and changing economy

development in the region will also potentially increase the accumulation and fluxes. Within EuroCat the problems these issues pose and their solutions are part of the Humber and Idrija studies.

As shown in Table 2 the changes of the nutrient yields, especially for phosphorus within the last 20 years are significant for both, the Rhine and the Elbe rivers. But decrease of nutrient emissions and related loads to the coastal sea (not calculated in table 2) is mostly due to the reduction of point discharges. Today the main sources of nutrient discharge follow diffuse pathways mainly nourished by agriculture (Figure 2).

This relation of diffuse and point sources applies even more so and also in

past times to the Vistula and other Eastern European rivers such as the Odra. Reasons can be found in different hydrological conditions, lower population density in the catchment and limited access to waste water treatment facilities, all of which result in a larger portion of nutrient input from diffuse sources. Not surprising that already at the beginning of the nineties the relative share entering these systems from diffuse sources compares with the scheme that currently applies to the Rhine and Elbe (Table 2, Figure 2.)

As a consequence of the huge agricultural pressure and limited water treatment the status of the specific nutrient loads of the Po into the Adriatic Sea is also clearly dominated by diffuse sources again

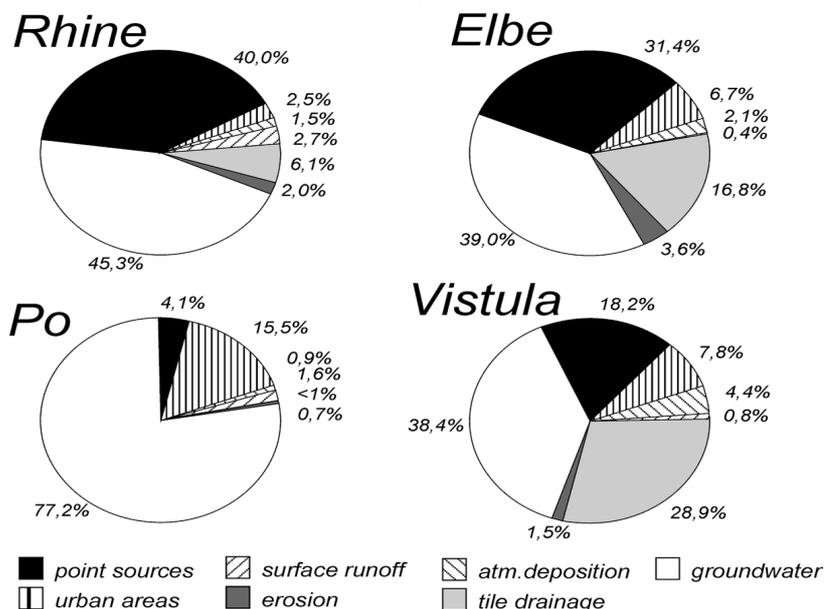


Figure 2: Sources of nitrogen emissions into 4 large European river basins in the period 1993-1997 (Rhine, Elbe) and 1991-1995 (Po, Vistula); (the high portion of groundwater-based input shown for the Po model is because no data on tile drainage were available)

Table 2: Calculated Nitrogen (N) and phosphorus (P) yields of selected European rivers at the first non estuarine station downstream; and relative portion of total N and P input from diffuse sources (partly preliminary MONERIS modelling results from EuroCat case studies – not be used without prior reference to: Dr. Horst Behrendt, e mail: behrendt@igb-berlin.de).

River	Period	Area	Water Discharge	specific TN-load (yield)	Portion of diffuse Sources	specific TP-load (yield)	Portion of diffuse Sources
		[km ²]	[l/(km ² ·s)]	[t/(km ² ·a)]	[%]	[t/(km ² ·a)]	[%]
Rhine*	83/87	159710	15.6	2.49	50.6	0.182	23.5
Rhine*	93/97	159710	14.5	1.58	59.8	0.075	49.7
Rhine*	98/00	159710	16.8	1.58	70.9	0.074	59.8
Po	91/95	73760	20.5	1.46	95.9	0.058	85.5
Elbe	83/87	134860	5.4	1.52	61.7	0.060	38.0
Elbe	93/97	134860	5.4	0.86	68.6	0.035	60.5
Elbe	98/00	134860	5.0	0.79	74.5	0.029	68.3
Vistula	91/95	190310	5.2	0.60	81.8	0.031	58.0
Odra	93/97	118580	4.7	0.59	63.6	0.038	37.9
Danube	98/00	802890	8.6	0.47	80.0	0.038	58.1

* Station Bimmen/Lobith at the German-Dutch Border

comparing to the status of the Elbe in the eighties (Table 2, Figure 2). However, concentrations of nutrients in the Po are 4 times lower than in the Elbe caused by its 4 times higher specific runoff.

Scenarios of future developments play an important role in the EuroCat project (for details please refer to Newsletter No. 23, for more details on other catchments see the EuroCat website). Consultation with users plays an important role in establishing these scenarios. The user interaction including institutions such as the HELCOM, OSPARCOM, and the EEA and of course LOICZ is formalised in the establishment of advisory boards for each regional study.

The EuroCat study will be finalised in 2004. It has shown to be a challenge for integration but this level of complexity also bears potential to serve as a valuable template for future European coastal and “water cascade” research. This research is expected to provide the sound scientific information needed to underpin the implementation of the Water Directive and to nourish the establishment of a coherent strategy for integrated coastal management. Natural and social scientists have to combine their models and findings but also members from the catchment and coastal science communities join their forces in regional teams.

References

Arthurton, R.S. et al. 2002: African Basins, LOICZ R & S No.25. ii + 344 pages, Texel, The Netherlands.

Hong, G.H. et al. 2002: East Asia Basins, LOICZ R & S No. 26. ii + 262 pages, Texel. The Netherlands

Kjerfve, B. et al (Caribbean); Morcom, N. et al. (Oceania) 2002: Caribbean Basins with a desktop study of Oceania Basins, LOICZ R & S No. 27. ii + 174 pages, Texel. The Netherlands.

Lacerda, L.D., et al. 2002: South American Basins, LOICZ R & S No. 21. ii + 212 pages, Texel. The Netherlands.

Turner, R. K. et al. 1998: Towards Integrated Modelling and Analysis in Coastal Zones, LOICZ R & S No. 11, iv + 122 pp, Texel. The Netherlands.

Related websites providing further articles, reports and working documents:

The LOICZ web-site:

(<http://www.nioz.nl/loicz/>)

The LOICZ Basins web-site:

(http://w3g.gkss.de/projects/loicz_basins/)

The EuroCat (ELOISE) project web-site:

(<http://www.iia-cnr.unical.it/EUROCAT/project.htm>)

The daNubs (ELOISE) project web-site:

(<http://danubs.tuwien.ac.at/>)

LOICZ START “AfriCat” foundation project – coastal impacts of damming in Africa

Russell Arthurton

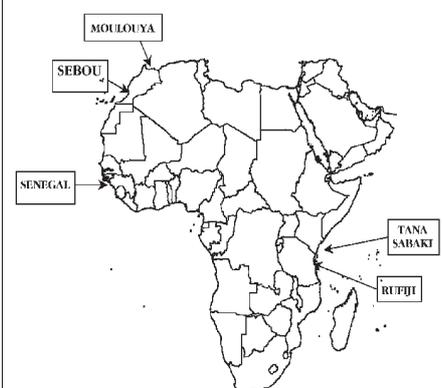
The LOICZ AfriBasins Workshops, held in Nairobi in 2000 and 2001, provided a ranked overview of African coastal issues and impacts, their driving forces

and pressures at catchment to regional scales, based on expert knowledge and judgement from the region (Arthurton et al., 2002). Apart from climate change, the principal internal drivers of environmental change within the African catchment-to-coast systems are agricultural development and urbanisation, and their associated activities – deforestation, industrialisation and in particular damming.

As a follow-up to AfriBasins, LOICZ-AfriCat, which is based partly on the EU/ELOISE - EuroCat design (see lead article), provides a framework for investigating in more detail the linkages between human activities in African catchments and their impacts at the coast. A foundation project for AfriCat, funded by START and entitled ‘*The coastal impact of water impoundment and abstraction in catchments, past, present and future*’, commenced in November, 2002.

Damming, water diversion and ground-water abstraction are practices that have increased significantly in Africa during the last 50 years, in response to development demands for agricultural irrigation, freshwater supply (particularly to fast-growing urban areas) and hydro-electric power (World Commission on Dams, 2000). This foundation project is assessing the past, present and future impacts of damming in four countries, Morocco, Senegal, Kenya and Tanzania. The selected catchments comprise:

- Sebou and Moulouya—the two largest rivers in Morocco—both of which have been dammed;
- Senegal—a large, transboundary West African river with a seasonal barrage on its lower course;
- Tana and Sabaki in Kenya, the former having been dammed and for which additional damming is planned;
- Rufiji in Tanzania, for which damming is planned.



While the catchments differ in the state and scale of their damming and in the nature of the impacts and issues at the coast, the project has adopted a standardised approach, placing a strong emphasis on human dimensions through consultation with catchment and coastal managers and stakeholders. A key element of the project is the assessment of the contributions that socio-economic and climate-related changes have made over the last 50 years, and are predicted to make over the next 50 years under a range of published scenarios (e.g., by the IPCC), to coastal state changes and their environmental and socio-economic impacts. In the long term the overarching aim of AfriCat is to improve the scientific basis for national, transnational and regional policy-making and management responses as they relate to catchment-to-coastal sea systems in Africa, in respect of not only damming but all human-activity and natural drivers. Operational links with EuroCat and new related research in Europe are anticipated to be value adding in the future of AfriCat.

The regional contacts for this AfriCat project are:

Morocco: Maria Snoussi,
snoussi@fsr.ac.ma,

Senegal: Alioune Kane,
akane@ucad.sn,

Kenya: Johnson Kitheka,
jkitheka@recoscix.org,

Tanzania: Yohanna Shaghude,
shaghude@ims.udsm.ac.tz

References

Arthurton, R.S. et al. 2002: LOICZ R & S No. 25: ii+344 pages, LOICZ, Texel, The Netherlands.

World Commission on Dams, 2000. Dams and Development – A New Framework for Decision-Making. The Report of the World Commission on Dams: xxxvii+404 pages, Earthscan Publications Ltd, London and Sterling, VA.

European Land Ocean Interaction Studies on the edge; taking stock of the “ELOISE approach” – Gdansk, 24-27 March 2003

Some 250 international and, multi-disciplinary scientists followed the invitation to the Technical University in the historical City of Gdansk, Poland.

The distillation of scientific findings from completed and ongoing ELOISE research activities (in total 60 projects since 1996) to underpin European decision making and management was a key objective of the meeting. Formulating the “Community added Value” needs to convert the rather fragmented and primarily natural science oriented, although high standard scientific outputs, into appropriate tools applicable for the multiple scales and institutional dimensions of coastal policy.

Grouped under six themes

- Catchment-coast interactions;
- Biodiversity and ecosystem functioning;
- Coastal morphology and global change;
- Valuing coastal systems;
- Tools, techniques and methodologies;
- Biogeochemical fluxes and cycling,

the most remarkable change as compared to earlier ELOISE conferences was a much more structured thinking that came across in most of the presentations and discussions. Likewise with LOICZ, the catchment – coast scale was guiding considerable parts of the scientific presentations covering biogeochemical and hydrological issues as much as institutional and people issues including economic fluxes and valuation efforts. Goods and services of complex coastal systems, their interplay with conservation aspects and biodiversity were addressed and the conference concluded in a vital discussion on future perspectives of European Coastal Research and its relevance in the field of Global Change and the Earth System as a whole.

The conference will be followed up and actually feed into three Dahlem type workshops under the aegis of the ELOISE secretariat aiming to synthesize existing ELOISE science under the overarching topics of:

- Demands at the European and global level (upscaling), Profs. Carlo Heip and Peter Herman, NIOO-CEMO, 07-10 May 2003;
- Integration into European Policy: Environmental Impact Assessment, Prof. Wim Salomons and Dr. Jan Vermaat, IVM-VU, 2-5 June;
- Developing coastal futures for Europe, Prof. Kerry Turner and Dr. Laure Ledoux, CSERGE, UEA, 2-5 June.

Undoubtedly this process will nourish the design process of a vision for the future of European Land Ocean Interaction Research even beyond the next

decade – something the representatives of the Commission clearly urged the ELOISE community to provide in the near future. Since this development parallels the design of a future science plan and implementation strategy for the second phase of LOICZ a close collaboration between the ELOISE and wider LOICZ community seems most recommendable. Further information about the conference including abstracts and the ELOISE newsletter can be found under <http://www.nilu.no/projects/eoise> or by contacting: Dr. Kevin Barrett, ELOISE Secretariat and Consortium., Centre for Ecological Economics, NILU, P.O. Box 100, 2027 KJELLER, Norway, Phone: +47 63898245 (direct), +47 63898000 (switch), Fax: +47 63898050, e-mail: kevin.barrett@nilu.no

APN/SASCOM/LOICZ Regional Workshop on ‘Material Fluxes to Coastal Zones in South Asia and their Impacts’, Negombo, Sri Lanka, 8-11 December, 2002

The Sri Lanka Association for the Advancement of Science (SLAAS) hosted a 3-day regional workshop on “Assessment of Material Fluxes to Coastal Zone in South Asia and their Impacts” from 8-11 December, 2002 in Negombo, Sri Lanka. Objectives were to: (1) review and analyse the findings of the related APN project, (2) compare results and present the LOICZ-type biogeochemical budgets for different sites, and (3) discuss key issues related to the origins of nutrient, sediment and carbon, quantification of fluxes to the coast and, environmental and socio-economic impacts, and their human dimensions. 48 experts including national and overseas resource persons and guests participated in this workshop. Following the inauguration by Mr T. Hewage, Secretary to the Ministry of Environment and Natural Resources of Sri Lanka twenty-six technical papers and 4 posters were presented. Individual country reports included discussions on gaps and potential fields for improvement such as the integration of research and management in the region. Specific attention was paid to future Sri Lankan coastal zone management initiatives and related regional programmes. This was put in the context of the current LOICZ

Synthesis and future plans for the next decade of LOICZ research and its implications for South Asia. The scientific program also addressed the remote forcing of estuarine circulation and provided an interactive session, introducing methods of flux calculations and biogeochemical budgeting. Where sufficient data was available participants calculated nutrients fluxes using the LOICZ model, while in other cases a ranking of impacts and priority issues was generated following loosely the LOICZ-Basins approach. A field trip highlighted the environmental issues of the wetlands and mangroves of the Negombo Lagoon.

An immediate outcome of the workshop is a collaboration of regional experts with LOICZ aiming to publish a set of selected papers on the biogeochemistry of South Asian Estuaries. As part of the LOICZ R&S series this will complement the global efforts of the related earlier UNEP/GEF project. The volume is currently in the review process. Publishing is foreseen in mid 2003. A second effort will be aimed to apply the LOICZ-Basins regional assessment and synthesis method to provide a state of the art overview of current scientific understanding of catchment-coast interaction. Focus will be on major, large, medium and also small-scale rivers (and islands) in South Asia. Starting as a desk study with support of LOICZ expertise the synthesis and conclusion of this analysis will likely be in the form of a regional South Asia Basins workshop. In principle, LOICZ in its second phase investigates further options to strengthen its regional activities and networking in South Asia.

The new OCEANS project – calling for LOICZ input and comments

Julie Hall

IGBP and SCOR are developing a new project on Ocean Biogeochemistry and Ecosystems Analysis (OCEANS). Its goal is to understand the sensitivity of the ocean to global change, focusing on biogeochemical cycles, marine food webs and their interactions in the context of the Earth System. It will seek a comprehensive understanding of the impacts of climate and anthropogenic forcing on food web dynamics (i.e., structure, function, diversity and

stability) and elemental cycling (i.e., biogeochemical pathways, transfers and cycling), including the impacts of underlying physical dynamics of the ocean. It will also strive for a mechanistic and predictive understanding of how these linked systems respond to global change resulting from climate modes (e.g., El Niño Southern Oscillation, North Atlantic Oscillation, etc.) and anthropogenic perturbations.

The new OCEANS project is being established as part of the second phase of IGBP, and will work closely and collaborate with existing projects such as Global Ocean Ecosystem Dynamics (GLOBEC), the second phase of Land-Ocean Interactions in the Coastal Zone (LOICZ), and the Surface Ocean – Lower Atmosphere Study (SOLAS). To develop the OCEANS Science Plan/Implementation Strategy, an open science conference was held in Paris 7-10 January 2003. 370 participants, from 36 countries provided their views and commentary assisting in the development of the science focus of the new project. Abstracts of the 200 posters presented and the program are available on the website (<http://www.igbp.kva.se/obe/>).

Working groups were prioritising key research questions and what it was we needed to answer those questions including promising approaches, emerging technologies, or regional considerations by focussing on the following titles:

- Trace elements in ecological and biogeochemical processes;
- Physical forcing of biogeochemical cycling and food webs;
- Climate modulation of organic matter fluxes;
- Direct effects of anthropogenic CO₂ on biogeochemical cycles and ecosystems;
- Integrating food web dynamics from end to end;
- Continental margins;
- Mesopelagic layer;
- Biogeochemical hotspots, choke points, triggers, switches, and non-linear responses;
- Feedbacks to the Earth System;
- Coupled models of biogeochemical cycles and ecosystems.

Among those working groups of key relevance to the LOICZ community, Kon-Kee Liu (kkliu@ntu.edu.tw) led the one on continental margins, assisted by

Laura David (ldavid@upmsi.ph). Overarching themes, which could be developed for the OCEANS project, address the ways that continental margins interact with land, the open ocean and the atmosphere. This includes understanding the cycling of biophilic elements, and their sources and sinks. Modelling of the margins was considered essential, and therefore there is a pressing need to generate suitable input for such models.

Potential collaborative links for LOICZ/OCEANS “Biogeochemistry and Ecosystems Analysis” were identified. These included: i) identifying the extent and scale of forcing which determine transport, storage, and transformations (both biological and abiotic) across continental margin boundaries; ii) the unique features of continental margins and how these respond to global change; iii) elemental cycling in these regions. The often highly heterogeneous nature of continental margins, with only restricted access may require specific regional and local cooperation, in ways that open ocean studies often do not provide. Furthermore the vulnerability of margins to human activities, calls for improved capabilities for rapid action in the event of random events, e.g., oil spills, storm surges, floods. As both LOICZ II and OCEANS are at similar stages of development, both projects intend to ensure strong collaboration right from the beginning. While continental margins issues are relevant for all five themes identified for the LOICZ science plan (LOICZ Future discussion document version 10 – www.nioz.nl/loicz/) major links are likely to be accommodated in theme 3: Fate and transformation of materials in coastal and shelf waters. Ways and contents of cooperation will also be part of the working group discussions at the next IGBP Congress in Banff, Canada, 20-23 June 2003.

Currently the OCEANS Transition Team evaluates the results of the working groups to identify the key science themes and questions, which will form the scientific focus of the new OCEANS project. They shall be available for discussion at the IGBP congress in Banff. A full draft of the Science Plan/Implementation Strategy (to be produced as a single document) will be accessible via Internet (and through e-mail notification to conference participants) in Sept./Oct. 2003.

The LOICZ community is encouraged to read and comment on this draft. The final draft is expected to be completed by the end of 2003 for review by IGBP and SCOR.

Carbon and Nutrient Dynamics at Oceanic Margins, CMTT synthesis in progress

Roger B. Hanson

Regions of the World Oceans control major sinks and sources of carbon dioxide (CO₂) to the atmosphere. However, relatively little in comparison is known about the dynamics of carbon, especially CO₂ gas exchange at the air-sea interface along the continental-ocean boundary. This knowledge gap became vividly apparent to JGOFS and LOICZ when the early ocean maps of CO₂ exchange lacked information on gas exchange in this vulnerable, dynamic, heterogeneous and variable zone along ocean margins. To evaluate the present biogeochemical regimes, nutrient fluxes, and sources and sinks of CO₂ in the coastal zone, the Joint Global Ocean Flux Study (JGOFS) and the Land-Ocean Interactions in the Coastal Zone (LOICZ) formed a joint JGOFS-LOICZ Continental Margins Task Team (CMTT). Thanks to early workshops on regional carbon and nutrients budgets and box modeling of horizontal fluxes across continental margins, a new perspective emerged, which indicated that global ocean margins are most likely a CO₂ sink and not a major source of CO₂ to the atmosphere as once thought.

To document this emerging view, the CMTT needed to assemble essential information on air-sea gas exchange, coastal discharge of terrigenous carbon and nutrients to the shelf, carbon cycling and storage on the margins and potential transfer to the deep ocean in as many different continental systems as possible. With additional financial assistance from the Intergovernmental Oceanographic Commission (IOC), the CMTT organized five regional workshops that focused on the major continental margin types and synthesized the available information and data in the region. A global synthesis workshop followed and the group outlined a book for the IGBP Book Series on our present knowledge

of continental margins, tentatively titled Carbon and nutrient fluxes in continental margins: a global synthesis.

The editors Kon-Keo Liu, Larry Atkinson, Renato Quiñones and Liana Talau-McManus will describe the group's synthesis and modeling approach. Where ocean observations and modeling has produced important findings, it extends the horizontal scales of biogeochemical flux box-models and budgets of carbon and major nutrients in coastal zones to the open ocean. In the selected geographical regions, a group of co-authors will describe concisely the dominant features, the best estimates of carbon and nutrient fluxes and their uncertainties. The book will also address cross-cutting issues of exchanges across land and sea, air and sea, water and sediment and margins and open ocean boundaries, and finally discuss arising issues, new approaches, global views and future prospects. Publication by Springer Verlag of this extensive synthesis effort is expected in early 2004.

New joint IAPSO/IAHS Commission "Groundwater-Seawater Interactions"

Groundwater-Seawater Interactions (GSI) in the coastal zone are receiving increased attention. The SCOR-LOICZ working group 112 with support from UNESCO IOC addressed this issue by a variety of approaches including ongoing intercalibration experiments. The goal is to evaluate the best methodological approaches as well as to provide some further insight into the global relevance of submarine groundwater discharge for coastal metabolism. Another outcome of the growing scientific attention has been the establishment of "Joint IAPSO/IAHS (IUGG) Commission on Groundwater-Seawater Interactions" with representatives from the International Association for the Physical Sciences of the Ocean (IAPSO) and the International Association of Hydrological Sciences (IAHS) (http://www.iugg.org/iapso/grdwater_seawater02.html).

The IAHS-IAPSO joint commission on "groundwater-seawater interactions" operates under the following terms of reference:

- To foster research concerning the flow of groundwater into the coastal zone;

- To participate in research on submarine groundwater discharge within developing countries;
- To engage in capacity building and training so research concerning groundwater discharge to the coastal zone.

The commission and LOICZ wish to encourage interested scientists, in particular young experts from developing economies to get in touch and investigate options for collaboration. Colleagues attracted to follow this call should get in touch with:

Evgeny A. Kontar (IAPSO),
kontar@ocean.ru,
William C. Burnett (IAPSO)
wburnett@mail.fsu.edu or
Makoto Taniguchi (IAHS)
makoto@nara-edu.ac.jp.

IPO NOTES

LOICZ SSC - New, renewed and former members

On the edge of its second phase the LOICZ SSC has changed substantially. Four of our SSC members have finished their term in which they provided invaluable expertise and guidance that contributed in a major way to the architecture of the first phase and equally important, to the legacy for the future LOICZ. We would like to take this opportunity to thank **Robert W. Buddemeier** (1996-2002), **Stephen V. Smith** (1995-2002), **Fredrik Wulff** (1995-2002) and **Nicholas Harvey** (1997-2002) for their dedication and fundamental input during their membership and look forward to their future involvement in LOICZ. The new mechanism of "corresponding membership" to the SSC, which was particularly endorsed at the recent IGBP SC Meeting in Punta Arenas, will hopefully stimulate their involvement and continued input to assist the project in accomplishing its new challenging objectives. Equally important, at least we think, will be the new LOICZ in itself, which we expect to be attractive enough to keep their scientific and personal interest alive.

The following SSC memberships have been renewed: **Han Lindeboom** (Chair), **Wim Salomons** (Vice-Chair), **Gerardo Perillo**, **Shu Gao**, **Liana**

Talae-McManus, Peter Burbridge, Robert Costanza, Jozef Pacyna and James Syvitski. We anticipate their continued commitment in this demanding and sensitive new phase for LOICZ where the development of a science plan and the structural changes during the transition will call for as much guidance as possible.

Eight nominated candidates have been accepted by the IGBP Officers to join our SSC. We are really glad to welcome all of them to the LOICZ Scientific Steering Committee and look forward to their refreshing and energetic contributions that will help us shape the future of LOICZ. These new members, who will be further introduced in our next Newsletter, are: **Maria Snoussi**, Rabat, Morocco, **Anthony T. Forbes**, Durban, South Africa, **Weigen Huang**, Zhejiang, China, **Laura T. David**, Quezon City, Phillipines, **John Parslow**, Hobart, Tasmania, Australia, **Yoshiki Saito**, Ibaraki, Japan, **Luiz Drude de Lacerda**, Fortaleza, Ceara, Brazil and **Michel Meybeck**, Paris, France.

We are excited to enter the challenging transition phase towards a new LOICZ with all of you, and we are looking forward to working with you.

Han Lindeboom, Hartwig Kremer & Hester Whyte.

For the contact details of all past & current SSC members please visit this LOICZ web-page <http://www.nioz.nl/loicz/org.htm> and click on the SSC hyperlink.

Second Call: LOICZ Newsletter Reader Survey More input needed!

Dear readers of the LOICZ Newsletter: First of all a big Thank You for your valid and informative response to our newsletter Reader Survey. Your valuable comments will assist us considerably in improving the newsletter. At this point we have received about 15% feedback, but to consolidate the results we need more input. That's why we have extended the deadline. For your convenience the form has now been made available electronically on the LOICZ home page (<http://www.nioz.nl/loicz>) and your answers can be sent to us directly by using the submit button at the bottom of the form. We look forward to your continued reply.

Mildred Jourdan moving on

On behalf of all the IPO co-workers who have had the pleasure to work with Mildred we would like to thank her for all the years she has been supporting the IPO operations with great enthusiasm as office assistant. Her efforts in maintaining the database and in workshop organizing are greatly appreciated. We will also miss her optimism and humor which always added some color to the everyday office business. As she will take up a new job within the NIOZ institute we will keep in touch and wish her all the best for the future.

Hartwig & Hester passing on to Mil:

After eight years I want to say goodbye to the newsletter readers and all the people I have met through the years. It was a pleasure to work for the LOICZ Office for so many years. My contract has ended and I have found a new job at the same institute where LOICZ is located. My personal e-mail address remains mildred@nioz.nl. I wish everybody good luck in a nice and safe environment.

Mildred Jourdan

LOICZ IPO New Executive Officer

Since January 2003 **Hartwig Hubertus Kremer** has taken over the Executive Officer position in the IPO. Most of you will know him already from his time as Deputy EO and co worker of Chris Crossland 1996-2002 here at the Royal Dutch Institute for Sea Research in the Netherlands. For all the others, follows a brief introduction:



Hartwig's background covers biological oceanography and fisheries and in 1995 he received a research award on recommendation of the Federal German Advisory Committee of Marine Sciences, DWK, for his work on heavy metals in marine mammals. He holds a degree

as a public advisor for fisheries economy and gained additional experience in science dissemination and capacity building at the WWF Wadden Sea office and as head of a vocational training program based in Germany for ICZM and Food Security targeted for young executives in developing economies.

Within LOICZ he strengthened the collaboration with UNESCO, UNEP the EU, START and intergovernmental Global Change Networks in Asia and Latin America, and launched the global LOICZ-Basins project. It provides regional expert typologies on catchment-coast interactions, land-based drivers, trends and critical thresholds for coastal functioning. The Basins objective also bridging into the second phase of LOICZ is to foster sustainable development on multiple scales by taking the whole water cascade and coast as a single system and by identifying the institutional dimensions needed to help society respond to observed and predicted change.

Hartwig is presently member of the Policy Advisory Board of the European Catchment/Coast Interaction Studies, EuroCat, advisory to the European Land Ocean Interaction Studies ELOISE and the DINAS-Coast global assessment of coastal risk and vulnerability to climate and sea level change. He is member of the editorial board and special issue guest editor of the Springer journal, Regional Environmental Change.

His immediate tasks in the transition towards a new LOICZ (2003-2012) are to set up a distributed structure for the IPO and to support the development of a science plan jointly with the International Human Dimensions Project, IHDP. This will include to establish regular exchange with the various other projects under the new phase of IGBP, i.e., ILEAPS, LAND, IGAC, OCEANS and SOLAS, which are all following comparable schedules aiming to have science plans and implementation strategies ready for approval by early 2004. He will further help identify mutual agendas and ways of complementation with the joint initiatives under the Earth System Science Partnership, namely GWSP, GECAFS, the Global Carbon and the Health program. This is to assist LOICZ to become a truly holistic approach with strong regional presence and growing interdisciplinary networks of scientists.

HAVE YOU SEEN

New Global Carbon Project and Global Water Systems Project, joint ventures of The Earth System Science Partnership to develop a comprehensive understanding of the carbon and hydrological cycles encompassing their natural and human dimensions. For more information please visit: <http://www.globalcarbonproject.org> and <http://www.gwsp.org>

PUBLICATIONS

LOICZ R & S volumes are downloadable from the LOICZ web-site. For hard copies (as long as stocks last) e-mail: loicz@nioz.nl

Harvey, N. and B. Caton, March 2003: Coastal Management in Australia, Oxford University Press, pb., 352 p., 68 maps & figures, 41 tables.
To order: www.oup.com.au

Springer Regional Environmental Change Volume 3, number 1-3, December 2002. Special Issue: Regimes of Regional and Global Coastal Change

URLs for Springer LINK site on Regional Environmental Change
General info: <http://link.springer.de/link/service/journals/10113/index.htm>
Publications and online first articles: <http://link.springer.de/link/service/journals/10113/tocs.htm>

LOICZ/IGBP/IHDP/ESSP
CALENDAR

For more upcoming meetings and regular updates visit our web-site at <http://www.nioz.nl/loicz> and click on 'Calendar'

8-9 May 2003, Delft, The Netherlands: Regional meeting of the Global Water System Project (GWSP-formerly Joint Water Project under the ESSP).
Contact: Interim coordinator Holger Hoff, e-mail: hhoff@pik-potsdam.de or visit www.gwsp.org

18 June 2003, Banff, Canada: LOICZ-IHDP Scoping Team Meeting
(By invitation only)

19 & 24 June 2003, Banff, Canada: LOICZ 14th SSC Meeting.

20-23 June 2003, Banff, Canada: IGBP's 3rd Congress. Contact: Clemencia Widlund, clemencia@igbp.kva.se or Charlotte Wilson, charlottew@igbp.kva.se

13-16 August 2003, Antalya/Kemer, Turkey: NASA, ITU, LUCC & IGBP, endorsed by LOICZ Int. Colloq. Series on LUCC Science and Applications Conference: "Studying Land Use Effects in Coastal Zones with Remote Sensing and GIS".
Visit: <http://ins.itu.edu.tr/rslucoat1>

8-10 October 2003, Portsmouth, New Hampshire, USA: Global Water System Project (GWSP-formerly Joint Water Project under the ESSP).
Contact: Interim coordinator Holger Hoff, e-mail: hhoff@pik-potsdam.de or visit www.gwsp.org

OTHER MEETINGS

28 April-2 May 2003 San Carlos, Sonora, Mexico: Joint ECSA-ERF Symposium: Scientific Research as a Strategy to Support Estuarine & Coastal Management.
Visit: <http://www.dictus.uson.com.mx>, <http://www.ecsa.ac.uk> and <http://www.erf.org>
or e-mail the Conference Secretariat: s.gomez@cascabel.ciad.mx

5-7 May 2003 Santiago, Cuba: International Conference CARICOSTAS 2003.
Visit: <http://usuarios.lycos.es/caricostas>

30 June - 11 July 2003 Corsica, Italy: 1st International Summer School Cargese. Surface Ocean-Lower Atmosphere Study.
Visit: <http://bcg.mpg.de/~corrine.lequere/solas/>

30 June- 11 July 2003, Sapporo, Japan: IUGG 2003 General Assembly. For information visit: <http://www.jamstec.go.jp/jamstec-e/iugg/index.html>

13-17 July 2003 Baltimore, USA: Coastal Zone 03: Coastal Zone Management Through Time.
Visit: www.csc.noaa.gov/cz2003

25-29 August 2003 Wellington, New Zealand: International Geological Correlation Programme (IGCP)-project #464-3rd Annual Conference: Continental Shelves during the Last Glacial Cycle.
Visit: <http://www.gns.cri.nz/news/conferences/igcp/>

9-12 September 2003 Auckland, New Zealand: Coasts & Ports Conference 2003.
Visit: www.coastsandports.co.nz or e-mail: coastandports@tcc.co.nz.
Deadline for abstracts: 14 March 2003

WHAT'S ON THE WWWEB

Web-sites on Biogeochemical Budgets and Modelling, Typology, Basins, Deltas Management & South-Asia Coastal Fluxes are accessible via the LOICZ home page: <http://www.nioz.nl/loicz>

New IOCARIBE Web Site:
<http://ioc.unesco.org/regcar>

IPO STAFF

HARTWIG KREMER
Executive Officer

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