

LOICZ NEWSLETTER

LOICZ Status and Progress

*Chris Crossland
LOICZ Executive Officer*

Eighteen months into the second phase of LOICZ, with a synthesis of our coastal science due at end of 2002, we are seeing a significant increase in our science products. Many of the projects in LOICZ have been publishing in global literature, and new projects at local and regional scales are being contributed. Publications and project information is in the process of listing on our web site for information of LOICZ and other researchers. The LOICZ Annual Report 1998 (on our web site) summarises key outcomes and progress in the last year.

Regional workshops in Australasia, Africa, South East Asia and Europe have been integrating new and existing information into an early stage of synthesis against LOICZ questions. Major advances have been made in the building of biogeochemical budgets, and various patterns are starting to emerge into "derivative models" that relate systems inputs and responses in regions. Allied and recent advances in methods for up-scaling of local systems information to regional and global dimensions, are putting our actions at the cutting edge of this "hot issue". Here, products are starting to flow and a wider collaboration across IGBP projects is evolving that should yield some fascinating end-to-end pictures of material flux, in a coastal catchment-seas context. River basin work has refined its focus towards the critical load concept and, linked with the human dimension, has seen some strong assessments and coherence developing

This is the eleventh 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.

especially from the European sector. Thematic and integrative regional projects are being put in place, and the South East Asia (SWOL) project is delivering vital case study information on the people-environmental processes interaction and a model that should be transferable to other regions.

Collaboration with other IGBP projects (e.g., START, BAHC, LUCC, GLOBEC) continues to grow and joint workshops are increasing as we join our agenda within themes and regions. Importantly, we have made headway in linking to science end-users, such as, the European Union and the Intergovernmental Oceanographic Commission, ensuring that our science will be accessible and useful to policy and coastal managers. Further work is being done to extend this network. LOICZ success depends on the work and global network of researchers. The Open Science Meeting in Argentina later this year

will provide a stimulus as will the increasing number of science-delivery workshops now in preparation and planned. The completion of arrangements with UNEP, and GEF funding, is providing further support to these developments.

Despite these advances, we continue to try and build better communication within and beyond LOICZ in an effort to gain contributions from key science and researchers, and to improve our collegiate approach. Our web site and global science gatherings are crucial tools in this enterprise. However, not all folk can access those – this Newsletter has an important role. In this issue, we have aimed to provide an outline of elements of progress and activities. We want to improve its content and to incorporate hard science reporting. Here, we would appreciate you comment and advice, and especially encourage you to provide brief descriptions of your science and commentary on coastal science issues.

IGBP Congress Japan

Shonan Village Conference Centre, near Yokohama Japan, was the meeting place for about 300 scientists representing the 11 core projects of IGBP on 6-13 May 1999. While the theme of "IGBP synthesis" (distilling down the IGBP science to meet the generic goals) was the central focus of the meeting, LOICZ and others took part in a strongly interactive and collaborative milieu.

The IGBP clearly made some major gains in pulling together the broad array of science approaches and information being gained from



the regional and global scale spectrum of the contributing core projects, and saw real synergies developing as “boundaries” between research disciplines and projects were removed. The discussion and debate on human dimensions in IGBP, and the increasingly collegiate approach were particular “take home” messages.

LOICZ gained much. The SSC took the opportunity to deal with the full agenda of progress and planning issues that accompanies its annual meeting. Importantly, we struck up some vital collaborative actions with other core projects, and developed a blueprint for the “first synthesis” of our results due for completion at end 2002.

Research gaps were recognised, and thought and discussion put into ways of resolving the bits we had missed. For example, the “sleeper” of coastal zone material flux – submarine groundwater – was highlighted in plenary and workshop discussions, especially by Bill Burnett (Chair, SCOR-LOICZ WG112).

Two evening meetings, with working groups convening in between, saw the biogeochemical budgets boffins and the fisheries folk of LOICZ and GLOBEC extend their association with the establishment of two joint task groups: one dealing with teleconnections (and societal relevance); the second, addressing typology approaches. These initiatives should see a closer blending of cause-and-effect relationships between coastal changes and fisheries resources, and improved ways to assess, scale and represent the information.

The “hot issue” research area of typology (essentially global classification systems which allow up-scaling of local and regional data and information) was further carried forward by combination of BAHC, GLOBEC, LOICZ, and Lucc in a vital show-and-tell workshop. This work is now being jointly pursued through a collaborative team approach, and related to the Continental Aquatic System initiative. There was real excitement in the various camps

during the workshop, as bridges were built and the real and potential opportunities were identified, and a joint workshop is planned for the LOICZ OSM in November.

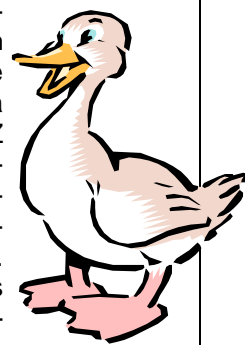
The joint JGOFS-LOICZ Continental Margins Task Team (CMTT) took on a second phase of activity aimed at assessment and global synthesis of CO₂ and nutrient fluxes in marginal seas and boundary currents. Building on earlier work, key issues for understanding material fluxes along continental shelf margins include: CO₂ sequestration, processes in boundary currents (e.g., continental shelf pumping, control mechanisms for variability in air/sea CO₂ fluxes), and re-evaluation of the (apparently “too high”) export production from the coastal ocean. The CMTT will address flux inventory and processes questions relating to boundary currents and marginal seas through five regional working groups, over the next two years. A global synthesis of material flux in these coastal-oceans interface systems will be published.

The broad synthesis of the START projects, gave LOICZ a wider picture of opportunities to extend existing joint actions. Regional studies are a fundamental tool in the LOICZ program, and the building of synergies through links with START (and Lucc) are being acted on. Networking with representatives of potential donor agencies, is bearing fruit and appears likely to advance the LOICZ science agenda in regions from Asia-Pacific through Latin America.

Coastal – GOOS and LOICZ

The GOOS acronym will be familiar to most, and recognised as a major initiative being orchestrated through the International Oceanographic Commission (IOC) of UNESCO. It forms part of the broad-scale Global Observing Systems (GTOS terrestrial; and GCOS-climate), being implemented and established throughout the world. The coastal panel of GOOS, led by Tom Malone, is developing a science plan and, subsequently, an

implementation plan that should take effect in the next 12 months. LOICZ has been an invited participant to these developments and, with members of the panel including a number of LOICZ folk, has been forging close relationships in the development phase. Much of LOICZ’s outcomes will assist the C-GOOS, especially the tools and methodologies, for example, of typology and up-scaling, first and second-order models of material fluxes in regions, and indicators of status and changes in ecosystem process that are derived from the LOICZ enterprise.



LOICZ has a mandate to develop scientific knowledge and tools that addresses global change in the coastal zone, focussing on material flux and human dimensions at regional and global scales. The C-GOOS has a primary goal to provide the basis, in observations and models, for assessing the effects of human activities and for predicting change in coastal waters. Thus, it maybe generally represented as an operational monitoring program, which incorporates end-to-end observing systems, that link bottom-up (measurement programmes) and top-down (user needs) perspectives. It will use scientific tools, knowledge, and national and regional skills and enterprise, to maintain a global assessment of status and changes in “health” of the coastal seas. It has a specific mandate to work with and provide information to users. Also like LOICZ, it has a regional focus in the pilot projects being developed to further understand and develop system indicators, guidelines and to build networks of researchers and agencies.

LOICZ and C-GOOS are strongly complementary. LOICZ is looking to describe and understand the changes of material fluxes and their environmental effect in the coastal zone, by evaluation of their dynamics and kinetics, and mechanisms of interaction with associated systems. C-GOOS focuses on

monitoring and measurement of the changes in chemicals and systems resulting from these interactions over time, and particularly engaging the science-user in governmental and policy arena.

Further information on C-GOOS can be found on the Internetsite: <http://www.unesco.org/ioc>.

Groundwater Contributions to Coastal Biogeochemical Flux Budgets



A workshop on Mexican and Central American coastal lagoons was held at CINVESTAV, Merida Mexico on 12-16 January 1999. The aim was to extract CNP flux budget information from existing research data on estuarine sites across the climatic regimes ranging from cool (arid) temperate to wet and dry tropics, and to provide active researchers in the region with advice on use and application of the LOICZ Biogeochemical Modelling Guidelines.

The 14 participants had a strong representation of Mexican researchers and 12 site budgets were developed in the workshop, ranging from the Gulf of California and the Yucatan, to Venezuela. These developments provided new descriptions for the region and, adding to the results of a previous workshop in Ensenada, provided a range of examples across climatic zones, areas of human impact and influence, system size and water residence times, and system structures (LOICZ Biogeochemical Modelling web site on www.nioz.nl/loicz/)

A major focus was the assessment of the coastal lagoons of the Yucatan in which groundwater rather than surface water flows dominates as the freshwater inputs to the systems. The workshop discussions led to the development of new protocols in the LOICZ Guidelines that allow more detailed quantification of the groundwater contribution of materials to the flux estimates. Of particular value, was the derivation

of calculation protocols based on silicate tracer, which is a feature of the groundwater chemical composition. These protocols will contribute significantly to assessments not only in the region, but also to budgets developed in other global areas where systems have a significant groundwater component.

A workshop report is published and results will be published in a CD-ROM later this year, as well as being posted to the LOICZ web site.

LOICZ in the Caribbean – strengthening regional links through IOC

Hartwig Kremer
LOICZ Dep Executive Officer

On invitation from IOC and the regional IOCARIBE, LOICZ participated in two regional workshops in the Caribbean:

- the IOCARIBE Users and GOOS Capacity Building Workshop, San José, Costa Rica, 22-24 April 1999, and
- Sixth Session of IOCARIBE, San José, Costa Rica, 26-29 April 1999

Recognizing common agendas IOC and LOICZ are continuously improving their operational links and pursue joint efforts for the further development of databases, identification of key indicator variables for monitoring (particularly at local and regional scales), scenario building for forecasting purposes and model validation. LOICZ would like to establish a regional project in the IOCARIBE area, picking up on the special geomorphological characteristics and ecosystem settings. The expected outcomes may prove beneficial for the IOCARIBE scientific and user community on different local and regional scales, as well as to the LOICZ project goals. It may also contribute to regional applied science and the design of a monitoring scheme, including a Caribbean-GOOS.

The workshops identified a great variety of ongoing scientific and

networking activities, which could provide important links and input to the LOICZ work. For example CARICOMP established in 1990, covering 19 of 28 sites across 19 different Central American and Island states in the Caribbean, are gaining information on biophysical and biological productivity parameters from seagrasses, coral reefs and mangroves. The network pursues a protocol that focuses on the human dimension. CARICOMP provides a broad regional infrastructure including a data management centre at the University of the West Indies.



Another important activity is the Intra Americas Seas Initiative (IASI) which aims at covering physical oceanographic processes, biological – physics interactions including life cycles of economically relevant species; and coastal and offshore environment interaction. This effort is based on mutual interests of the Miami Rosenstiel School of Marine and Atmospheric Science, NOAA and CATHALAC, (the Centre for the Humid Tropics of Latin America and the Caribbean in Panama).

The major outcomes from the GOOS and IOCARIBE workshops included:

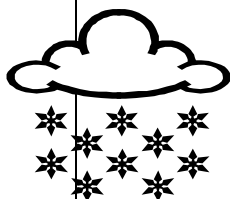
1. An *ad hoc* Advisory Group to the Steering Committee of Caribbean GOOS will temporarily be formed to draft the specific regional objectives. They will be formulated closely along the major socio-economic drivers of coastal and marine change (e.g. tourism, agriculture, fisheries, population pressures), marine biodiversity issues, sea level rise questions and specific forecasting of relevant events such as tsunamis, hurricanes and storm surges. Following a clear definition of regional GOOS data requirements including natural and social science input the identification of existing human, scientific and organisational capacities in the region will be crucial. A related scientific workshop will need to identify the respective capacity building requirements.

2. The meeting recognised that in the context of linkages to regional and globally active organizations, IGBP/LOICZ could contribute in the context of the global commitment of GOOS, particularly its typology, biogeochemical modelling guidelines, and socio-economic integration tools. LOICZ could support the setting up of the scientific bases for the regional GOOS. For LOICZ, engagement in the region would yield further validation of its science deliverables and a significant contribution to its Focus 4, aimed at understanding the coastal sea interaction especially with the socio-economic drivers.

3. Mutual interests and common objectives were identified during the meetings between LOICZ, the UNEP Regional Seas Programme, and the IAI. Links of comparable level are already in Asia where LOICZ co-operates with START and intergovernmental bodies, like ENRICH and APN and globally with UNEP.

Support for the current and future regional LOICZ-related activities will become part of the IOCARIBE resolutions drafted during the meeting.

Socio-economic aspects of fluxes of chemicals into the marine environment



The joint ELOISE/LOICZ workshop held at NILU, Kjeller, Norway on 8-10 March 1999, (involving social and natural scientists, and private and public sector users) aimed to develop and elaborate future strategies to foster the exploitation of scientific results by end-users. The following aspects were discussed:

- Review of the potential for exploitation of European Union DG XII funded research for issue-driven outcomes, which are relevant for management needs;
- Identification of the input and expectations towards science

at the user level;

- Definition of communication needs between scientists and decision-makers, including the appropriate language and/or mechanisms of translation;
- Explanation of the DPSIR (Drivers, Pressure, State, Impact, Response) framework as outlined by OECD and EEA; and evaluation of the applicability of the framework in the process of integrated modelling. Reference was made to the recently published LOICZ Reports and Studies No. 11, 1998);
- Evaluation of major constraints in developing and using integrated models for coupling natural and socio-economic science disciplines; and
- Review of the current status of ELOISE research and related developments in the view of this integrative data and management needs and develop the strategies for future improvement;

In general, projects like ELOISE are committed to the advancement of science rather than knowledge application in coastal zone management. However, it was recognised that changes in approach are taking place, in which science effort and quality is sustained and greater awareness is being generated of the roles and mechanisms for integrating effort for researchers and users. The meeting agreed that large projects like ELOISE and LOICZ must play an increasingly important role as brokers between the users and the scientific community. This could be achieved through strengthening the focus on the human dimensions of regional/global environmental change including the development and application of integrative analytical methods. In principle the socio-economic aspects of change scenarios, i.e.:

- identification of anthropocentric driving forces, and
 - taking into account the co-evolution of natural and social systems affecting state changes of the environmental systems and thus the impact and response;
- should be considered in order to generate a coherent set of goals

among the different parts of the projects. The meeting concluded with stressing the strong need for capacity building in holistic thinking, project design and user participation. To encourage this process the meeting recommended to run jointly with LOICZ an advanced European study course for young scientists and environmental planners.

A full meeting report will be available as part of the European Commission Research Development series.

LOICZ in South Asia



Under the aegis of the IGBP-START South Asia Committee (SASCOM), a joint START/LOICZ/IGBP Sri Lanka workshop on Estuarine Modelling and Coastal Zone Management was held in Colombo, Sri Lanka on 28 April to 1 May 1999. The aims were to extend the regional research network of START and, with LOICZ, initiate and promote research on mathematical modelling on coastal aquatic systems, especially those that will contribute to solutions for coastal zone management problems.

Strong support was received from participants of the sub-continent and island states of the Indian Ocean region. In addition, South East Asian and European specialists carried some relevant LOICZ science experience to the workshop as contributing models.

The workshop reviewed the regional experience in the area of estuarine modelling and coastal zone management, identified coastal zone problems common to the region (which could be investigated by regional cooperation), and identified areas of need in capacity building. The key outputs included:

1. Development of a project proposal for regional cooperation at, initially, four sites.
2. Identified an opportunity for a LOICZ-related workshop on biogeochemical budgets.
3. A report and recommendations for regional cooperation in the areas of estuarine modelling and coastal zone management.

LOICZ 4th Open Science Meeting 15-18 November 1999

The OSM for Bahia Blanca, Argentina is on-track in its development of a topical and vital science program addressing Regimes of Change. Three major pre-Meeting workshops will be held addressing: South American biogeochemical budgets, Latin America river basins, and the SWOL project. Other thematic workshops are being planned in areas of, for example, typology, and science engagement with users. Gerardo Perillo is piecing together the local arrangements and registrations continue to be received at IPO in a constant stream.

To date, more than 120 researchers are registered, representing a wide coverage of natural and socio-economic science disciplines. We have received strong donor support and the folk requesting travel support will be notified of outcomes in mid-July. While we will not be able to meet all requests, it is expected that a relatively high number of applicants may gain assistance. Some places remain open for additional "self-funding" registrants – information is available from the IPO or from the LOICZ web site.

Further details will be mailed to registrants, and the evolved science program will be posted to the LOICZ web site and regularly updated, from early July. Look forward to meeting up in Argentina.

LOICZ/SCOPE Workshop on Land-Ocean Nutrient Fluxes: The Changing Silica Cycle.

An International Workshop will be held in Linköping, Sweden, during October 3-4, 1999. The Workshop is a part of a series being sponsored by SCOPE (Scientific Committee on Problems of the Environment) and LOICZ (Land-Ocean Interactions in Coastal Zone) and is being jointly organized by the Universities of Linköping and Stockholm in Sweden and Hamburg in Germany.

The Workshop will address the overall issue of degradation of waterbodies from land-based activities, with special reference to the mobilization and retention of silicate on land and its fluxes to the oceans and *inter alia*:

- (1) analyze the historical data sets on nutrient inputs to the ocean with emphasis on silicate,
- (2) assess nutrient removal in reservoir lakes behind dams and its effect on the nutrient mix,
- (3) assess the impact of changes in hydrological cycle associated with climate change on land-ocean nutrient fluxes and
- (4) investigate the link between land-ocean nutrient fluxes and changes in fisheries, biodiversity and carbon cycle.

A number of internationally reknown scientists are invited as keynote speakers to introduce each topic.

You are invited to participate in the Workshop and to contribute to the discussions to identify the gaps in knowledge and areas for future research on regional and global scale. **Please contact by fax or E-mail**

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HAVE YOU SEEN.....

- Carbon and Global Change articles in *IGBP Global Change Newsletter*, No. 37, March 1999
- Land-Sea Link in Asia – *Proceedings of an international workshop on sediment transport and storage in coastal sea-ocean system*. Ed. Yoshiki Saito, Hen Ikehara & Hajime Katayama, STA (JISTEC) & Geological Survey of Japan, Tsukuba, Japan, March 15-19, 1999, 485pp.
- Geochemical consequences of increased atmospheric carbon dioxide on coral reefs. J.A. Kleypus, R.W. Buddemeier, D.Archer, J-P. Gattuso, C. Langdon, B.N. Opdyke. *Science* 286 (2 April 1999): 118-120.
- SCOR Working Group 104 (Coral Reefs) conference papers in *American Zoologist* 39 (1), February 1999: 1-183. (IPO).
- Annual Records of Tropical Systems. Ed. R.B. Dunbar & J.E. Cole. *PAGES Workshop Report, Series 99-1, 72pp.*

LOICZ PUBLICATIONS

Australasian Estuarine Systems: Carbon, Nitrogen and Phosphorus Fluxes, *LOICZ Reports & Studies No. 12, 1999.* (IPO)

Mexican & Central American Coastal Lagoon Systems: Carbon, Nitrogen and Phosphorus Fluxes, *LOICZ Reports & Studies No. 13, 1999.* (IPO)

LOICZ Annual Report 1998 (available on web site)

LOICZ CALENDAR

- LOICZ-UNEP Workshop on estuarine systems of the South China Seas 19-22 July 1999, Manila, The Philippines
- SCOR-LOICZ Submarine Ground Water Working Group 112 meeting (in conjunction with IUGG meeting) 22-24 July 1999, Birmingham, UK
- LOICZ-SCOPE Workshop on land-ocean nutrient fluxes: the changing silica cycle 3-4 October 1999, Linkoping, Sweden
- North Asia workshop on basins and coastal systems (tentative) 10-12 October 1999, Qingdao or Vladivostok
- LOICZ-UNEP Workshop on biogeochemical budgets in South America estuarine systems 10-12 November 1999, Bahia Blanca, Argentina
- LOICZ Workshop on Latin American basins 11-13 November 1999, Bahia Blanca, Argentina
- SARCS-WOTRO-LOICZ Workshop 12-13 November 1999, Bahia Blanca, Argentina
- **LOICZ 4th Open Science Meeting** 15-18 November 1999, Bahia Blanca, Argentina
- LOICZ SSC meeting 18-20 November 1999, Bahia Blanca, Argentina
- LOICZ-UNEP workshop on estuarine systems of South Asia January 2000, TBA, India

OTHER MEETINGS

- Non-CO₂ Greenhouse Gases (NCGG-2) Scientific understanding, control and implementation. 8-10 September 1999, Noordwijkerhout, The Netherlands.
- 15th Biennial International Estuarine Research Federation Conference, "Where the River meets the Sea", 25-30 September 99.
- 3rd International Symposium Environmental Geochemistry in Tropical Countries. 25-29 October 99, Rio de Janeiro, Brazil.
- Third ELOISE Annual meeting. 1-4 December 1999, Noordwijkerhout, The Netherlands.

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