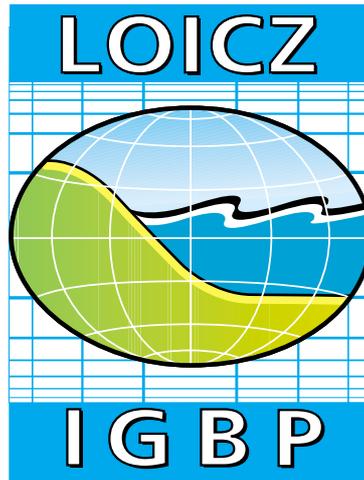


LOICZ NEWSLETTER

**A Report
from the Workshop on
Land-Ocean Interactions in
China Seas
organized by the Institute of
Oceanology of the Chinese
Academy of Sciences
in Mt. Laoshan, Qingdao,
China from 30 June
through 2 July, 2002**

A workshop on Land-Ocean Interactions in China Seas was organized by the Institute of Oceanology of the Chinese Academy of Sciences in Mt. Laoshan, Qingdao, China from June 30 through July 2, 2002. The aim of this workshop, designed and carried out by Prof. Dunxin Hu, the Chairman of the Chinese LOICZ/JGOFS Committee was to summarize the results of research carried out in China on land-ocean interactions in the coastal zone of China.

The first day of the meeting was dedicated to discussions of progress in the Chinese Academy of Sciences Innovation Project "Land-Ocean Interactions in Chinese Main Estuaries and the Adjacent Continental Shelf" (2000-2003). The main aim of the project is to explore and understand the dramatic variations of the materials (nutrients and sediments) discharged from the Changjiang River, resulting from strong anthropogenic activities in China and their impacts on coastal environment, such as on the Zhoushan Fishery Ground. Several surveys in different seasons have been carried out in the Changjiang River estuary and catchments of



This is the twenty fourth 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

the Changjiang and Yellow Rivers, since the project was started in July 2000. Based on field and historic data, variations of nitrogen flux in the Changjiang River, and transportation in Yellow River, primary production limitation and thermohaline distributions were discussed.

On the second day, more experts, including the Chinese LOICZ Committee members, attended the Workshop and a number of lectures were presented on various topics related to the main subject of the meeting. Welcome remarks were delivered by Prof. Jianhai Xiang, the Director of the Institute of Oceanology of the Chinese Academy of Sciences, who outlined the importance of land-ocean interaction studied in China.

It was mentioned that about 40% of the Chinese population lives in the coastal zone, producing 60% of the Chinese GNP. These numbers are likely to increase in the near future.

Introductory remarks were then presented by Prof. Dunxin Hu, also a former member of the Scientific Steering Committee of LOICZ.

Prof. Jozef M. Pacyna, representing the international community of LOICZ has informed the workshop participants on the preliminary results of the synthesis of results of research carried out within the first decade of LOICZ projects. He has also outlined general plans for the next phase of LOICZ starting in 2003. Major objectives and themes of IGBP II were also presented and discussed.

Dr Jun Li has given an elaboration on the future LOICZ research activities in China. He stressed particularly on the importance of carbon cycling research and the studies of the impacts of changes in the catchments on the state of the coastal environment in China. Dr Li focused on the research of dynamics of these changes as opposed to the steady state studies of geochemical cycles of chemicals carried out within the past period of LOICZ.

Dr Fan Wang, the secretary of the Chinese LOICZ/JGOFS Committee has introduced the Chinese Academy of Sciences (CAS) innovation project on Land-Ocean Interactions in Chinese Main Estuaries and Adjacent Continental shelf. A short description of 30 years of research results (1968-1997) was presented concluding on 5 time increase of nutrient releases in the

case study of the Changjing river and 10 times increase of DIN levels, mostly due to the enhanced use of fertilizers in the region. This is the major driver of the environmental change in the catchment of this river.

Prof. Zuosheng Yang has discussed shifts of the water flow and modern evolution of the Huanghe Delta. He described a shift of a coastline creating new deltas, decrease of water discharge during the last 50 years and the decrease of sediment discharge. Erosion has been defined as a main reason of these changes. Major economic and environmental consequences were pointed out, including shrimps catching decrease, wetland eroding and sea salty water intrusion.

Prof. Chongxian Li discussed the subject of land-ocean interactions along the late quaternary coast with strong tide and abundant sand. He presented an example of studies in the Changjiang Delta and adjacent coast. The following topics were discussed: transport of terrestrial sediments to the coast and the length of tide-level fluctuations (~640 km), flood tidal current (~230 km) and saltwater intrusion (~100 km), sea-level rise and formation of transgressive succession, sea-level change and the sediment discharge and impacts of the discharged sediments on the coastal zone. It was concluded that the Yangtze River delivers large amounts of sediments, and that the exchange of material and energy between estuary and coastal zone cannot be ignored.

Prof. Huanting Shen presented information on sediment flux from the Changjiang River to the East China Sea. This information was obtained on the basis of measurements at the Datong station. Clear decrease of the sediment transport rate was measured at this station. The magnitude of the sediment discharge flux over the years was then described and discussed.

Prof. Rong Wang presented the results of estimation of the annual production of fecal pellets by *Calanus sinicus* in the East China Sea. He introduced a

concept of biological pump from CO₂ through phytoplankton, zooplankton to fecal pellets focusing on 3 components of this pump: rotary pump, Archimedean pump, and reciprocating pump. Then, the production of fecal pellets and moults by Antarctic krill was assessed (in terms of the carbon production). In the next step the importance of *Calanus sinicus* as a food for fish was outlined, as well as the amount of fecal pellets, the major component of sediments reaching the bottom of the sea. The discussion focus was on: feeding by large particles feeder during sinking, decomposition of bacteria, and resuspension.

Prof. Chongguang Pang discussed seasonal variations of the circulation and suspended matter transport in the Yellow and East China Seas. Results of numerical simulation of this circulation were presented with clear gradient from the land to the sea. Variabilities in direction of the suspended matter transport in summer and winter seasons were presented and explained.

Prof. Fei Yu presented results of the analysis of shelf circulation in the East China Seas with the use of drifting buoy's data. The advantages of this method were discussed.

Prof. Weijin Yan introduced to the workshop a project of Global Nutrient Modeling, supported by UNESCO. Global Nutrient Modeling, supported by UNESCO. Global nutrient (CNP) cycling has been approached in this project, including the discussion of environmental consequences of the changes of this cycling. A review of various models and available data bases is planned in the year 2002, the decision on the selection of the model for further studies in project and the model formulation will be made in 2003, while the final runs of the model will be carried out in 2004. The specific watersheds include: the Mediterranean Sea, the Chongjiang River basin, the US East Coast and the Gulf Coast (the Mississippi River), the Seine River, and the Baltic Sea catchments.

In the final presentation Prof. Pacyna

presented the EU European Land-Ocean Interaction Studied (ELOISE) program. Various ELOISE projects were presented with the special focus on the EUROCAT project. It was concluded that several ELOISE projects have similar objectives to the Chinese studies presented at the workshop. It was clear that future cooperation between the Chinese/LOICZ/JGOFS projects and the ELOISE projects will result in mutual benefits and will substantially contribute to better understanding of land-ocean interaction on the global scale. In this way this cooperation will be an important factor in LOICZ II success. An effort should be made to strengthen this cooperation, possibly through the Scientific Secretariat of ELOISE.

The final part of the workshop was a meeting of the Chinese LOICZ/JGOFS Committee, during which the Global Change Open Conference held in July 2001 in Amsterdam and LOICZ Synthesis & Future Meeting held in May-June 2002 in Miami were reviewed by Prof. Dunxin Hu. Dr Fan Wang introduced the working report of the Chinese LOICZ/JGOFS Committee to Chinese IGBP Meeting held in December 2001 in Chongqing, China. Attributed to the work of the committee, the LOICZ and carbon cycle studies have been included in the Chinese National Basic Research Developing Programme. Finally, members discussed and the committee set up strategy for LOICZ/JGOFS studies in China, such as finding funds from the state and coastal regions, adding younger members to the committee, improving communication and cooperation between natural and social scientists, etc.

COASTAL CHANGE AND THE ANTHROPOCENE

LOICZ Synthesis & Futures Meeting

After nearly 10 years extending and building on initial plans and collaborative research addressing Global Change in the coastal zones, the

LOICZ Core Project is synthesizing its major findings. Drawing on the extensive work provided by a network of more than 2500 scientists around the world, the LOICZ Synthesis and Futures Meeting (29 May to 1 June 2002 at the Rosenstiel School of Marine and Atmospheric Science, University of Miami, Florida, USA) provided a forum for:

- discussion of draft chapter developments leading to delivery of a book that provides a first integrated assessment of global change in the coastal zone, and
 - discussion and development of thematic research areas for a Future LOICZ program (2003+).
- At the meeting, more than 130 scientists, coastal managers and representatives of agencies from all parts of the world engaged in lively and constructive discussion and debate on the range of issues and questions put to the meeting.

LOICZ Synthesis

The focus of the Synthesis work is on material flux models and processes, and the human dimensions. The meeting promoted vital discussions to enable the latest updating of the various chapters that will form the first global LOICZ assessment report. The Chair of the LOICZ Scientific Steering Committee, Dr Han Lindeboom, provided an overview of the LOICZ project to date. He reviewed the directions taken to gain answers to the major questions on global change in the coastal zone that had been the focus of the wider LOICZ research endeavours over the last decade. While most of the scientific research has been focussed at local to regional scale, the role of LOICZ in integration of data and information at regional to global scale assessment was emphasised. Some of the major findings from the river catchment-basins, biogeochemical budgeting, and scaling approaches were provided as examples of outcomes from the global LOICZ effort. Most of this work was being captured by the synthesis work in preparation of the LOICZ book, and the key messages and outcomes were addressed in

detail during the subsequent plenary and workshop activities of the meeting.

The Executive Director of IGBP, Dr Will Steffen, provided a synopsis of the achievements and fascinating spatial and temporal findings that have derived from the wider IGBP activities that describe Global Changes in Earth systems. He noted the clear demonstration that the Earth environment is changing at an unprecedented rate, both in:

- a) its broad climatic setting (e.g., atmospheric CO₂ levels are beyond the historical boundaries of the last 400 000 years) and
- b) the extraordinary pressures of human development, especially over the last 50 – 100 years (e.g., more nitrogen is now chemically produced by humans than is fixed by the natural system).

The major research findings from the whole IGBP indicate:

- The Earth is a system that life itself helps to control.
- Global change is much more than climate change. It is real, it is happening now, and in many ways it is accelerating.
- The human enterprise drives multiple, interacting effects that cascade through the Earth System.
- The Earth's dynamics are characterised by critical thresholds and abrupt changes. Human activities could inadvertently trigger changes with catastrophic consequences for the Earth System.
- The Earth is currently operating in a no-analogues state.

These findings have opened up some real conundrums for the science community in order to understand issues such as the extent and effects of teleconnection across large spatial scales of processes, the increased awareness of the non-linearity of biogeochemical system responses to multiple forcings, and questions about the potential for feedbacks and sudden changes in the poise of systems and thresholds for change in Earth systems processes.

The first major task of the meeting

participants was to review and, through workshop activities, refine the chapter assessments to derive the key implications for the changing coastal environments under natural and anthropogenic forcing. Preliminary draft chapters of the LOICZ Synthesis were presented in plenary and formed the basis for review and discussion, including:

1. *Coastal Ecosystems and Resources.*
The key purpose of the chapter is: to describe succinctly the coastal habitats, the living resources and increasing human pressures that are important for the global coastal zone, and to provide support information and a context for the other chapters.
2. *Water and the Coastal Zone.*
The chapter is aimed at assessment of river basin or catchment units and is underpinned by a modified DPSIR framework in order to evaluate the continuum of water and allied material fluxes in relation to human activities. One important goal is development of critical load/ threshold assessments of coastal impacts across local to regional (continental) scales.
3. *Dynamics of the Coastal Zone.*
The chapter is primarily addressing the physics of the global coastal zone and non-reactive material fluxes, looking to document how human impacts and environmental shifts can affect and have affected the stability of our coastlines on a global scale
4. *C, N and P Cycling in the Coastal Zone.*
A somewhat different approach is being made to that of other chapters with a quantitative, internally consistent methodology being applied to the derivation of site-specific nutrient budgets and the up-scaling to regional and global assessments using a typology. A study of trace gases and their significance is included.

5. *Science for Management in the Coastal Zone.*

The chapter will focus on what is “new” from LOICZ, translated into key issues for management, and will build on the messages from earlier chapters – challenges, questions, new knowledge and knowledge needs. Socio-economic elements will address goods and services provision in the coastal zone and will consider approaches and models for assessment and evolution of the DPSIR framework to support integration of scientific information into management utility. An emphasis will be put on identifying where management can effectively intervene in the global coastal zone.

Support presentations were provided in each chapter’s plenary session to expand on particular issues raised in each chapter outline. The combined plenary presentations were considered by the meeting participants as a whole, with suggestions and issues such as chapter structure, gaps in information and potential additional information being noted for detailed consideration during the deliberations of the working group allied to each chapter.

The working group discussions and recommendations, along with comments contributed by the wider meeting forum during report-back by each working group, provided constructive advice for the LOICZ SSC and lead authors of chapters. Work continues on the chapters and the LOICZ Synthesis book publication is anticipated for mid-2003. A companion synoptic overview of the LOICZ findings and messages also will be published as part of the IGBP Science Series.

Details of the discussions and the recommendations are available in hardcopy (Coastal Change and the Anthropocene. Conference Proceedings) from LOICZ IPO or on the LOICZ website.

LOICZ Futures

The introductory “Futures-plenary” recalled that the goal of the present futures discussion was to get input on the themes, issues and foci for the future. Building on the preliminary thematics identified in the Futures Discussion document, viz.:

- River Basins and Human Dimensions
- Spatial Issues: Implications of Land Use Changes in the Coastal Zone
- Fate and Transformation of Materials in Coastal and Shelf Waters
- Towards System Sustainability and Resource Management
- Risk and Vulnerability;

the plenary provided focus for discussion on LOICZ future directions and related IGBP core projects that are currently planned or implemented, such as Oceans, SOLAS and Land. Institutional perspectives were given by the European Commission, the IAI, and UNESCO’s IOC encompassing both a client’s view of LOICZ science and products, and perspectives for funding. Further insight was given into current and potential applications of LOICZ science by representatives of the Coastal GOOS (Global Oceans Observation System) of IOC and the EU 6th Framework Programme. The immediate relevance of river basin/coastal sea assessment scales was supported and the implications for policy advice (EU water framework directive) were highlighted.

Prof. Robert Costanza emphasised the importance of socio-economic elements in any kind of integrated assessment relevant for Earth systems and change description. Rather than following conventional models, which mainly focus on the growth rate of the economy, new approaches employing expanded models of the combined Ecological-Economic System are preferred. These try to describe how the development of goods and services of the ecosystem can support human welfare taking into account the various forms of natural, human, social and manufactured capital and their interplay.

From an outside and regional perspective, Dr Christos Fragakis (EU Commission) noted that the synthesis of LOICZ is very timely for the European Commission and should feed into the design of future EU programs; in particular, in the 6th Framework Programme (2002-2006). There European research will evolve from clusters (such as, ELOISE) into large integrated mega-projects and networks of excellence. In addition, Dr Hartmut Barth (EU Commission) elaborated on the EU Water Framework Directive (1999) and its relevance for LOICZ research. As with some of the most important LOICZ assessment approaches, the geographical reference applied in the Directive is at the river basin scale, including the coastal zone. Underlying quality criteria are based on reference levels rather than “pristine” conditions, which are considered inappropriate in a human-dominated environment. Research covering the whole water cascade and the different scientific disciplines is needed to support the implementation.

Dr Michel Meybeck reflected on coastal issues in the water continuum, and promoted the scientific need to regionalize C-N-P budgets taking into account this coastal zone filter function and to reconstruct trends in riverine C-N-P and silicate delivery for the 20th century. Therefore, a key issue for an integrated new LOICZ project with a catchment/coast focus could be reconstruction of riverine inputs to oceans since the last glacial maximum.

The SOLAS core project was reviewed by Dr Tim Jickells; it will address the air-sea interface aiming to describe and assess the biogeochemical fluxes and feedback between the ocean surface and the lower atmosphere as two coupled systems. This domain consists of the lower first kilometre of the atmosphere and the upper 100–200 m top layer of the ocean, which is considered to be of crucial importance for the advancement of climate modelling. Coastal zones play a key role in SOLAS. Beyond the practical reasons of finance and resources, there are

important scientific reasons in that this is the most productive zone in global oceans, representing a significant source of radiatively important gases (N_2O , CH_4 , CO , COS) and that global change will have major impact in the coastal zone.

LOICZ was invited to continue collaboration in the development of the OCEANS core project. Dr Julie Hall summarised the research issues of this new project that will build on former JGOFS research by examining the time control function in biogeochemical variability, marine food webs and carbon accumulation. Also considered will be 'hot spots', switch points and choke points in systems processes.

Coastal GOOS was presented by Prof. Tom Malone. The initiative goes back to the UNCED Conference in 1992, which expressed the need for repeated and timely assessments and predictions of the oceans. Most important phenomena of interest addressed in the coastal module of GOOS are the major drivers of change for coastal marine estuarine systems. At present, LOICZ provides some of the science foundation for C-GOOS, and could assist in the location of sentinel and reference stations for coastal monitoring. The LOICZ "typology" and database could assist in dealing with rapid access and sustained data streams on key variables and the propagation of global scale variability to local scales.

A short overview of IGBP-PAGES noted a focus on evaluation of soil and ice cores and existing collaboration with LOICZ in the area of sea level dynamics. A polar program under PAGES may provide further opportunity for co-operation with LOICZ.

Key Findings of the Futures Working Groups

In adopting the interim objective of a new LOICZ:

"to undertake a systems analysis of coastal zone composition and dynamics, focussing on the interactive biological, chemical and physical

OCEANS: Ocean Biogeochemistry and Ecosystems Analysis



Second Announcement and call for abstracts International Open Science Conference January 7-10, 2003, Paris, France

Abstract and early registration deadline: 15 October 2002

This conference will focus on integrated studies of biogeochemistry and ecosystem dynamics in the ocean in the context of the Earth System and global change. It is designed to assist the development of a new ten-year international research project. Questions to seed discussion include:

- How does global change, represented by changes in natural climatic modalities and anthropogenic forcings, impact marine biogeochemical cycles and ecosystem dynamics?
- How do these impacts alter the mechanistic relationship between elemental cycling and ecosystem dynamics?
- What are the feedback mechanisms to the Earth System from these changes?

In addition to plenary and poster presentations, there will be two full days of working group discussions.

Abstracts are invited for poster presentations on themes such as: Trace elements in ecological and biogeochemical processes; The mesopelagic layer; Integrating food-web dynamics and biogeochemical cycles; Direct effects of anthropogenic forcing on biogeochemical cycles and ecosystems; Feedbacks to the Earth System; Biogeochemical hotspots, triggers and non-linear responses.

For full programme, abstract submission and registration details, visit our website or send an e-mail to: scor@dmv.com

 International Council for Science
Scientific Committee on Oceanic Research

**GLOBAL
CHANGE**

www.igbp.kva.se/obe/

processes that define Coastal System Dynamics, the changes that are occurring in these dynamics, and the role of human activities in these changes", the meeting noted that this objective will be refined as the LOICZ Futures discussion evolves and the Science Planning group is established. It was affirmed that the five research thematic and broad scientific directions and key questions outlined in the Futures Document were endorsed by the meeting, with additional suggestions and amendments from the working groups. One of the most important changes for LOICZ would be moving towards more user-driven science and development of closer links to the International Human Dimensions Program and its core projects. This has to be implemented with recognition that the role a new

LOICZ would have as a contributor to the global scale Earth System Sciences needs a balance between applied and fundamental science.

The following points were highlighted during the discussion:

- LOICZ will have to direct efforts towards higher levels of integration between natural and social sciences and this is likely to be assisted by tailored models elaborating on coupled ecological-economic systems. This needs to encompass the agendas of a broader audience with stakes in the coastal zone. Thus, the new LOICZ will include the various aspects of the human dimensions in all the scientific thematic and mechanisms for this broader participatory approach need to be determined.

- Applying full catchment scales in assessment, synthesis and upscaling of the coastal issues was a key recommendation made on various occasions during the meeting. Inherent in this approach is the need to identify those management units and their key environmental system functions where intervention can best be implemented and cost benefit evaluation under different climate and human pressure change scenarios be calculated.
- Concerning the methodologies and scientific protocols for research, LOICZ should build on existing tools in parallel with the development and adoption of new modeling and assessment approaches. Assessments of coastal fluxes and ecosystem function can rely partly on the modelling approaches conducted earlier but these could be broadened towards questions of system resilience and thresholds. The typology approach is valuable for scaling and application in management.
- Shelf processes were considered a key element of the coastal ecosystem for future assessments. This needs to be allied with appropriate estimates of land-based loads reaching the shelf and to provide information on effects of shelf processes and change on the coastal goods and services.
- Desirable futures scenarios in the context of strong and weak sustainability options for coastal development under multiple forcing were seen as important ways for LOICZ to evolve into a “learning organization”, brokering science and issues between researchers and users.
- Regionality and typological approaches encompassing the key coastal change issues in the global coastal zone (sea level rise and hydrological cycles), polar areas (climate change), temperate regions (eutrophication) and soil erosion in tropical regions should form the basis of the risk and vulnerability theme. Linking state changes to vulnerability features

and adding value-functions to impact and potential response scenarios will allow this research to contribute appropriate response action and perception of uncertainty among coastal users.

Prof. Holligan referred to the Implementation Plan from 1995, concluding that while LOICZ has achieved a remarkable improvement in our scientific understanding and promoted a global perspective, the future research would need:

- to include improved databases and typologies, including continued self-education in this vital field of scaling tools;
- to address the role of biology in LOICZ in conjunction with material transformation and storage, system entropy, impacts of changes in sea level, temperature and pCO₂ - in other words, to include and integrate important aspects of biogeomorphology;
- to include socio-economic aspects of goods and services and functionality of systems;
- to increase partnerships and anticipation in a new LOICZ program; and
- to contribute to the critical step from Earth System Science towards adaptive management.

The LOICZ Chair, Dr Han Lindeboom, enlarged on these points, confirming that the goal and mission statement of a new LOICZ would be to provide science needed for “healthy coasts” in a sustainable and desirable future. The current transition phase of LOICZ would need to involve consultation with a wide constituency of coastal zone interests. This would contribute to the broadening of the scientific scope of the project, as recommended by all working groups, and help build the necessary interfaces with other scientific programmes and inter-governmental organisations.

LOICZ will need to develop a Science Plan that is widely owned and supported by actions of the global scientific networks of the natural and

social science community, relevant institutions and the sponsors. This has to be supported by a new strategic plan that provides guidelines for project implementation, timelines and milestones. Both planning elements will be the next milestones in the transition towards a LOICZ II. A joint task team of LOICZ and IHDP expertise is proposed to draft the new Science Plan.

LOICZ IPO NOTES

Crossland family back to Australia

After living and working on Texel for more than four years we have to say goodbye to the Crossland family. Chris, Jan and their two daughters Angela and Suzie are moving back to Australia. Jan has already left Texel with Angela and Suzie to get settled in their new home in Yaroomba, Queensland.

Chris will join his family shortly and remains the LOICZ IPO Executive Officer till the end of this year. Jan Crossland, responsible for the editing of the LOICZ Reports and Studies series and other LOICZ publication will keep editing our publications.

The LOICZ IPO on Texel stays the contact point for Chris and Jan. Both their e-mail addresses ccross@nioz.nl and jcross@nioz.nl stay active.

Although physically no longer in the IPO from the end of September we will continue enjoying working with them on a virtual basis, but will definitely miss their presence (especially Chris’ good spirit(s) and Jan’s homemade cookies) at the office as well as on Texel.

Lot’s of happiness for you all in your new home. Bye for now. Hartwig, Mildred & Hester.

HAVE YOU SEEN

START is pleased to announce the START Fellowship/Visiting Scientist program for 2002. This program is designed to increase the number of developing country scientists actively pursuing global change research by providing for shortterm visits to leading laboratories and institutions worldwide. START Fellowships are offered at the graduate and post-graduate levels, while the Visiting Scientist program is targeted toward more senior professionals. Program details, including application information, are available through the START website (http://www.start.org/Fellowships/app_guide.html)

WHAT'S ON THE WWWEB

BIOLOGICAL/ENVIRONMENTAL DATABASE UPGRADE

New and expanded data, search capabilities and tools have been added "Biogeoinformatics of Hexacoallia" <http://www.kgs.ukans.edu/Hexacoral> "Hexacoral" is part of the Ocean Biogeographic Information System, ORBIS: <http://www.iobis.org>

An interoperable dynamic search and data link between "Hexacoral" and the NMITA (Neogene Marine Biota of Tropical America) database is now available:

<http://porites.geology.uiowa.edu/>

In addition to interoperability with NMITA, searches of Hexacoral as well as other OBIS sites can be initiated from the OBIS portal. OBIS partner Fishbase:

<http://www.fishbase.org/> and Cephbase:<http://cephbase.nrc.utmb.edu/> now use remote environmental database and/or mapping tool links to Hexacoral to provide visualisation and environmental information on their holding.

The Science Plan and Implementation Strategy for the next phase of the International Global Atmospheric Chemistry Project (IGAC-II) is now available on the IGAC website. Under

Hot Items on the left side of the Homepage: www.igac.unh.edu

Studying the Groundwater-Surface water Interface (GSI) or collecting sediment pore water? Visit these two websites: <http://www.GSIwebpage.net> and <http://MHEproducts.com>

We would like to bring your attention on the following paper in the June issue (vol.33/1-2, pp.47-56) of "Global and Planetary Change", (special issue: "The global carbon cycle and its changes over glacial-interglacial cycles", edited by Louis Francois et al.) (ISSN: 0921-8181)

The Coastal Oasis: Ice Age Springs on emerged continental shelves. Eds. Hugues Faure, Robert C. Walter, Douglas R. Grant.

In this paper we demonstrate that during hyperarid glacial maxima water could have been abundant on the emerged continental shelf. We have applied studies on present day submarine groundwater discharge (S.G.D., LOICZ/SCORE W.G.112) to the glacial low sealevel.

To reach this conclusion we have combined observations and information on the ocean and continental shelves, on submarine groundwater discharge (SGD), on sea-level and lake level changes, with evidences of arid zone hydrogeology, sedimentology and prehistoric migrations. Web Site INQUA: <http://inqua.nlh.no/> Web site IGCP 459 "Carbon Cycle and Hydrology in the Paleo Terrestrial Environments" <http://www.omp.obs-mip.fr/omp/umr5563/4equ/hg/IGCP459/second.html>

Web Site "CHANGES": www.sheffield.ac.uk/changes

The following sites are accessible via the LOICZ web-site:

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

Biogeochemical Budgets and Modeling – new sites and tutorial materials (<http://data.ecology.su.se/MNODE/>)

Typology web-site: (<http://water.kgs.ukans.edu:8888/public/Typpages/index.htm>) and (www.kgs.ukans.edu/Hexacoral/Workshops)

The following links can be found under the "NEW" button on the LOICZ home page.

Basins: http://w3g.gkss.de/projects/loicz_basins/

Deltas management:

<http://www.deltanetwork.nl>

South Asia Coastal Fluxes:

<http://www.coastal-fluxes.slt.lk>

Latest LOICZ Newsletter

Most recent LOICZ R&S publications.

LOICZ PUBLICATIONS

LOICZ publications are available as printed copies and are also downloadable from the LOICZ web-site. For hard copies of LOICZ R&S volumes (as long as stocks last), email: mildred@nioz.nl.

African Basins: LOICZ Global Change Assessment and Synthesis of River Catchment-Coastal Sea Interactions and Human Dimensions. Eds. Arthurton, R.S., H.H. Kremer, E. Odada, W. Salomons and J.I. Marshall Crossland 2002, *LOICZ Reports & Studies No.25*, ii + 344 pages, LOICZ IPO, Texel, The Netherlands.

East Asia Basins: LOICZ Global Change Assessment and Synthesis of River Catchment-Coastal Sea Interaction and Human Dimensions. Eds. Hong G.H., H.H. Kremer, J. Pacyna, Chen-Tung Arthur Chen, H. Behrendt, W. Salomons and J.I. Marshall Crossland 2002, *LOICZ Reports & Studies No. 26*, ii+262 pages, LOICZ IPO, Texel, The Netherlands.

Soon to be published in the LOICZ Report & Studies series:

R & S No. 27 Caribbean and Oceania Basins

LOICZ/IGBP CALENDAR

For meeting updates also see <http://www.nioz.nl/loicz> and click on 'Calendar'

LOICZ Lead Authors Meeting 'Synthesis', Arlington, Virginia, USA 6-7 October 2002 (by invitation only)

OCEANS: Ocean Biogeochemistry and Ecosystems Analysis, International Open Science Conference January 7-10, 2003, Paris. Second Announcement and call for abstracts. Abstract and early registration deadline: 15 October 2002. For full programme and registration details visit : <http://www.igbp.kva.se/obe/> or e-mail to: scor@dmv.com

OTHER MEETINGS

26th SCOR General Meeting, 1-5 October 2002, Sapporo, Japan. Contact: SCOR Secretariat, scor@jhu.edu

GLOBEC: ICES/ASC (ICES Centary). 1-5 October 2002, Copenhagen, Denmark. Contact: ICES Secretariat: ices.info@ices.dk

Australia's National Coastal Conference: Coast to Coast 2002 "Source to Sea". 4-8 November 2002, Tweed Heads, NSW, Australia. Visit: www.coastal.crc.org.au/coast2coast2002/

GTOS Terrestrial Observation data warehouse building workshop. 16-21 November 2002, Prague, Czech Republic. Visit: <http://www.fao.org/gtos/resmeetPRA.html> or e-mail: [GTOSsecretariat, gtos@fao.org](mailto:GTOSsecretariat@fao.org)

LUCC-ISPRS Workshop on LUCC Contribution to Asian Environmental Problems, 2 December 2002, Hyderabad, India. Visit: <http://shiba.iis.u-tokyo.ac.jp/LUCC/WS2002>

Third IASC/IPA sponsored Arctic Coastal Dynamics Workshop, 2-5 December 2002 in Oslo (Norway). Deadline for abstracts and registration: 30 September 2002

Contact: Dr Volker Rachold (vrachold@awi-bremerhaven.de). Visit AWI: <http://www.awi-bremerhaven.de> and <http://www.awi-potsdam.de> & ACD: <http://www.awi-potsdam.de/www-pot/geo/acd.html>

Framing Land Use Dynamics: Integrating knowledge on spatial dynamics in socio-economic and environmental systems for spatial planning in western urbanized countries. International Conference, 16-18 April 2003, University of Utrecht, The Netherlands. Visit: <http://networks.geog.uu.nl/conference>

Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences. The research programme Sustainable Coastal Zone Management (SUCOZOMA) & The Foundation for Strategic Environmental Research (MISTRA) announce: Rights and Duties in the Coastal Zone: Multidisciplinary Scientific Conference on Sustainable Coastal Zone Management, 12-14 June 2003, Stockholm, Sweden. Visit: <http://www.beijer.kva.se/conference.htm>.

The 9th International Conference on River Research and Applications, 6-11 July 2003, Albury, on the Murray River, New South Wales, Australia. For general information visit: <http://www.conlog.com.au/NISORS>. For registration and logistic information contact: Ms Elizabeth Medley at conference@conlog.com.au. For inquiries about the scientific program contact A/Professor Martin Thoms at thoms@scides.canberra.edu.au

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

The XIVth Global Warming International Conference & Expo, 27-30 July 2003, Boston, USA. Visit: www.GlobalWarming.Net

X Latin American Congress on Marine Science X Colacmar, 22-26 September 2003, Puntarenas, Costa Rica Visit: <http://www.una.ac.cr/Xcolacmar/> or ioicos@una.ac.cr

1st International Young Scientists Global Change Conference, 16-19 November 2003, Tieste, Italy. Sponsored by START, Norwegian Agency for Development Cooperation, and other international donors. Expression of Interest by the end of November 2002 to Kristy Ross at kristy@crg.bpb.wits.ac.za

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