

IGBP/LOICZ 4th Open Science Meeting (APN 99014)

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Introduction/Background

LOICZ, after six years of operation and with only three years left for preparing its initial synthesis on the role of coastal zones and material flux in global change, held its Fourth Open Science Meeting (OSM) in Bahía Blanca, Argentina. The Meeting was hosted by the Instituto Argentino de Oceanografía, Bahía Blanca. It brought together nearly 170 key people from the global 2700-person LOICZ network, representing a range of scientific disciplines and coastal managers. While the major regional focus was on Latin America, other areas such as South and South-East Asia, Africa, Australia and Oceania, Europe and North America were also well represented (see 1.2). Participants contributed more than 120 topical presentations and posters addressing the different LOICZ issues. Ms. Monica Gil, Argentina, received the LOICZ OSM Poster Award supporting her attendance at an international conference in 2000. Associated with the OSM was the Argentinean chapter of IAPSO (the National Oceanographic Society), which had its regular annual meeting.

Outline of activities conducted

The OSM aimed to review the status of the LOICZ programme, to recommend on directions for further research and to relate the unfolding science to key coastal questions. Defining the directions for the LOICZ synthesis process was a major issue. The Meeting also functioned as a major focal point for continued improvement of the working relationships with potential users of the LOICZ products. Inter- and non-governmental agencies such as IOC-UNESCO with its Global Ocean Observation System (GOOS), IAI, and APN, all of which have major interests in the world's coastal zone, were represented or supported the Meeting, and opportunities were taken to enhance mechanisms for the transfer of science to policy and other decision-making. LOICZ continued its efforts to enhance the brokering of issue-driven science and its implications for users, notably with a public policy-industry users meeting in Bahia Blanca.

The *human dimension* of coastal change regimes provided a vital strand in the tapestry of the OSM discussions, working groups and the three targeted workshops that preceded the conference. Here, we asked leading questions in order to:

- a) identify the land-based activities (drivers) which affect and/or enhance the flow of material through the coastal zone,
- b) influence the cycling of these materials, and
- c) explore the interaction of respective flux changes with the socio-economic drivers

Understanding processes and derivation of models and budgets for materials (especially C, N, P and sediments) across the whole coastal water continuum, including the catchments, estuaries and coastal seas, was a second vital strand. Here, the biogeochemical budgeting (see workshop description below) – following the standardized approach developed within LOICZ – provided progressive insight into regional scenarios of C, N, P cycling in the context of global change.

The scaling of findings and modeling from local-to-global continues to be a crucial issue. The broad integrative typology approach taken by LOICZ aims to highlight current and future aspects of the scaling question: this is crucial to LOICZ and its global commitment.

Program (some general remarks)

Five topical sessions and two working groups were held during the meeting paralleled by the poster sessions:

Session 1:	INTERREGIONAL COMPARISONS:REGIONAL PRESSURE –STATE ISSUES
Session 2:	HUMAN DIMENSIONS OF FLUXES
Session 3:	SEDIMENTS FLUXES AND BUDGETS
Session 4:	INTER-REGIONAL COMPARISONS: A LOICZ BIOGEOCHEMICAL APPROACH
Session 5:	TYPOLOGY & SCALING

Working Group I: *Typology developments river catchments – coastal seas*

Working Group II *LOICZ in Global Island States and the Caribbean*

Pre-OSM Meetings and Workshops (by invitation):

- LOICZ-UNEP South American Biogeochemical Budgets Workshop, (10-12 November)
- Latin BASIN “Latin American Aquatic Systems” Workshop, (11-13 November)
- SARCS-WOTRO-LOICZ South East Asia Workshop – Phase 1 Final Synthesis (12 –13 November)

In general the typology discussion caught up with efforts to facilitate the links between the IGBP projects. The whole water-continuum from the catchments to the ocean margins as outlined in the IGBP-Continental Aquatic Systems initiative (CAS), was discussed in a joint IGBP-BAHC (Biospheric Aspects of the Hydrological Cycle)/LOICZ river basin/coastal zone typology working group as well as in a pre-Meeting workshop (11-13 November) on “Latin Basins”. Fluxes of groundwater into the coastal sea and how they influence the cycling of chemicals was an issue in the OSM discussions.

New features were identified, in particular from the final synthesis of the integrated South East Asian core project of SARCS/WOTRO/LOICZ (SWOL), where scientists have developed considerable experience in quantifying residual production and flux changes driven by various socio-economic activities and affecting various environmental systems. The project received considerable recognition for serving management and decision making purposes and is therefore of specific importance for the intergovernmental networks APN, IAI and ENRICH. It was identified to contribute as a blue-print for integrative issue driven science in other regions by providing experiences in cross-disciplinary approaches and development of modeling tools.

APN support specifically offered the chance to LOICZ to concentrate further efforts on enhancement of its scientific activities and networking in the in Island/Atoll regions, including Oceania and South Asia as well as in the Wider Caribbean. Here, in particular, the human dimensions of coastal change at demonstration sites provides a way ahead. The **drivers, pressures, state, impact, response** scheme (DPSIR; see LOICZ R&S Report 11, 1998) proved beneficial for providing a descriptive framework for this approach. Again the SWOL project synthesis showed an important direction to follow in these LOICZ Island efforts and

the Meeting agreed to aim at close collaboration with the regional intergovernmental bodies and direct users such as IOC GOOS from the beginning.

Not surprising the vital need for a close association of scientists and science-users (environmental managers, industry and policy makers) was a continuing theme throughout the whole Open Science Meeting. While a scatter of science-users were represented (and wider interest in participation had been provided), the meeting was predominantly scientists talking to scientists. However, an evening session engaging end-users in Bahia Blanca was well attended (navy, coastguard, local government, industry) and resulted in fruitful discussions about potential science-user interaction in the region. (For detailed Programme please refer to the proceedings volume)

Outcomes/Products

Products from the Meeting, as well as the abstracts and proceedings contained herein, include publications of two special issues addressing major scientific contributions to the LOICZ issues. *The Journal of Sea Research* (Elsevier) and the journal *Regional Environmental Change* (Springer) will provide platforms for contributors to share their findings with a broad scientific community. In addition, three separate LOICZ R&S Reports will be published in early 2000, each containing the science outcomes from the pre-OSM workshops dealing with: South American Biogeochemical Budgets, Latin BASIN – Latin American River Basins, and SARCS-WOTRO-LOICZ South East Asia Project – Phase I Final Synthesis. The Meeting Proceedings (*Printing supported by APN*) with a full documentation of the program, discussions, participants and abstracts have been published immediately following the Meeting in late 1999.

Future Directions

SWOL

The Synthesis of the SWOL, SARCS WOTRO LOICZ project directly paralleled a proposal towards a second period for the project which was submitted to the Dutch funding agency WOTRO and is expected to receive final approval in early 2000. Following the OSM discussions and vital exchange with the global scientific community focus will be on sophisticated studying of impact – response interactions in coastal system change and management application. Socio economic science will become involved even more closely and besides residual modelling monetarisation will receive increasing attention.

For upscaling towards regional synthesis efforts will be directed to enhanced typology development and application, i.e. increasing the number of demonstration sites and clustering the region into areas showing specific similarities in the DPSIR features. The LOICZ global coast typology database will prove as a platform. Application of results will be enhanced by means of close links with global monitoring efforts such as the Coastal GOOS (UNESCO/IOC) and intergovernmental networks like the APN as well as START.

LOICZ Global Islands

In order to complement the LOICZ global syntheses and further studies in major Global Island Regions the Pacific-Indian Ocean and Wider Caribbean have been identified to become the priority LOICZ areas for this kind of scientific work. The outline for follow up activities in 2000 is as follows:

(until 2nd half of 2000) LOICZ R&S report volume of the regional assets – existing scientific information to be reviewed against the LOICZ task, for example to answer the questions:

- What is the current status of material fluxes from drainage basins to the coastal sea as

- surface and/or groundwater runoff?;
- How do these fluxes undergo changes and what are expected trends for future developments?
- What are the other transboundary fluxes interactions and impacts from ocean and atmospheric inputs and how do they vary?

Emphasis shall be put on the questions of how do humans affect these transport pathways and perturbate the cycling processes of the key materials, and how does this change feed back on the socio economic system.

Included and following up on the earlier LOICZ / START activities in Oceania – sea level rise - will be an important issue included. (This is matching a respective proposal directed to APN for funding consideration in the 2000 call earlier)

Partners in the two regional projects will be SOPAC (Fiji) for the South Pacific with support from South Asia (both direct outcomes of the APN engagement in the LOICZ OSM) and the CARICOMP network of scientific institutions in the Caribbean.

In addition to these regional overviews, up to three integrated pilot projects in each of the two regions shall be identified and proposals detailed to elucidate the land-sea interactions and human dimensions of change. A scientific template on which to build these pilot projects may be drawn from the LOICZ SWOL project (reference forthcoming R&S report from SWOL) where efforts are aimed to express the change of systems functions in economic terms.

Both of the proposed regional R&S reports and the proposed pilot studies for the regions will contain a synthesis of physical, biogeochemical and human interaction processes relevant to the global change scientific community and will contain deliverables suitable for management. The preparation of the reports and the project proposals included will be linked to the IOC C-GOOS program to ensure that the identified pilot studies to be carried out in the second step will also become pilot sites for the C-GOOS monitoring effort. Deliverables should also ideally be linked to activities of the ICAM programme of IOC. The IOC representative emphasized the opportunity to underpin the proposed work process through the capacity building component (TEMA), and that they would be ready to contribute to such efforts. This would involve both building additional capacity and encouraging efficient and improved use of existing capabilities.

The two proposed regional IGBP/LOICZ R&S reports will be presented and discussed during regular conferences or workshops in each region. It is proposed that the Pacific-Indian Ocean report will be presented during the Climate and C-GOOS meeting, 11-12 August 2000, Tonga, South Pacific. The Wider Caribbean Report will be presented in the draft form at the LOICZ Latin BASINS meeting planned for early September in Caracas, Venezuela.

Following the presentations of the R&S reports (including the pilot study proposals) consensus will be sought for submission of the study proposals for funding to donor organizations. This needs to be accomplished before end of 2000 in order to allow for implementation of the pilot projects no later than early 2001.

Discussion brought forward the following key points: The SOPAC representative as well as the IOC and CARICOMP participants underlined the appropriateness of natural and

socio-economic integrating science approaches (as in SWOL) for management. Initial key areas in different Pacific Island locations were already identified. Pressures such as tourism could be addressed together with effects of flux changes for system functioning, for example in terms of fishery productivity. Sediment transport was reviewed in the context of its relevance to sea level issues. The proposed R&S reports were recognized as having potential to provide a sound rationale for the regional LOICZ programs allowing for upscaling and LOICZ-relevant inventories of past and ongoing science information on coastal change.

In some examples provided to the meeting, it was underlined that the policy-making process would benefit significantly from these projects which could help to ameliorate a major constraint -- the lack of synthesis of existing data. For example, no key environmental function synthesis is available yet and LOICZ was considered to be in a position to facilitate this vital process by development of the proposed R&S reports and the pilot site proposals aiming at issue-driven science.

LOICZ BASINS

Following the LOICZ Latin American Basins Workshop, preceding the LOICZ 4th Open Science Meeting, which followed the approach taken in EuroBASINS the Meeting started preparation of a LOICZ R&S report – to be published in early 2000. The report reviews the heterogeneity of natural conditions of LA river/coastal sea systems such as catchment size, geological activity (Andes versus Eastern Plains), as well as of the human dimensions such as land use and pollution in deriving a regional synthesis. It expands on currently available knowledge and gives emphasis to future changes of fluxes, considering major pressures relating to water, sediments and contaminants issues.

The products arising from this exercise currently under development are a database on catchment characteristics and fluxes in Latin America, which is expected to link with information compiled through the BAHC project (Dr M. Meybeck). Review articles to be prepared in 2000 following the DPSIR framework will focus on specific rivers in Patagonia, the Rio de la Plata, the Rio San Francisco, Par del Sul, the Orinoco River, the Rio Magdalena and rivers along the Pacific coast. Database, review articles and the R&S report will form the scientific background from which to **develop a science plan** and targeted project proposals for integrated BASIN research in the forthcoming years. This work is planned for presentation the **SAMBAS (South American Basins) meeting in Caracas, Venezuela, September 2000**, with a view to marrying the two LOICZ BASINS efforts in South America and the Caribbean.

Further work will follow along these lines and concentrate on the African continent (**AfriBASINS** – July 2000 Kenya - tentative) and in East Asia (**East Asia BASINS** – Oct/Nov. 2000 – Hongkong - China Beijing tentative). The latter will in particular involve and synthesize regional research on catchment coastal sea interaction elaborating on system change processes and human dimensions in catchments from Russia to Korea. Links to the other LOICZ Basin activities guarantee the potential for global upscaling.

Activities planned for 2001, which build upon the OSM results comprise similar synthesis workshops in South East Asia, Australia, South Asia and a second run in the others to implement the pilot study site activities.

LOICZ will principally continue to strengthen its links to the APN and acknowledges the

value added through embedding its project work into the regional strategies and frameworks of intergovernmental bodies. This is seen to enable better access to the user and policy levels as well as enhanced scientific networking and capacity building.

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