

LOICZ NEWSLETTER

LOICZ Workshop on Typology

The LOICZ Core Project is developing a typology to evaluate similarities among various coastal areas. A workshop was held at the Core Project Office in Texel on February 24-26 to compile a data set which could be used for the development of an initial typology (or typologies). This initial typology will be produced in the next few months and will relate primarily to the ongoing biogeochemical modelling efforts in LOICZ.

Much of the discussion concerned the need to weigh both short- and long-term objectives in the development of a coastal typology. One view was that it would be most desirable to initiate a long-term research project that focused on system processes. Such a product would evolve over a period of several years. Another view was to develop a multi-use typology that could include factors such as socio-economics and natural and human-induced hazards which are relevant to the ultimate goal of integrated assessment (Turner and Adger 1996).

The conceptual basis for the typology framework activity described in the Implementation Plan was discussed and suggestions for possible revision were considered by the group. A consensus was reached that a preliminary coastal typology could be produced by the end of 1997 after which it will be demonstrated to and reviewed by the larger LOICZ community. It was agreed to proceed with the compilation of data for a number of terrestrial,



This is the third newsletter of the Land Ocean Interactions in the Coastal Zone (LOICZ) Core Project of the IGBP. It will be produced quarterly to provide news and information regarding LOICZ and related activities.

aquatic, and socio-economic variables at different geographic scales that could be circulated and reviewed by LOICZ researchers. An example from the Gulf of Guinea in West Africa (Figure 1) displays catchment areas defined by 5' x 5' grid cells and coastal units (delineated by the 50 meter contours) defined by larger 1° x 1° cells.

A plan of action was adopted that involved the following conceptual framework:

1. The objectives of identifying fluxes through and transformations of materials in the estuarine zone could be effectively achieved by identifying data sets which might be functionally used in three component typologies: (a) an "input" typology representing natural and anthropogenic fluxes from land and atmosphere into the

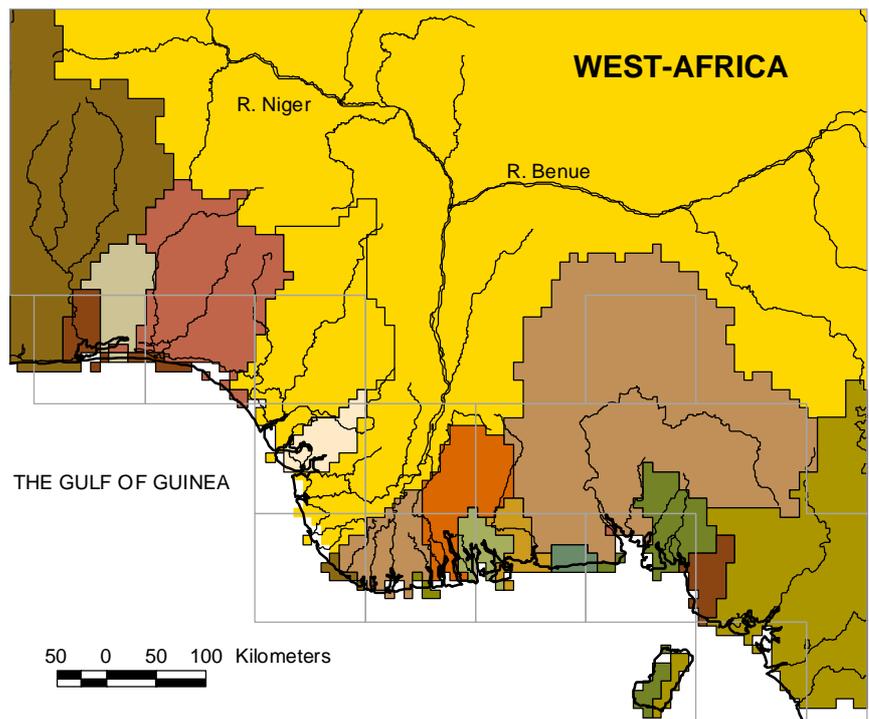


Figure 1. Map of possible grid cells for LOICZ typology data

estuarine zone; (b) a "transformation" typology which characterises the biogeochemical reactions within the zone (e.g., biomineralisation, net primary production, etc.); and (c) an "exchange" typology representing the exchange of material from the inner shelf, primarily to the outer shelf and ocean, but potentially to land or air if that is relevant. Inherent in each of these component typologies is the potential for multiple typology layers.

2. The immediate objective was to develop sets of data which could be used for testing typologies for the estuarine/marine environment and the terrestrial component. Data sets needed for the outer shelf and exchanges with the open ocean were being considered by others and would be handled separately.

3. The formulation of data sets for typologies relating to "exchange" and "transformation" of nutrients and materials is relatively straightforward and depends on a number of primarily marine components. In contrast, data for the "input" typology deals primarily with terrestrial variables and their interactions; thus, the development is more challenging.

4. The short-range objective of the typology exercise is to develop a qualitative system to extrapolate or globalise local and regional flux estimates that are derived from biogeochemical budget models. Modelled results will be applied to coastal reaches with similar bio-physical and land-use attributes.

5. It was recognised that the initial typology product be as rigorous, versatile, and comprehensive as possible; however, the time constraints and application to biogeochemical flux globalisation were given priority by the workshop.

Three related issues were discussed in detail by the workshop participants. Firstly, the nature of readily available digital databases, scalar properties (both spatial and temporal), and

potential problems with such databases were considered. A second point of concern was that environmental variables should be sampled or estimated at the same temporal and spatial scales for purposes of inter-comparison. If this was not possible, or if it would limit the number of input parameters, certain statistical and modelling procedures could not be used. Thirdly, the problem of a practical definition of the landward portion of the coastal zone depended on and was constrained by both of the other concerns, as well as by operational considerations.

A great deal of discussion in the workshop focused on whether to use a definition of the landward extreme of the coastal zone that was based on simple topographic criteria (e.g., elevation), or to use a definition that incorporated contributions from and attributes of drainage basins. Although a drainage-basin approach was favoured as a more scientifically sound approach for hydrologic, sediment, biogeochemical, and socio-economic studies, such an approach would expand the definition of the coastal zone to continental scales and greatly increase data needs and processing requirements. The possible use of topographically defined coastal basins or of coastline assignment to basins defined on the basis of divides between major river watersheds was discussed. These approaches are being considered for future applications to the coastal typology but they are recognised to be conceptually complex and

LOICZ Open Science Meeting

The preparations for the 3rd LOICZ Open Science Meeting are moving forward. As announced in our last edition in January, the OSM will be held from October 10-13th, 1997 at the Leeuwenhorst Conference Centre in Noordwijkerhout, The Netherlands. In February, the Organising Committee for the Meeting prepared an initial

programme and circulated it, together with a registration form, to the LOICZ Database contacts. The initial programme includes topics such as 'Terrestrial Inputs to the Coastal Zone', 'Coastal Typology', 'Biogeomorphology - The Coral Reef as an Example', 'North Sea coastal science sessions on 'Socio-Economic Models and Methodologies' and 'Biogeochemical Fluxes', and other sessions. The deadline for registration for the OSM is April 15th. A large number of applications have been received thus far; applications submitted after this deadline will only be considered in the selection procedure on a space-available basis.

Development of LOICZ Integrated Modelling Guidelines

It was recognised in the LOICZ Implementation Plan (Pernetta & Milliman 1995) that to properly study the fluxes of water and materials in the coastal domain it is essential to integrate natural sciences study with that of the interactions between socio-economic processes and their impact on the rates of flux and changes in these rates over time. LOICZ also recognises that in addition to these changes in biophysical components, integrated guidelines should also incorporate realistic scenarios of changing land-use, consumptive patterns, and demographics in the coastal zone. The only possible way of achieving this understanding is to conduct integrated studies that adequately balance different data inputs, conceptual models, and outputs of both the natural and socio-economic disciplines. This requires the development and application of models that can use common currencies to describe material flux, human welfare and human values.

The LOICZ Core Project is in the process of developing a document to address these integration needs.

This document will describe several conceptual/analytical approaches to the integration of socio-economic and natural science research in the coastal zone. The methodologies being developed represent a continuation of the previous LOICZ guideline documents dealing with coastal zone resource analysis (Turner & Adger, 1995) and biogeochemical budget modelling (Gordon *et al.* 1996). In addition to identifying links between these LOICZ approaches, this document will identify several high priority issues and scenarios to be evaluated by integrated modelling. The development of common conceptual frameworks and analytical techniques will allow more or less independent researchers the opportunity to generate comparable results that can be scaled up to regional and global estimates of the interaction of human actions and their impacts on coastal systems.

The guidelines will not be proscriptive in the sense that they can be applied to all coastal systems and situations. In almost all cases individual researchers will have to use techniques and methodologies specific to their interests. The goal is to provide a framework such that their results can be compared and compiled with those from other areas and regions of the world. Development of these guidelines implies a number of scientific compromises or simplifications. Because the methodologies should be globally applicable, they must be more general in nature those typically used by researchers evaluating specific socio-economic or natural science issues. In most situations the simple, generalised results can and will be generated from the typical, more detailed studies. In this sense, LOICZ supports and encourages local and regional studies that can be used to generate input into the global models and analyses.

Development of methodologies for the integration of natural sciences and socio-economic sciences is a challenge that requires linkages between the two fields. In the discussions leading up to the preparation of the

integration guidelines, two complementary approaches were identified: one beginning from the human health and welfare perspective focusing on the supporting role of natural and environmental resources and a second approach that attempts to evaluate the environmental resources and link them to the resultant socio-economic benefits and impacts.

LOICZ Workshop in Norwich, UK on Integrated Modelling Guidelines

From 17-19 March 1997, LOICZ sponsored a workshop on "Integrated Modelling Guidelines" held in Norwich, United Kingdom. The workshop was chaired by Professor Kerry Turner of the Centre for Social and Economic Research on the Global Environment (CSERGE) at the University of East Anglia. A mixed group of 17 natural and socio-economic scientists participated in the workshop to formulate preliminary generic guidelines for the interdisciplinary assessment of coastal zone resources with reference to sustainable management strategies and human welfare issues.

The basic concept required to address the integration modelling issues involves the scoping of various problems in the contexts of "Pressure - State - Impact - Response" scenarios. With this common background, a number of environmentally significant illustrative contexts, representing various levels of complexity, were developed. The contexts were recognised as simplifications of real world situations that would allow the LOICZ Project to develop useful methodologies in both short and longer terms.

The simpler contexts generally would have accessible data and good understanding of system processes, whereas the more complex cases require significant model development and data collection and compilation. At the

simplest level is the issue of coastal land use conflicts. Examples include reclamation of land from the sea to support housing development, expansion of ports, and industrial facilities. The next level of complexity was identified as representing tourism pressures. This example includes issues related to sewage disposal, impacts on fishing and navigational areas, potable water supplies, nature conservation, coastal geomorphology, and effects on local economies. Next, the impacts of natural (and human-induced) hazards were considered. The most relevant examples to human welfare are land-fall typhoons, earthquake-related (including tsunami) events, and oil spills. Here the interactions with humans, land use, and infrastructure are most important. At a higher level of complexity is the case of integrated estuaries and catchments. To evaluate this system in a socio-economic context, both temporal and spatial trends in land-use, demographics, and water, sediment and nutrient transport must be estimated in the coastal zone. This requires the use of existing models and remote sensing techniques. Finally, at the highest level of complexity, is the case of linked coastal sub-systems. This scenario involves a detailed quantification of the cascading effects of population growth in coastal areas on food supply (especially related to fisheries) and related socio-economic and biophysical impacts.

In addition to developing the outlined set of case examples for inclusion in the integrated modelling guidelines, the participating scientists outlined data gaps, existing models and analytical tools, and institutional support needed for successful implementation of such a programme. The LOICZ CPO has scheduled a follow-up workshop in Kuala Lumpur, Malaysia, from July 28-30, 1997, to further develop these integration modelling guidelines and to include examples relevant to southeast Asia.

NEW SCIENTIFIC JOURNAL

The initial issue of the scientific journal "Mangroves and Salt Marshes" was published by SPB Academic Publishing, Amsterdam, The Netherlands in December 1996. The chief editors are:

Dr. Eric Wolanski (physical processes); Australian Inst. of Marine Science, PMB 3, Townsville M.C., Qld. 4810, Australia.

Prof. Bill Wiebe (ecological processes); School of Marine Programs, Univ. of Georgia, Athens, GA 30602-2206 USA.

Prof. Yoshihiro Kohda (management topics); ISME, College of Agriculture, Univ. of Ryukyus, Nishihara, Okinawa 903-01, Japan.

This is an important new journal for scientists and managers working with mangroves and salt marshes. It has been recognised that these eco-systems are hydrodynamically and ecologically similar, yet the lessons learned from one have seldom been applied to the other. Both of these systems are disappearing world-wide: the present destruction of mangroves in many tropical countries replicating the past destruction in Europe and North America, but at an accelerated pace. The journal offers researchers and managers the opportunity to express their findings in a format focused on tidal wetlands world-wide and to learn from each others experiences related to knowledge gained in studies of mangroves and salt marshes. Contributions to the new journal are invited and instructions for authors can be obtained from one of the three chief editors. The journal publishes original research papers, discussion papers, and short reports. Multidisciplinary papers are encouraged.

NEW PUBLICATION

Proceedings of International Conference on Coastal Change. Inter-governmental Oceanographic Commission Workshop Report No. 105 Supplement, 1023 p., IOC-UNESCO, Paris, 1996.
Chief Editor: Prof. E. Duursma

The Conference addressed aspects of coastal change leading to impact assessment and the prediction of future changes. Outputs of the Conference are useful to managers, technical experts and decision-makers, as well as to the scientific community, due to the increased awareness of the importance of the coastal marine environment and its socio-economic implications (Agenda 21, Chapter 17). In this framework, the coastal zones of developing countries are studied with particular care.

To receive the Proceedings please contact:
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NEW LOICZ PUBLICATIONS

- Report of the Second LOICZ Executive Committee Meeting. Texel, The Netherlands, Nov '96. LOICZ/EXCOMM.2. *Meeting Report No. 19.*
- Report of the Typology Workshop. Texel, The Netherlands, Feb '97. *Meeting Report No. 21.*

(LOICZ Meeting Reports are not available for general distribution).

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LOICZ 1997 CALENDAR

- LOICZ SSC6 Meeting May 28-30, Ensenada, Mexico.
- LOICZ Budget Modelling Workshop, June 2-3, Ensenada, Mexico.
- LOICZ Second Workshop on Integrated Modelling, July 28-30 Kuala Lumpur, Malaysia.
- Coastal Margins Task Team, (CMTT) Workshop, October 8-10, Texel, The Netherlands.
- LOICZ Open Science Meeting, October 10 -13, Noordwijkerhout, The Netherlands.
- LOICZ SSC7 Meeting, October 13-14, Noordwijkerhout, The Netherlands.
- SARCS/WOTRO/LOICZ P.I. Meeting, November 24-28, The Philippines.

"Classical understanding is concerned with the piles (of sand) and the basis for sorting and interrelating them. Romantic understanding is directed toward the handful of sand before the sorting begins. Both are valid ways of looking at the world although irreconcilable with each other.

What has become an urgent necessity is a way of looking at the world that does violence to neither of these kinds of understanding and unites them into one. Such an understanding will not reject sand-sorting or contemplation of unsorted sand for its own sake. Such an understanding will instead seek to direct attention to the endless landscape from which the sand is taken. ..."

Robert M Pirsig, from Zen and the Art of Motorcycle Maintenance