

3. Results and Applications

3.1 Community and Capacity Building

The workshop series has provided an enhanced awareness of the issues and problems of integrating data and information across spatial scales. A cadre of scientists have had opportunities to apply the LOICZ typology tools and database and to contribute to the further development of the methodology and approach by contribution of outcomes and identification of additional data requirements. Discussions and interactions during the workshops have led to further collaboration and utility of the tools and their applications to other local and regional issues beyond the goals of the LOICZ-UNEP project. For example, New Zealand scientists are developing an estuarine classification system for environmental management purposes. This requires a finer scale of resolution than the global half-degree scale application of LOICZ. The LOICZView tool is being used with a separate and detailed database in these developments. Similarly, the tool and databases are being applied to questions in other parts of the world, often augmented with local regional data relevant to the research issues.

Most participants in the workshops had attended earlier and companion workshops addressing biogeochemical budget development in different continental regions of the world. The network of scientists from the biogeochemical budgets has been active and sustained in the further development of biogeochemical budgets for additional sites, these have been incorporated in the database. This work continues and the approach is used in formal teaching and training courses in various regions. The typology workshops have involved additional scientists, particularly those with experience in geoinformatics, and the resultant interactions have led to a number of products exemplified in the attached CD-ROM. Importantly, the network of scientists continues to collaborate on scaling and typological research beyond the workshops, adding to the products for the project and applying the approach to allied problems. A final global integration workshop for the project held in November 2001 added further impetus to the network and the wider issue of scaling and coastal classification.

3.2 Coastal characterization

3.2.1 General

Major progress was made over the course of the three workshops in terms of both coastal characterization itself (typology) and the conceptual and operational tools available for the task. The strategy of having workshop participants work on and report typology experiments of their own devising produced an eclectic mixture of products and experience. These are listed and briefly described or discussed in section 3.2.4 below, and in more detail in Appendices IC, IIC, and IIIC. Most of the contributions were prepared in electronic, browser-viewable form; these are available for review and examination on the CD-ROM accompanying this report, and on the project web-site.

Sections 3.2.2 and 3.2.3 below briefly summarize the developments in the Web-LOICZView tool and in the typology (now combined with budgets) database. This is done for two purposes: to document the power of the workshop process in identifying and shaping the necessary developments; and to provide a context in which to view the participant contributions from the three workshops. Major changes in both the presentational and analytical tools available over the course of the project, as well as in the variables available for analysis, mean that there are substantial differences in form and content between otherwise similar experiments in the first (Australia-Asia) and the final (Europe-Africa) workshops. It is a tribute to both the underlying robustness of the approach and the dedication and quality of the workshop participants that this developing framework does not lessen the conceptual and practical significance of the work done in the earlier stages of the development.

3.2.2 Web-LOICZView developments

The major capabilities added to the WLV application over the course of the project were the eigenvector analysis (principal components) package, and the cross-clustering operation (see the CD-ROM or web-site tutorial pages for descriptions of these features). Other developments, however, had comparably significant effects on the ease of use and the products. These include file management options such as

the ability to rename and combine files, enhancements to the tolerance of the application for the formats of uploaded files, and substantial expansion of the labels and information messages provided to the user.

Equally important were the major additions in terms of information available for easy use, capture and download. The “point identification” function in the cluster visualization was added, as were additional summary statistics in the “information” outputs of the overlay and dual visualization operations. The extent of data available for download and the ease of doing so were increased, and the ability to save products in conveniently usable format (html, pdf, text) was expanded.

3.2.3 Database developments

Over the course of the project the actual contents of the database were greatly expanded, while ‘debugging’ and refinement improved the utility of the existing contents. A major effort was devoted to incorporating the river basin variables provided by the University of New Hampshire-BAHC groups; this involved not only adapting the model flow and cell structure to the LOICZ system, but also populating the basins with additional variables and working through the ways of presenting and using cumulative basin data projected onto one or a few coastal cells. Other substantial additions included addition of ocean color (chlorophyll) data, and greatly expanded hydroclimatology data.

User-support tools in the ‘front end’ of the database were developed to provide major improvements in the user’s ability to review, select, and modify the available data. Additional cell categories were added to provide truly global coverage, and various options for the arrangement of the variable selection pages were provided. The major development efforts provided extensive new capabilities for dealing with the dataset assembled. The user can now view summary statistics and a histogram, exclude null values, filter, selectively modify or transform any of the variables in a data set, and can create a correlation matrix for the entire data set. These added tools greatly facilitate data selection for clustering.

3.2.4 Workshop typology contributions.

At each of the three regional workshops, participants were provided with on-line computer access to the database and clustering tools, and encouraged to explore regions and topics of interest with the assistance of the resource people. Working individually or in small groups, all of the participants completed some form of project-relevant typologic study and prepared results for collection and inclusion in the workshop reports. The workshop processes and products are described more fully in Appendices I to III, and the project results are contained in the CD-ROM accompanying this report, and posted on the project web-site.

These activities served the dual purpose of training the participants in the overall project approach and the use of the tools, and of providing user tests of the database contents and the web tools designs.

Table 3.1 Participant Contributions, Asia-Australia Workshop, Brisbane

See Appendix I for a more detailed description and discussion, and the CD-ROM version of the report for the actual products.

	Author(s)	Region(s) and Subjects
1	Tetsuo Yanagi	Japan/East Asia: Classification of coastal eutrophication in Japan and application to other areas of Asia.
2	Jia-Jang Hung	NE Asia (China/Taiwan/Japan): classification of the East China Sea region.
3	Wenzhi Cao, MingWong	China (Japan, Korea): Typologies for the Chinese coast, with emphasis on cluster comparisons and human activities.
4	Liana Talaue-McManus	SE Asia (world comparison): Clustered typologies for SE Asia, applied to the world and compared with independent typologies.
5	Vilma Dupra	SE/East Asia: Proxies for biogeochemical budgets.
6	Gullaya Wattayakorn	Thailand/SE Asia: Human impacts on SE Asian coasts.
7	M.L. San Diego-McGlone	Philippines: Classification of eutrophication in Philippine waters.
8	Laura David	Asia-Australia: Extreme events and vulnerability.
9	John Zeldis, Terry Hume	NZ-southern Australia: New Zealand estuary classification and scaling evaluations.
10	Bradley Eyre	Australia: Australian estuaries classification.
11	David Pullar	Australia: defining functional zones in Australian coasts - coastal productivity.
12	Bill Dennison	Australia: <i>Trichodesmium</i> spp. distribution.
13	LynneTurner	Australia: Comparative classification of Australian estuaries.
14	Victor Camacho-Ibar	Australia/South America: Freshwater discharge comparisons
15	Wajih Naqvi	South Asia (Indian subcontinent): coastal typologies with biophysical variables
16	Fred Wulff, Dennis Swaney	Europe: classification of coastal runoff and nutrient loads.
17	Bradley Opdyke, Bill Dennison	World (tropics): Mapping of tropical benthic habitats.
18	Stephen V. Smith	World: Proxies for biogeochemical budgets – ocean and river systems.

Table 3.2 Participant Contributions – Americas Workshop, Ensenada

See Appendix II for a more detailed description and discussion, and the CD-ROM version of the report for the actual products.

	Author(s)	Region(s) and Subject
1	Dennis Swaney	Biogeochemical budgets: Comparison spreadsheet & metadata.
2	Laura David, Victor Camacho, Dennis Swaney	Typology and biogeochemical assessment approaches.
3	Carlos Lechuga, Martin Merino, Francisco Contreras	Classification variables for CNP inputs – Mexico.
4	Paul Boudreau	Global classification: Biogeochemical approach – inputs and exchange processes.
5	Eduardo Marone, Eunice Machado, Bastiaan Knoppers	Comparison of classifications and physiographic parameters – Brazilian coast.
6	Joanie Kleypas, Gerard Szejwach	Classification of carbonate shelves – Caribbean.
7	Jose Carriquiry	Coral reefs classification – East Tropical Pacific and Caribbean.
8	Ramon Ahumada, Laura Farias	Discriminating oceanic and climatic values – Peru-Chilean coast.
9	Jorge Herrera	i) Identifying variables to discriminate groundwater and karst Regions –Caribbean and Atlantic coasts ii) Supervised clustering for global extrapolation
10	Jorge Marcovecchio	Impact of freshwater on coastal estuaries – Atlantic South America
11	Victor Rivera, Robert Twilley	Mangrove distribution – Caribbean.
12	Victor Rivera	Elevation and runoff – Southern Caribbean.
13	Mike Kemp, Robert Twilley	Estuaries classification and biogeochemical budgets estimates – Continental USA.
14	Vilma Dupra	DeltaDIP means and weighting by typology –SE Asia and Australasia.

Table 3.3 Participant Contributions: Africa-Europe Workshop, the Hague

See Appendix III for a more detailed description and discussion, and the CD-ROM version of the report for the actual products.

	Author(s)	Region(s) and Subject
1	Robert Buddemeier	Global: Humans in a changing coastal zone
2	Dennis Swaney, Bruce Maxwell	Global: Assessment of Δ DIP and Δ DIN from biogeochemical models data set
3	Howard Waldron, Dan Baird, Tickie Forbes	Regional characteristics of sub-equatorial Africa for budgets settings
4	Xavier Niell, Ricardo Prego	Gradients and drivers describing coastal types in Iberian Peninsular
5	Natasha Brion	Typology for linked riverine N and P loads to the ocean - European North Atlantic
6	Amani Ngusaru, Mwakio Tole	East Africa: Comparison of expert coastal typology and differentiating variables
7	J-P Gattuso	Characterising estuary and ecosystem types, and human pressures - Europe
8	Lars Ramm, Christoph Humborg, Sukru Besiktepe, Adriana Cociasu, Inna Yurkova, Fred Wulff	Comparison of Baltic and Black Seas
9	Charles Gabche, Nick Murray	Coastal typology and variables influencing nutrient fluxes – West Africa
10	Christos Anagnostou, Hassan Awad	Scaling issues and data trials for ocean and coastal site sensitivities – Eastern Mediterranean Sea
11	Steve Duardze	Evaluation of applications to land cover and oceans typologies – Northwest Africa
12	Laura David	Tool development: Portable search engine
13	Hartwig Kremer	Scaling and database integration for riverine DPSIR and chemical data