LOICZ Summary

The Land-Ocean Interactions in the Coastal Zone (LOICZ), a core project of the International Geosphere-Biosphere Programme (IGBP) and International Human Dimensions Programme (IHDP) on Global Environmental Change (GEC), has since 1993 studied the heterogeneous, relatively small but highly productive, dynamic and sensitive area of the earth's coastal zones. The science of LOICZ is focussed on the measurement of biogeochemical fluxes into and within the coastal zone. These fluxes are important because:

- Biogeochemical fluxes are the key variables for scaling up to global climate change.
- Biogeochemical variables are the key constituents for connections across coastal boundaries.
- Biogeochemical fluxes include primary production, which underpins ecosystems resources.
- Water and sediment quality determine distribution of key habitats and affect human use.
- They include key positive and negative feedbacks in coupled coastal systems.

LOICZ aims to overcome traditional disciplinary fragmentation, in particular between natural and human dimension sciences, to focus on the primary issues of sustainable human use of coastal systems in respect to vulnerability of coasts and risks for human uses through the following objective:

'to develop capacity to assess, model and predict change in the global coastal zone under multiple forcing, including the contribution of human activity and consequences for human welfare'

Science Themes

Confronting and managing the consequences of global environmental change whilst securing a sustainable future requires a more integrated approach that inculcates human aspects within traditional analytical methods of disciplinary studies LOICZ II will focus on how humans are supported by, and impact, the coastal system, and what policies and practices will be required to ensure the sustainability of this system. The LOICZ II strategy is designed to provide improved understanding that integrates coupled biogeochemical, physical and human dimensions of coastal change through 5 themes that form the backbone of its scientific activities. Because much of the change originates from outside the coastal zone, but is borne to it via river systems, this requires catchments and coasts to be considered as a single interrelated system – the water continuum.

Theme 1: Vulnerability of coastal systems and hazards to human societies sets the stage for the subsequent themes that address the wider coastal domain. It addresses the hazards to humans from coupled human and ecological system change, carrying capacities and vulnerability issues.

Theme 2: Implications of global change for coastal ecosystems and sustainable development focuses on conflicting spatial, temporal, and organisational issues of coastal change, and land and sea use, and how they influence natural resources availability and natural systems sustainability.

Theme 3: Anthropogenic influences on the river basin and coastal zone interactions address river catchment–based drivers/pressures that influence and change the coastal domain. The whole water cascade (source to sea) is considered as a single system.

Theme 4: Fate and transformation of materials in coastal and shelf waters focuses on budgeting methodologies to describe the cycling of carbon, nutrients and sediments in coastal and shelf waters and their exchange with the ocean.

Theme 5: Towards coastal system sustainability by managing land-ocean interactions provides an overarching integration cutting across the four other themes addressing the development and management of coastal zone resources in the context of strong and weak sustainability options.

Products

The outcomes of LOICZ are focussed upon a better understanding of (i) the temporal and spatial relationship between the flow of land-based materials and impacts on the coast, (ii) the complexity of the coastal sea environment in determining critical levels and thresholds, and (iii) the multiple interests of stakeholders from local to global scales which determine the net trajectories of drivers and pressures of change. LOICZ aims to produce a suite of deliverables that can scientifically underpin management. A key product line in this context will be integrated coastal system change models and scenarios of change and management options.