

LOICZ II: Shaping keystones for our bridges



L. Talaue McManus

University of Miami Rosenstiel School of
Marine & Atmospheric Science



1993 - 2002

2005 - 2014

SOCIO-ECONOMIC DRIVERS

ENVIRONMENTAL PRESSURES

How are humans altering these mass balances, and what are the consequences?

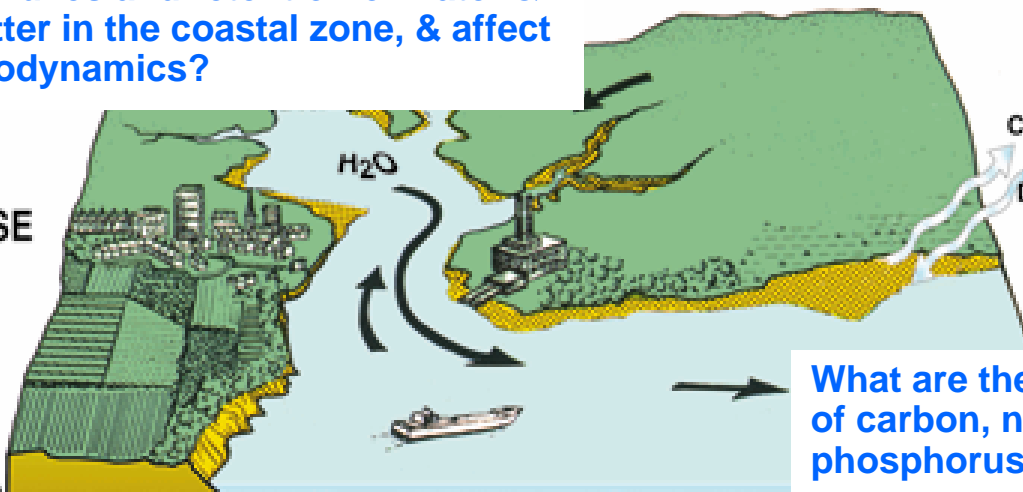
What is the role of the coastal zone in trace gas emissions (e.g., DMS, NO_x)?

Is the coastal zone a sink or source of CO₂?

How do changes in land use, climate & sea level alter the fluxes and retention of water & particulate matter in the coastal zone, & affect coastal morphodynamics?

POLICY RESPONSE OPTIONS

ENVIRONMENTAL 'STATE' CHANGES

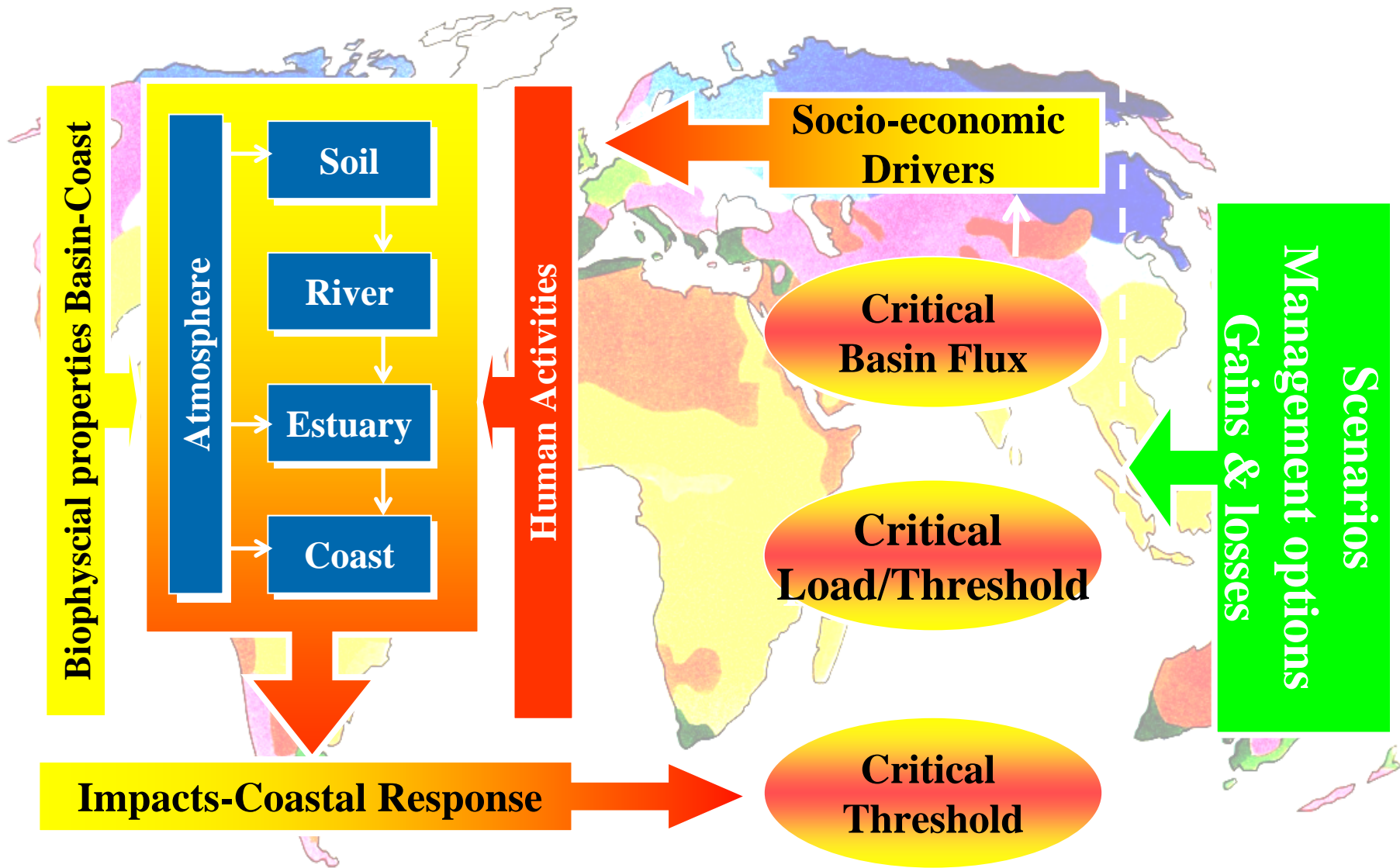


What are the mass balances of carbon, nitrogen & phosphorus?

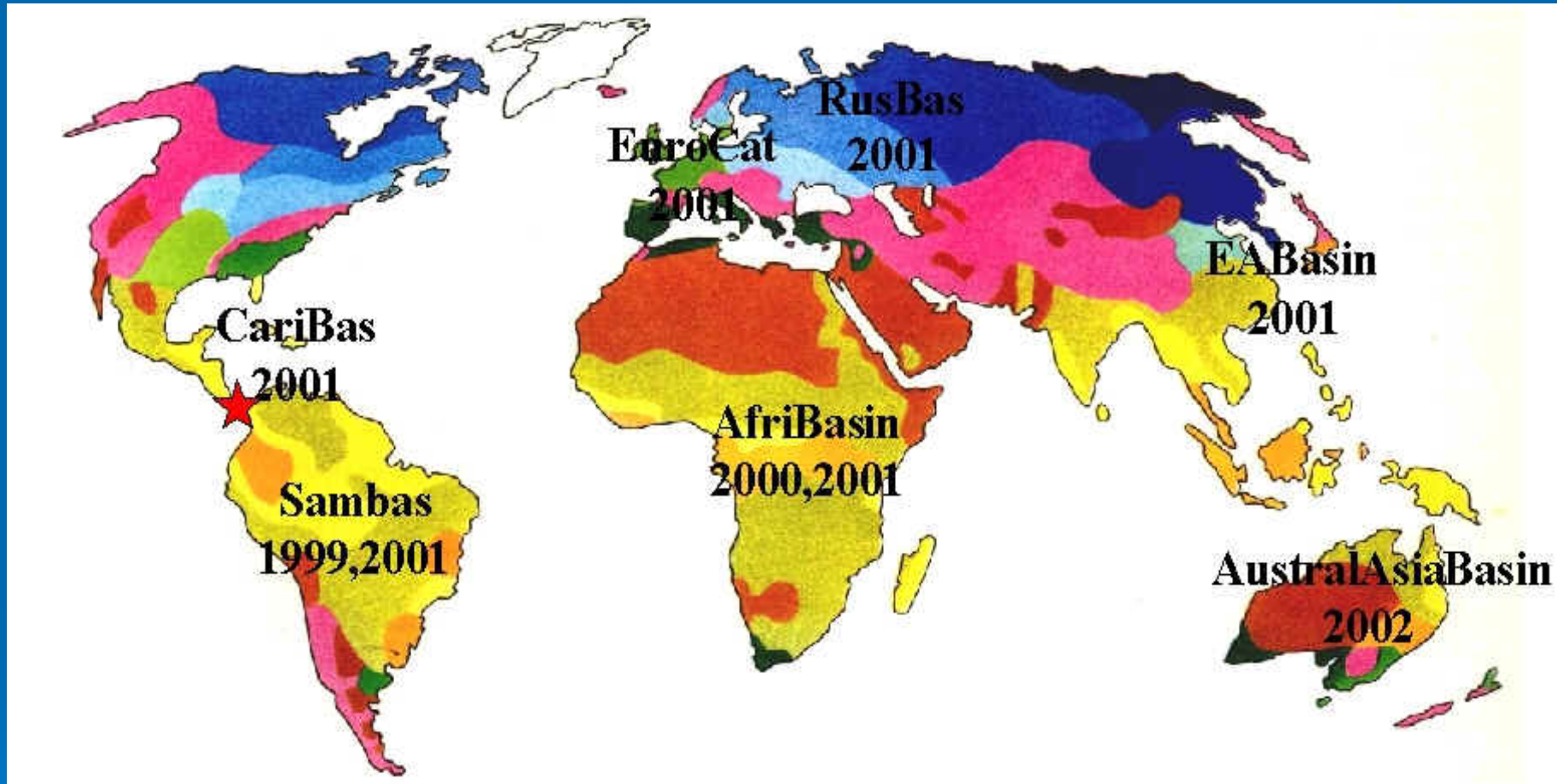
How can knowledge of the processes & impacts of biogeochemical & socio-economic changes be applied to improve Integrated environmental & economic management of the coastal Areas, ICAM ?

IMPACTS

DPSIR Framework & Critical Load/Threshold

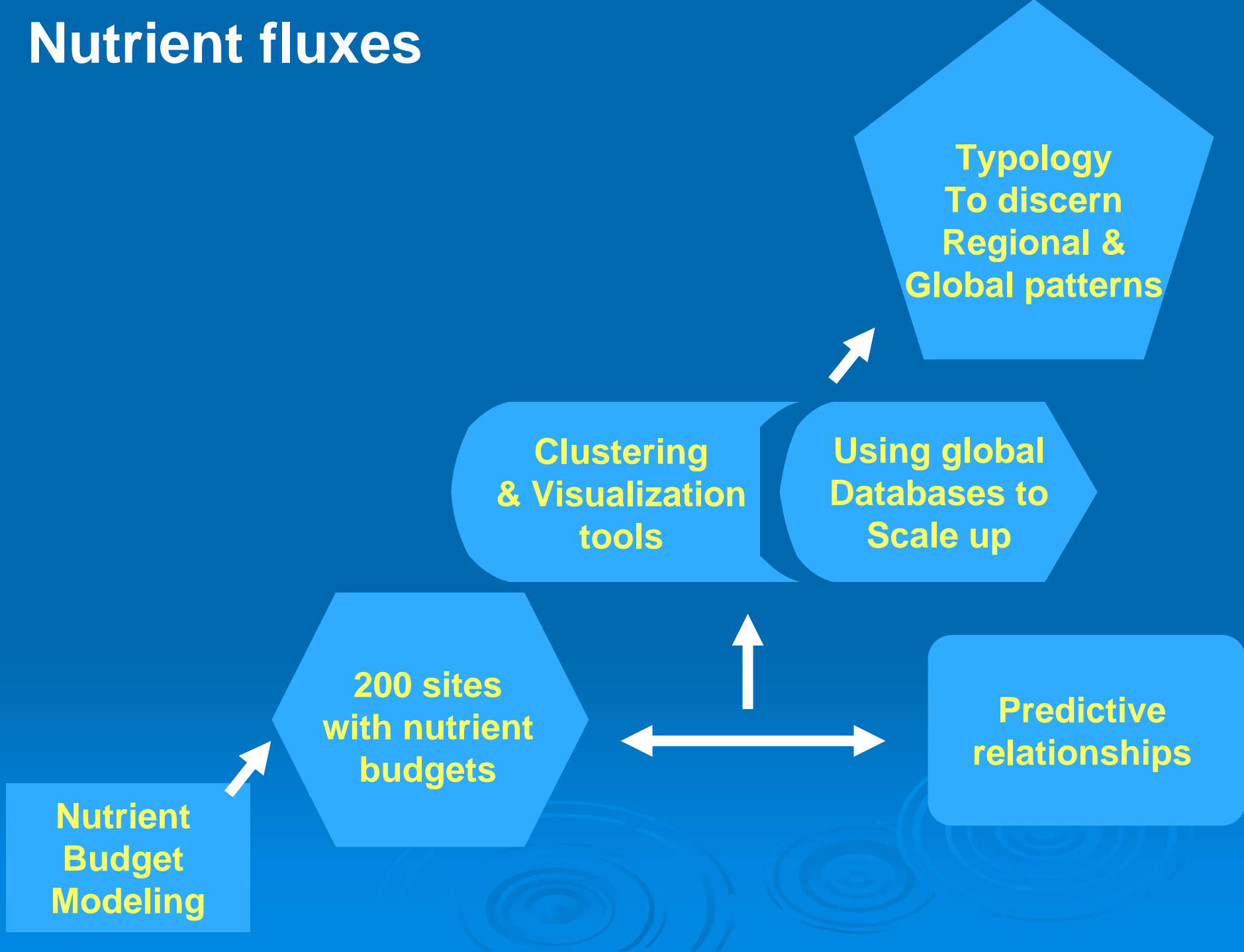


Current LOICZ Basins Network

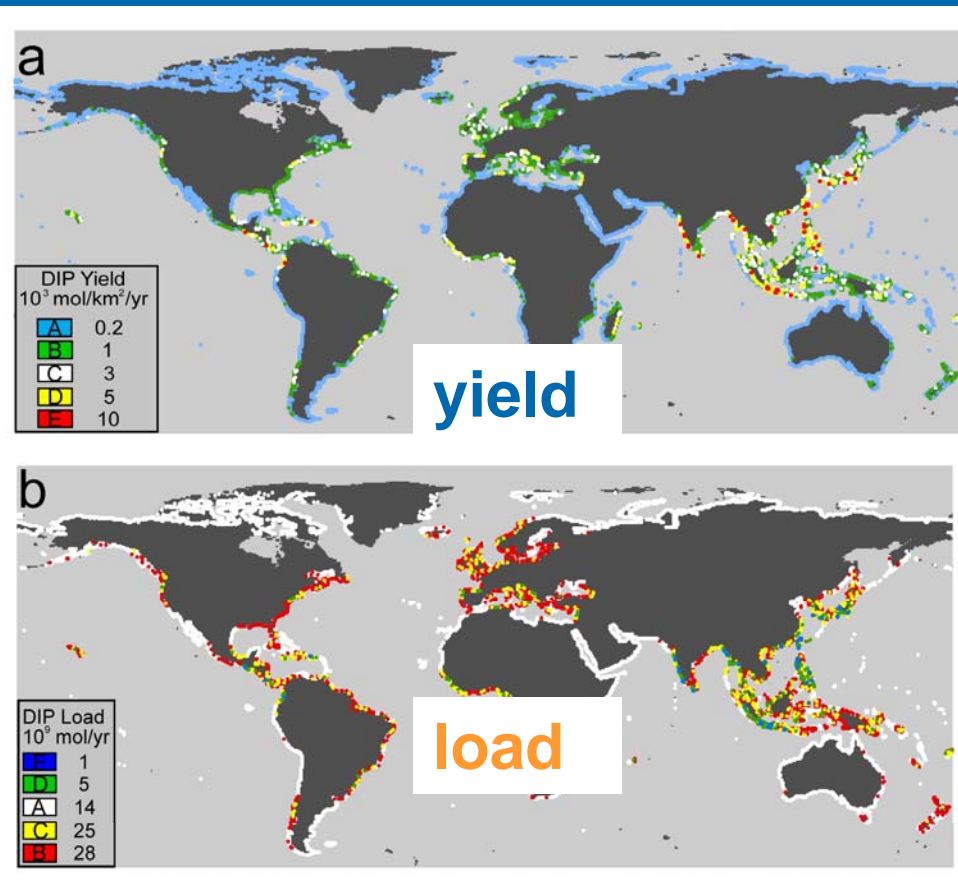


- DPSIR analyses of 100 river catchments
- Expert analyses upscaled to coherent subcontinental & continental regions
- Workshops, meetings, projects, desktop studies

Nutrient fluxes

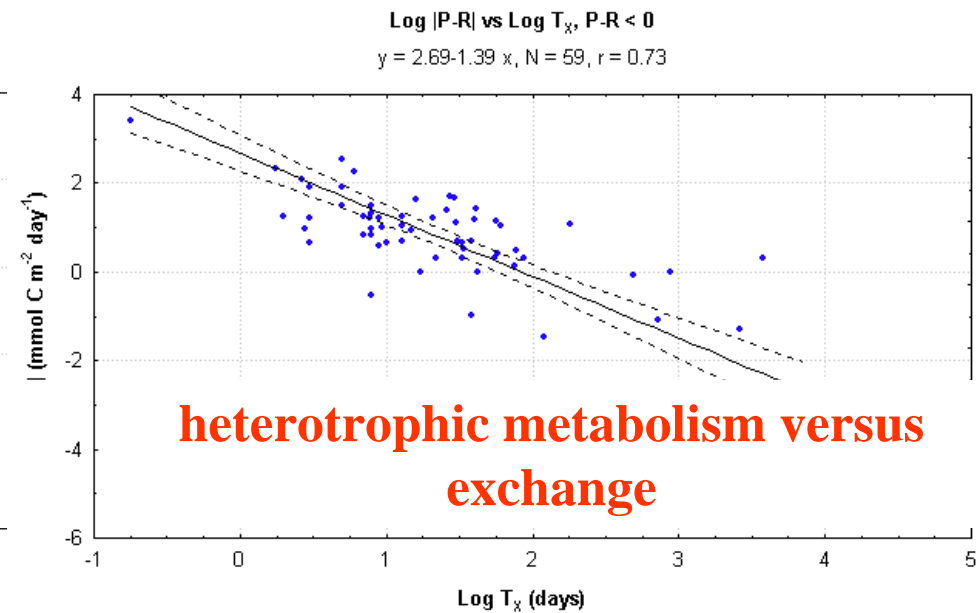
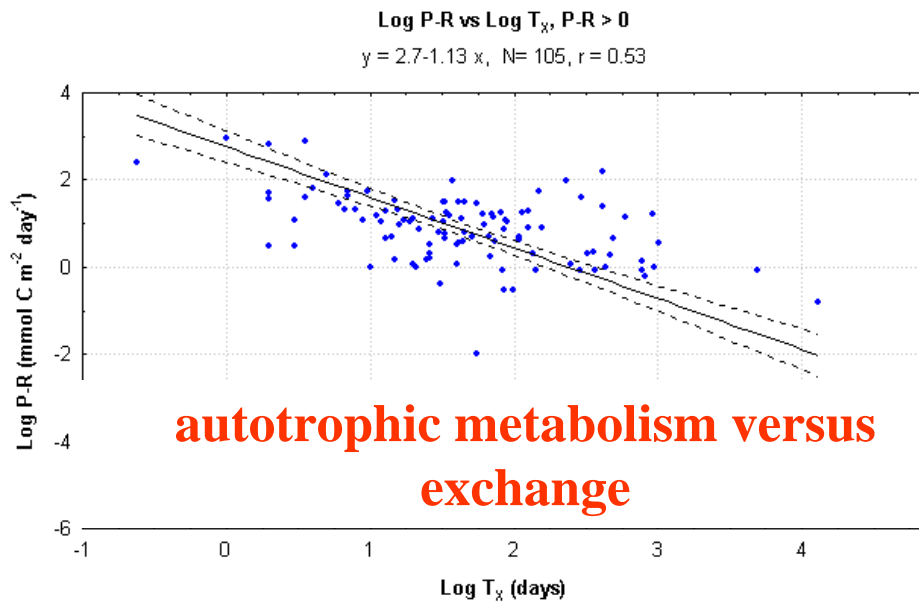
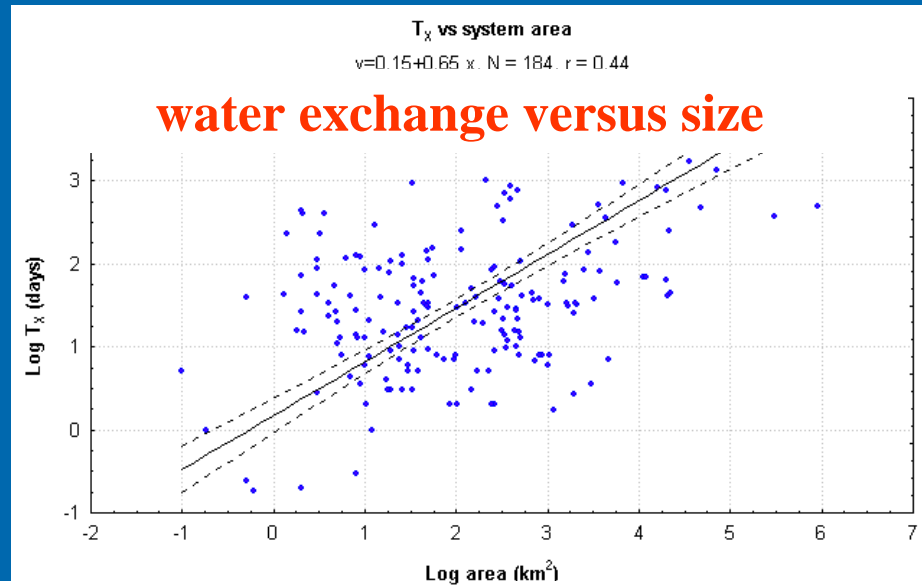


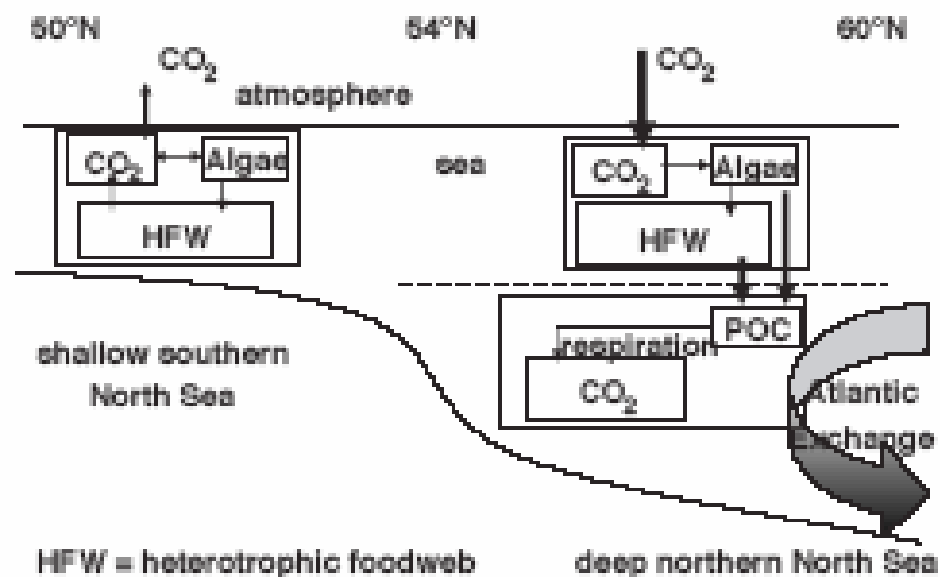
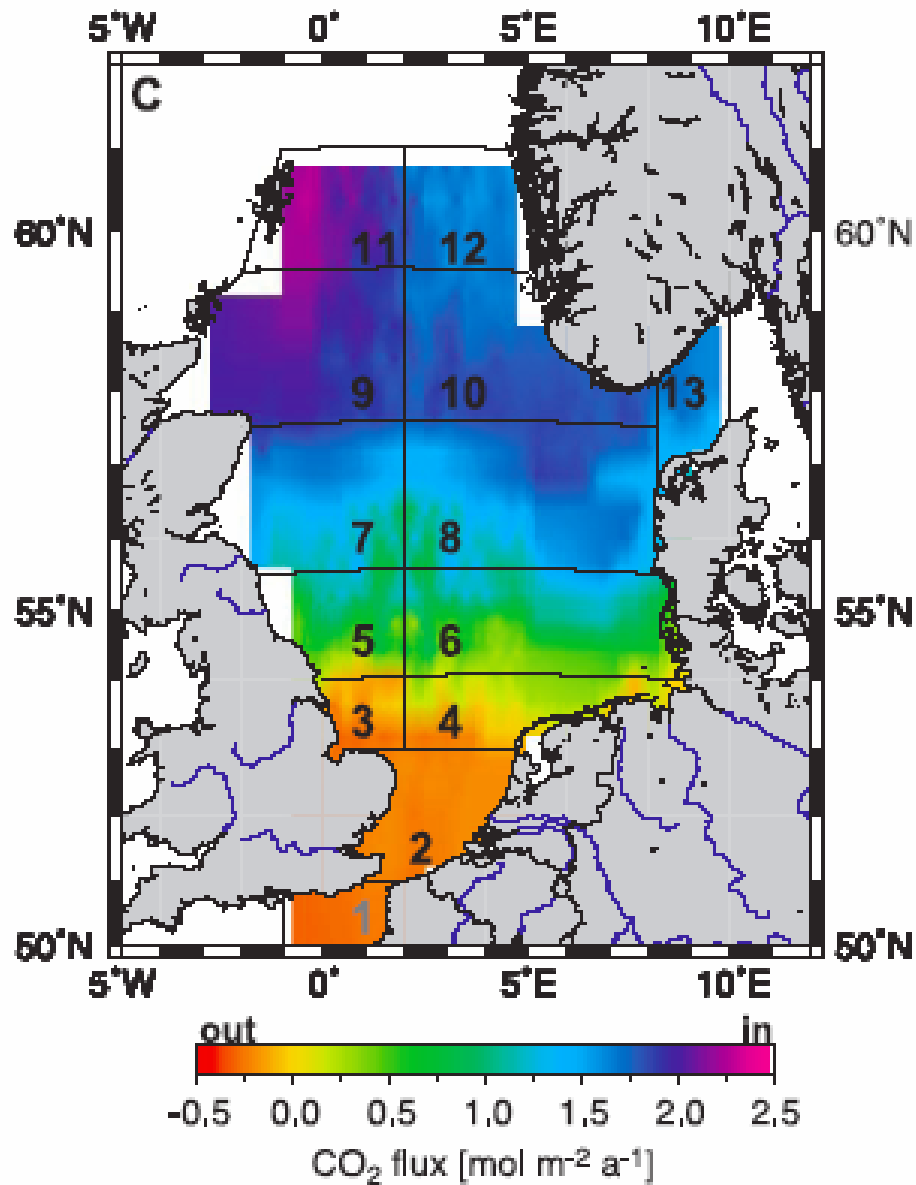
Nutrient yield and load to the world ocean (Estimates for DIP)



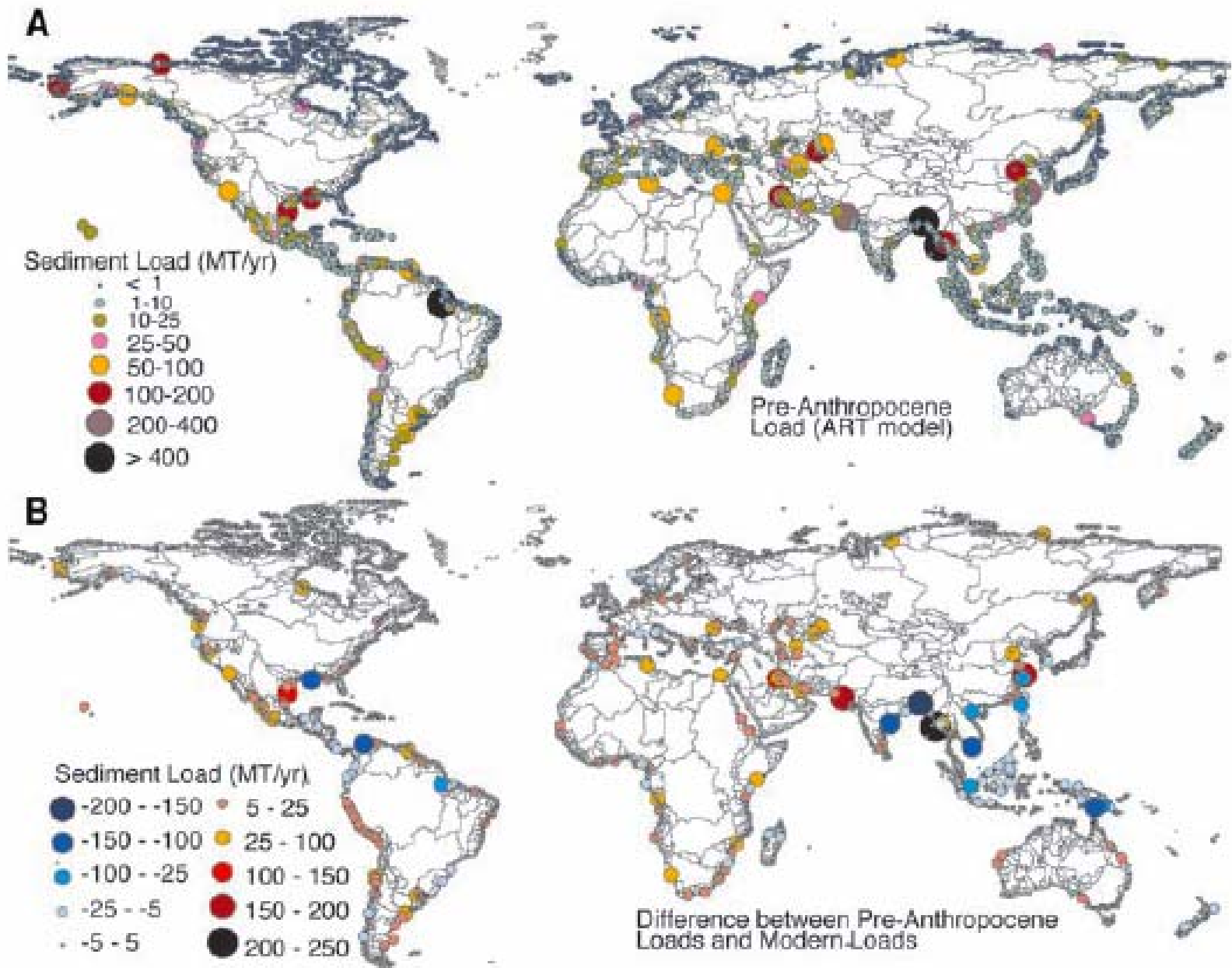
- Most of the world coastline *still* has low yield
 - top blue (68% of coastal cells).
- High yield is locally restricted
 - top red, yellow (1, 2% of coastal cells).
- Most of the load comes from regions with low to intermediate yield
 - bottom red, yellow and white (38, 34, 19% of load);
 - top green, white, and blue (20, 9, 68% of coastline).
- Load will continue to grow with population and land use change.

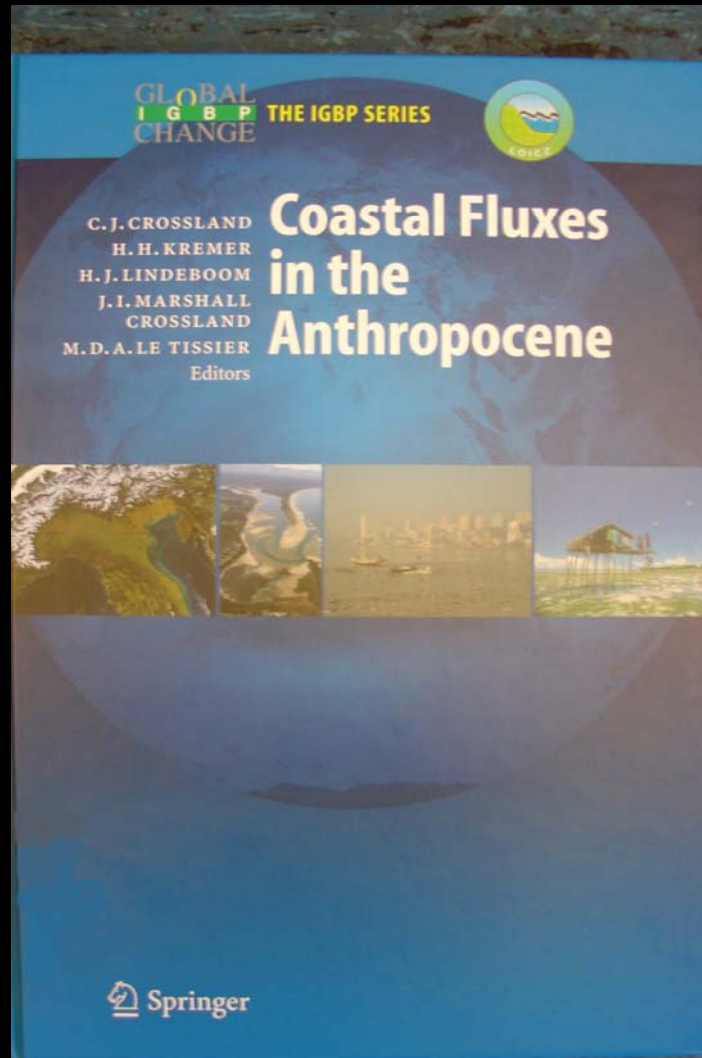
Size really does matter – small may be important!





(Thomas et al. 2004)





LOICZ I SYNTHESIS BOOK (2005)

Context of synthesis

- **Humans** and their institutions at multiple scales are integral components of coastal systems
- **Water continuum** from river basin catchments to coastal ocean = fundamental unit for coastal studies & management
- **Social-ecological system approach** must underpin policy and management

QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

Box 2. The Specific LOICZ Goals

1. To contribute to Earth System science by researching the relevance and impact of global change on coastal systems – a global-scale commitment.
2. To make scientific knowledge on the scales of coastal change and the options for sustainable use available to policy makers, managers and stakeholders – an issue driven commitment.
3. To develop a research framework for interdisciplinary analysis of existing information, and generation of new research, integrating biogeochemical, biophysical and human components of coastal systems.
4. To provide within this research framework, a flexible infrastructure able to respond to new research demands that includes and integrates scientific disciplines of natural and social sciences.
5. To develop a framework for science dissemination, outreach and capacity building that encourages participation by scientific and non-scientific communities at local, national, regional and global scales.
6. To provide a global platform to facilitate and coordinate international, regional and national coastal research initiatives, that improves the design and implementation of observation and research networks.

POPULATION
CONSUMPTION
TRADE

CLIMATE
SEA LEVEL RISE
TECTONICS

RIVER CATCHMENT

MATERIAL
FLUXES

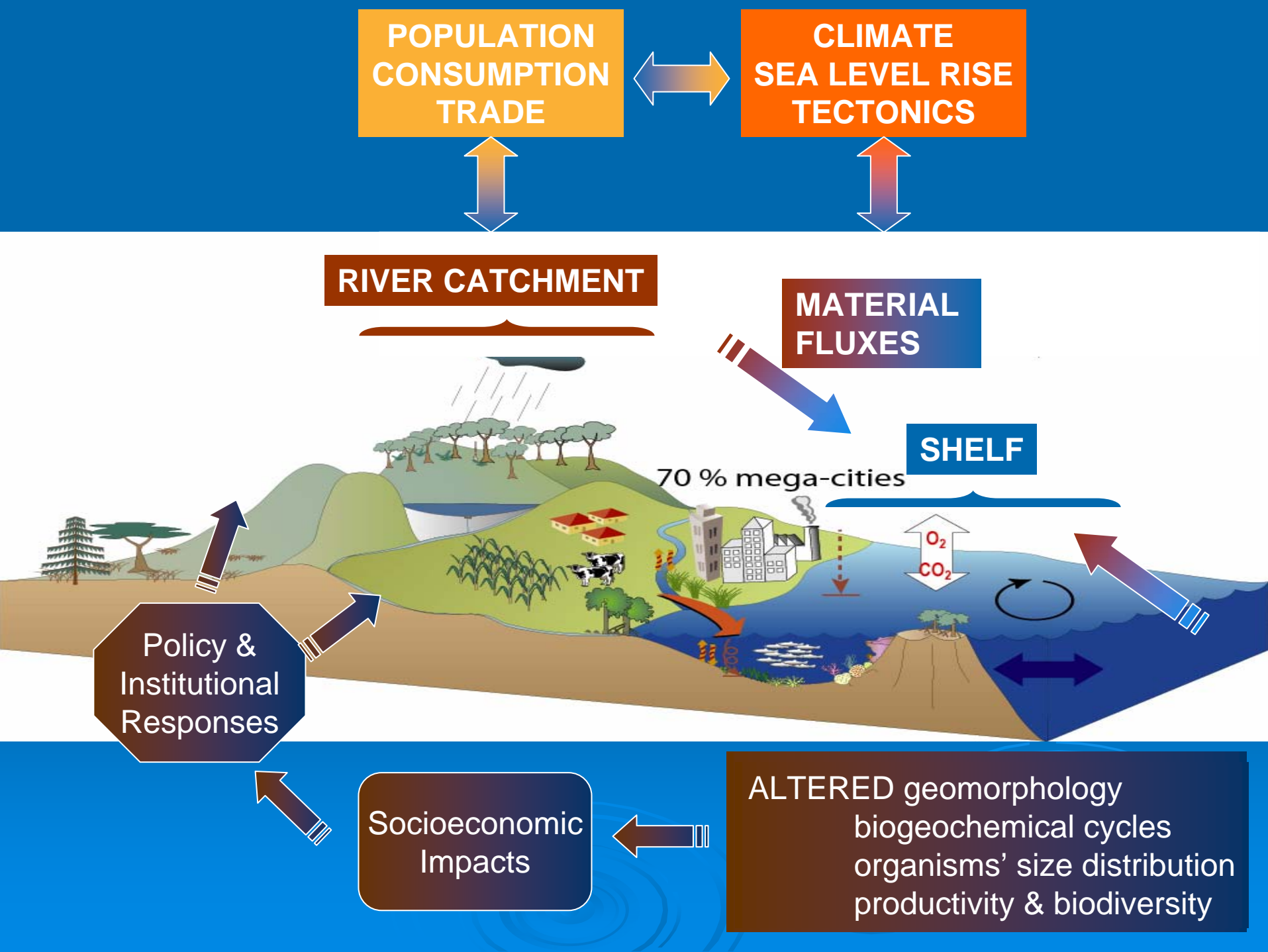
SHELF

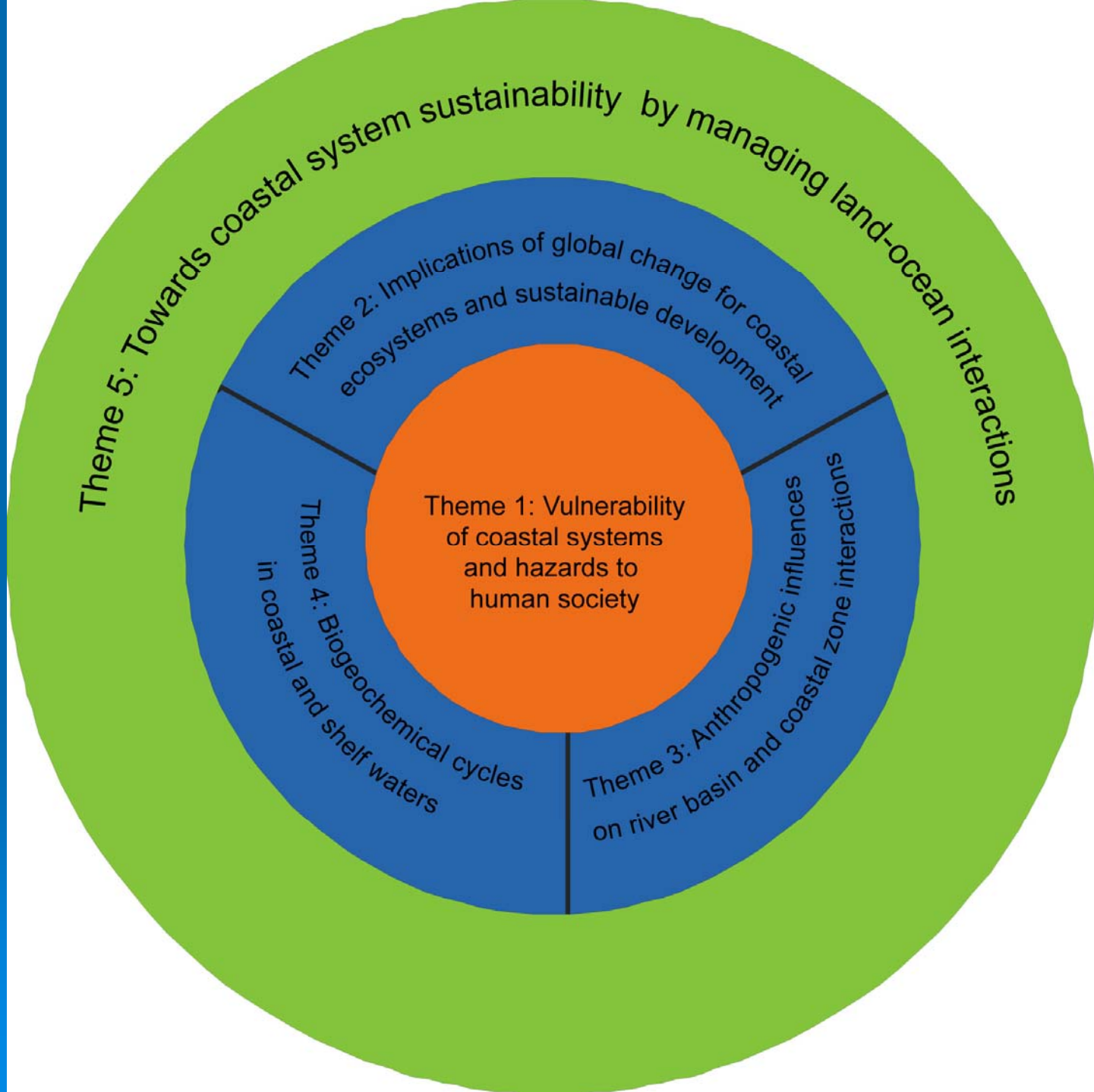
70 % mega-cities

Policy &
Institutional
Responses

Socioeconomic
Impacts

ALTERED geomorphology
biogeochemical cycles
organisms' size distribution
productivity & biodiversity







1979



2000

Huang He (Yellow River) Delta, China

Fed by Yellow River as it empties to the Bohai Sea. From 1979 to 2000, the delta grew by 100 sq km with the development of aquaculture and agriculture. (UNEP 2003)



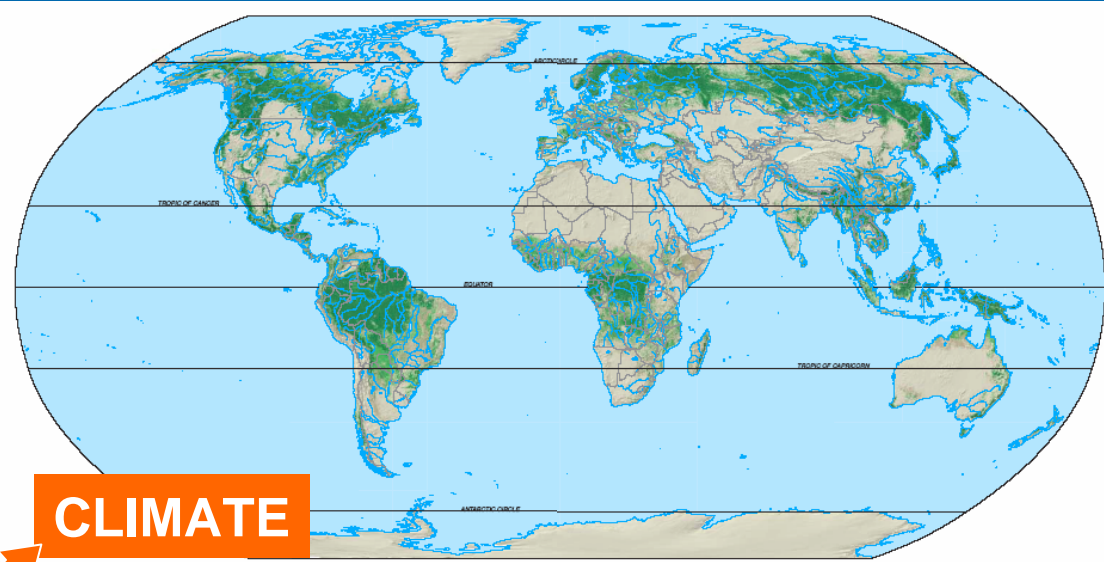


1993



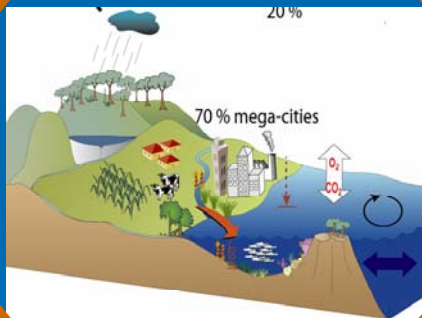
2000

Isahaya Bay Reclamation, Japan: Project separated 30 sq km of tidal flats from Ariake Sea in 1997 to increase agricultural land and decrease the risk of flooding. One of the near term effects was the reported decrease in tidal range in the Ariake Sea with the closure of the sluice gates around the mud flats. Ecosystem Impacts have yet to be determined including changes on seaweed aquaculture. (UNEP 2003)



CLIMATE

GLOBALIZED TRADE



Local

MASS TOURISM



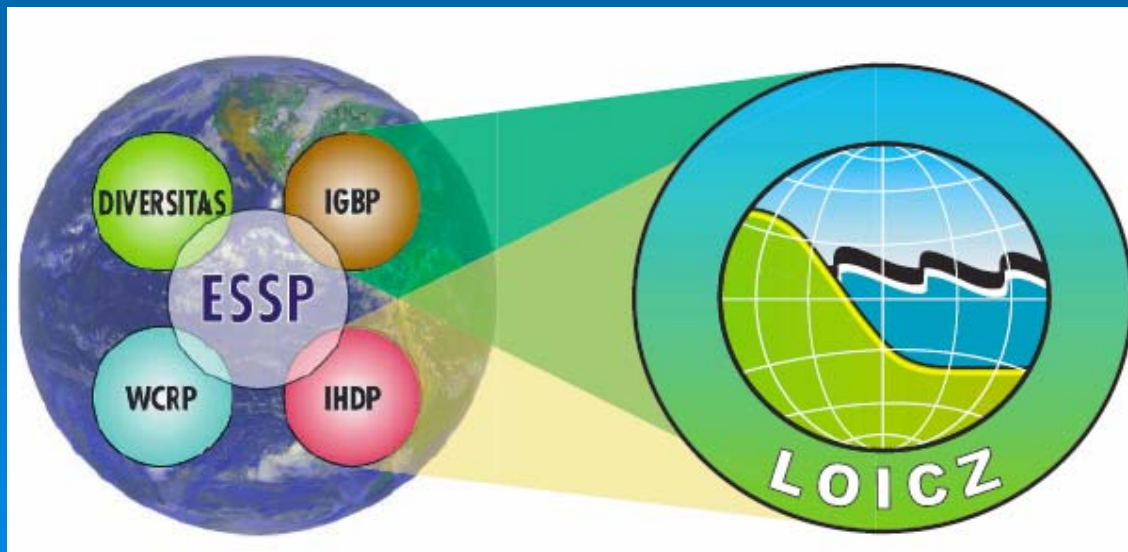
IGOS
PARTNERS

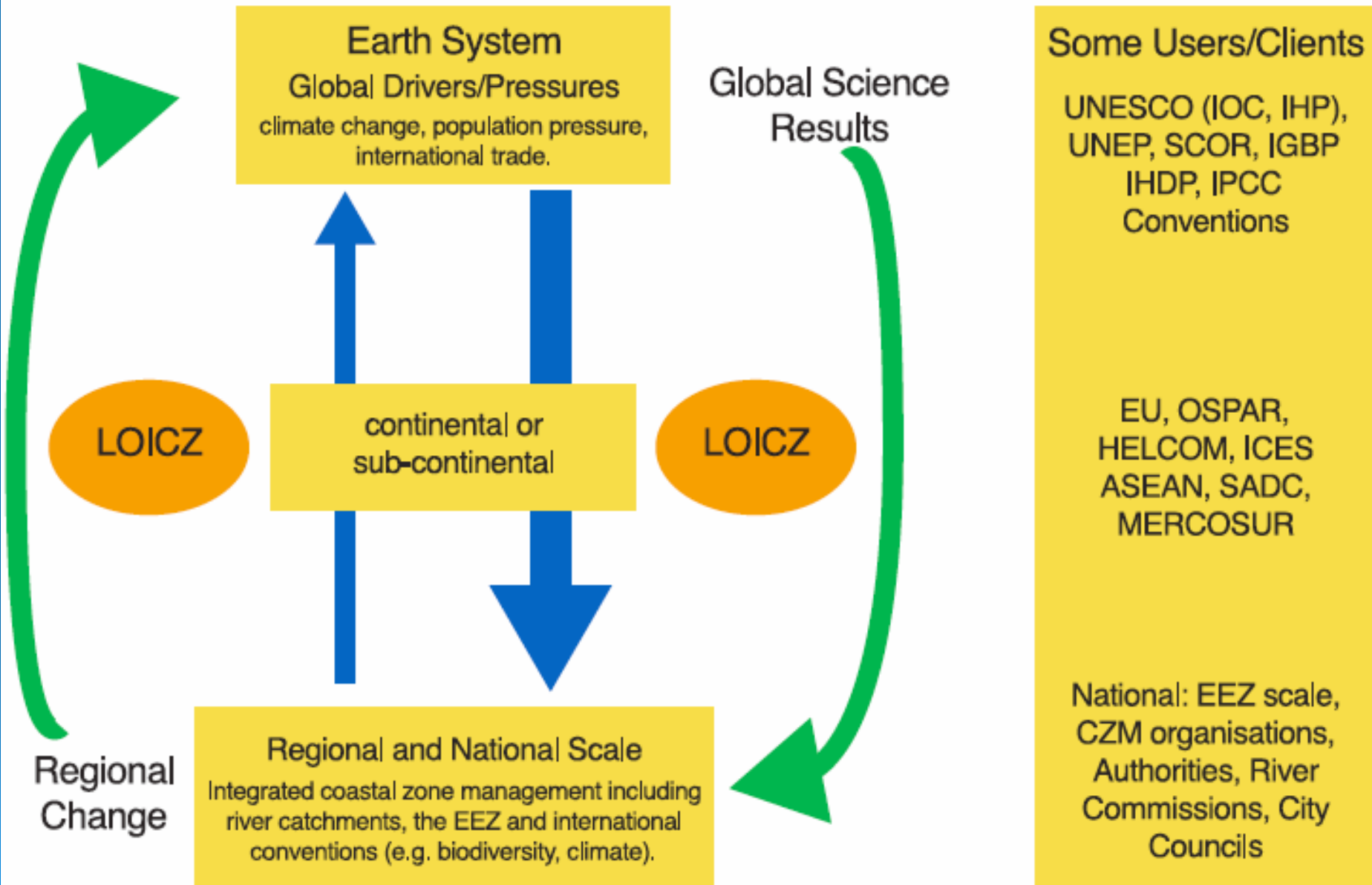


IGBP CORE
PROJECTS



IHDP CORE
PROJECTS







**COASTS AND COASTAL PEOPLE - SCENARIOS OF
CHANGE AND RESPONSES**

Egmond aan Zee, Netherlands

27-29 June, 2005



**Land-Ocean Interactions in the Coastal Zone
LOICZ II Inaugural Open Science Meeting**

**Setting the stage for research on global environmental change and
human dimensions in the coastal zone.**

LOICZ II INAUGURAL OPEN SCIENCE MEETING

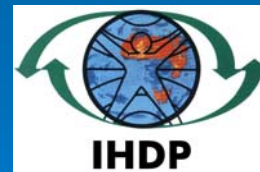
Operational Approach

	Site/ National	Regional	Global
Scientific Synthesis	Process studies	Site comparisons	Global trends
Policy Interface	Management strategies	Best practices Standards	Global impacts
Capacity building	Erasmus Mundus Tools & Training Workshops	Regional mentorships	Topical working groups
Mechanism	Corresponding members	Regional Project Nodes	LOICZ SSC + IPO



1993 - 2002

2005 - 2014



2005 - 2014