Marine Sciences in ICAM

Integrated Coastal Area Management

Javier Valladares
Chairman IOC/UNESCO

- IOC of UNESCO, strategy
- IOC ICAM Programme, objectives, framework, elements of the process
- IOC ICAM main activities, adaptation, awareness and mitigation, indicator, marine spatial planning.
- IOC ICAM/Capacity Building/GOOS- GLOSS-Tsunami
- Future

IOC

IOC of UNESCO

- Established in **1960** as a body with functional autonomy within UNESCO (Resolution 2.31)

- **Focal point on marine sciences in the United Nations system**, with the purpose to:

  *Promote **international cooperation and coordinate programmes** in research, services and capacity building**,** in order to learn more about the nature and resources of the ocean and coastal areas and **apply that knowledge for the improvement** of management, sustainable development, the protection of the marine environment, and the decision-making processes*

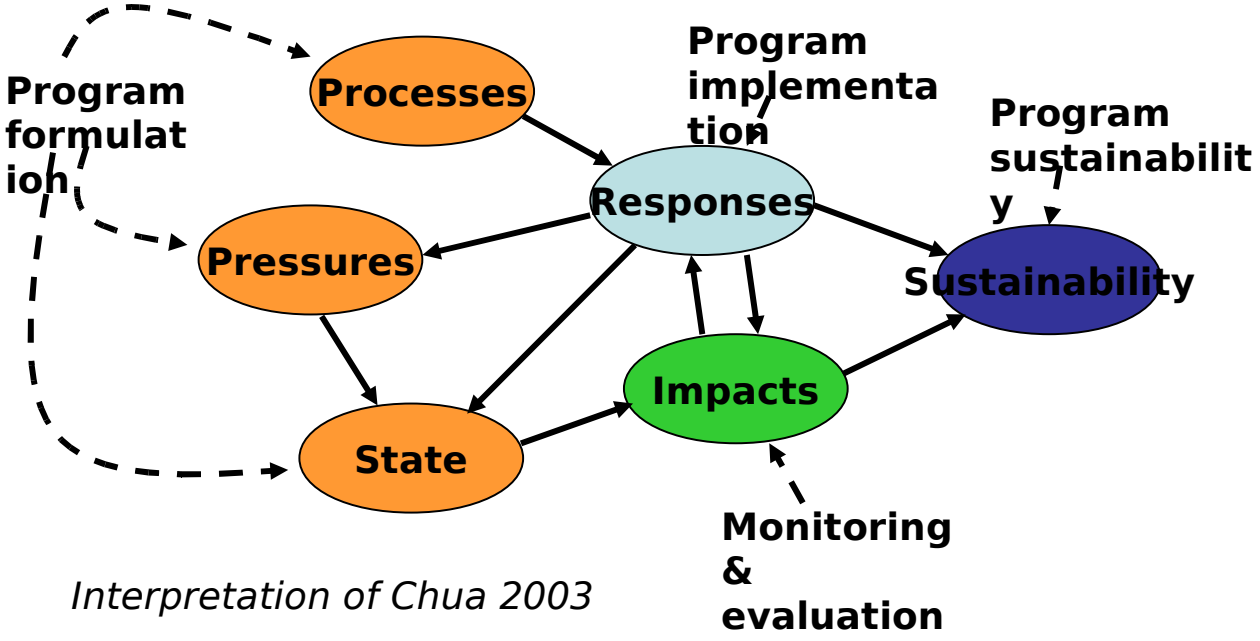
Medium-term Strategy 2008-2013

- Four High-level Objectives
  1. Prevention and reduction of the impacts of natural hazards
  2. Mitigation of the impacts and adaptation to climate change and variability
  3. Safeguarding the health of ocean ecosystems
  4. Management procedures and policies leading to the sustainability of coastal and ocean environment and resources
- Programme 2008-2009 –Main Lines of Action
  - Oceans and coastal zones: improving governance and fostering intergovernmental cooperation through ocean sciences and services
  - Promoting science, knowledge and education for disaster preparedness and mitigation … (tsunamis)

The IOC ICAM Programme

- Established in **1997** by the 19th session of the IOC Assembly with the objectives to

1. Assist IOC Member States in their efforts to build marine scientific and technological capabilities in the field of ICAM
2. Ensure that scientific requirements are integrated into national and regional ICAM programmes and plans



Interpretation of Chua 2003

PEMSEA: ICM Cycle and PSR

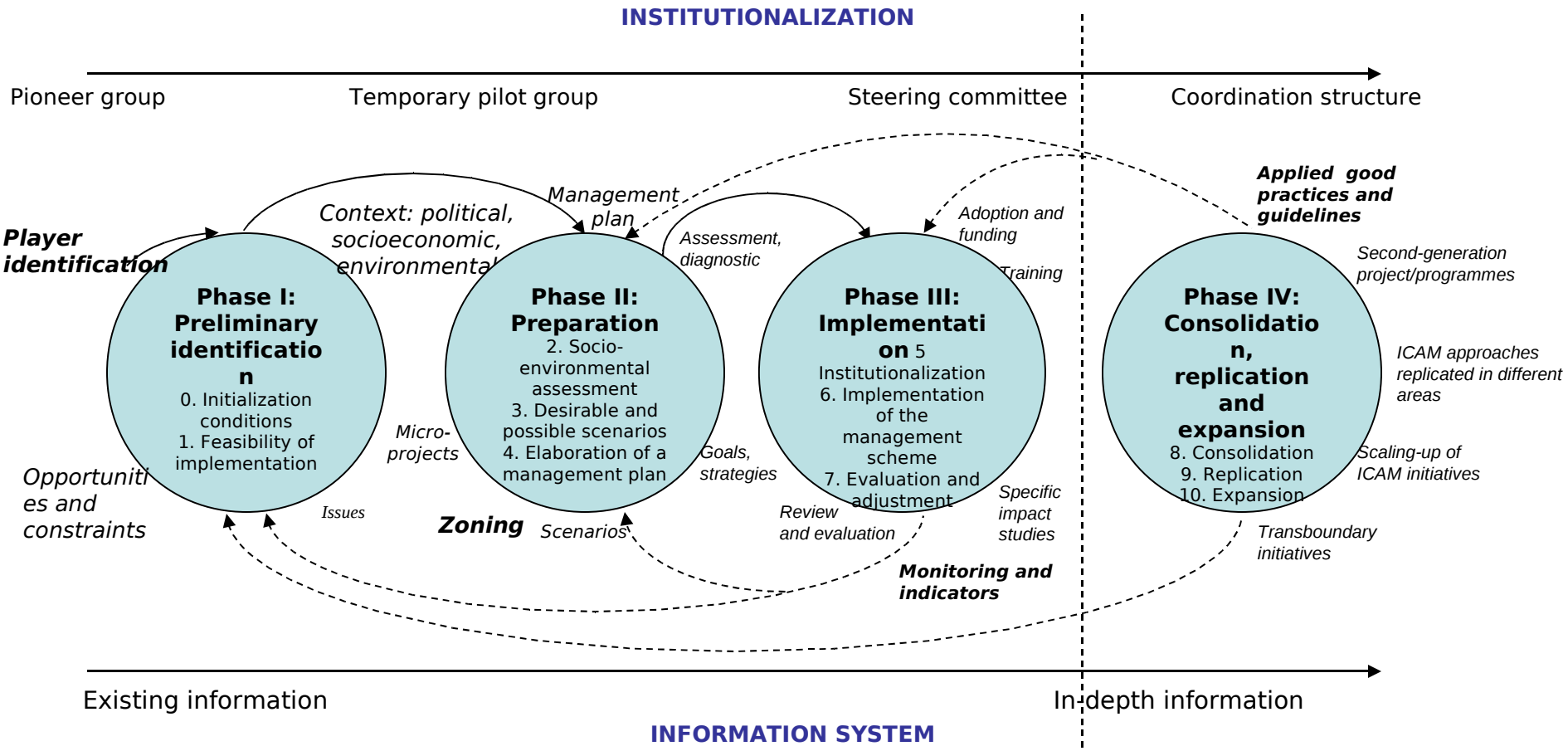
Goals	Functions
Area planning	• Plan for present and future uses of ocean and coastal areas • Provide a long-term vision
Promotion of economic development	• Promote appropriate uses of ocean and coastal areas (e.g., marine aquaculture, ecotourism)
Stewardship of resources	• Protect the ecological base of ocean and coastal areas • Preserve biological diversity • Ensure sustainability of uses
Conflict resolution	• Harmonize and balance existing/potential uses • Address conflicts among ocean and coastal uses
Protection of public safety	• Protect public safety in ocean and coastal areas typically prone to significant natural, as well as human-induced, hazards
Proprietorship of public submerged lands and waters	• As governments are often outright owners of specific ocean and coastal areas, manage government-held areas and resources wisely and with good economic returns to the public

Typical examples of objectives and functions of ICAM

Year	Organization	Framework
1992	UN	Agenda 21, Chapter 17
1993	OECD	Coastal Zone Management: Integrated Policies
	World Bank	Guidelines for Integrated Coastal Zone Management
	IUCN	Cross-Sectoral, Integrated Coastal Area Planning: Guidelines and Principles for Coastal Area Development
1995	UNEP	Guidelines for Integrated Management of Coastal and Marine Areas: With Special Reference to the Mediterranean Basin
1996	UNEP	Guidelines for Integrated Planning and Management of Coastal and Marine Areas in the Wider Caribbean Region
1998	FAO	Integrated Coastal Management and Agriculture, Forestry and Fisheries
1999	UNEP	Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management
	EC	Towards a European Integrated Coastal Zone Management (ICZM) Strategy: General Principles and Policy Options
	C. of Europe	European Code of Conduct for Coastal Zones
2000	CBD	Review of Existing Instruments Relevant to Integrated Marine and Coastal Area Management and their Implementation for the Implementation of the CBD
2004	CBD	Integrated Marine and Coastal Area Management (IMCAM) Approaches for Implementing the CBD

Frameworks and international agreements related to ICAM

Elements of the ICAM process



The growth of ICAM initiatives

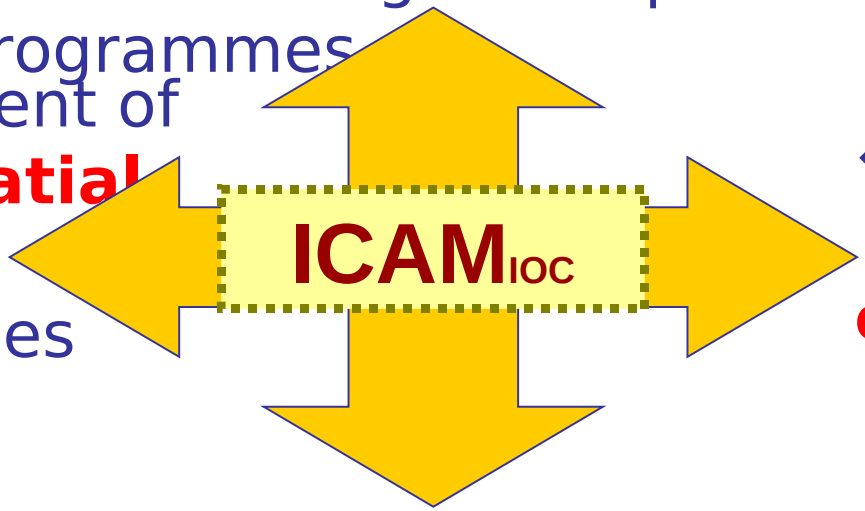
- Since the early 1960s, over 700 ICAM efforts at the national and sub-national level initiated in 145 countries and semi-sovereign states (Sorensen 2002)

- Investments in ICAM and coastal- and marine-related projects are significant, for example:
  - World Bank: in 1997-2002, over $770 million (including pipeline)
  - GEF: since 1992, over $570 million (including pipeline and $110 in preparation)
  - IADB: over $250 million since 1995 (including $100 in preparation)

ICAM$_{IOC}$: 4 Main lines of activity

❖ Development and application of **performance indicators** for coastal management plans and programmes

❖ Development of **marine spatial planning** methodologies and their application



❖ **Adaptation to climate change** in the coastal zones

❖ Development and testing of **guidelines for the mitigation of coastal hazards** through ICAM

❖ Adaptation to Climate Change in CZ

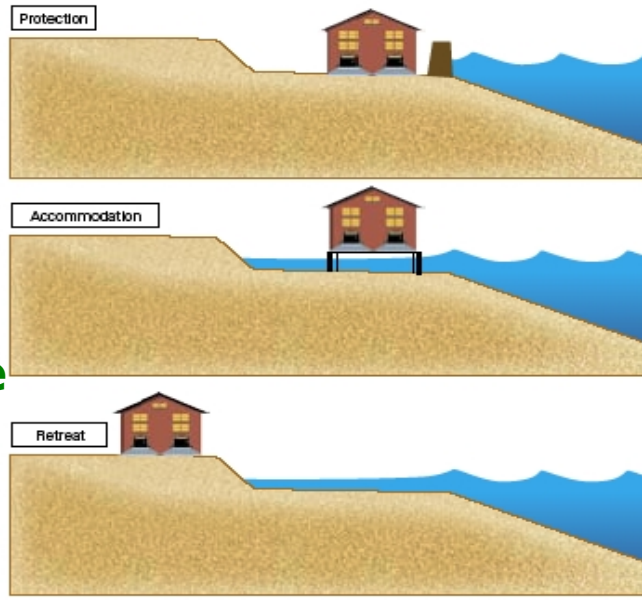
Other factors

Identified issue

Coastal Erosion

Climate Change

Sea level rise



Impacts on ecosystems, local populations, infrastructure and livelyhood

Build adaptive capacity

Systems response

❖ Guidelines for the mitigation of coastal hazards

Experts contribution: *IOC, UNU-EHS, NOAA, Italian Ministry of Environment and Territory, University of Moratuwa (Sri Lanka), University of Southampton (UK), WMO, Canadian Hydrographic Service (IOS), UNEP, ISDR, GITEWS project, GFZ, University of Lisbon, U.S. Geological Survey, Russian Academy of Sciences, Ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire (France), University of Cadiz (Spain), University of Coruña (Spain), Joint Research Council (European Commission), University of Alexandria (Egypt), Universitat Politecnica de Catalunya (Spain), University of Wollongong (Australia), DLR, Bureau of Meteorology (Australia), Environment Agency (UK), Ocean Research Institute and eThekwini Municipality (Durban-South Africa), Flood Hazard Research Centre, University of Middlese (UK)*

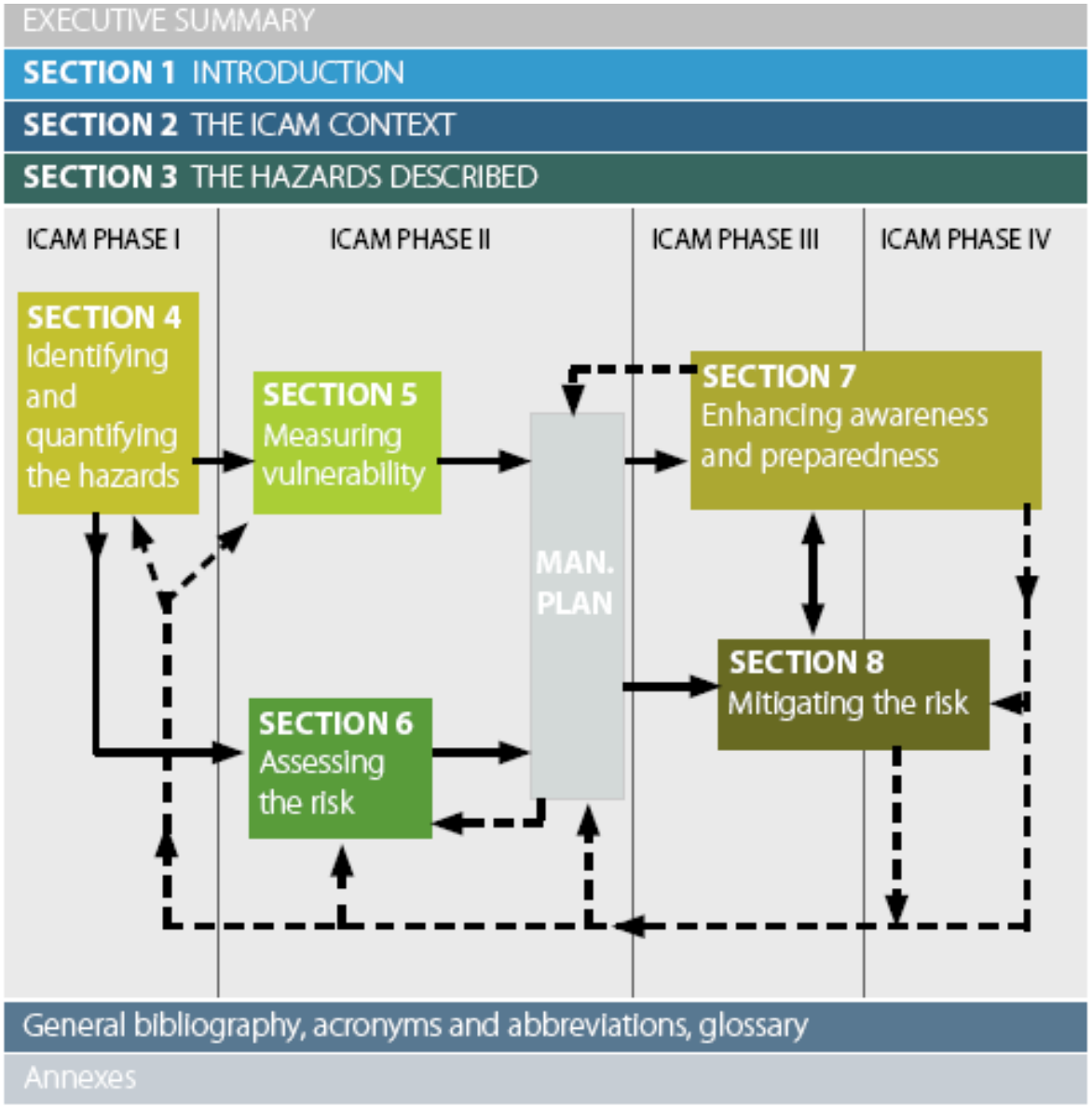
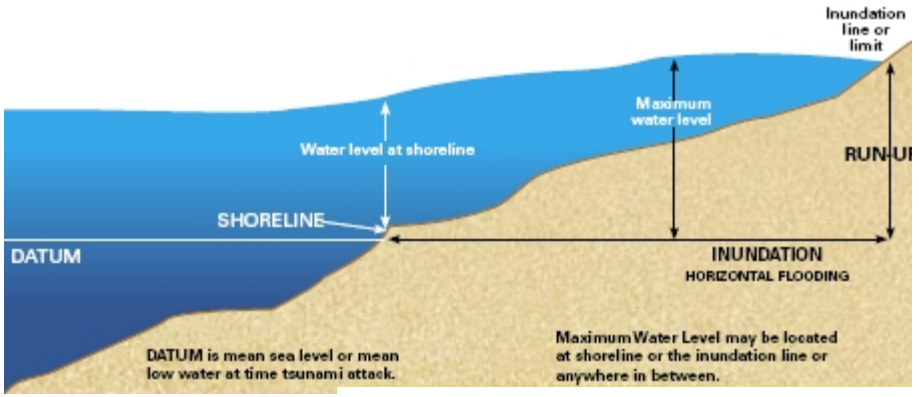
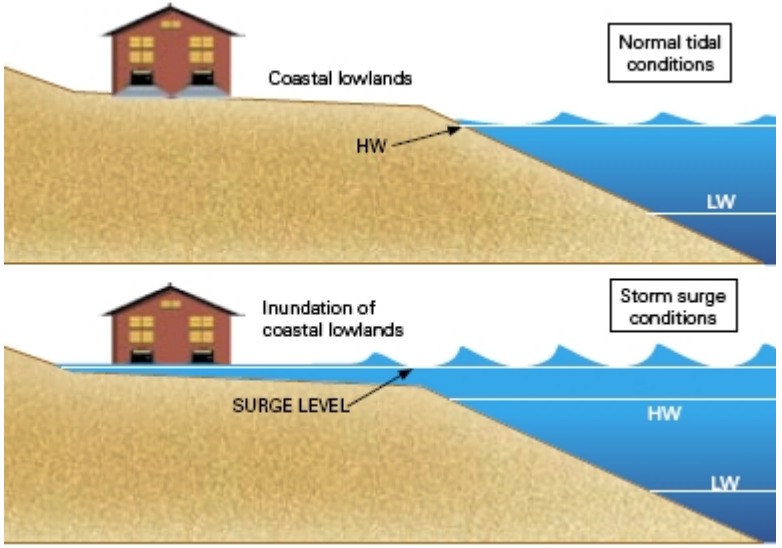


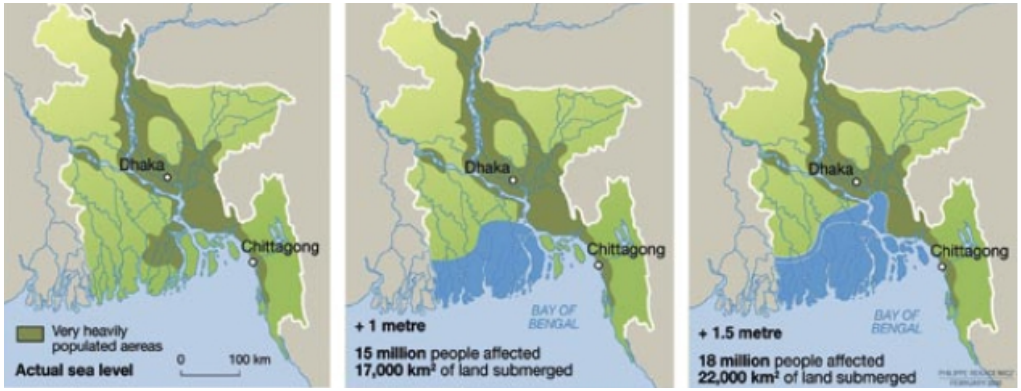
***Fig. 1.2**. The relationship of the Guidelines' sections to four phases of ICAM. Linkages (solid lines) and feedbacks (pecked lines) between Section topics; MAN. PLAN = Management Plan.*

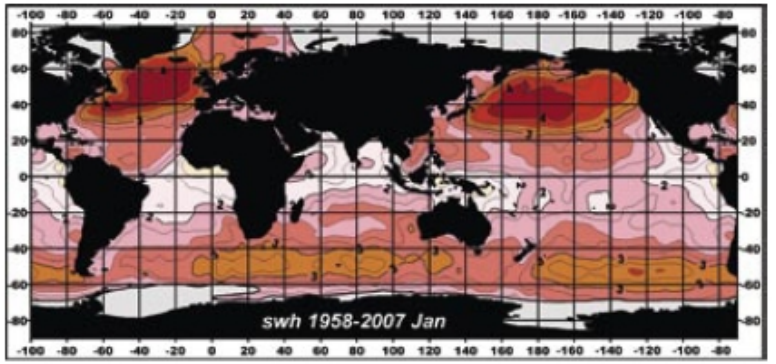
- **The Hazards described**



Rapid-onset hazards	Tsunami
	Storm surge
	Extreme wind-forced waves
Cumulative, progressive or "creeping" hazards	Long-term sea-level rise
	Coastal erosion





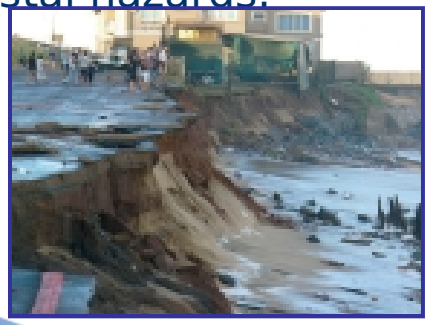


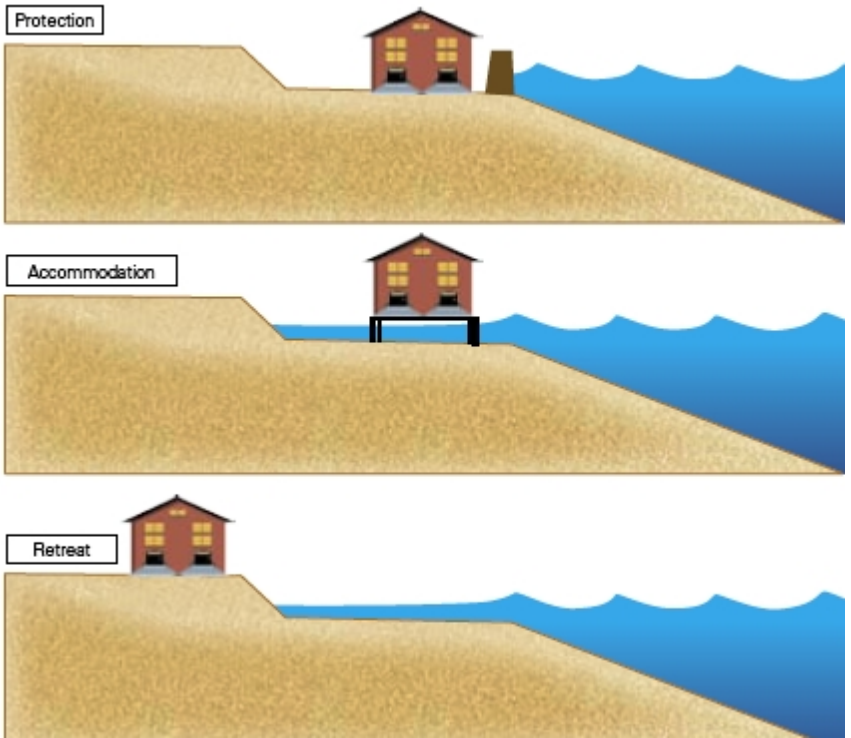
• Enhancing Awareness and Preparedness

- Identify an appropriate **early warning framework**.
- Raise **awareness of the risk** at all levels in the community.
- Establish the **key operational requirements** of the early warning system.
- Prepare all levels of the community for **emergency responses.**

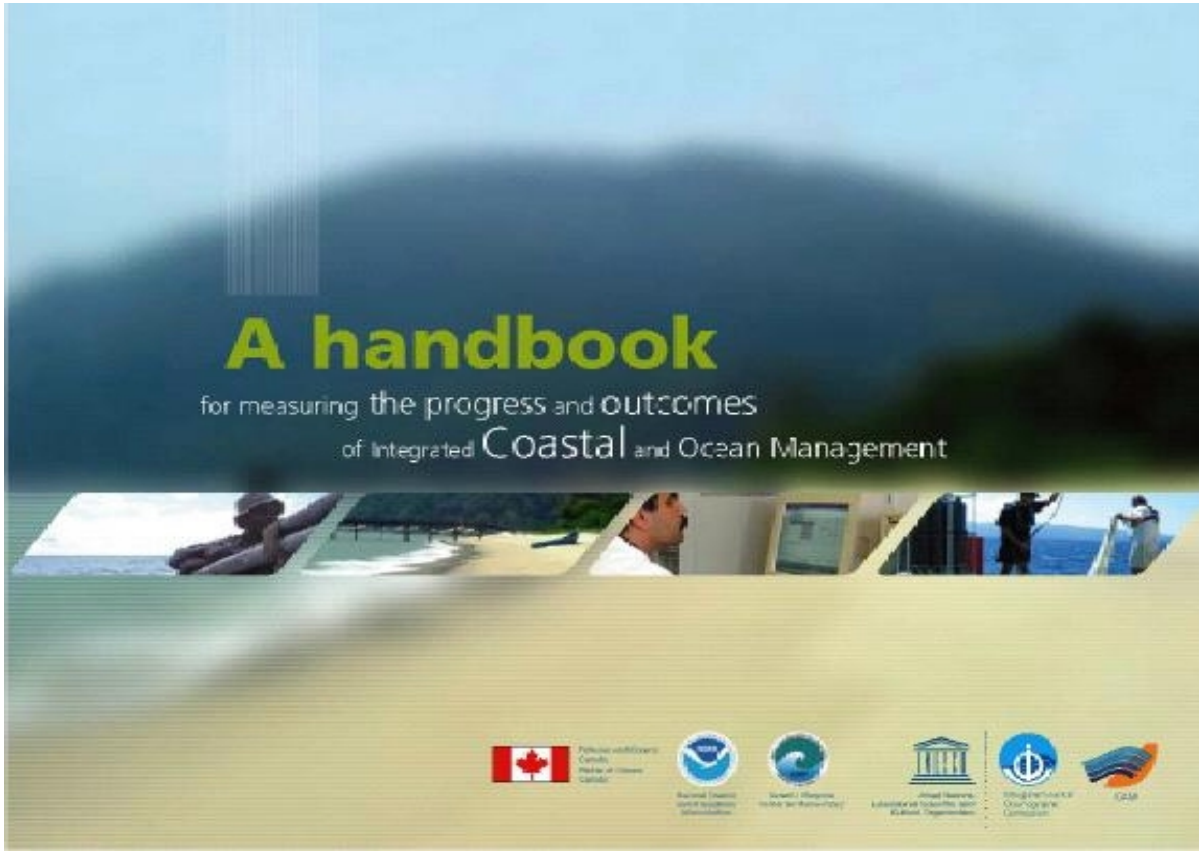
• Mitigating the Risk

Procedures and information that policy makers should consider within ICAM when developing a risk mitigation strategy for the coastal hazards.





❖ IOC Handbook on ICAM indicators



- Focus on both processes and outcomes
- Considers governance, socioeconomic and ecological dimensions
- Makes use of different approaches, methods and tools

South-east Pacific data and Information Netwo support to integrated Coastal Area Manageme (SPINCAM)

GENERAL OBJECTIVES

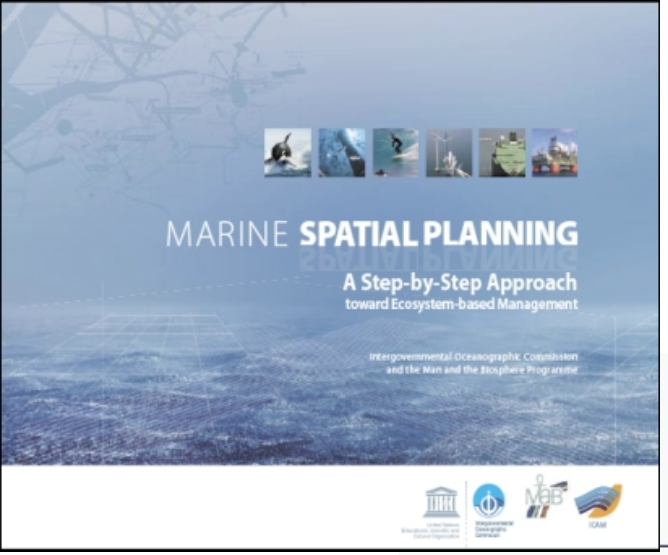
1- To support the implementation and efficiency of ICAM through the improvement of data and information management capacity, knowledge, communication and networking at national and regional level

2- To improve the delivery of information on the status and management of coastal resources by all coastal stakeholders.

Specific objectives

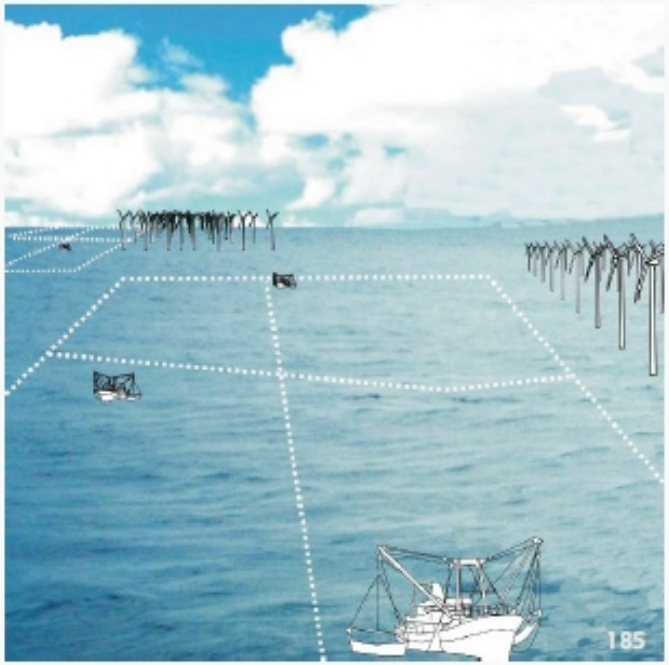
1- to establish a NATIONAL INDICATOR FRAMEWORK focusing on the state of environmental and socio-economic conditions to provide information on the sustainability of existing and future coastal management practices.

2- To establish INFORMATION SYSTEMS at national and regional level to support the development of indicators, their spatial representation and the dissemination of ICAM resources and experiences



❖ Marine Spatial Planning

WHAT IS ECOSYSTEM-BASED MARINE SPATIAL MANAGEMENT ?



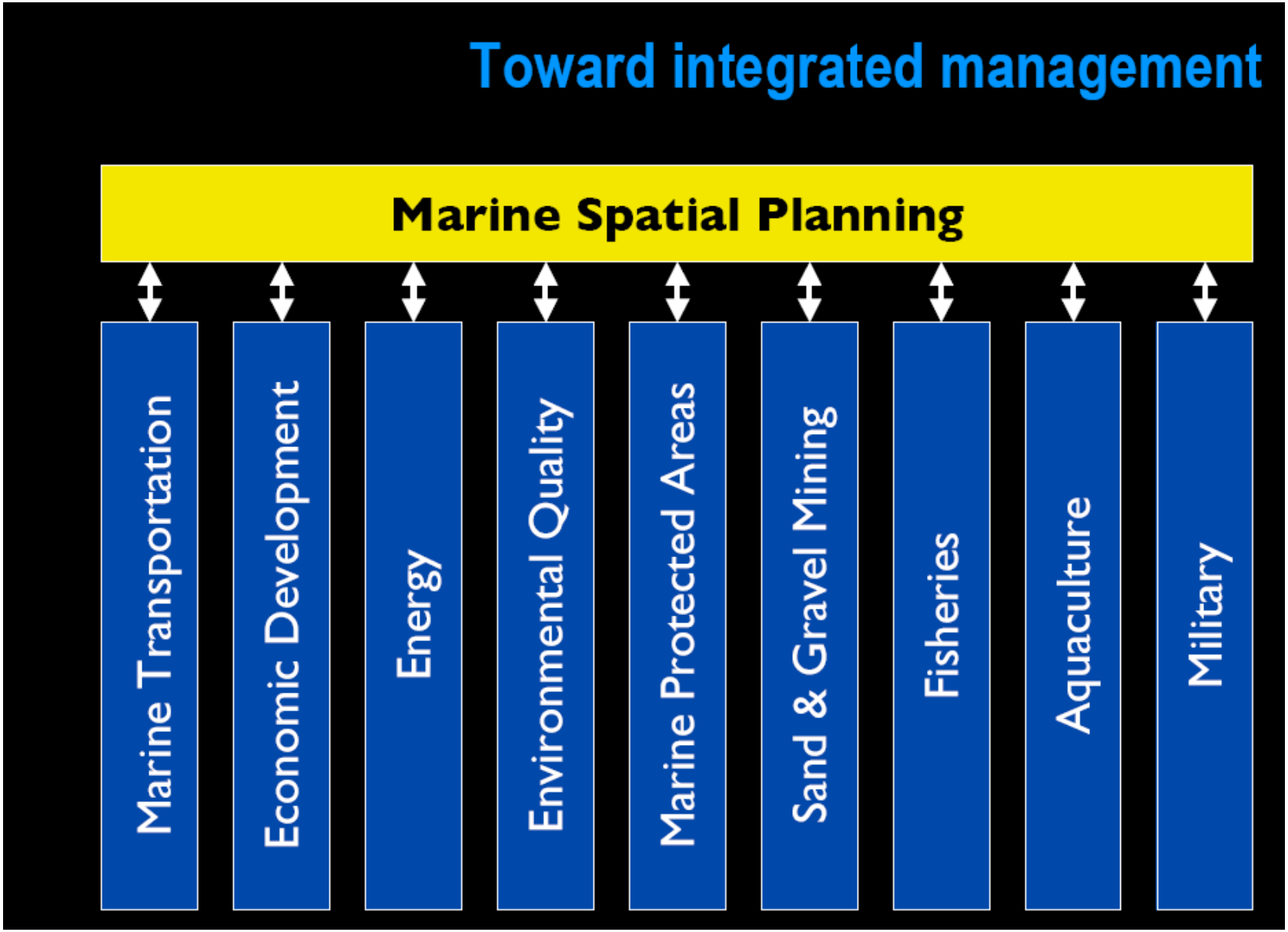
Maes et al., 2005. A Flood of Space

The process of analyzing and allocating parts of three-dimensional marine spaces (ecosystems) to specific uses, to achieve ecological, economic, and social objectives that are usually specified through a political process.

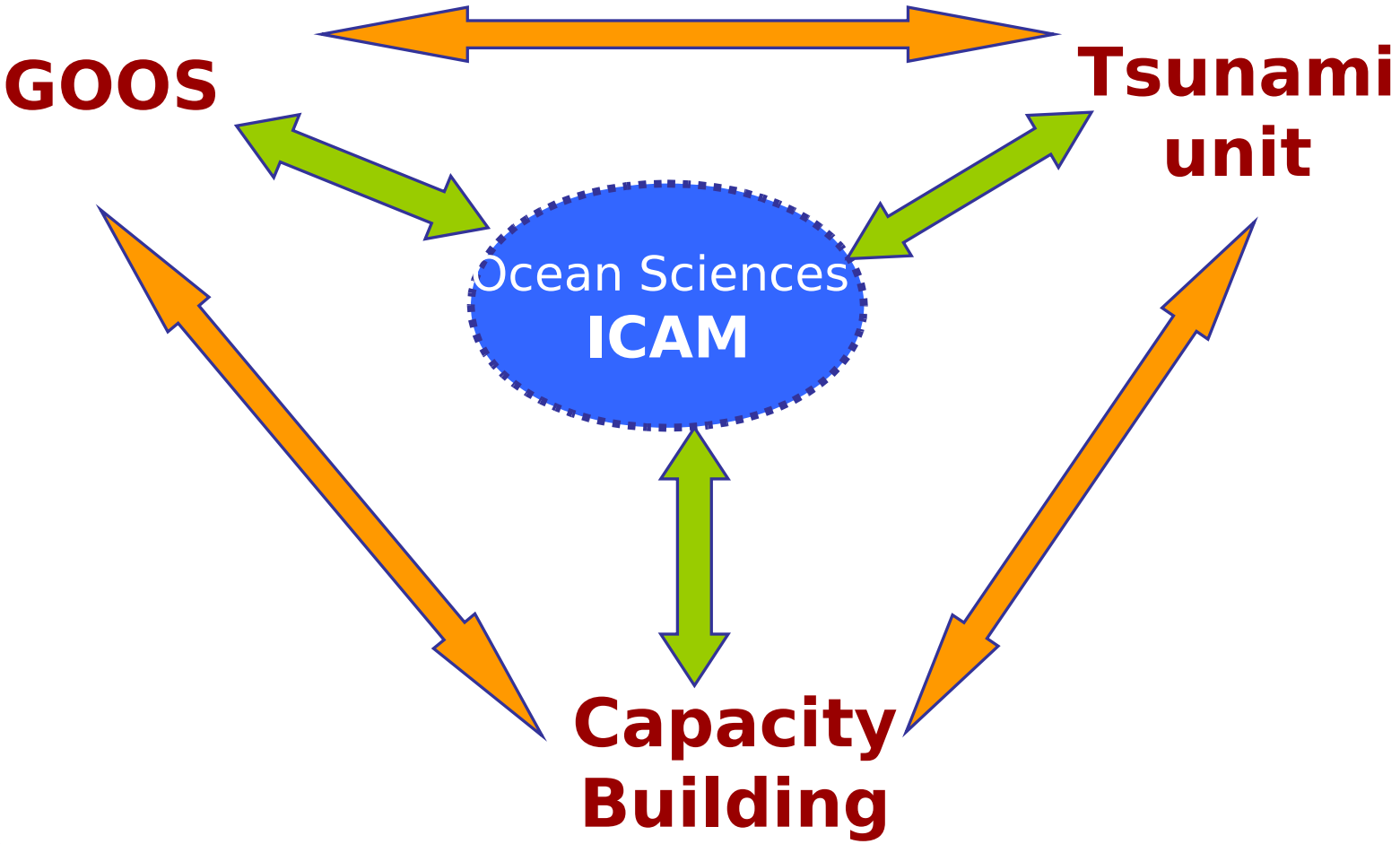
Ehler & Douvere
Visions for A Sea Change
UNESCO, 2007

IOC

Toward integrated management



ICAM$_{IOC}$ and other related sections



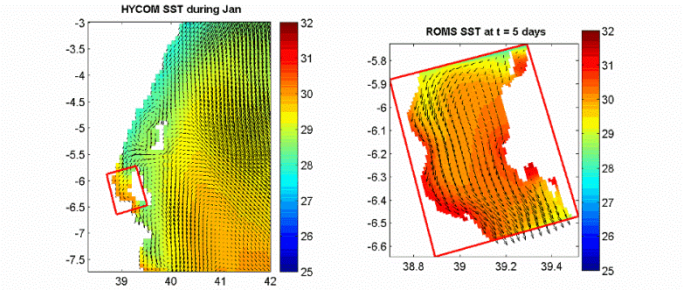
CAPACITY BUILDING

One of the most important investments the Commission is making today is the development of Leadership capacity, so that improved human and financial resources address the coastal and ocean issues of tomorrow

➢ Decision-support tools for coastal management

Coastal modelling for understanding and managing coastal environment – a cost-effective tool especially in developing regions

- Particularly **strong self-drive** in East African Institutes (700% leverage of funds on new projects -350k)
- regional **trainings** and international **fellowships** (6) organised by national institutions
- **5 local modelling projects** now providing information to coastal managers in the region addressing: climate change, water quality, aquaculture, fisheries, port management



Coastal modelling at the Institute of Marine Sciences in Zanzibar, Tanzania – simulation of one typical year (NSF/Pogo funded IMS/Theiss Research modelling project)

CAPACITY BUILDING

Contribution to enhanced participation in global programmes

- Working with **GOOS/IODE** institutes
  - Leadership workshop for directors of IOGOOS institutes (Hyderabad, 10-14 May 2008)
  - Proposal-writing workshop for projects leaders in IOGOOS institutes (Sabah, 9-13 Dec 2008)
  - GOOS-Africa institutes directors attended 5 leadership workshops in East and West Africa (Nov 2005 to April 2008)
- **Tsunami** activities
  - Coordinated, and worked with, Sea-level scholars in coastal modelling (Goa, Nov 2008 and Perth, Feb 2009)
  - Tsunami inundation modelling workshop co-organised in Hyderabad, 27Oct -7Nov 08
- Translating **GOOS data streams into visible local benefits** in developing countries
  - Coastal modelling recognised as the crucial link (GOOS report 125)
- Ocean sciences: **coastal modelling crucial tool for**

Ocean Observations and Services

The IOC's coordination of intergovernmental cooperation has enabled the global ocean observation systems so important to climate and ocean research and management

- **Monitor and better understand climate**
- **Improve weather and climate prediction**
- **Provide ocean forecasts unified view of real-time ocean**
- **Improve management of marine and coastal ecosystems and resources worldwide service-oriented network of data centers**
- **Mitigate damage from natural hazards and pollution**
- **Protect life and property on coasts and at sea**
- **Enable scientific research**
- **standards, best practices and coordinating preparation and dissemination of oceanographic products and services.**

GOOS works in partnership with:

- **IOC, UNEP, WMO and ICSU (*Sponsored by*)**
- **GEOSS, CEOS, IGOS (*Member of*)**
- **JCOMM, IODE (*cooperation within IOC*)**
- **POGO, ICES, PICES, National Agencies, Scientific Unions (*external cooperation*)**

Implementation Strategy for the Coastal Module (Report no. 148 – 2005)

Calls for establishing regional coastal ocean observing systems **(RCOOSs)** worldwide and, through this process, the development of a Global Coastal Network **(GCN)** that:

- measures, manages and analyzes common variables needed by all or most coastal nations and regions;
- establishes sentinel and reference stations; and,
- implements internationally accepted standards and protocols for measurements, data telemetry, data management and modelling.

Provisional common variables:

- geophysical variables (temperature, salinity, currents, waves, sea level, shoreline position, bathymetry, sediment grain size);
- chemical variables (dissolved inorganic nutrients, dissolved oxygen, sediment organic content);
- biological variables (faecal indicators, phytoplankton biomass, benthic biomass);
- biophysical variables (optical properties).

Global Sea Level Observing System GLOSS

provides…

- **Coordination mechanism for global sea level observations (e.g. GLOSS Group of Experts)**
- **Global data standards and archiving facilities, QC of data**
- **Technical manuals and training material**
- **Technical advice and special workshops on technical issues**
- **Training courses on analysis and uses of sea level observations**

Hardware (e.g. tide gauges, GPS, transmitters)

GLOSS contributions to tsunami warning systems

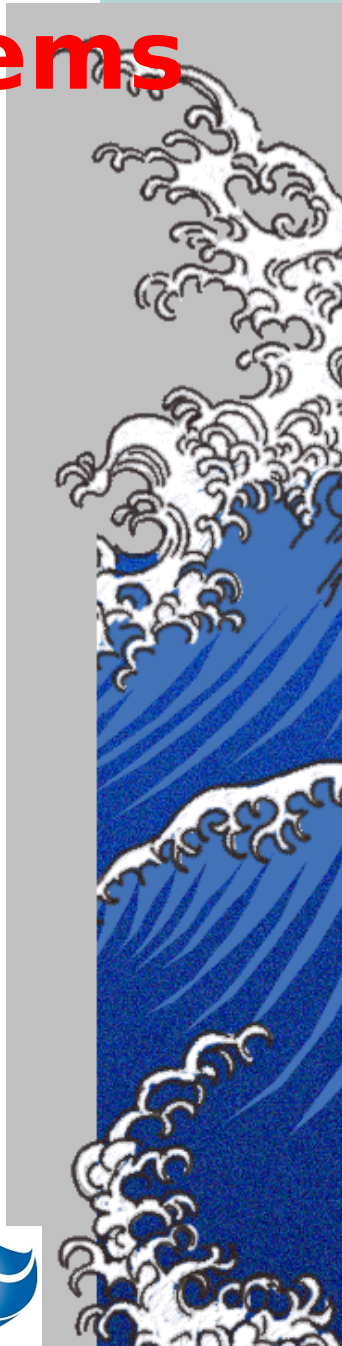
- GLOSS stations contributing data to PTWC

- IOTWS - GLOSS coordination of network upgrade through multilateral, bilateral and national upgrade efforts
  - more than 50 GCN stations upgraded and IOC/GLOSS directly responsible for installation coordination 22 of these stations (funded by ISDR, Finland)
  - IOTWS Fellowship programme in sea level science and applications (funded by Norway) – 30 fellowships awarded
  - Airtime agreement between IOC and Inmarsat

Tsunami Early Warning Systems

IOC is assisting Member States in the development and coordination of regional tsunami early warning systems together with other UN partners

- Owned and operated by Member States, Tsunami Warning Systems (TWS)
  - **Collect, distribute and interpret all available seismic and sea level data** for the existence and propagation of a tsunami
  - **Issue timely and clear warnings for their area** of operation **and exchange these data and information** with other national and international centres
- Complementary and sustained activities in tsunami hazard risk assessment, tsunami warning training, emergency response, and preparedness are part of the comprehensive tsunami mitigation programs that extend the TWS's as end-to-end systems



Outreach and Future

- Tailor to regional needs - Empower the Regional Alliances. (eg. IPY legacies in Arctic and Southern Ocean)
- Better engage researchers, governments and the private sector.

Thank you very much

javiervalladares09@gmail.com

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Intergovernmental
Oceanographic Commission
Lic. Javier Valladares
IOC Chairman