IOC and WCRP

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• Focal point for ocean observations, science, services and data exchange

• Competent international organization for marine science (United Nations Convention on the Law of the Sea – UNCLOS)
Vision

Strong scientific understanding and systematic observations of the changing world climate and ocean ecosystems shall underpin global governance for a healthy ocean, and global, regional and national management of risks and opportunities from the ocean.
IOC high-level objectives

- **Healthy ocean ecosystems** and sustained ecosystem services
- **Effective early warning systems** and preparedness for tsunamis and other ocean-related hazards
- Increased **resiliency to climate change** and variability and enhanced safety, efficiency and effectiveness of all ocean-based activities through scientifically-founded services, adaptation and mitigation strategies
- Enhanced **knowledge of emerging ocean science issues**
From vision to execution

- Improving governance
- Applying knowledge for societal benefit
- Building scientific knowledge

A. Ocean research
B. Observing system / data management
C. Early warning and Services
D. Assessment / information for policy
E. Sustainable management and governance

WCRP CLIVAR
Climate research and observations

**GOOS**
- Global Climate Observing System
  - IOC/UNESCO lead on *oceanic* observations for climate (GOOS)
  - WMO lead on *atmospheric* observations for climate (WIGOS)

**UN Framework Convention on Climate Change**
- SBSTA standing agenda item on observations

**WCRP**
- World Climate Research Programme
  - Objective: Determine predictability of climate and effect of human activities
  - Strategy: Facilitate analysis and prediction of Earth system variability and change, for use in an increasing range of practical applications of direct relevance, benefit and value to society

**UN Intergovernmental Panel on Climate Change (IPCC)**
- Working Group I: Physical Basis for Climate Change
  - 91% of coordinating authors, 66% of lead authors were WCRP scientists

**Dialogue on research needs**

**UN Framework Convention on Climate Change**
A simple system

Input (Requirements)

Output (Data & Products)

Process (Observations)
Structure of the Framework

Issues (Scientific and societal drivers)

Requirement

What to Measure

Essential Ocean Variables

Data Assembly

Data/Info. Products

Observations Deployment and Maintenance

Issues Impact

- Argo
- SOOP
- OceanSITES
- IMOS
- VOS
- IOOS
- Satellite Constellation
- Satellite

...
Driven by requirements, negotiated with feasibility

**Essential Ocean Variables**

- We cannot measure everything, nor do we need to
- basis for including new elements of the system, for expressing requirements at a high level
- Driven by requirements, negotiated with feasibility
- Allows for innovation in the observing system over time
Towards sustained system: requirements, observations, data management

Readiness

Concept

Attributes: Peer review of ideas and studies at science, engineering, and data management community level.

Pilot

Attributes: Planning, negotiating, testing, and approval within appropriate local, regional, global arenas.

Mature

Attributes: Products of the global ocean observing system are well understood, documented, consistently available, and of societal benefit.
Framework for Ocean Observing

Societal drivers next decade

- Fisheries
- Climate and Weather
- Assessments and management of ecosystem services
- Regional priorities
- Real-time services
- Fisheries
- Regional priorities
- Climate and Weather
- Assessments and management of ecosystem services

Data Products

- Climate and Weather
- Real-time services
- Assessments and management of ecosystem services

Expanded EOVs

- Expanded observing systems and networks
GOOS Framework for Ocean Observing

Governance structure

GOOS Steering Committee
(John Gunn and Eric Lindstrom, co-chairs; Peak Bodies, Sponsors, Observing Panel Chairs, Observing System leaders)

Observing System Panels
(focused on EOVs e.g. Physics through OOPC, Carbon/Biogeochemistry through IOCCP, new Biology/Ecosystems panel); Coordination for observing system elements

Technical Advisory Groups / Projects / GRAs
(Observing technologies and networks, Variable focus: data and products, synthesis, link to models)
Developing ‘GOOS Projects’

• **A Deep Ocean Observing Strategy**, [ioc-goos.org/doos](http://ioc-goos.org/doos)
  – *Eric Lindstrom* lead
  – across physical, biogeochemical, and biological observations
  – including a strong element of discovery

  – *Neville Smith* and *Billy Kessler*, Scientific Committee co-chairs
  – A transformative project 2014-2020 leaving the legacy of a more integrated and sustained observing system

• **AtlantOS** (H2020 proposal): strong EuroGOOS and IOC-UNESCO/GOOS involvement

• ‘GOOS Project’ definition, coordination, governance, and reporting will be a major topic for the GOOS Steering Committee (July 2014) – including intersection with WCRP/CLIVAR
WCRP and IOC

- WCRP contributes to a key High-Level Objective and Function of the IOC Member States
  - Particular interest on global/regional sea level, extremes, intersection with vulnerability/adaptation, capacity development, climate services (*IOC-27 Decision 5.4.1, 2013*)
- IOC secretariat since 2011 has been working without the voluntary and assessed contributions from USA
  - For 2014-2015 operating with a 30% reduction in regular programme budget
  - IOC’s Joint Climate Fund contribution will unfortunately be very limited in 2014-2015
  - IOC Member States remain committed to WCRP
- Working relationship with GOOS and GCOS through OOPC / CLIVAR is strong
WCRP and IOC

- Climate is a cross-cutting issue for IOC
  - Oceans and the physical basis for climate variability and change
  - Carbon and ocean acidification
  - Impact on ocean ecosystems from: temperature, sea level, acidification, deoxygenation
  - Ocean-related climate services: seasonal forecasting, regional sea level rise
  - Contributing to scientific assessments and informing policy
  - Developing the capacity of all Member States to contribute to climate science and benefit from its knowledge

- WCRP can help build links across all the needed interfaces