Coordinating Implementation of the Global Ocean Observing System

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Co-President of JCOMM

Thanks to Candyce Clark, Hester Viola, Jose Meulbert for material for the presentation
The Global Ocean Observing System

- GOOS concept originally developed in the late 1980s, endorsed by the second World Climate Conference in 1991; IOC is the lead agency for GOOS, which is co-sponsored by WMO, UNEP and ICSU

- Government input through the Intergovernmental Committee for GOOS, an IOC major subsidiary body; scientific design and oversight by the GOOS Scientific Steering Committee, appointed by the sponsors; support from the GOOS Programme Office in IOC

- GOOS now has two components:
  - Open ocean/climate component which is also the ocean component of GCOS
  - Coastal component
GOOS development and implementation

The open ocean component
Advised by the Ocean Observations Panel for Climate (OOPC) [with GOOS/WCRP/GCOS]
Initial design from OceanObs99, to be refined after OceanObs09
Implemented by Member States and participating organizations usually cooperating through the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM)

A coastal component
Advised by the GOOS Scientific Steering Committee (GSSC) through the Panel for Integrated Coastal Observations (PICO).
Implemented through Member States and participating organizations usually cooperating through GOOS Regional Alliances (GRAs).
JCOMM Concept and Objectives

- NWP, climate studies, maritime services, ocean modeling and forecasting, ocean research, all require integrated metocean data and information streams.

- To address these requirements and realize potential benefits, JCOMM established as a major technical subsidiary body of both WMO and IOC.

- Combines and benefits from the strengths and expertise of the met. and ocean communities, avoids duplication of effort, integrates existing activities.

- Integrated marine observing, data management and services system; extensive outreach programme.

- An implementation mechanism for open ocean GOOS, the ocean component of GCOS, and in situ marine component of WWW/GOS.
JCOMM Structure

**Management Committee**
- 2 Co-Presidents
- 3 PA Coordinator, rep. of Team Sat. Data Req., rep. of Team on Capacity Building, reps. of GOOS, IOC, IOF, additional experts

**Cross-cutting Team on Satellite Data Requirements**
- Observations PA
  - Observations Coord. Group
    - Coordinators (chair), Chairs of Teams/Panel, liaison with Argo, IOCCP, OceanSITES, data assim. expert,
    - Two satellite experts, CB Rapporteur
  - Ship Obs. Team
    - ASAPP, SOOPP, VOSP
  - Data Buoy Cooperation Panel
    - GLOSS Group of Experts
      - Argo, IOCCP, OceanSITES

**Cross-cutting Team on Capacity Building**
- Services PA
  - Services Coord. Group
    - SERV Coordinator (chair), Chairs of EB, 3 additional experts
  - Expert Team Climate Change Detection and Indices
    - CCI-CUWAR-JCOMM Expert Team
  - Expert Team Marine Accident Emergency Support
    - Expert Team Maritime Safety Services
    - Expert Team Operational Ocean Forecast Systems

**Data Management PA**
- DM Coord. Group
  - DM Coordinator (chair), Chairs of EB, 3 specific experts incl. WIS, rep. IOF, 2 additional experts
  - Expert Team Marine Climatology
  - Expert Team Data Management Practices (Joint with International Oceanographic Data and Information Exchange (IOD)
The implementation plan for in situ ocean observations is in place.

**GCOS-92:**
- Initial GOOS
- GEOSS Ocean Baseline
- UNFCCC Priority
- G8 Commitment

**Implement the ocean domain of GCOS-92:**

**Additional Drivers**
- Tsunami
- IPY
- Regional
15 Essential Climate Variables

- **Surface:**
  - Sea surface temperature, sea surface salinity, sea level, sea state, sea ice, currents
  - Ocean color, carbon dioxide partial pressure;

- **Sub-surface:**
  - Temperature, salinity, currents, nutrients, carbon, ocean tracers, phytoplankton.
The initial system is designed to meet Climate requirements, but it also supports:

- Weather prediction
- Global and coastal ocean prediction
- Marine hazards warning
- Transportation
- Marine environment and ecosystem monitoring
- Naval applications
- 8 of 9 Societal Benefits

- Tide gauge stations
- Drifting Buoys
- Tropical Moored Buoys
- Profiling Floats
- Ships of Opportunity
- Ocean Reference Stations
- Ocean Carbon Networks
- Arctic Observing System
- Dedicated Ship Support
- Data & Assimilation Subsystems
- Management and Product Delivery
- Satellites -- SST, Surface Topography, Wind, Color, Sea Ice
Initial Global Ocean Observing System for Climate
Status against the GCOS Implementation Plan and
JCOMM targets

Total in situ networks: 62%  

- Surface measurements from volunteer ships (VOSclim): 87%
  - 200 ships in pilot project
- Global drifting surface buoy array: 100%
  - 5° resolution array: 1250 floats
- Tide gauge network (GCOS subset of GLOSS core network): 59%
  - 170 real-time reporting gauges
- XBT sub-surface temperature section network: 81%
  - 51 lines occupied
- Profiling float network (Argo): 100%
  - 3° resolution array: 3000 floats
- Repeat hydrography and carbon inventory: 62%

Milestones:
- Drifters: 2005
- Argo: 2007

References:
- Continuous satellite measurements of sea surface temperature, height, winds, and colour
System Status
8447 Platforms reporting in the last month
System Status
4858 Platforms reporting in the 3 days
System Status

550 Moored Data Buoys reporting in the last month

Date: 14-Aug-2009 00:00:00 to 13-Sep-2009 23:59:59

Platforms Reporting: 550
### Progress Toward Global Coverage

(Representative milestones)

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<th>2003</th>
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- **System % Complete Index**
- **Real-time Stations**
- **Initial GCOS Subset**
- **Number of buoys**
- **Number of moorings**
- **High resolution and frequently repeated lines occupied**
- **Number of floats**
- **Number of observatories, flux, and ocean transport stations**
- **Ice buoys, drifting and moored stations**
- **Repeat Sections Committed, one inventory per 10 years**

*Initial Ocean Observing System Milestones*
Observing System Status:
2009, Q2 Temperature Profiles

Sampling requirements:
1 profile
Every 10 days
In every 3 x 3 °

Requirement: All boxes blue

Goal: 100% Global Coverage
Information and technical support

- Argo Information Centre (AIC) / JCOMMOPS (also includes DBCP, SOT, OceanSITES) – www.jcommops.org

- Observing System Monitoring Center – http://osmc.info

- JCOMM general information – www.jcomm.info
Coastal GOOS

The design plan describes the vision for an integrated and sustained observing system for the coastal ocean, defines the elements of the system, and describes how they relate to each other to achieve an operational system.

The plan provides a framework for how the community of nations can make more cost-effective use of collective resources to address, in a more timely fashion, environmental issues and problems of mutual concern.
Coastal GOOS


Calls for establishing regional coastal ocean observing systems (RCOOSs) worldwide and, through this process, the development of a Global Coastal Network (GCN). The former has begun, with coordinated development of the regional observing systems needed to create a GCN that:

(i) measures, manages and analyzes common variables needed by all or most coastal nations and regions;
(ii) establishes sentinel and reference stations; and,
(iii) 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).
Coastal GOOS

Implementation Coastal GOOS through regions - GRAs

Regional Ocean Observing Systems

- EuroGOOS
- MedGOOS
- GOOS Africa
- Indian Ocean GOOS

GOOS Regional Alliances

- Based on User Requirements for Data & Information, GRAs
- Establish Regional Coastal Ocean Observing Systems
  - Contribute to building the Global Coastal Network (GCN)
  - Resolution of the GCN
  - New Variables
- R&D Incubators
- Set Priorities for Capacity Building
Coastal GOOS

Links to other bodies: GTOS, IGOS, GEO/GEOSS/CZCP, GCOS

GEO Coastal Zone Community of Practice (CZCP)
Panel for Integrated Coastal Observations

1. Provide the GOOS Scientific Steering Committee (GSSC) with **technical advice needed for scientifically** sound implementation of the Implementation Strategy for the Coastal Module of GOOS (GOOS Report No. 148).

2. Liaise with **relevant scientific and technical organizations** to facilitate synergy between advances in science and technology and the development of operational capabilities, including coastal services.

3. Provide **expertise and advice** to the GSSC on the development of operational elements of the Coastal module of GOOS including interoperability and the management and dissemination of non-physical, physical and socio-economic variables regarding:
   - Observations and data telemetry
   - Data management and communications
   - Modelling and analysis, and
   - Communication of data and information to user groups
PICO's Terms of reference

4. Advise the GSSC regarding capacity building needs of nations and regions and approaches to address such needs for sustained coastal observations, analysis and modeling.


6. Organize periodic assessments (every 5 years) of the status of implementation and performance of coastal GOOS and recommend improvements and enhancements.
Work of PICO

- PICO's role is to provide scientifically sound technical advice, with input from the GRAs on regional priorities for implementation.
- Meets in conjunction with the GSSC – two to date.
- Developing action plans for implementation.
- Some implementation actions will inevitably devolve on JCOMM, which will need to expand its mandate and expertise.
- So far only limited results.
The Future – where GEO can help

- In situ open ocean observing system has gone from 30% to 62% in almost 10 years but is now plateauing – additional resources will be needed to continue implementation
- More than 50% of the system is supported on “soft money”, through various research programmes
- Governments have to be convinced of the societal value of maintaining the basic ocean observing system as a long term investment
- The private sector is willing to support the case for Government infrastructure investment in the oceans
- Key ocean satellite missions (e.g. altimetry) also need to be sustained on a long-term basis
- Implementation of coastal GOOS has hardly begun, with the obstacles being political as much as technical
- Governments need to be convinced of the value to them of collecting and exchanging at least certain types of standardized coastal data
With Acknowledgement and Thanks to

all who, through their efforts, deliver observations day after day and sustain the ocean observing system.