

Ocean Observations Physics and Climate panel (OOPC)

Co-chairs:

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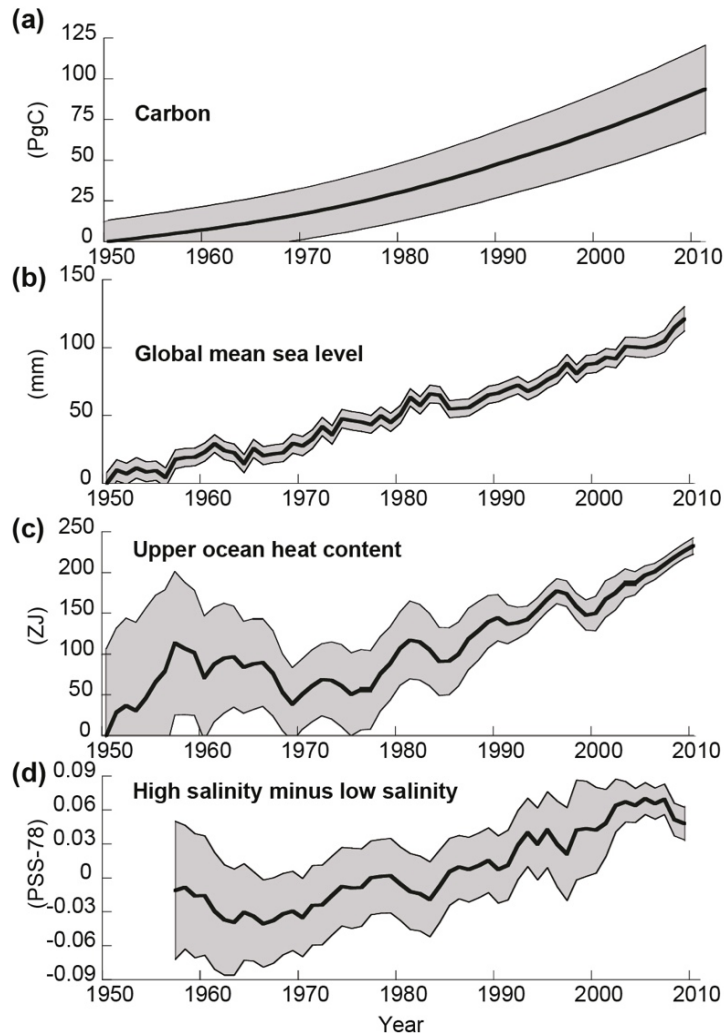
Presenter – OOPC Panel member:

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Use of Ocean Observations

Changes in large-scale ocean climate properties



From top to bottom:

- global ocean inventory of anthropogenic carbon dioxide
- global mean sea level
- global upper ocean heat content anomaly
- Global mean salinity contrast ($S_{\max} - S_{\min}$ regions)

(From IPCC 2015).

OOPC and the Ocean Observing System

The OOPC role is to:

- Formulate recommendations for a sustained global ocean observing system, in support of WCRP, GOOS, and GCOS objectives;
- Help develop a process for ongoing evaluation and evolution of the observing system: from process studies/community efforts, and recommendations for continued evolution;
- Support global ocean observing activities through liaison and advocacy for the agreed observing plans
- Provide advice on scientific requirements to the Joint WMO-IOC Technical Commission on Oceanography and Marine Meteorology (JCOMM), which is responsible for the coordination of implementation of platform-based observing system components

OOPC Work Areas

Promotion and advocacy of ocean observations – satellite and *in situ* – for scientific research, marine services and operational forecasting centres including NWP, seasonal and multi-year climate prediction systems.

We are undertaking a review of the observing system element for the adequacy of:

- Heat and Freshwater Content
- Air Sea Fluxes
- Ocean Surface Stress
- Boundary Currents and Shelf Seas interaction.

Establishing a working relationship with GODAE OceanView/OceanPredict

Involved in the planning and requirement and promotion of ocean observations in:

- OceanObs'19
- IPCC Ocean and Cryosphere Special Report
- UN Decade of Ocean Science for Sustainable Development

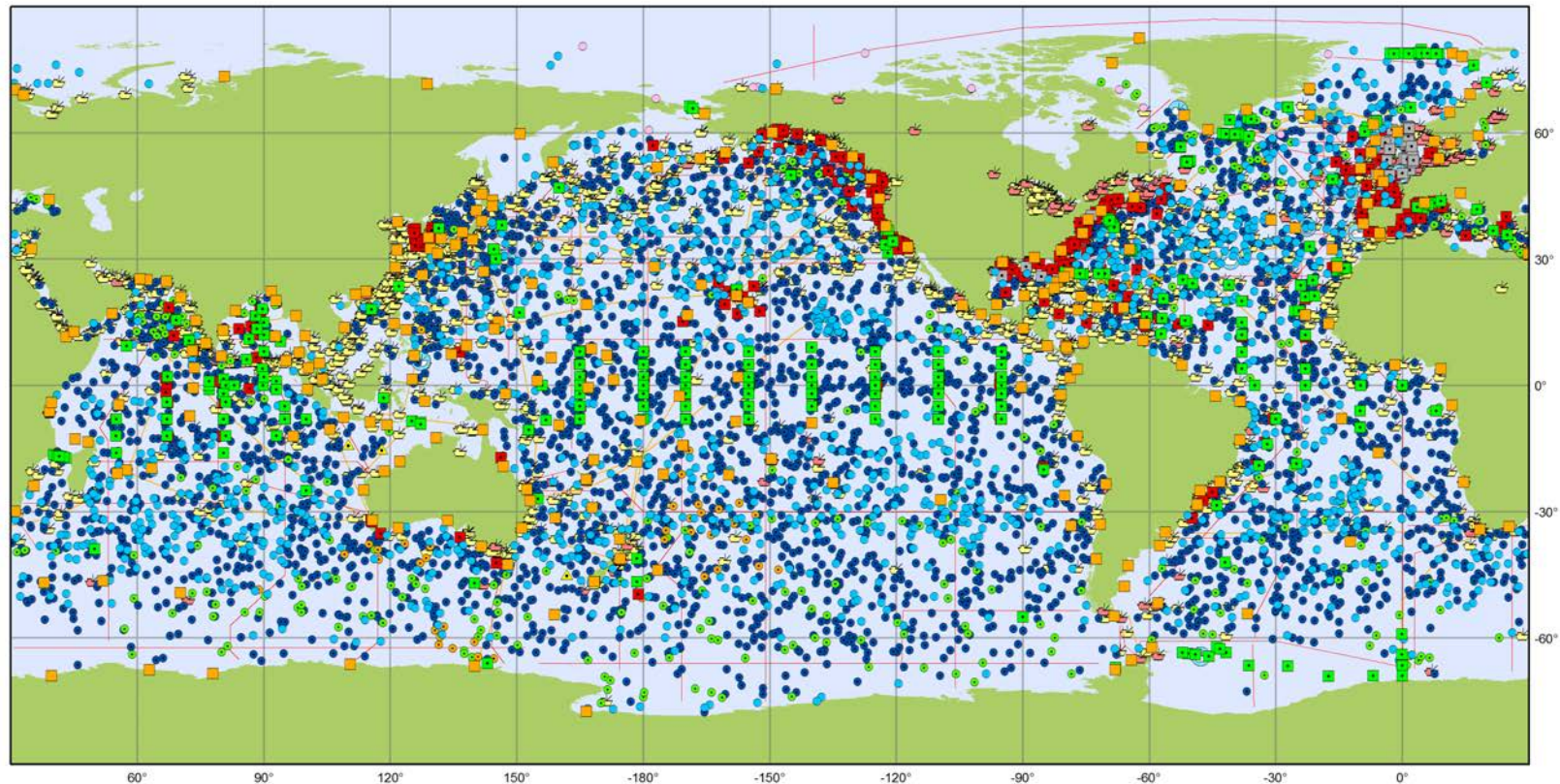
The Ocean Observing System



Satellites



The Ocean Observing System



Main in situ Elements of the Global Ocean Observing System

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Profiling Floats (Argo)

- Core (3858)
- Deep (50)
- BioGeoChemical (305)

Data Buoys (DBCP)

- Surface Drifters (1401)
- Offshore Platforms (96)
- Ice Buoys (14)
- Moored Buoys (374)
- ▲ Tsunameters (3)

Timeseries (OceanSITES)

- Interdisciplinary Moorings (340)
- Repeated Hydrography (GO-SHIP)
- Research Vessel Lines (61)
- Sea Level (GLOSS)
- Tide Gauges (252)

Ship based Measurements (SOT)

- Automated Weather Stations (258)
- Manned Weather Stations (1754)
- Radiosondes (13)
- eXpendable BathyThermographs (37)



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In-situ platforms

Essential Ocean Variables & technological readiness level

CONCEPT PILOT MATURE

Physics

- Sea State
- Ocean surface stress
- Ocean Heat Fluxes
- Sea Ice
- Sea level
- SST
- Subsurface temperature
- Surface currents
- Subsurface currents
- Sea Surface Salinity
- Subsurface salinity

Biogeochemistry

- Oxygen
- Nutrients
- Inorganic Carbon
- Tracers
- Suspended particulates
- Nitrous oxide
- Carbon isotope (^{13}C)
- Dissolved organic carbon
- Ocean Colour

Biology and Ecosystems

- Phytoplankton biomass and diversity
- Zooplankton biomass and diversity
- Fish abundance and distribution
- Marine turtles birds and mammals abundance and distribution
- Live coral
- Seagrass cover
- Mangrove cover
- Microalgal canopy

EOVs mapping to ECVs

Physics

- Sea State
- Ocean surface stress
- Ocean Heat Fluxes

Biogeochemistry

- Oxygen
- Nutrients

Biology and Ecosystems

- Phytoplankton biomass and diversity
- Plankton
- Zooplankton biomass and

The adoption of ECVs/EOVs will provide the mechanism to bring together existing systems and international coordination groups into a holistic ocean observing system.

- Surface currents
- Subsurface currents
- Sea Surface Salinity
- Subsurface salinity

- Dissolved organic carbon
- Ocean Colour

- Mammals abundance and distribution
 - Live coral cover
 - Seagrass cover
 - Mangrove cover
 - Microalgal canopy
- Marine Habitat Properties

WDAC-OOPC: Satellite Advocacy

SCATTEROMETER WINDS:

Coordinated orbits for 3 scatterometer satellites

- Coordination of orbital crossing of the equator is required to reduce diurnal biases in the wind products.

Near-Real-Time public data sharing:

- Open and timely access to all satellite data is required

WDAC-OOPC: Satellite Advocacy

SEA SURFACE SALINITY (SSS):

Require commitment for the continuance of Satellite Surface Salinity observations beyond SMOS and SMAP.

- GCOS IP 2016 Action 032: Continuity of satellite SSS (*mission beyond SMOS or SMAP for continuity*).
- SSS observations are a key parameter for monitoring the global water cycle (evaporation, precipitation and glacier and river runoff). Satellite SSS provide global coverage including marginal seas and coastal oceans and better spatiotemporal sampling of the in situ observation network. The recent advances in the provision of reliable SSS observations from satellites need to be maintained.

OOPC and WCRP WDAC

- OOPCs mandate is to "provide science-based recommendations for a fit-for-purpose, sustained and prioritized ocean observing system, focusing on physical variables that maximize support climate monitoring, forecasting, and research".

WRCP review:

What are the implication for OOPC's interaction with WRCP?