



# Introduction to GODAE OceanView (GOV)

Leading the Scientific Development  
and Implementation of Ocean  
Forecasting Systems





## Historical notes

- **GOV** is the follow-on project, now renamed Programme continuing the vision of *GODAE* (Global Ocean Data Assimilation Experiment), which has spawned a number of other international projects now vital for operational ocean forecasting:
  - **GHRSSST-PP** was a pilot-project of GODAE, **now** GHRSSST is the international Group for High Resolution Sea Surface Temperature (GHRSSST) for SST data producers, users, and scientists.
  - **Argo** was planned and developed by GODAE (and CLIVAR), **now** Argo is a global array of more than 3,000 free-drifting profiling floats that measures the temperature and salinity of the upper 2000 m of the ocean.



# What is GOV?

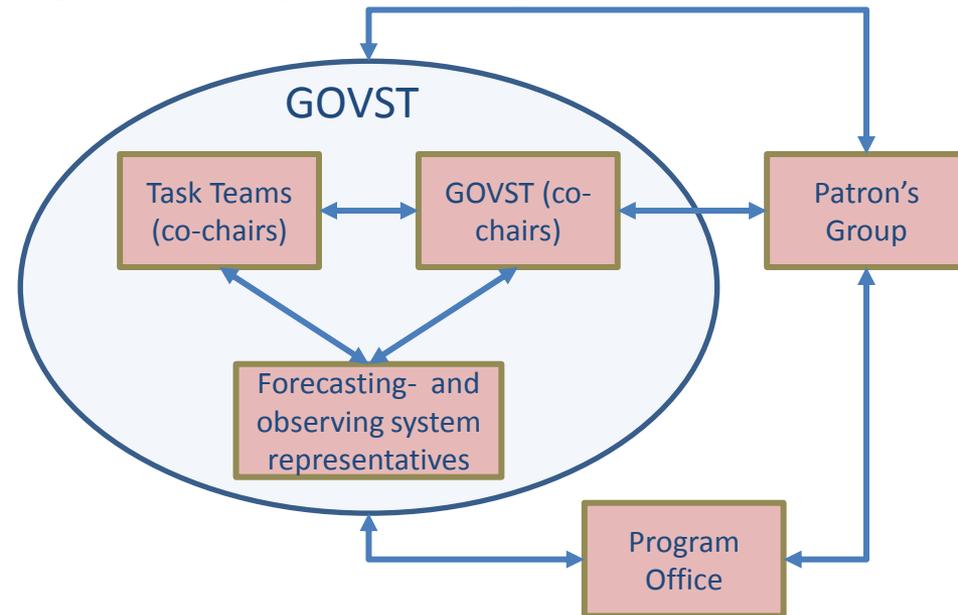


# GOV Science Team (GOVST)

“Core Goal”: GODAE OceanView continues the legacy of GODAE in providing leadership in consolidating and improving R&D for global & regional ocean analysis and forecasting systems.

GODAE Ocean View (GOV) is represented by the **GOV Science Team** or **GOVST**:

- *Representatives* from national, international and intergovernmental organisations with an expertise in operational ocean monitoring and forecasting



**GOVST co-Chairs:** Andreas Schiller (CSIRO, Australia) and Fraser Davidson (DFO, Canada)

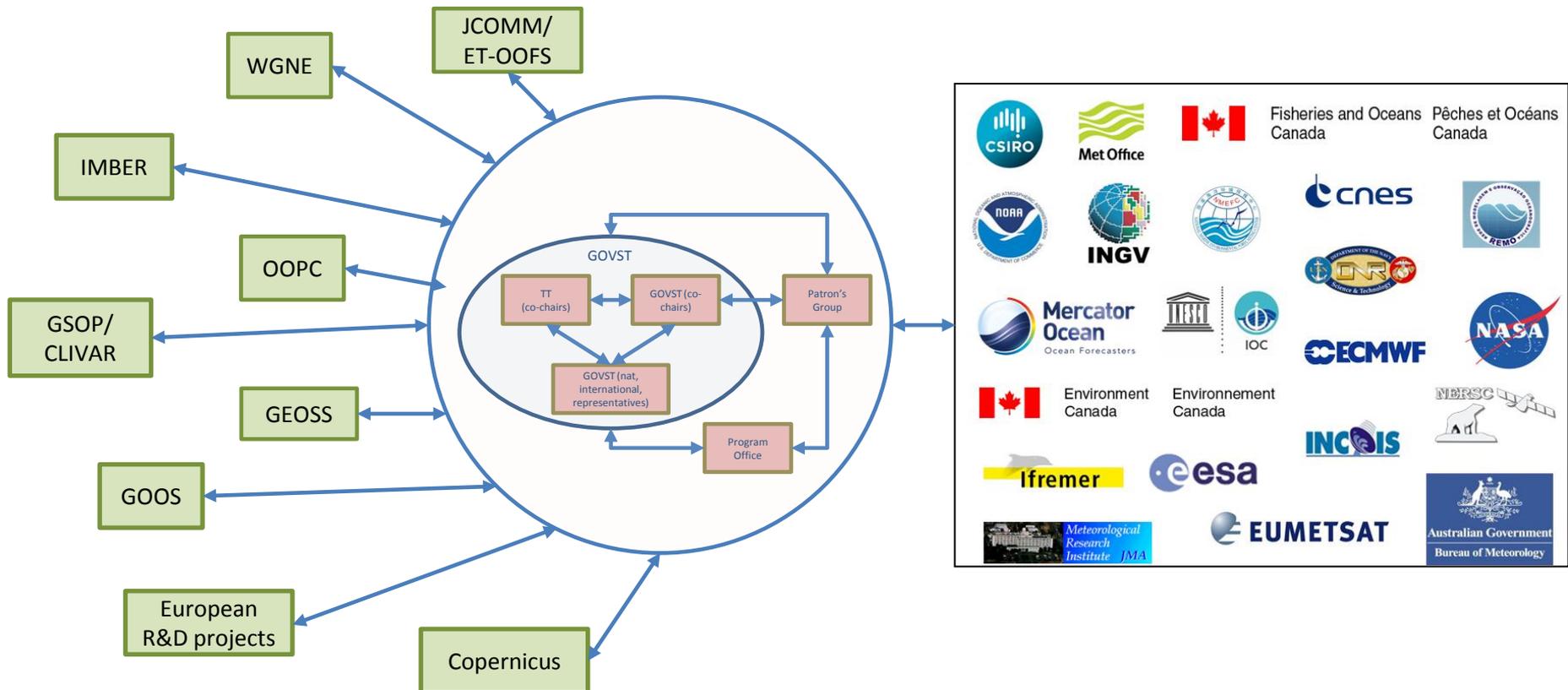
The GOVST is guided by a **group of Patrons** providing advice and advocacy to the members of the GOVST with regard to science activities, collaborations and resources.

The GOV is supported by the **programme office**.

# GOV, an International Programme



“GOV is inherently an international endeavour”: GOV provides a platform for international collaboration which is being integrated with parent bodies, international research programs and research initiatives related to ocean analysis and prediction including those within WCRP and IOC/WMO.



# GOV review (Nov 2013)



- In 2013 a panel of experts conducted a **review of GOV** (requested by the GOV Patrons' Group)
- Review panel recognised GOV success and improvements, but recommended that GOV should define a clearer direction and critical objectives by developing a **new strategy** with a focus on expected outcomes of GOV, expected investments and return of investment
- Strategic Plan was published in Dec 2014 which includes short-term plans for **annual Task Team activities**
- Invitation to Patrons to become **champion(s)** for closer collaboration with TT co-chairs and focused outcomes

# Scope and objectives



- Foster and coordinate the **development of new** ocean monitoring, modeling and assimilation **systems**
- Promote **access to data and information products** and enhanced uptake of ocean analysis and forecasting products
- Support the transition from the demonstration of new services based on ocean forecasting to the **provision of timely, robust and reliable operational services.**
- Demonstrate the **value of ocean observing system**
- Coordinate the development of **new capabilities** through the GOV Task Teams
- Organize **symposia and summer schools** to nurture a larger community of scientists and students

# GOV structure & task teams



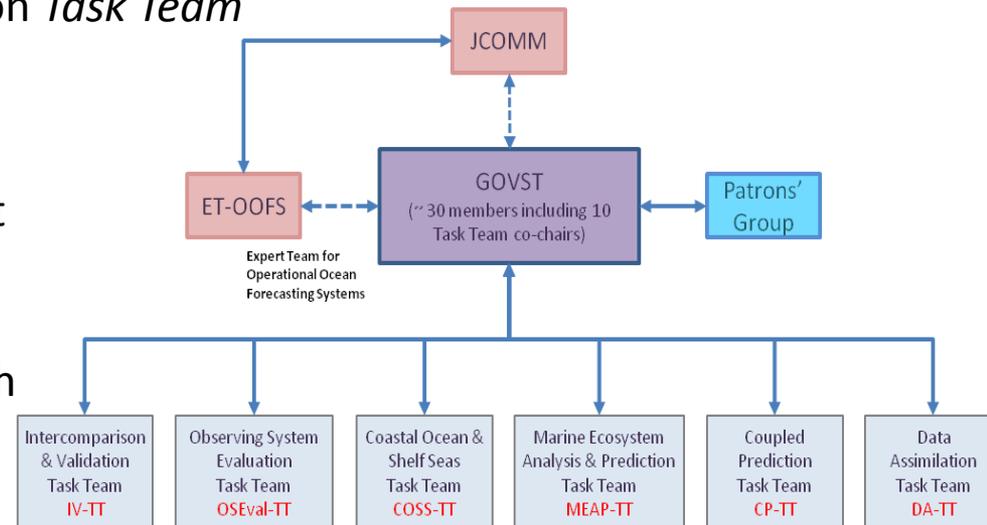
*Task Teams:* “GODAE OceanView aims to coordinate the development of new capabilities through a number of Task Teams (or TTs) which focus on topics of particular importance to GODAE OceanView.”

The GOV TTs and the areas they cover are:

- **COSS-TT:** Coastal Ocean and Shelf Seas *Task Team*
- **CP-TT:** Coupled Prediction *Task Team*
- **IV-TT:** Intercomparisons and Validation *Task Team*
- **MEAP-TT:** Marine Ecosystem Analysis and Prediction *Task Team*
- **OSEval-TT:** Observing System Evaluation *Task Team*
- **DA-TT:** Data Assimilation *Task Team*

All task team chairs are members of the GOVST.

- TTs address topics of particular interest to GOV
- TT work in collaboration with international programmes and research groups





# Task Teams

# Coastal and Shelf Seas Task Team (COSS-TT)



The mission goal of the COSS-TT is to work in coordination with GOVST and GOOS towards the provision of a sound scientific basis for sustainable multidisciplinary downscaling and forecasting activities in the world coastal oceans. The Task Team fosters international collaboration and also works with other GOV Task Teams conducting specific activities of common interest in the coastal and shelf seas.

**Co-Chairs:** Pierre de Mey (LEGOS) and Villy Kourafalou (University of Miami/ RSMAS)

The TT activities include:

- the development of best practices for prediction assessments (with the IV-TT)
- quantifying the impact of observations to guide array design (with the OSEval-TT),
- coastal data assimilation (with the DA-TT) and

Examples: COSS-TT: Coastal altimetry - Integration of coastal altimetry data sets in some Coastal Ocean Forecasting Systems (COFS)

→ Feedback to Coastal altimetry data providers from some COFS; Collaboration between the active international communities that support COFS and Coastal Altimetry

- on interface between open ocean and shelf models.

# Marine Ecosystem and Validation Task Team (MEAP-TT)



The MEAP-TT is the successor of the IMBER-GODAE working group which was formed in 2007 to define, promote and coordinate actions between developers of operational systems and ecosystem modelling experts, in tight connection with IMBER

**Co-Chairs:** Katja Fennel (University of Dalhousie) and Marion Gehlen (LSCE)

The **focus** of the MEAP-TT is on developing the underpinning science and tools which will eventually enable full integration of biogeochemistry and (simplified representations) of ecosystems in existing physical operational systems.

Its **mission** contributes to

- improving of the biogeochemical observing systems
- improving and developing of assimilation schemes for biogeochemical observations
- modelling of Essential Biogeochemical Variables (EBV)
- bridging the gap with end-users

## MEAP-TT (continued)



### Focus areas:

- Demonstration of improved biological/biogeochemical model skill through data assimilation
- Downscaling from global to regional systems for biological/biogeochemical model applications
- Assessment of dependence of model skill on biological/biogeochemical model complexity with emphasis on model portability and predictive skill
- Demonstration of usefulness of green OO products to end-users

*Cross-cutting activity:* Identification of metrics for system evaluation in view of transfer to operational services

# Coupled Prediction Task Team (CP-TT)



The mission goal of the CP-TT is to draw together the international scientific and technical expertise in ocean, sea-ice and wave prediction and to seek collaboration with equivalent expert groups in atmospheric-land surface-hydrology prediction to accelerate the scientific and technical development of fully coupled systems for short- to medium-range prediction.

**Co-Chairs:** Chris Harris (Met Office) and Hal Ritchie (Environment Canada)

Focus areas for activities and projects

- Coupled prediction in an Earth Systems Modeling context but with a focus on the role of and impact on oceans (e.g., ocean-ice-wave interactions)
- Coupled data assimilation in coordination with Data Assimilation Task Team

# CP-TT (continued)



## Main priorities for activities and projects

- Facilitate exchange of national and international programs of scientific progress
- Collation of quantified impact of earth system coupling for ocean-wave-sea-ice-atmosphere and interfacial flux phenomena
- Foster targeted research on particular topics of interest to GOV members (e.g., SST/diurnal cycle, sea ice impacts on boundary layer fluxes, wave coupling)



# Intercomparison and Validation Task Team (IV-TT)

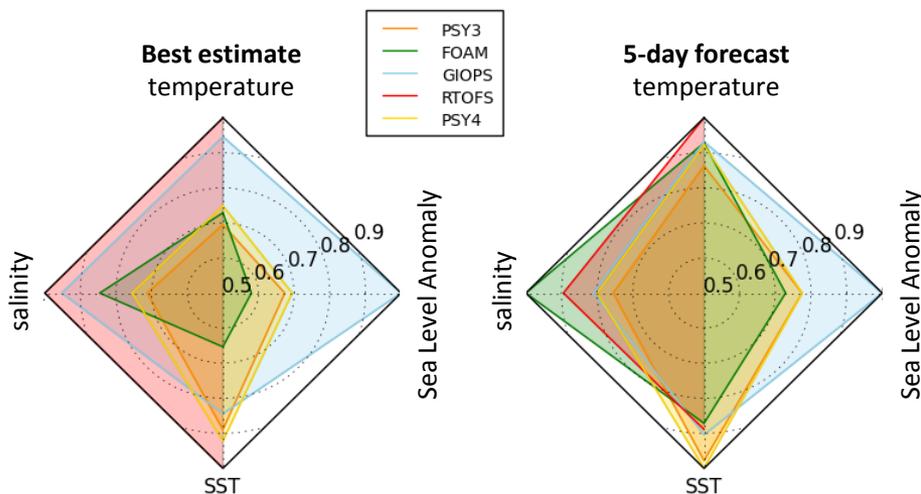
Coordinates and promotes the development of a framework for scientific validation and intercomparison of operational oceanography systems (Oofs) by

- Fostering scientific discussions on the validation of physical and biogeochemical ocean forecasting systems, linking with CLIVAR and the climate community on common interests
- defining metrics to assess the quality of ocean analysis and forecast products
- Coordinating multi-system intercomparisons and providing visibility to the community, linking with JCOMM (e.g. on standards)
- improving of GOV's systems

**Co-Chairs:** Fabrice Hernandez (Mercator Ocean) and Greg Smith (Environment Canada)

**Real time multi-assessment, and intercomparison started in 2013**

**Forecast accuracy of GODAE systems in 2013**



New metrics: Radar chart synthesis from the statistics of validation against observations and intercomparison of 5 operational global forecasting systems during 2013. Scores for 4 Ocean Essential Variables are provided along the four axes, normalized by the largest error.

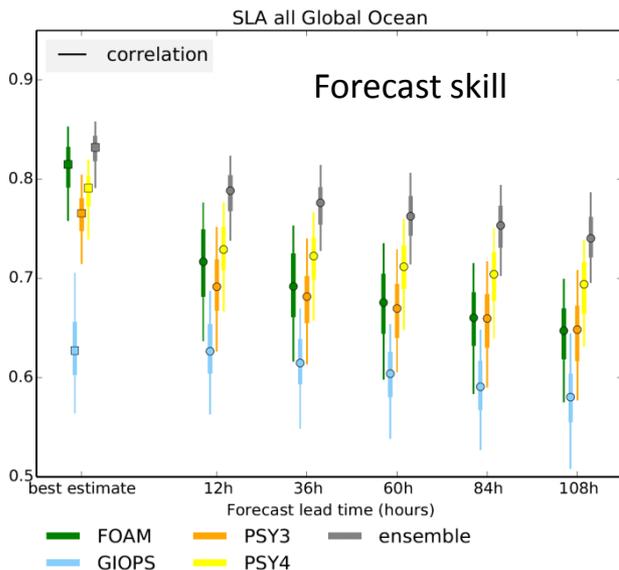
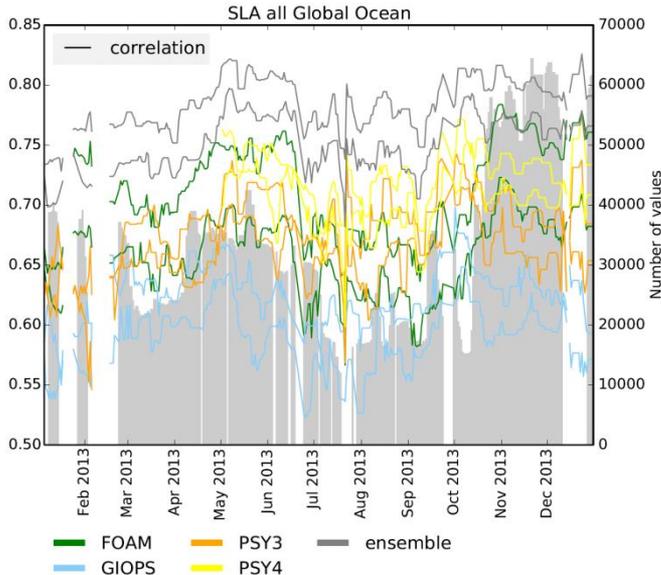
*Hernandez et al, JOO 2015*



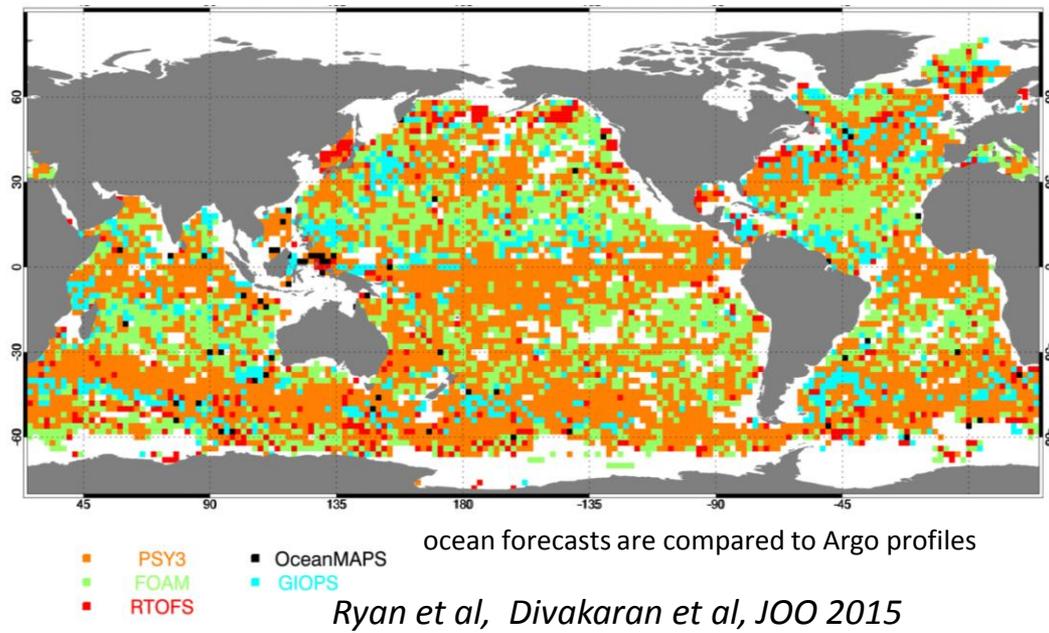
# IV-TT (continued)

**Real time multi-assessment, and intercomparison started in 2013: demonstration and monitoring**

Forecast accuracy with Class 4 metrics: comparison of 4 operational forecast against satellite altimeter sea level anomalies (correlation)  
 Together with the assessment of the multi-system ensemble estimates (grey)



0-100m salinity 1-day forecast: which system performs best in 2013



# Observing System Validation Task Team (OSEval-TT)



Through work undertaken by the OSEval-TT, GOV will provide unbiased, evidence-based assessments of mature observing systems, and will propose new observing systems to observing system agency providers. This will be achieved through system-wide evaluations of observation impact on ocean forecast and reanalysis systems, including routine monitoring of observation impacts, and through the application of a range of different observing system design experiments. The OSEval-TT will work with the assigned Patrons Group champion to effectively engage with observation groups.

**Co-Chairs:** Gilles Larnicol (CLS) and Peter Oke (CSIRO)

Example: OSEval-TT: Provide guidance and examples for observational agencies to optimise the Global Ocean Observing System, and convince funders of the value of ocean observations for ocean forecasting and for those benefitting from ocean forecasting (e.g., defence, search and rescue, environmental monitoring, oil spill response).

- Community Observing System Experiments (OSE) - both delayed-mode, and near-real-time
- Community Observing System Simulation Experiments (OSSE)

# Data Assimilation Task Team (DA-TT)



The DA-TT will foster the development and evaluation of data assimilation systems relevant to GOV. It will coordinate and improve the assimilation of ocean and sea-ice data into ocean, sea-ice and coupled models and provide a focus for diagnosing and understanding model and observation biases through the use of data assimilation techniques, and discussing the results with model developers and observation specialists.

**Co-Chairs:** Matt Martin (Met Office) and Andrew M Moore (UCSC)

## History

DA-TT was formed in Nov, 2014 and its members comprise data assimilation experts from operational centres, research laboratories and universities

## Objectives

- To coordinate and improve the assimilation of ocean and sea-ice data into models by providing a forum for discussion, and by creating a framework for inter-comparison of aspects of data assimilation.
- To provide a focus for diagnosing and understanding model and observation biases through the use of data assimilation techniques

# DA-TT (continued)



## Themes

- Improving the representation and parameterisations of error covariances for data assimilation
- Improving the capacity of current data assimilation systems to make use of all available observations
- Development of data assimilation systems for coupled models
- Development of hybrid data assimilation for the ocean

## Current Activities

- Improving understanding of error covariances in existing DA systems via a common set of coordinated single observation experiments
- Identifying and quantifying model and forcing bias that are common to global data assimilation systems via coordinated experiments
- Promoting the development of hybrid data assimilation methods in the ocean (eg. ensemble variational methods)
- Organise a meeting of the TT to foster the development of data assimilation, establish linkages, forge collaborations, and encourage joint publications



# Programme Office

# Project office



- Facilitation and support of GOV communications and activities
- GOV documents (e.g. Work Plan and Strategic Plan) and publications (e.g. GEOSS book, GOV special issue)
- Organisation and participation in GOV meeting, workshops and conferences or symposia
- Develop, maintain and update the GOV website, distributing material on GOV and GOVST & TT publications;
- Prepare and publish GOV meeting and workshop reports
- In collaboration with the GOVST and the Patrons' Group, promote the practical benefits and objectives of GOV among the operational and research communities (e.g. brochure);
- Manage GOV budget



The screenshot shows the GODAE OceanView website interface. At the top, there is a search bar and navigation links for Home, About, Organisation, Science, Outreach, Publications, Documents, News, Calendar, and Contacts. The main content area features a large banner for 'Ocean Forecasting Systems' with a video player. Below this, there are three columns of news items: 'Special Issue publication', 'MEAP-TT workshop presentation', and 'Next COSS-TT workshop 2015'. A sidebar on the right contains 'OceanView News' and 'Workshops & Meetings'. At the bottom, there is a section for 'GODAE OceanView Principle Sponsors' with logos for MetOffice, IOC, EUMETSAT, Mercator Ocean, CNRS, and others. A footer contains accessibility and site information.

# Meetings and workshops



## Most recent and upcoming GOV meeting and workshops

- DA-TT workshop, 20-22 May 2015, Met Office, Exeter, UK
- MEAP-TT workshop, 23-24 June 2015, Halifax, Canada
- COSS-TT & ARCOM workshop, 31 Aug – 4 Sep 2015, Lisbon, Portugal
- 6<sup>th</sup> Annual GOVST meeting, 2-6 Nov 2015, Sydney, Australia
- Joint DA-TT/MEAP TT workshop, May/June 2016, Santa Cruz, USA



Thank you!