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Oceanographic  
Commission
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océanographique  
intergouvernementale
- Comisión  
Oceanográfica  
Intergubernamental
- Межправительственная  
океанографическая  
комиссия

# Ocean & Coastal Information Supersite - Candidate Use Case - Helix Nebula Flagship

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# Why?

- The **Global Ocean Observing System** (GOOS) facilitates the collection, storage and use of ocean data to support society.
- Storing ocean data (existent and new) and then transforming it to '**Ocean Products**' (via modelling, analysis and creation of indicators etc) can require large computing facilities.
- **Cloud computing** could be a viable way of handling large amounts of ocean data without the need for sophisticated local computing facilities – scientists (in both developed & developing worlds) often don't have this.



# Ocean Forecasting

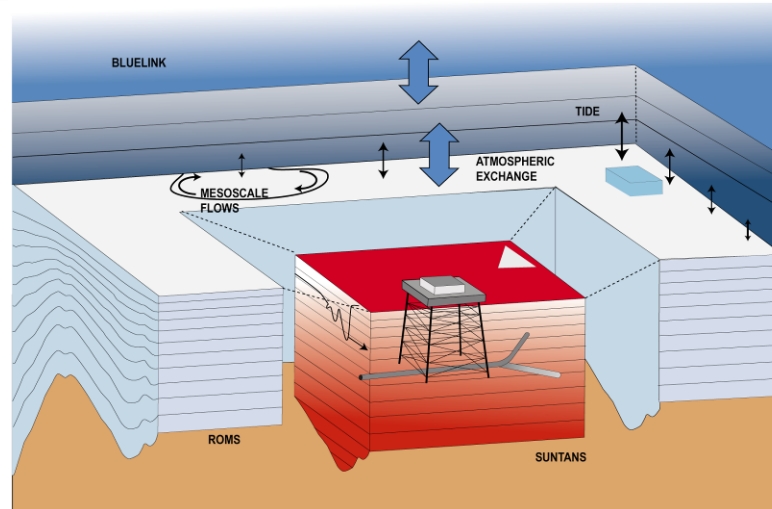
- **‘Ocean forecasting’** uses ocean data to model & provide forecasts of future ocean conditions (like forecasting the ‘weather’ in the atmosphere, instead for the ocean).
- **Benefits for society** – variety of end-users, including commercial mariners, sailors and fisheries managers.
- Some examples....



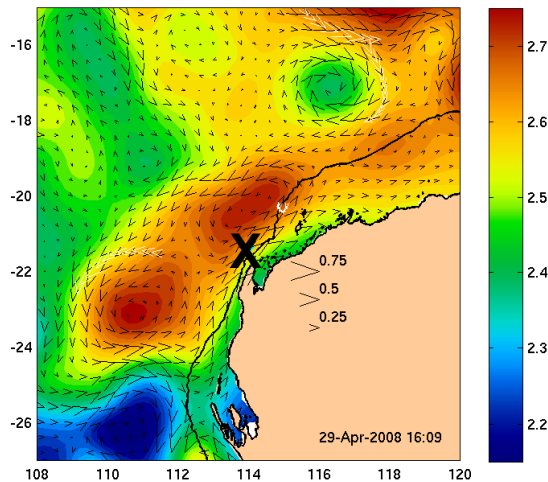
# Applications - Industry

## Woodside Petroleum

Engineering design of underwater pipelines,  
Offshore construction,  
Management of oil and gas operations

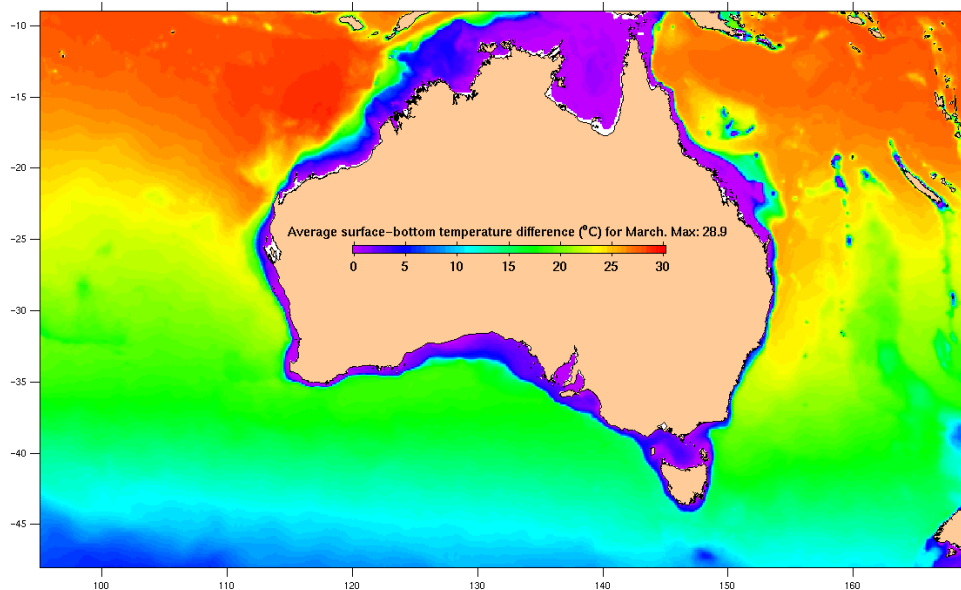
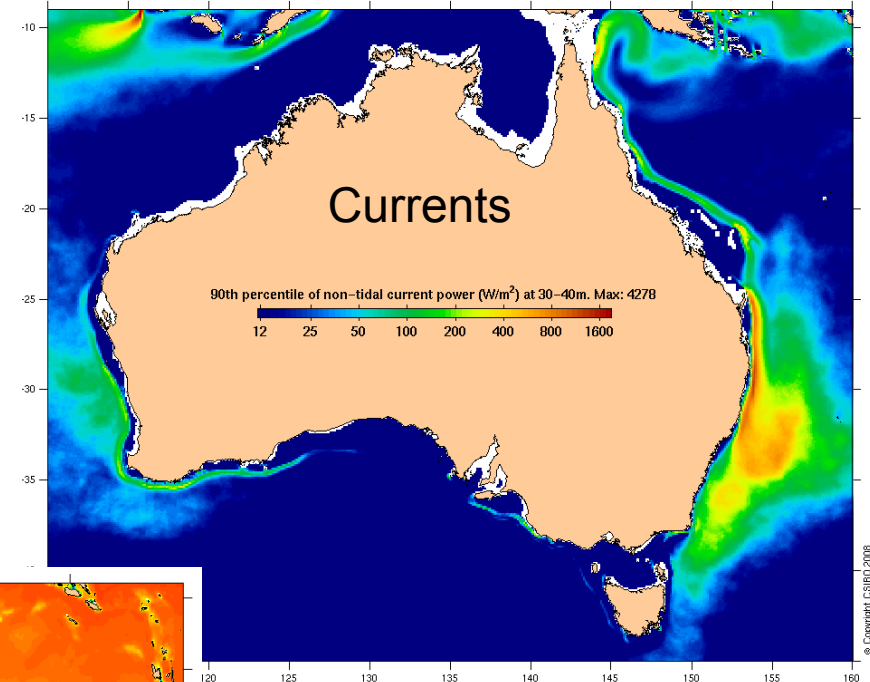
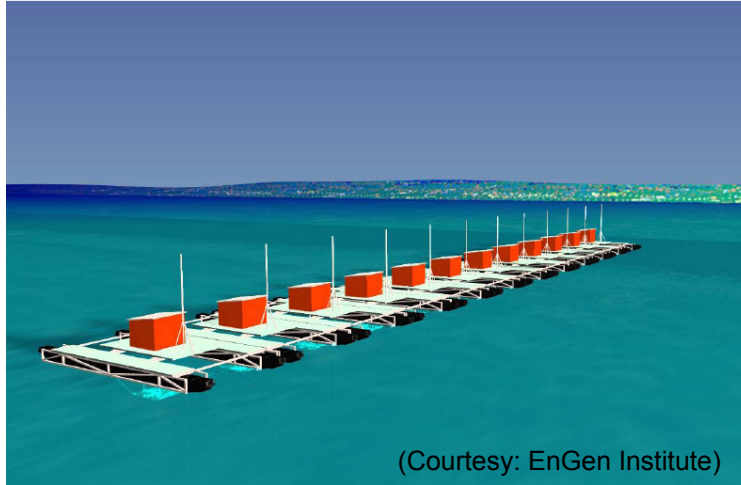


Analysis for 22-Apr-2008 22:41:52. TG hgt is 0.1  
Drifters : 16-Apr-2008 - 28-Apr-2008



## Emergency Response to Oil Spills

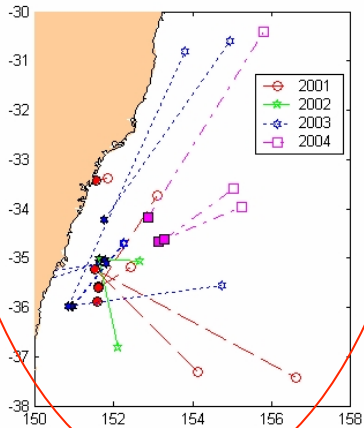
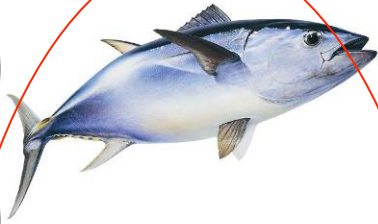
# Ocean Renewable Energy



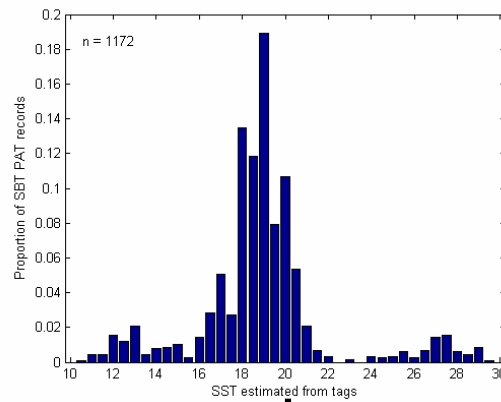
**Ocean Thermal Energy Conversion (OTEC)**

# Dynamic Spatial Strategies

## Southern Bluefin Tuna Management

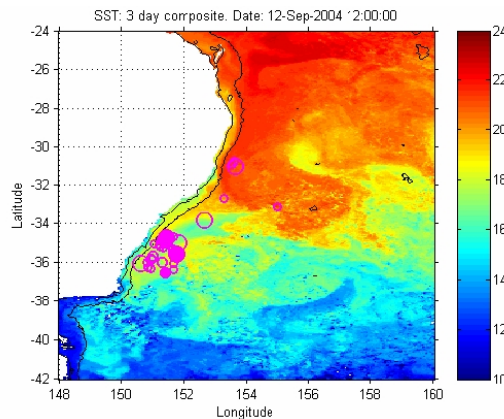


### Habitat preferences

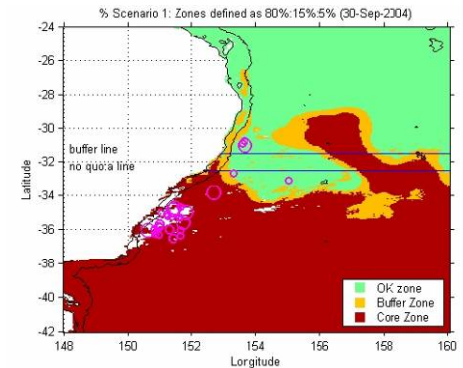


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### 3D ocean info



### Habitat prediction



Management  
decision



# Operational Ocean Forecasting

Real-time Observations

Automatic Quality Control

Data Assimilation

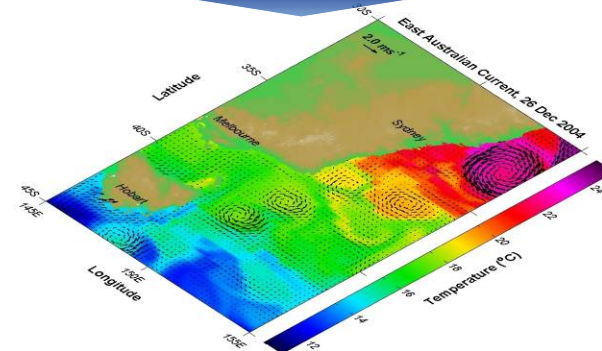
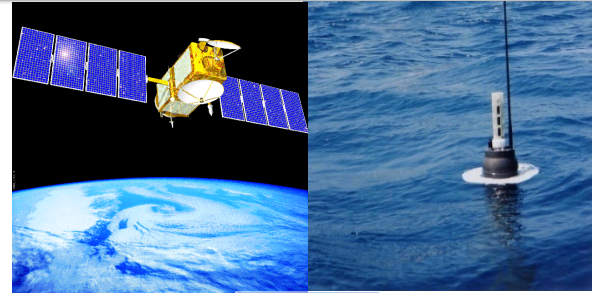
Model Simulation

Data Management

Products and Services



Ocean Model Analysis and Prediction System



# Ocean Forecasting & Cloud Computing

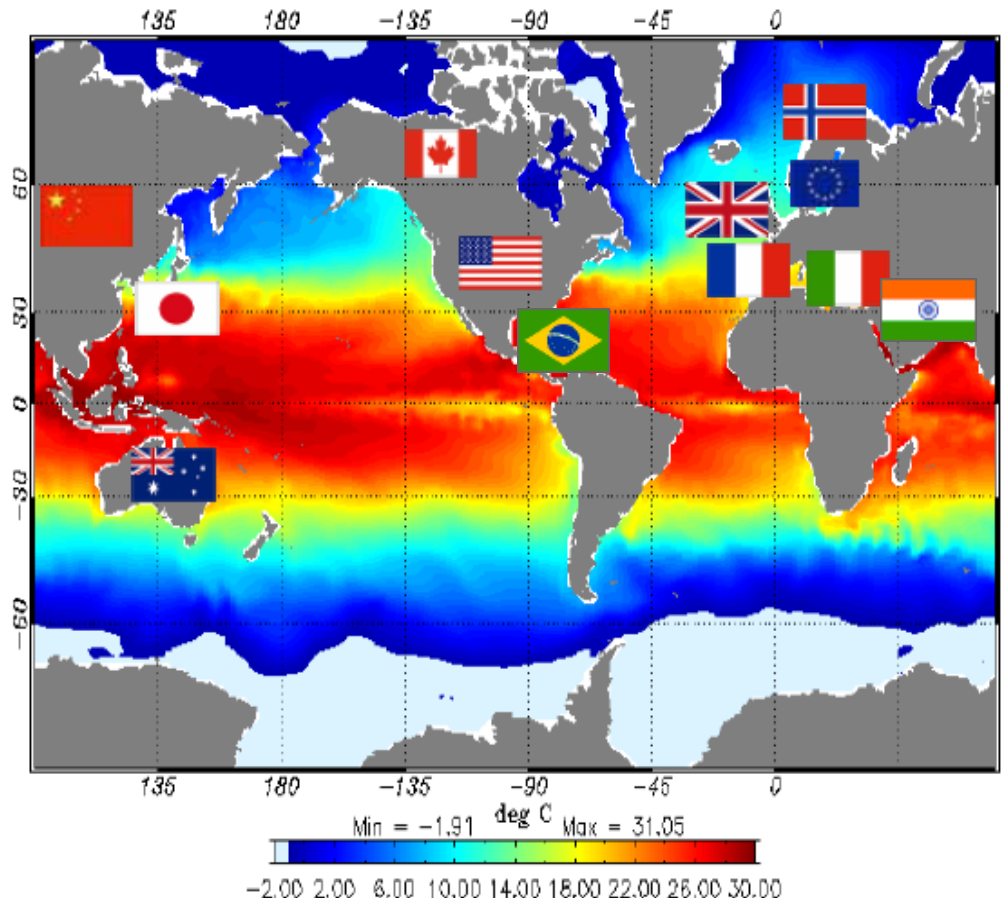
- ‘**Ocean forecasting**’ usually uses large stacks of multi-temporal data processed in the algorithms and models. This requires:
  - High performance computing facilities with platform components
  - Integration and inter-operability; and
  - Full and open access to the data (GEOSS Data Sharing Principles)
- There is **enormous potential for cloud computing** to assist and improve the efficiency of this process - especially for:
  - Scalability of ocean products
  - Deploying of regional models responding to emergency situations; and
  - Developing local capacities





# GODAE OceanView Forecasting Systems

GODAE OceanView— a **consortium of government agencies** around the world using ocean data (including from Coriolis/Ifremer) to produce models for ocean forecasting.



- This community has indicated an interest in exploring the use of cloud technology
- **The Challenge!** While seeing enormous potential for cloud computing, the operational production of forecasts would have to be proven (security and reliability) before operational use of the cloud could be foreseen.

# Candidate Use-Case:

## Ocean & Coastal Information Supersite

- Conveyor: **IOC/UNESCO**
  - Knows the customer needs;
  - Is the conduit for bringing together relevant end-users; and
  - Is a stakeholder for establishing a sustainable and global “Data as a Service” facility for scientists
- Partners:
  - Ocean Scientists (eg **GODAE Oceanview**, JCOMM)
  - Data Centres (eg Ifremer/Coriolis)
  - SMEs providing infrastructure integration support (**Terradue**)
  - Other SMEs processing large data volumes (eg Brockmann Consulting)



# Approach & Benefits

- Start with National Centres in GODAE Oceanview, seeking use of cloud computing under the Helix Nebula
- Through 'sharing' dataset types in the HN Cloud, information will be pulled together from various sources to create 'ocean products'
- This is possible via co-ordination between the partners and with multiple data providers
- Final customers will be the contacts **conveyed by IOC / UNESCO** (not IOC / UNESCO itself)
- **Expected benefits:**
  - Faster and more efficient creation of an ocean product through improved data retrieval (especially quicker access to multiple datasets), storage and ingestion operations; and
  - Increased number of user profiles that can access the system (especially from developing countries).

# Possibilities

- **GEOWOW** (GEOSS Interoperability for Weather Oceans and Water) – EU FP7 Funded.
- **Showcase with IOC and Terradue** – developing the infrastructure for supporting the creation of an ocean indicator (sea level & coral reef vulnerability) via the Cloud.
- Currently testing the way forward.



# Conclusions

- Success will improve prototyping, analyses and development of ocean forecasting models.
- Improves the efficiency and use of ocean forecasting for societal benefit.
- Assists capacity development (especially for developing countries).
- **Questions?**

