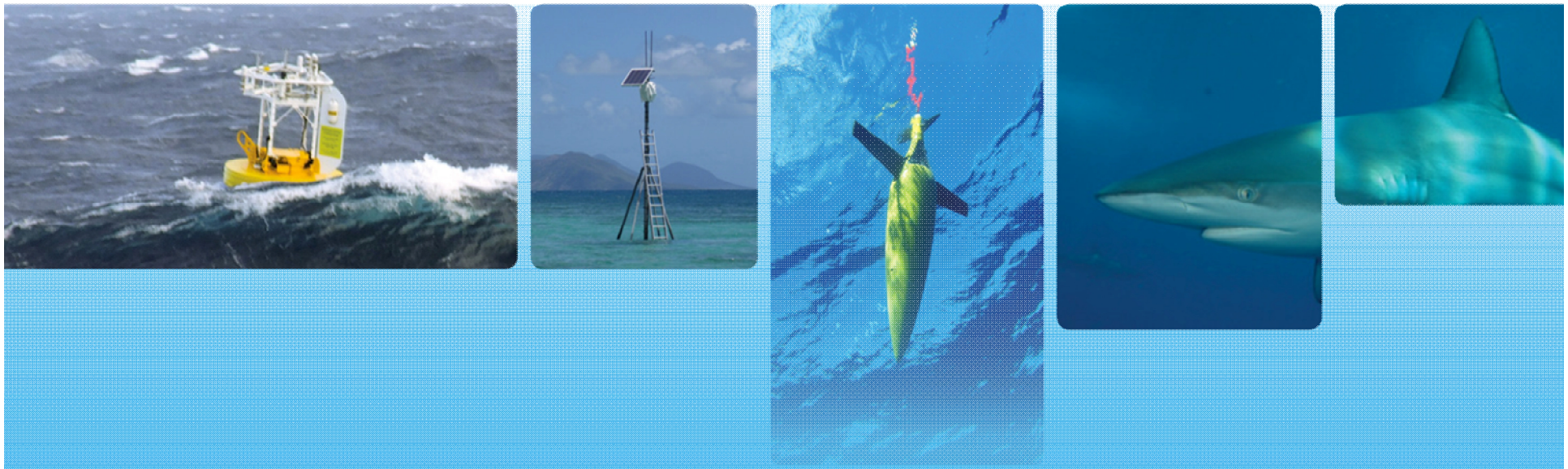
IMOS Integrated **Marine Observing** System



Australia's Integrated Marine Observing System and its role in satellite oceanography

Edward King, CSIRO/IMOS Facility Leader

Melbourne, 9 November 2015

Outline of the talk

1. What is IMOS and how does it work?

2. IMOS role in satellite oceanography

3. Future opportunities

1. WHAT IS IMOS AND HOW DOES IT WORK?

What is IMOS?

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

- IMOS is a
  - national
  - collaborative
  - research infrastructure
  - funded by Australian Government
- It provides the means for multiple institutions in Australia to undertake systematic and sustained observing of the marine environment
- Making all of the data openly available for research and other purposes

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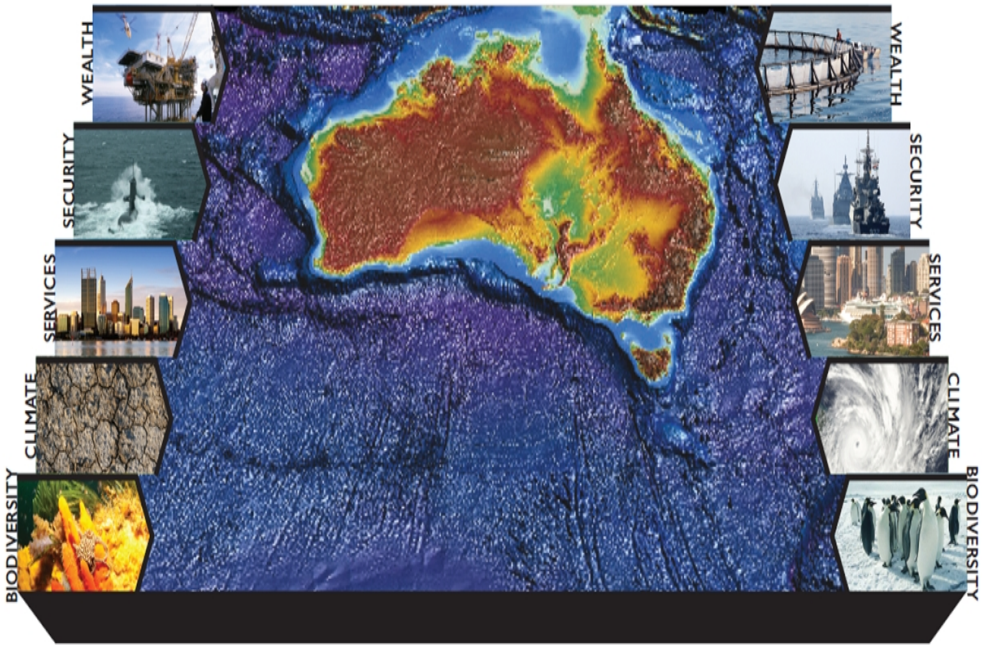
Why was IMOS established?

- Oceans matter to Australia as a ‘marine nation’
  - marine industries
  - national security
  - coastal populations
  - climate & weather
  - marine biodiversity



- Historically, our marine observing effort was uncoordinated
  - poor coverage, fragmented, not sustained
- IMOS was established in 2006 to address these problems

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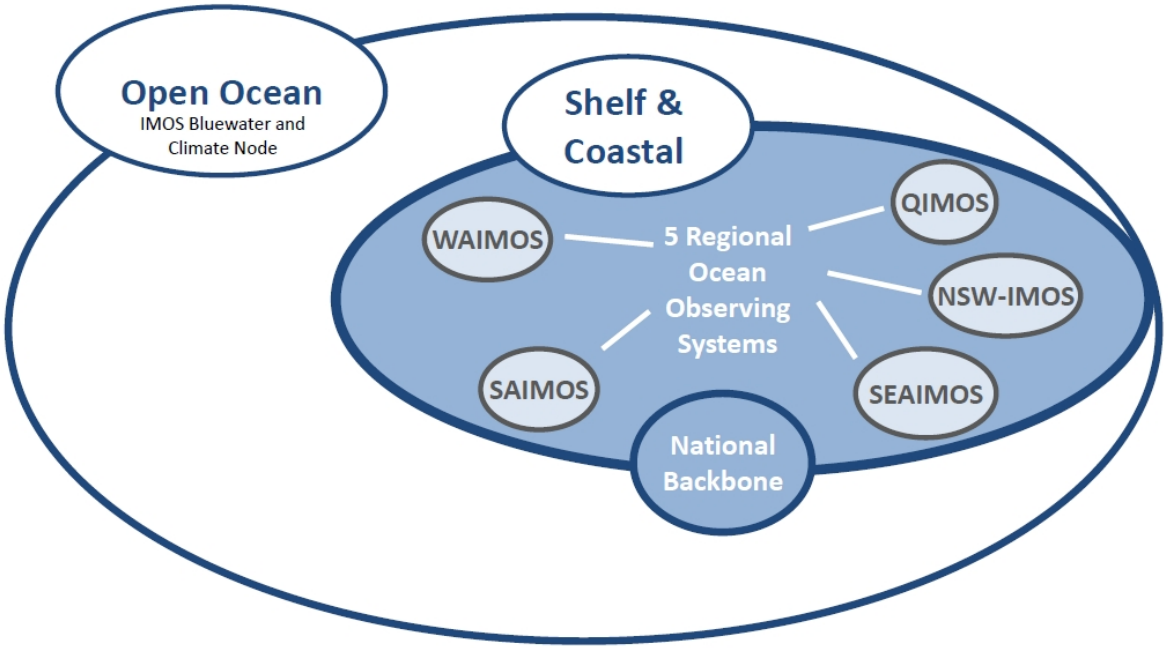
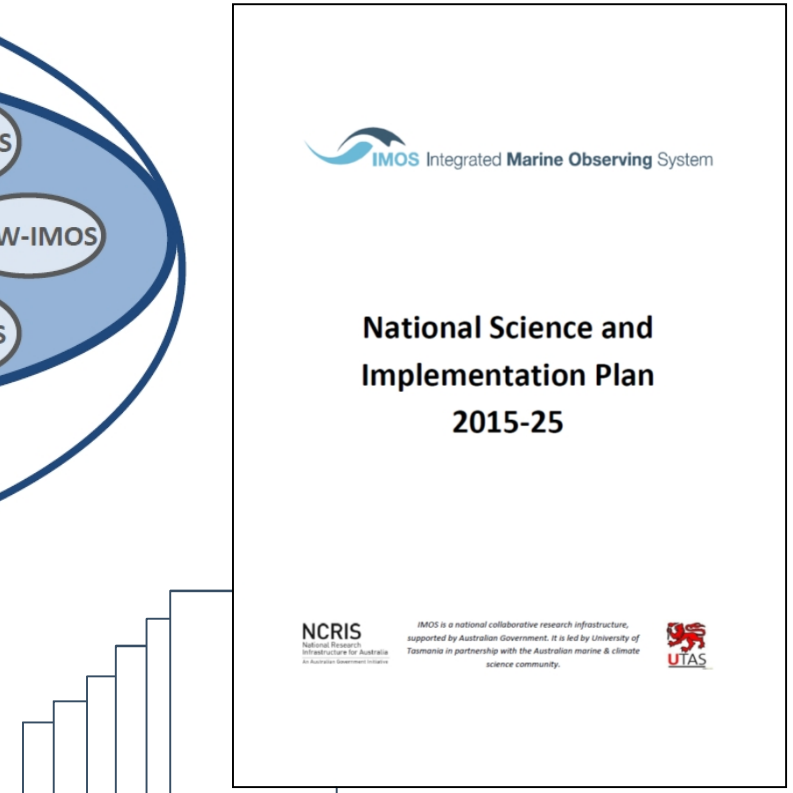
How does IMOS work? – Science Nodes



Why are we doing this?
What do we need to observe, where, when and how?



One national plan, six Node 'chapters' focused on the open ocean and regional marine systems

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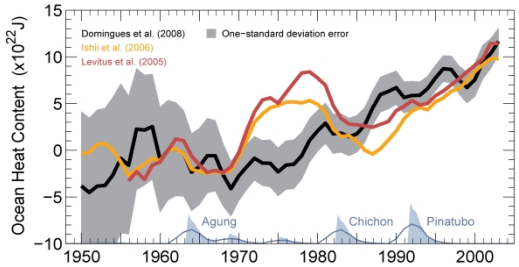
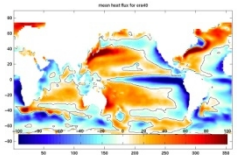
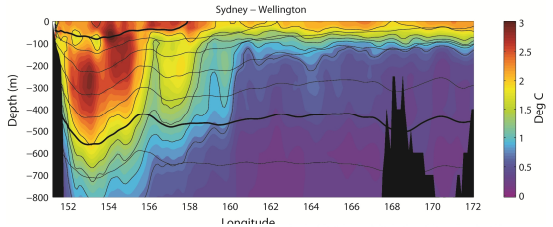
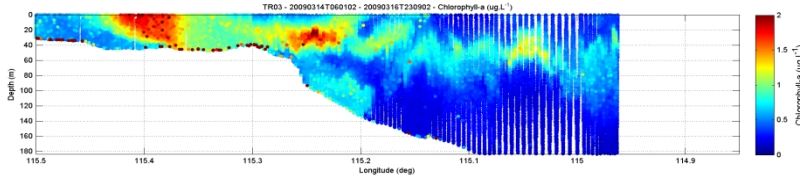
IMOS Node science questions

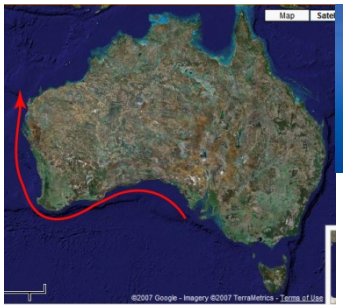
- Multi-decadal Ocean Change
  - Temperature, salinity, carbon
- Climate Variability, Extremes
  - ENSO, IOD, SAM
- Major Boundary Currents
  - EAC, Leeuwin, ITF
- Shelf and Coastal Processes
  - Eddies, currents, upwellings etc
- Ecosystem Responses
  - Productivity, abundance, distribution
  - Pelagic, benthic





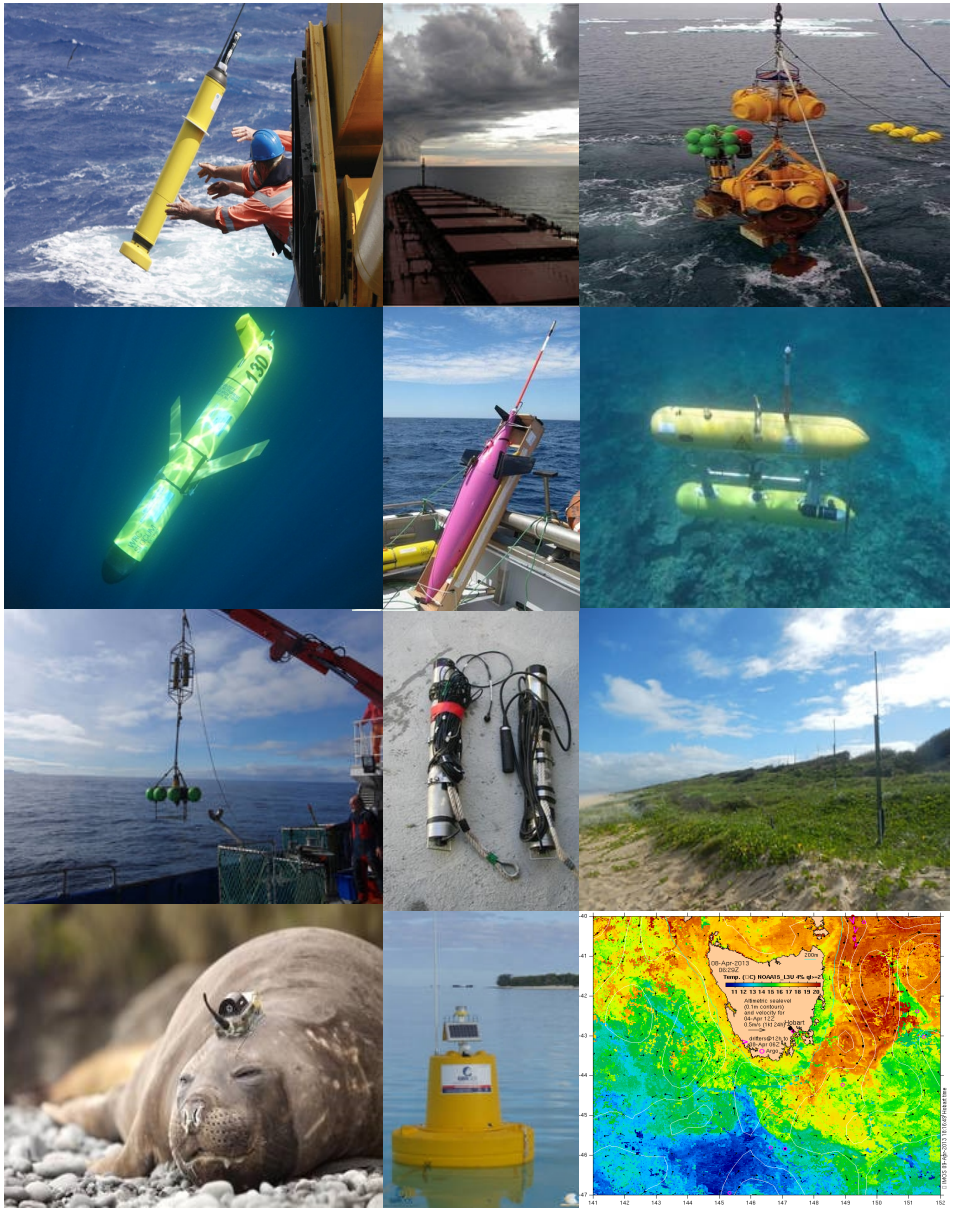






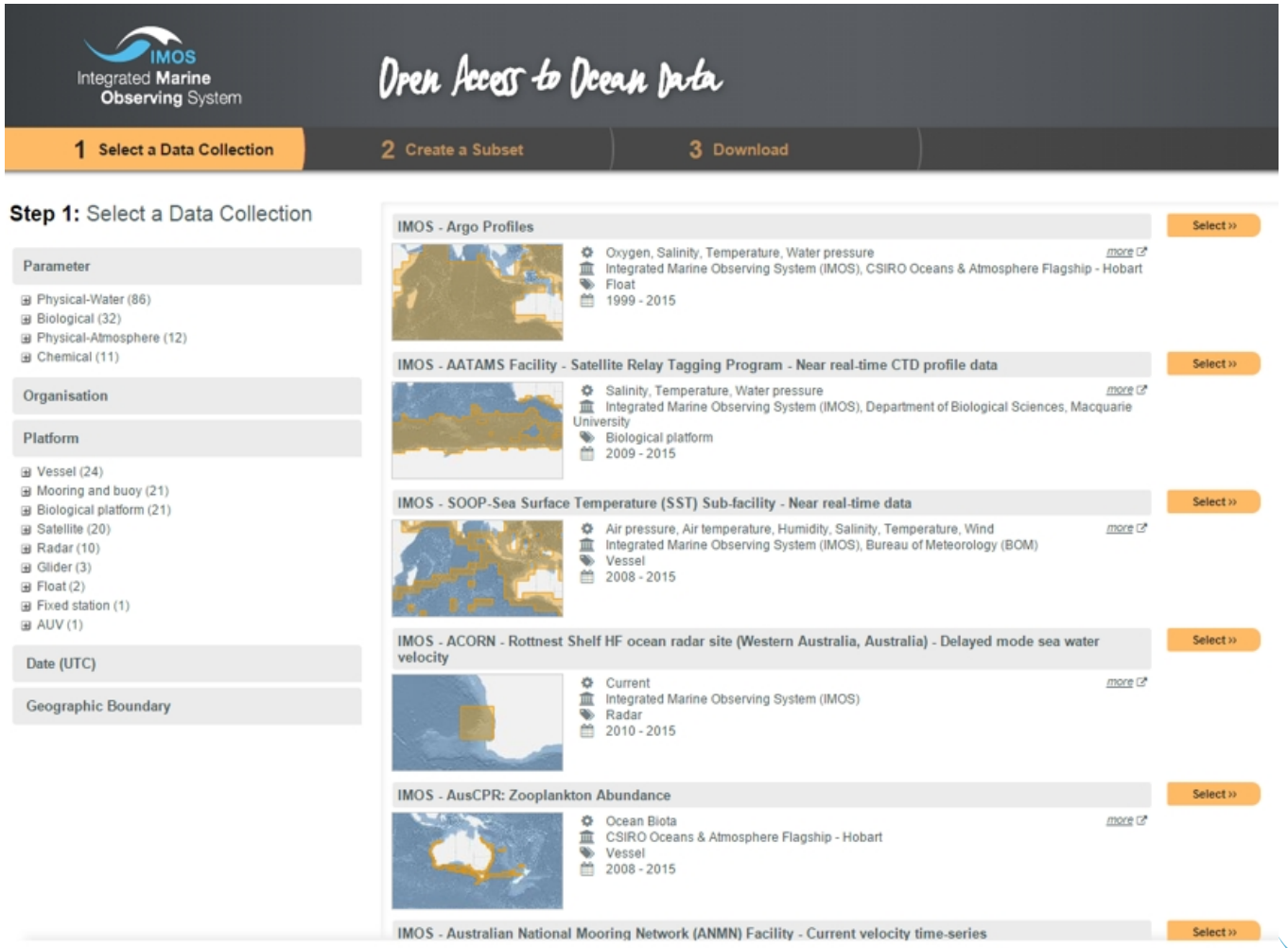
How does IMOS work? - Facilities

1. Argo Floats
2. Ships of Opportunity
3. Deepwater Moorings
4. Ocean Glider Fleet
5. Autonomous Underwater Vehicles
6. National Mooring Network
7. Ocean Radar Network
8. Animal Tagging and Monitoring Network
9. Wireless Sensor Network
10. Satellite Remote Sensing



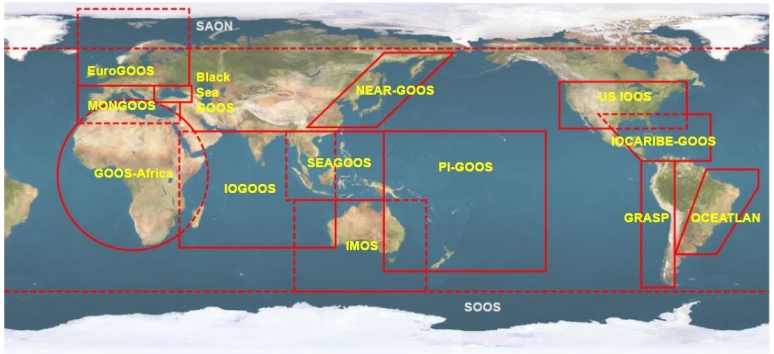
How does IMOS work? – Data

- all data discoverable, accessible, usable and reusable



IMOS benefits from and contributes to global ocean observing

- IMOS is one of 13 Regional Alliances of the Global Ocean Observing System (GOOS)



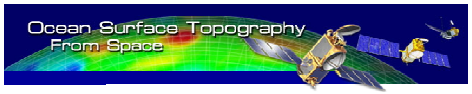
- All IMOS Facilities connected to relevant global programs

GHRSST
Group for High Resolution Sea Surface Temperature

iCCG
International Ocean Colour Coordinating Group

GEO GROUP ON EARTH OBSERVATIONS

BLUE PLANET
Oceans and Society



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2. IMOS ROLE IN SATELLITE OCEANOGRAPHY

Reception, cal/val, useful products

- Australia has no domestic research satellite capability
- As a nation we derive massive benefit from access to data and products from other nations' satellites
- The contributions Australia can make in return are:
  1. Being part of the global reception network
  2. Providing high quality, *in situ*, cal/val data
  3. Demonstrating usefulness of sat products in our region
- IMOS has invested in all three areas
  - Initially 1, 2 and 3, but now mainly 2 and 3
- Focused on SST, Altimetry and Ocean Colour
- Looking to play a key role in the Southern Hemisphere

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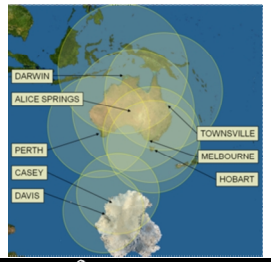
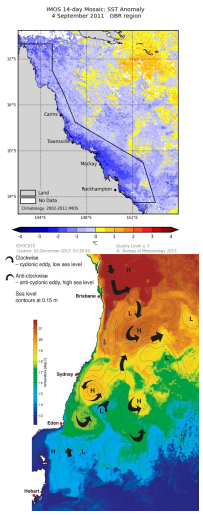
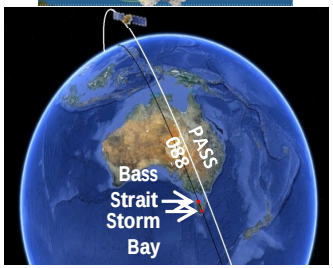
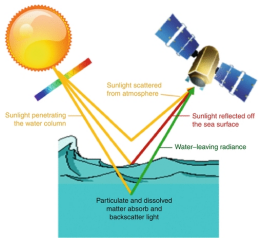
IMOS - SST, Altimetry, Ocean Colour

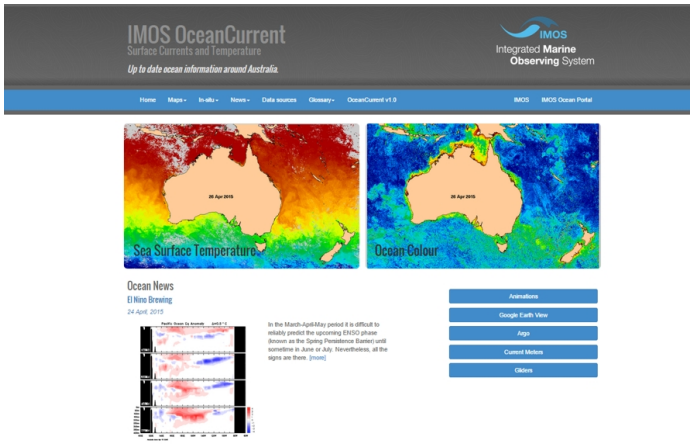
	Cal/val	Products (example)
SST	Ship of Opportunity	GHRSST, ReefTemp
Altimetry	Bass Strait and Storm Bay moorings	BLUElink, GSLA
Ocean Colour	Lucinda Jetty	eReefs WQ
all	-	*OceanCurrent*











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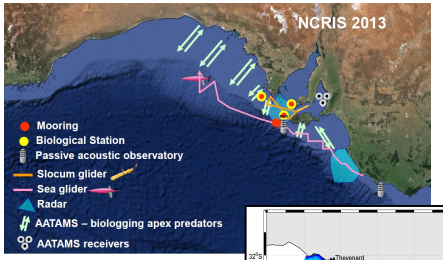
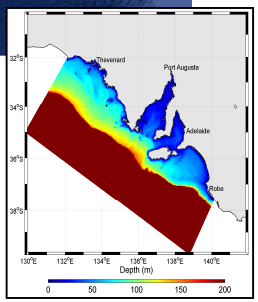
3. FUTURE OPPORTUNITIES

New variables, new satellites, new uses

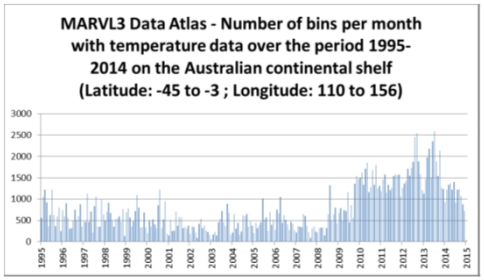
- New variables
  - IMOS starting to look at surface salinity
    - Other opportunities?
- New satellites
  - Is Australia's satellite oceanography community well placed to exploit these?
    - No doubt a major focus for discussion this week…
- New uses
  - Many opportunities
  - Some applications in fisheries, marine spatial planning
  - Suggest we need to 'scale up' nationally…

IMOS looking to drive collaboration between observations and modelling





- Regional modelling efforts building on IMOS regional observing systems
- Australian Coastal and Oceans Modelling and Observations (ACOMO) workshop
  - every two years, 2012, 2014…2016
- Marine Virtual Laboratory (MARVL)
  - Online portal that simplifies the process of marine modelling
  - Enabled development of a Data Atlas for coastal and shelf waters (1995-2015)
  - Hoping to undertake an Australian National Shelf Reanalysis (ANSR) project



IMOS involved in leading the development of Operational Oceanography in Australia

Forum for Operational Oceanography

Australian Government
Department of Industry and Science

- The inaugural Australian Forum for Operational Oceanography (FOO) was held in July 2015
  - 125 participants, with good representation across the 'four pillars'
- Went well, with strong support for the Forum to endure - priority areas:
  - surface currents, and waves
  - thermal structure
  - consensus forecasting
  - data products/stewardship

Figure 1: The 'four pillars' of FOO

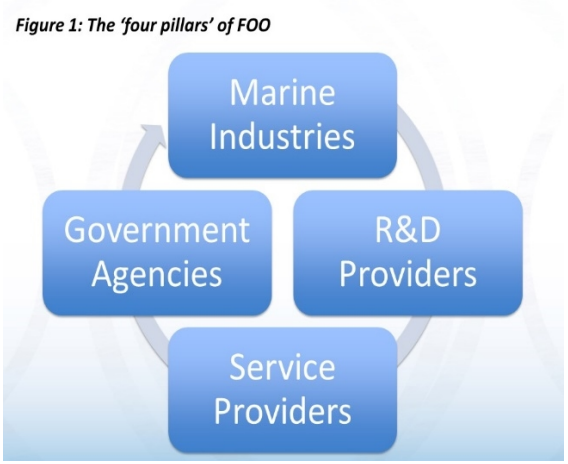
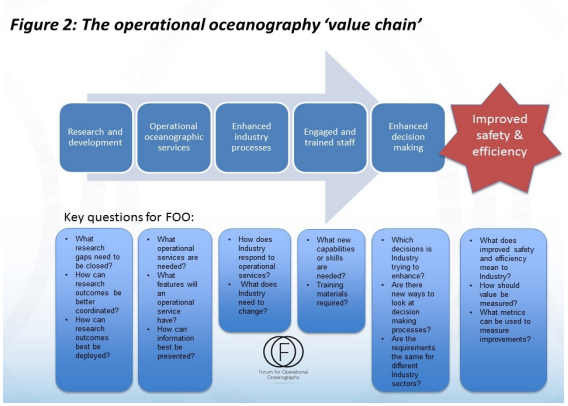


Figure 2: The operational oceanography 'value chain'



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UNIVERSITY of TASMANIA

IMOS is a national research infrastructure, supported by Australian Government. It is led by University of Tasmania in partnership with the Australian marine and climate science community.

www.imos.org.au

THANK YOU…

The Operators of the IMOS infrastructure are:

sims sydney institute of marine science

The University of Western Australia

Australian Government Bureau of Meteorology

Australian Government | Australian Institute of Marine Science

CSIRO

Government of South Australia Primary Industries and Regions SA

SARDI South Australian Research and Development Institute

Curtin University

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