IMOS Integrated **Marine Observing** System

OceaSITES 2011

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Australian Government

Department of Innovation
Industry, Science and Research

IMOS is supported by the Australian Government through the National Collaborative Research Infrastructure Strategy and the Super Science Initiative

IMOS is:

- An initiative or the Australian Government (currently funded to 2013)
- A national system providing a service
- A multi-platform, multi-disciplinary integrated system
- Delivering repeated observations in an enduring way
- Data are free, open to all and timely

IMOS Integrated **Marine Observing** System

Structured around a Blue Water and Climate node and 5 regional Nodes

Node science plans, objectives met by data delivered by National Facilities

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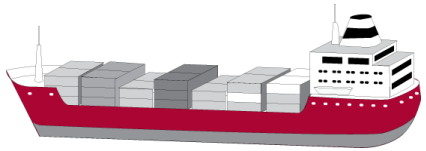
The 11 National Facilities

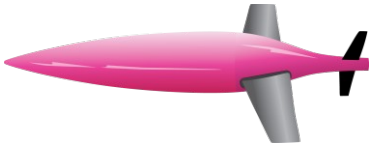
1. Argo Floats (>300)
   - autonomous profiling floats, O_2, under ice



2. Ships of Opportunity (>12)
   - repeat underway observing on volunteer ships
   - physical, chemical and biological observations

3. **Deepwater Moorings** (4 arrays)
   - Southern Ocean Time Series (47^{0}S)
   - Polynya (66 S)
   - Indonesian Through Flow (9 S)
   - East Australian Current (26^{0}S)

4. Ocean Gliders (17)
   - coastal and open ocean



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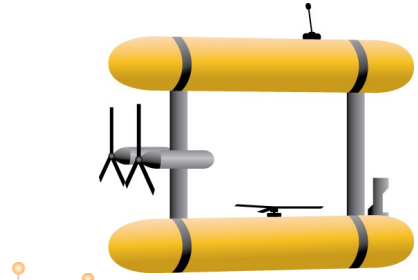
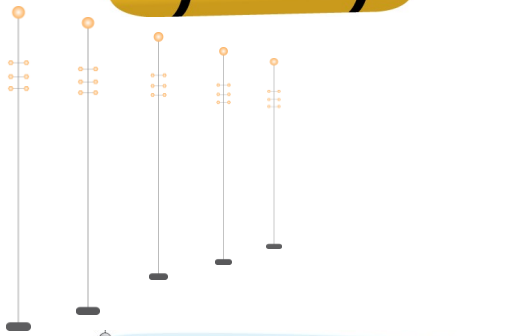
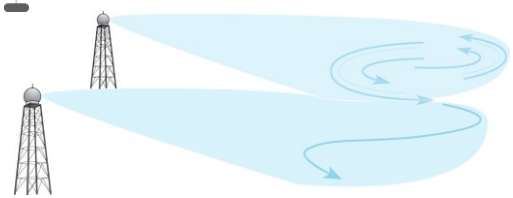


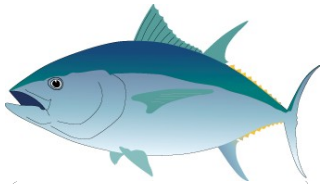
5. Autonomous Underwater Vehicle (1)
   - benthic surveys



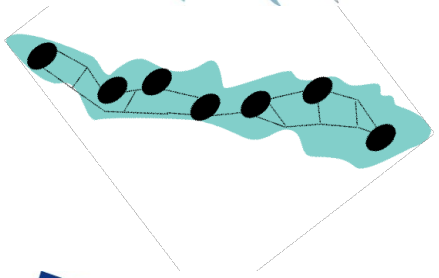
6. National Moorings Network (>20)
   - National Reference Stations (9)
   - shelf moorings and arrays



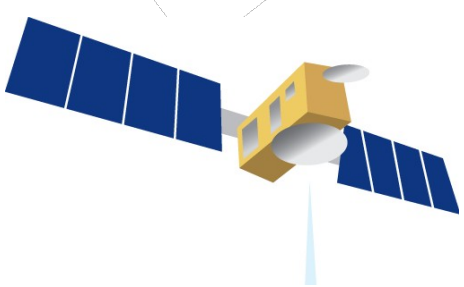
7. Coastal Radar Network (6)
   - phased array and direction finding



8. Tagging Marine Creatures (100s)
   - Acoustic curtains and satellite tags
   - CTDs on sea lions and seals



9. Sensor Networks (1)
   - southern Great Barrier Reef



10. Satellite Remote Sensing
   - SST, altimetry, and ocean colour

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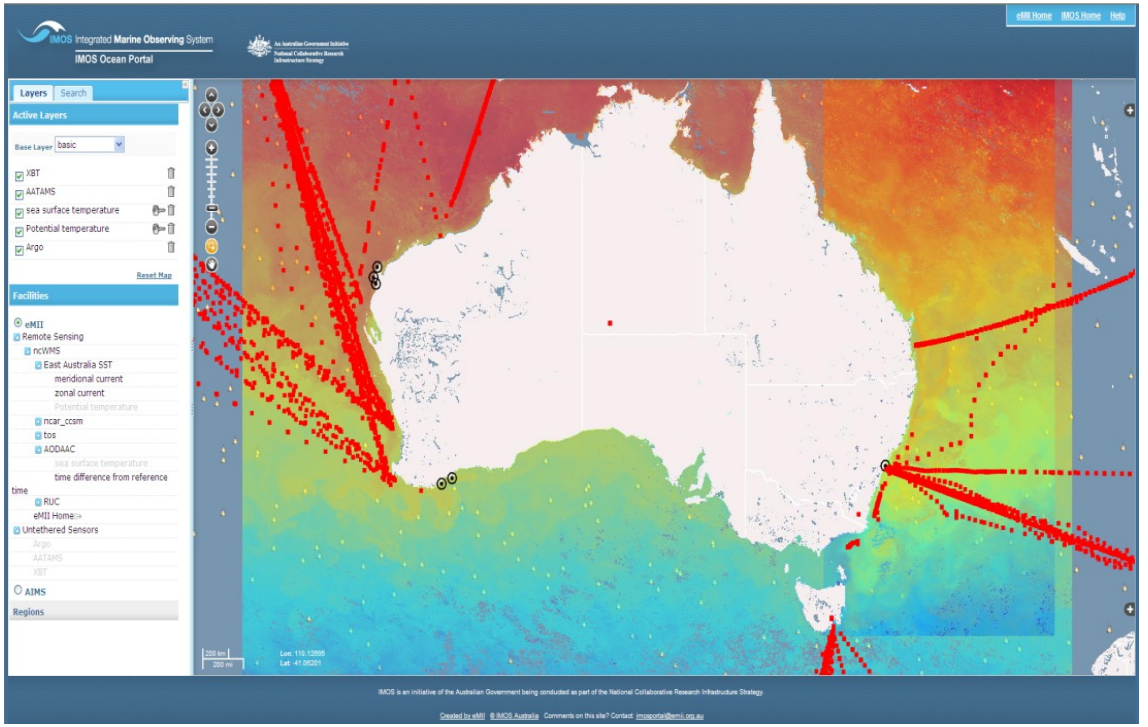
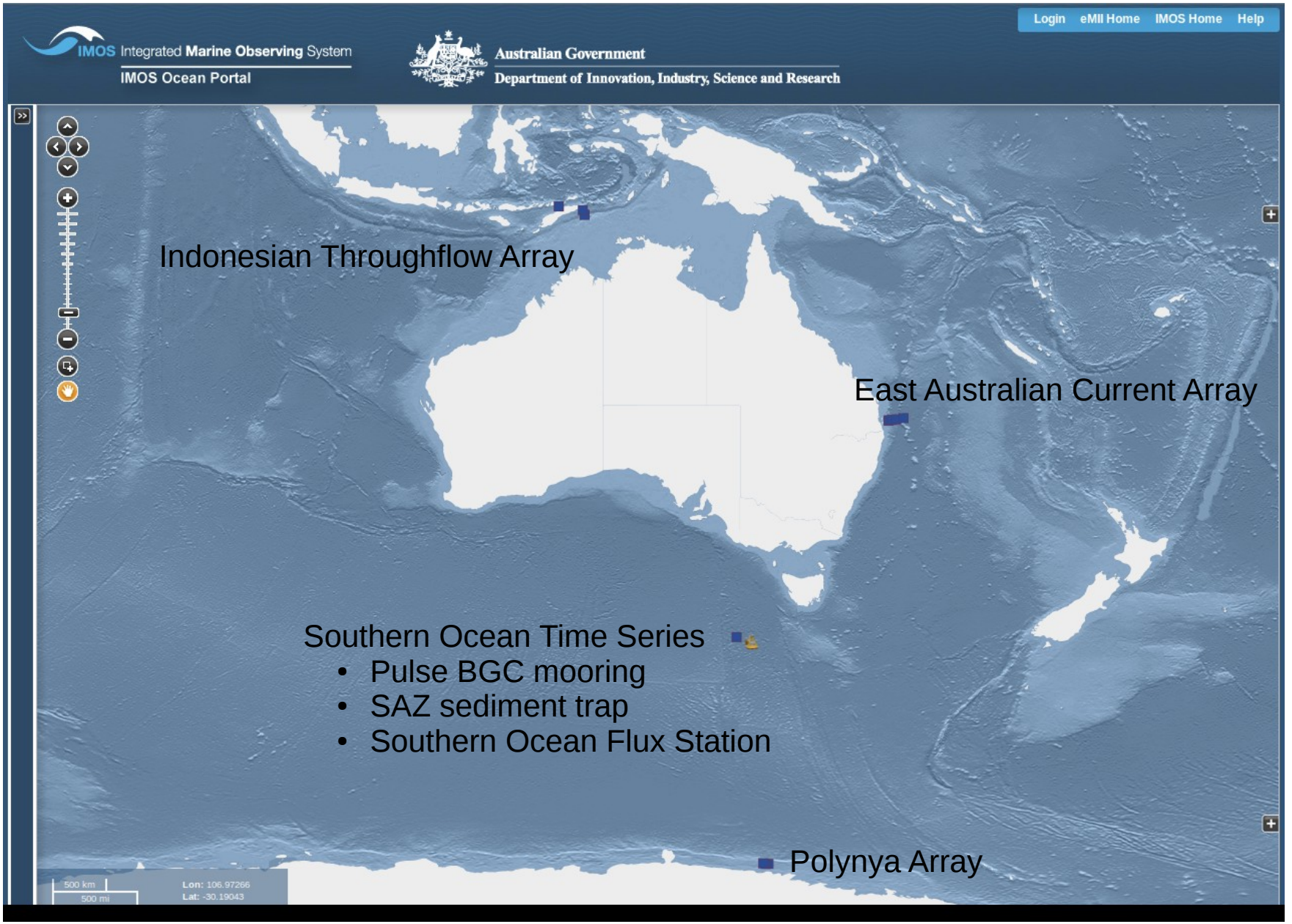
11. eMarine Information Infrastructure (eMII)

- Facility responsible for creating and developing the information infrastructure
  - to make all data discoverable and accessible via the IMOS Ocean Portal
- ~10% of core funding invested in this activity



Australian Bluewater Observing System



Australian Bluewater Observing System

- Facility leader: Tom Trull
- Sustained observation of open ocean properties
- Emphasis on climate & carbon cycle studies
- Major research drivers:
  - Multi-decadal ocean change (impacts)
  - Modes and drivers of climate variability in region
  - Understanding and prediction of ocean currents
  - Links between ocean and climate variability, marine chemical cycling and ecosystem structure and funciton

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Southern Ocean Time Series (SOTS)

- PI: Tom Trull (Tom.Trull@csiro.au)
- 46° S, 140° E
- SAZ sediment trap mooring
  - particle fluxes (5 depths, weekly/monthly resolution)
  - current meter
  - since Sept 1997
- Pulse mooring:
  - biogeochemical processes in the surface ocean
  - temperature, salinity, photosynthetically active radiation, fluorescence, turbidity, dissolved oxygen, total dissolved gases, water samples
  - data since 2009
- Data from both will be available early 2012 (non-QC)

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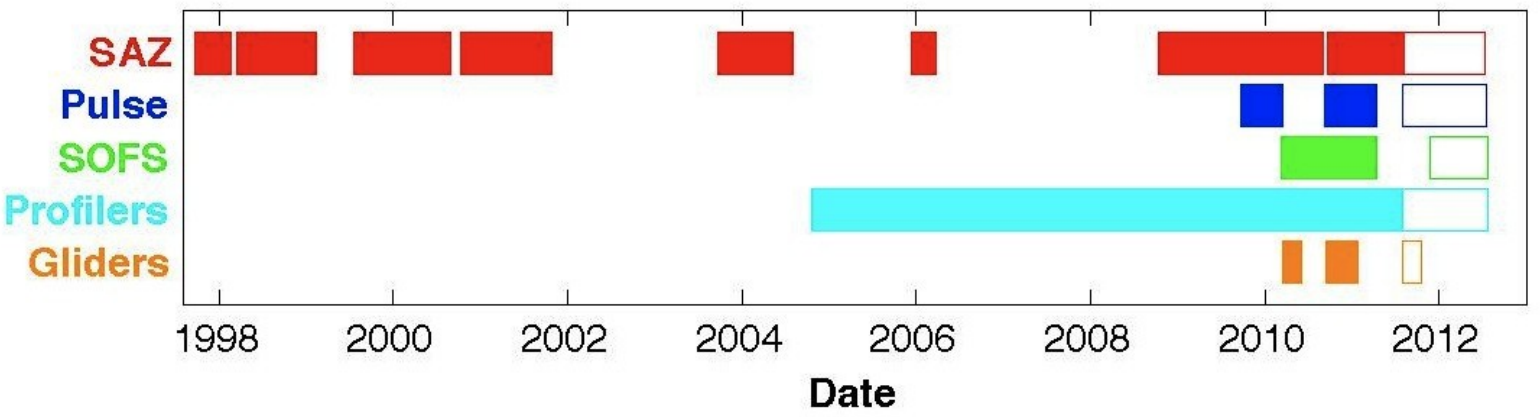
Southern Ocean Time Series (SOTS)

- Pulse mooring

1. T,S: Seabird 16+ CTD
2. Photosynthetically Active Radiation Sensor; Alec Electronics
3. Suspended phytoplankton (fluorescence) and total particles (backscatter) : Wetlabs FLNTUS
4. Dissolved oxygen concentrations; Aanderaa optode and SBE-43 electrode
5. Total dissolved gases: Pro-oceanus Gas Tension Device
6. water samples; Mclane RAS-500 48x0.5L samples



Southern Ocean Time Series (SOTS)

- Southern Ocean Flux Station (SOFS): Air-sea fluxes of CO2, heat, mass & momentum
- PI: Eric Shulz (E.Schulz@bom.gov.au)
- Real-time, continuous time-series of meteorological and oceanographic conditions at sea surface
  - 2x (wind velocity, air temperature, pressure, humidity, precipitation, downwelling radiation, water temperature & conductivity)
  - pCO2
  - photosynthetically active radiation (air, 10, 20, 40m)
  - subset of Pulse package (fluorescence, turbidity, dissolved O2)
- Started March 2010
- Met data (real time and delayed) will be available to OceanSITES early 2012
- Sub-surface data yet to be processed
- Duplicate mooring being built at WHOI to allow continuous monitoring

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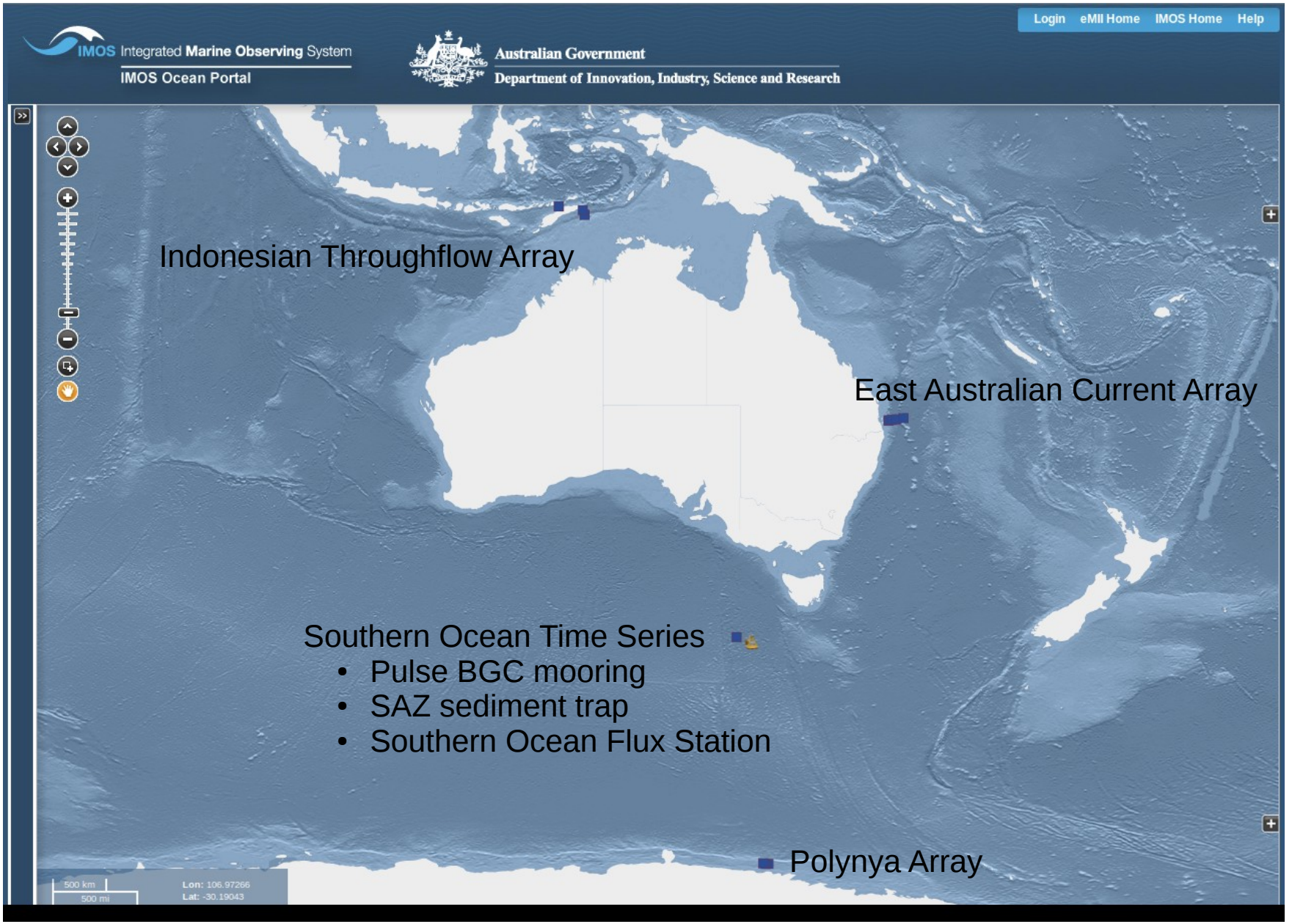
Table 3-SOFS SOFS instrument distribution and detail. Depth and height is based on an assumed 0.75m buoy freeboard.

Depth /height [m]	Instrument	Observed variable	Data averaging (delayed mode), (real-time)
3.47 (in air)	Gill 2-D sonic model 1390 x 2	Wind vectors	1-minute, 1-hour
3.12	Rotronic MP-101A x 2	Air temperature & humidity	
3.12	Heise DXD x 2	Air pressure	
3.07	R.M. Young 50201 x 2	Precipitation	
3.02	Eppley PIR x 2	Downwelling long-wave	
3.02	Eppley PSP x 2	Downwelling short-wave	
?(in air)	Licor	PAR	?
0.66 (in water)	SBE-37	Water temperature and conductivity	1-minute, 1-hour
0.72	Aanderaa optode and SBE-43	Dissolved oxygen	?
0.70	Wetlabs FLNTUS	Fluorescence and backscatter	?
1?	MAPCO2	pCO2	?
10	Vemco T8K	Temperature	1-hour
	Alec Electronics	PAR	2-minute
20	Vemco T16K	Temperature	1-hour
	Alec Electronics	PAR	2-minute
29	Vemco T16K	Temperature	1-hour
30	Aanderaa Sea Guard ADCM	Current vectors	30 minute, 300 ping
40	Vemco T16K	Temperature	1-hour
	Alec Electronics	PAR	2-minute
50	Vemco T16K	Temperature	1-hour
55			
60			
65			
70			
75	Vemco TD64K	Temperature and pressure	1-hour
85	Vemco T16K	Temperature	1-hour
100	Sea-bird SBE-37	Temperature, conductivity, pressure	10-minute
110	Vemco T16K	Temperature	1-hour
120			
140			
160	Vemco TD64K	Temperature and pressure	1-hour
200	Aanderaa Sea Guard ADCM	Current vectors	30 minute, 300 ping

Australian Bluewater Observing System



Deepwater Arrays (DA)

- PI: Bernadette Sloyan (Bernadette.Sloyan@csiro.au)
- Role of ocean in climate and climate variability
- Temperature, pressure & salinity timeseries, current meters (profiles & point)
- Indonesian Throughflow Array (9°S, 127° E, 3 moorings)
  - inter-basin Indian-Pacific Ocean exchange
  - Deployed June 2011
  - recovery Sept 2012
- Polynya Array (66° S, 143° E, 3 moorings)
  - outflows of Antarctic bottom water
  - deployed Jan 2011
- East Australian Current Array (27° S, 155° E, 5 moorings)
  - monitor EAC transport
  - deployment planned 2012

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