IMOS Integrated Marine Observing System

Australian Ocean Data Network

Smarter access, real-time insights and global impact

Mark Rehbein

Director, Australian Ocean Data Network

Integrated Marine Observing System

Australian Ocean Data Network (AODN)

National hub for Australian marine and coastal data

A certified repository for IMOS data - a national scale marine observing program (55 facilities from 10 Institutions)

Also, a federated network of Partners, underpinned by:

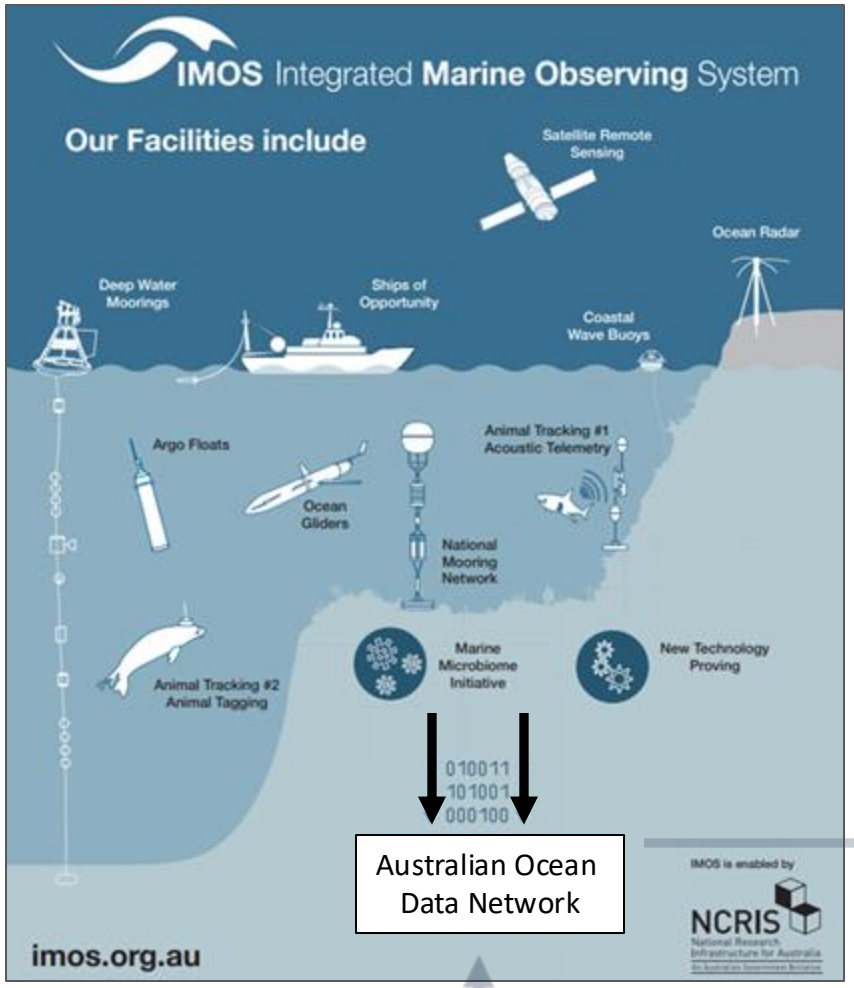
- Metadata standards
- Spatial data standards

Delivers open & free data via:

- National marine data catalogue
- Interactive portal
- Data web services
- Cloud optimised formats

Supporting various technical and non-technical use-cases & end-user needs

Connected into other national and international data systems



National & International Connections Eg WMO

AODN Federated Partners

Institute of Marine and Antarctic Studies | National Institute of Water and Atmospheric Research | Geoscience Australia | Australian Antarctic Division | Australian Institute of Marine Science | CSIRO Oceans and Atmosphere | National Computational Infrastructure | e-Atlas | Other partners (e.g. WAMSI, Private Industries ...)

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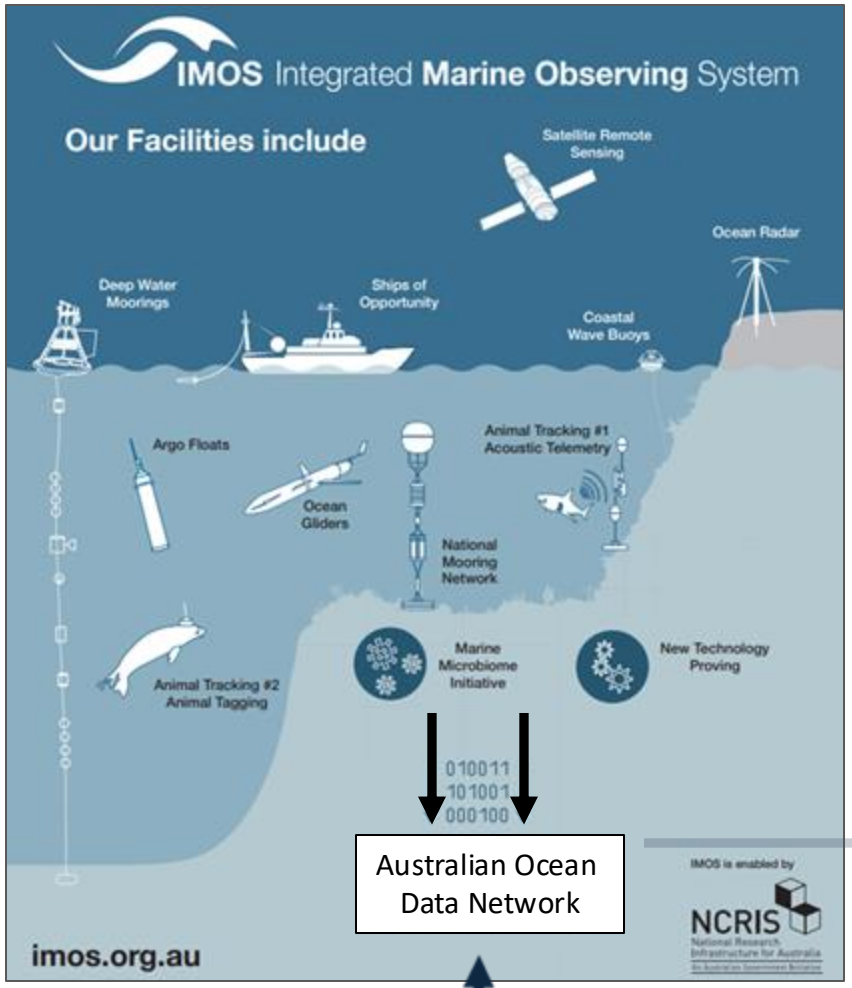

National & International Connections Eg WMO

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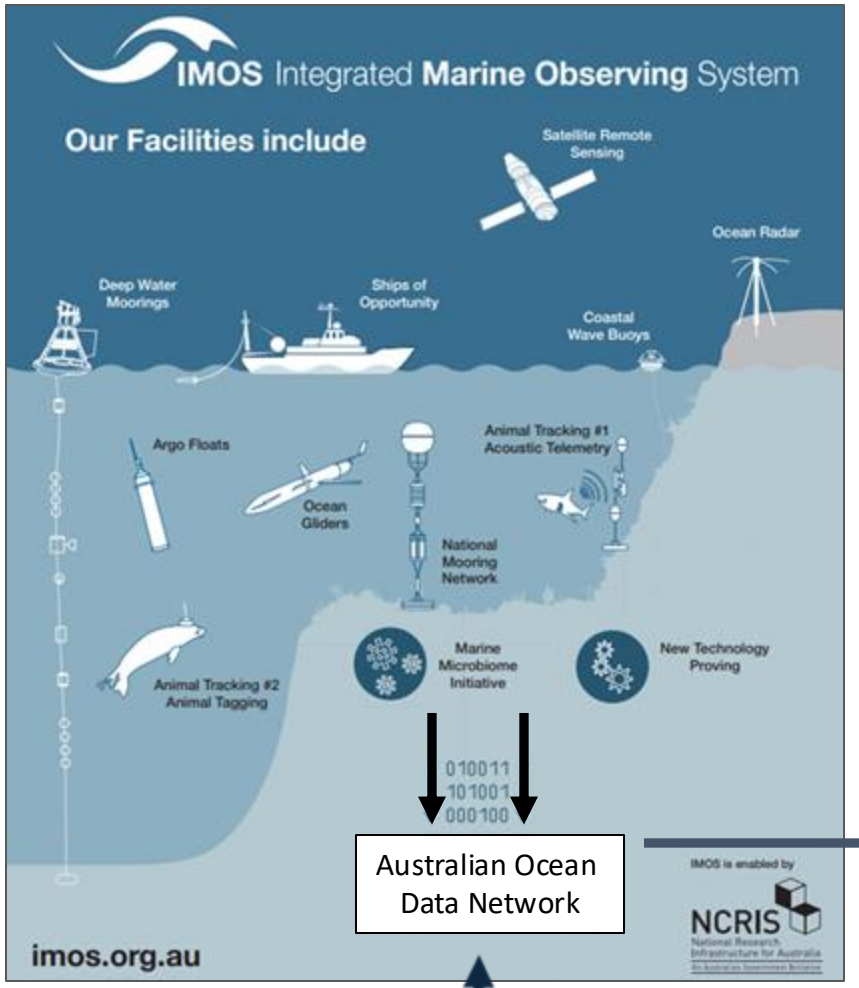
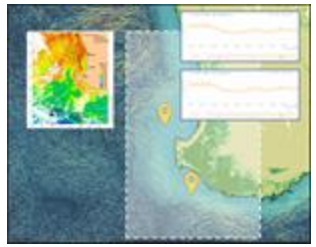


National & International Connections Eg WMO

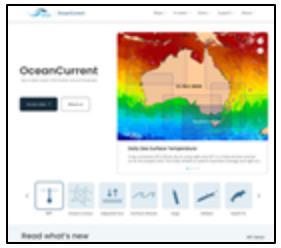
AODN Federated Partners

IMOS data delivery at a glance



IMOS Live

IMOS AODN Portal



OceanCurrent / BOO

AODN Data Services

THREDDS + Cloud

WIS2.0 GIS OGC

Data Science Notebooks

Data Repository & Ingestion / Processing

Data Archive / Storage Pipelines NRMN DB AnimalTracking DB

Collection Facilities

Non-technical users

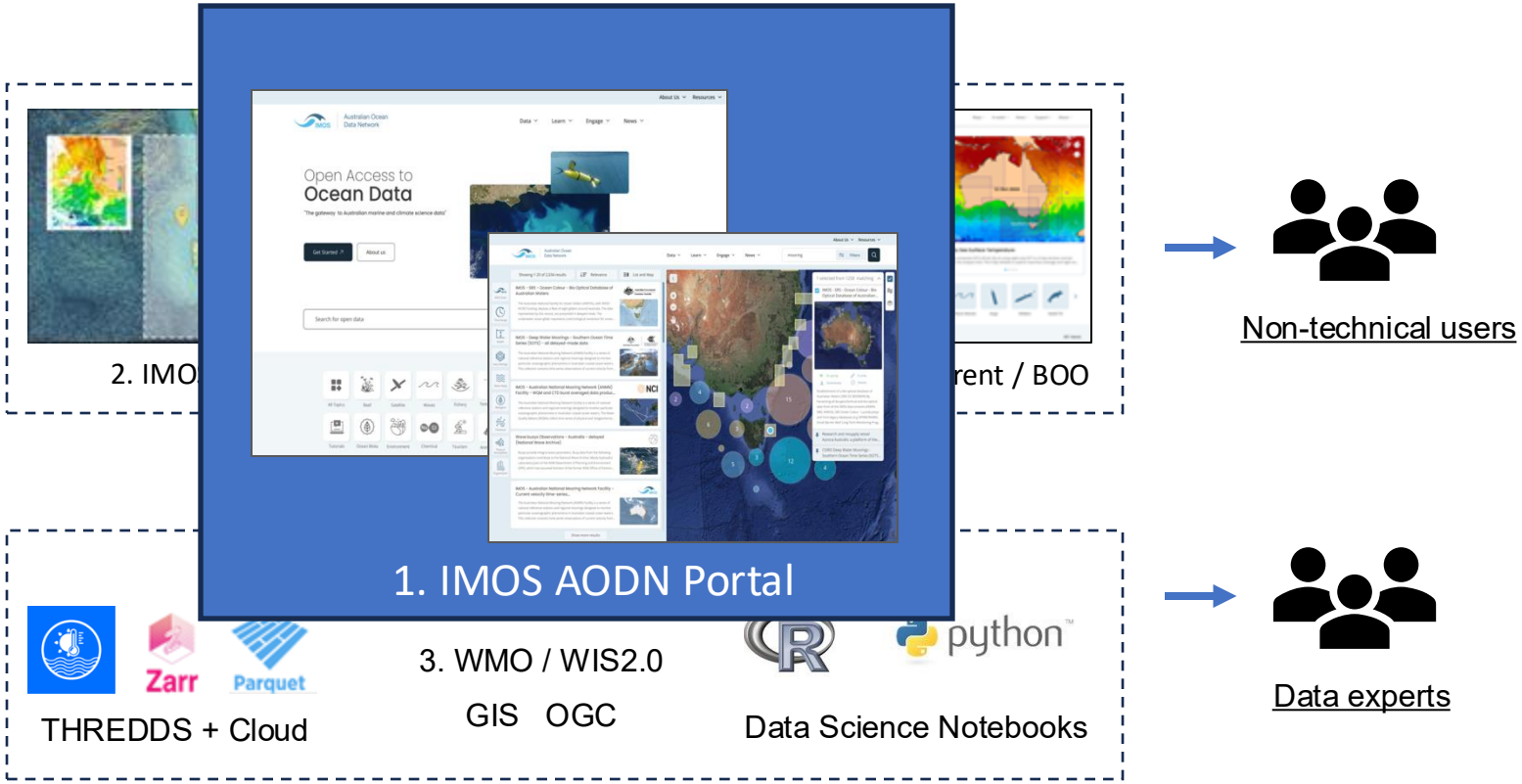
- Data discovery
- Interactive experience
- Data previews
- Subset download (CSV, GeoTiff, NetCDF)
- Data products
- Data to information

Data experts

- Programmatic access
- Data analysis
- Data science use-cases
- Modellers Oceanographers
- Weather forecasting
- Climate modelling
- GIS users

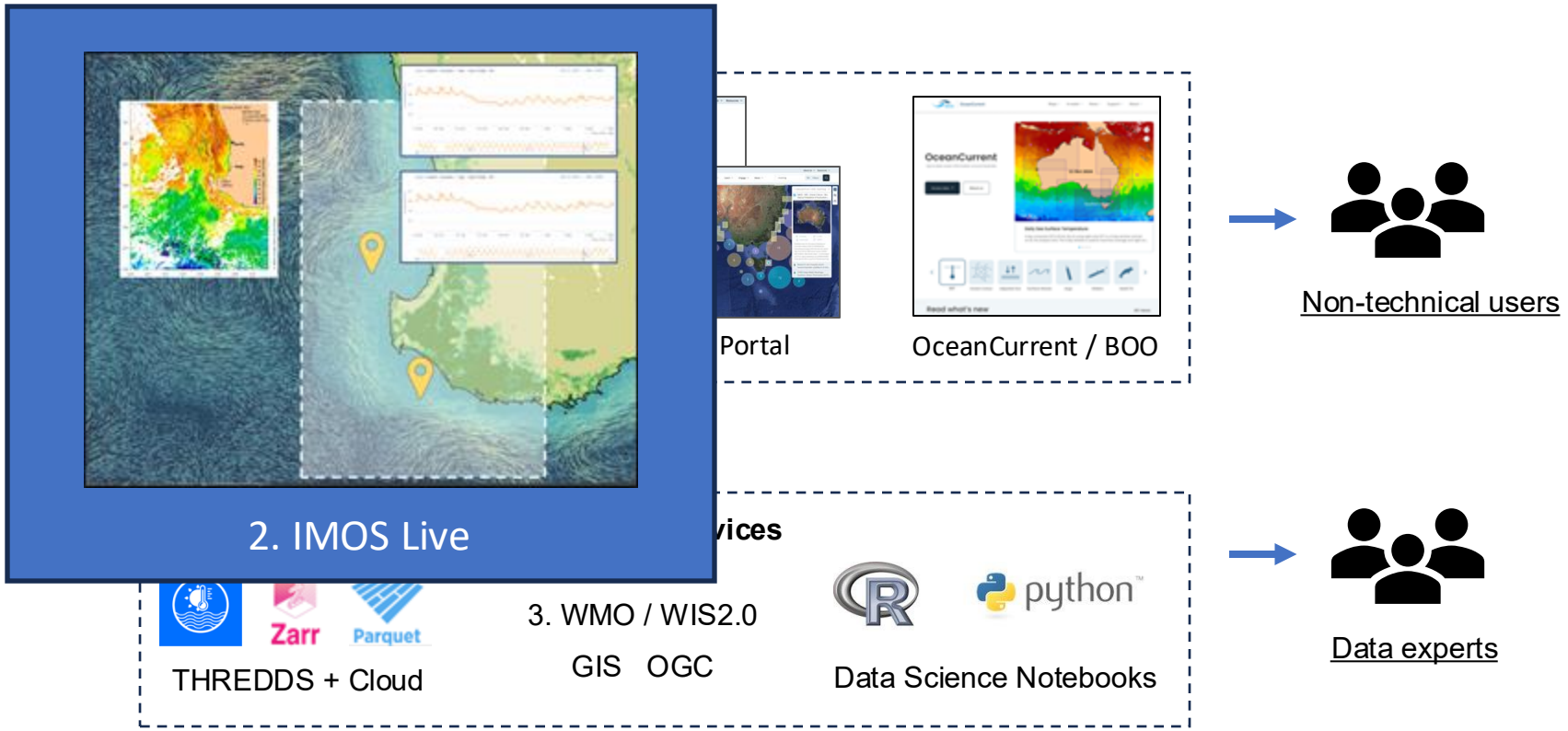
Three New Initiatives

1. **Upcoming new AODN Portal – Better ways to discover data**
2. IMOS Live
3. Delivery of IMOS data to WMO



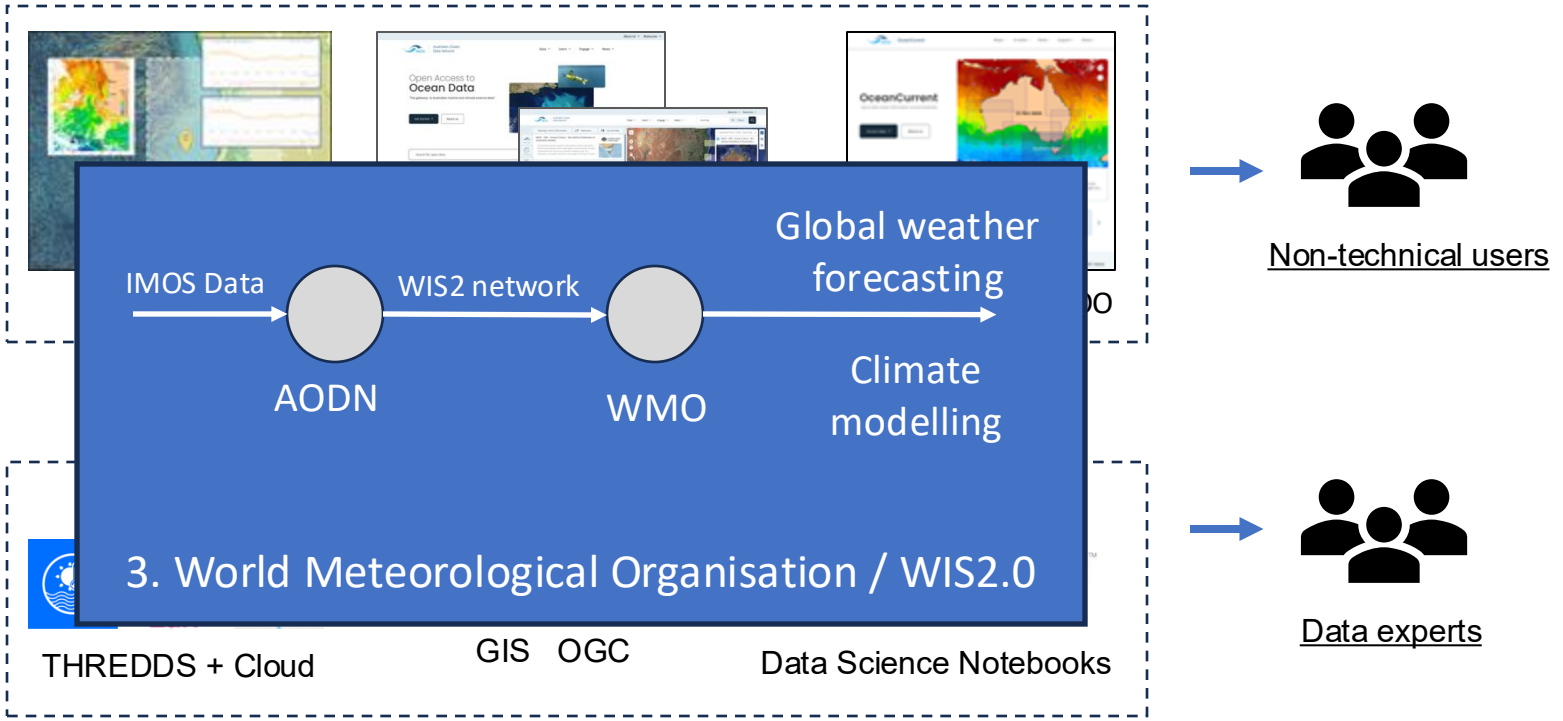
Three New Initiatives

1. Upcoming new AODN Portal
2. **IMOS Live – Preview IMOS near real time data**
3. Delivery of IMOS data to WMO



Three New Initiatives

1. Upcoming new AODN Portal – Better ways to discover data
2. IMOS Live
3. **Delivery of IMOS data to WMO – Global forecasting**

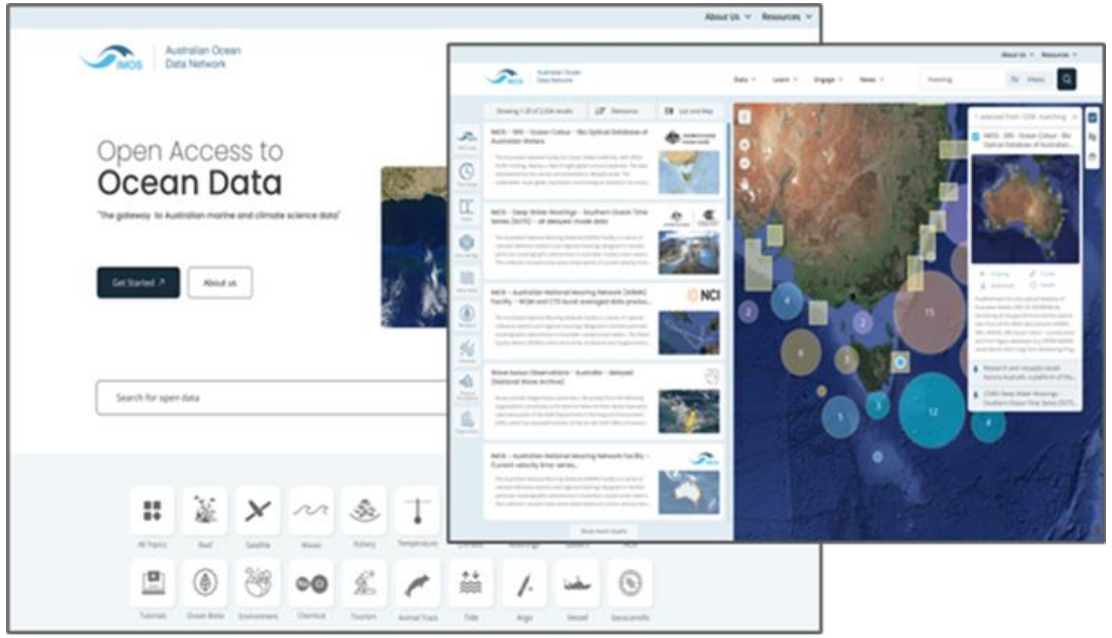


1. What's new in the upcoming AODN Portal

More data, easier to find, easier to use

Key features:

- ✓ Smarter, faster search
- ✓ Map-based navigation
- ✓ Data Previews
- ✓ Data sub-setting
- ✓ Mobile friendly
- ✓ IMOS and other data
- ✓ Increased content – from 300 to 14,000 datasets



New IMOS AODN Portal

IMOS Integrated Marine Observing System | Australian Ocean Data Network

Open Access to **Ocean Data**

"The gateway to Australian marine and climate science data"

Search for open data

Date | Location | Filter

Show All | Sea Temperature | Moorings | Argo Floats | Gliders | Satellite | Waves | Vessels | Animal Tracking

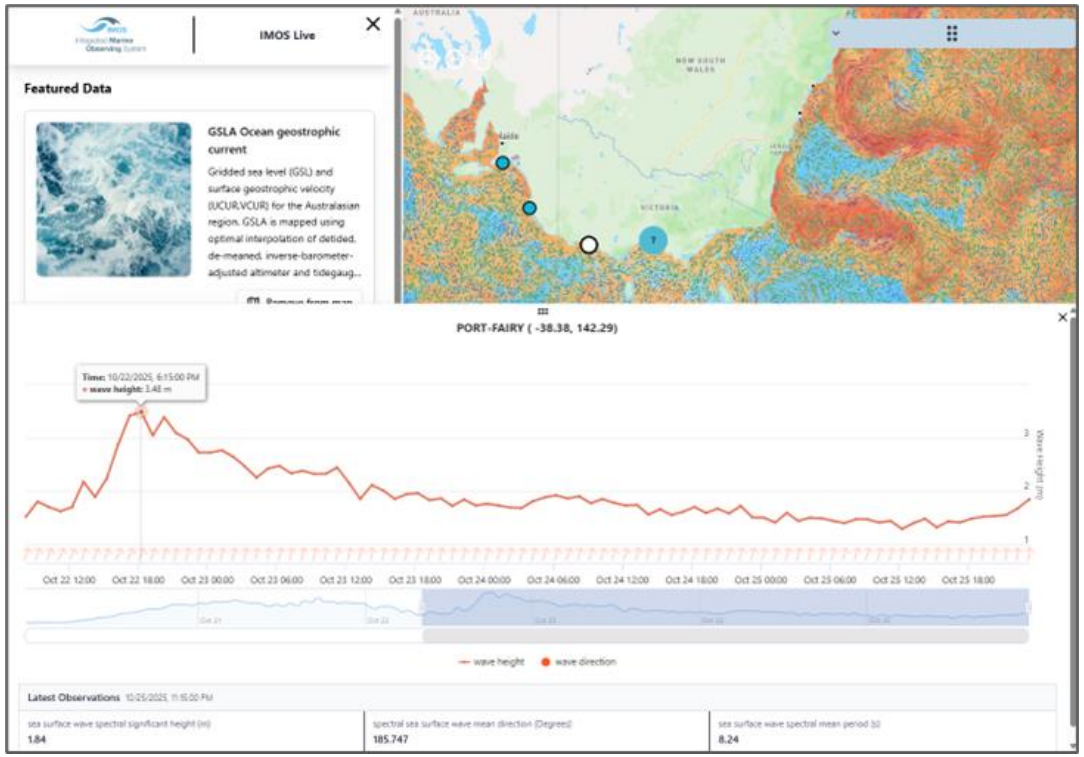
Weather & Climate | Acidification | Ocean Chemistry | Tides | Fisheries | Industry | Gridded Datasets | Ocean Physics | Underwater Vehicles

2. IMOS Live

Interactive previews of IMOS near real time data

Key features:

- ✓ Interactive visualisations
- ✓ Map-based exploration
- ✓ Mobile friendly
- ✓ Last 7 days
- ✓ Surface currents, sea level anomaly
- ✓ SST anomaly, coastal wave buoys
- ✓ Expand to other data in future



IMOS Live – Near Real Time IMOS Data

GSLA Anomaly sea levels

Gridded (adjusted) sea level anomaly (GSLA) for the Australasian region. GSLA is mapped using optimal interpolation of detided, de-meaned, inverse-barometer-adjusted altimeter and...

Add to map

-1.2 -0.5 -0.2 -0.1 0 0.1 0.2 0.5 1.2

anomaly sea level (m)

Sea surface skin temperature anomaly

AusTemp is a specialised remote sensing application for the monitoring of SST conditions that lead to coral bleaching. The BOM legacy system was developed in consultation with Great Barrie...

Add to map

-10 -5 0 5 10

degrees Celsius (°C)

Wave buoys

Buoys provide integral wave parameters. Buoy data from the following organisations contribute to the National Wave Archive: Manly Hydraulics Laboratory, Bureau of Meteorology, DOT, DES, IMOS...

Remove from map

Have you identified a bug, or have suggestions for new features? Please submit an issue using the provided templates.

Contribute

3. Delivery of data via the World Meteorological Organisation (WMO)

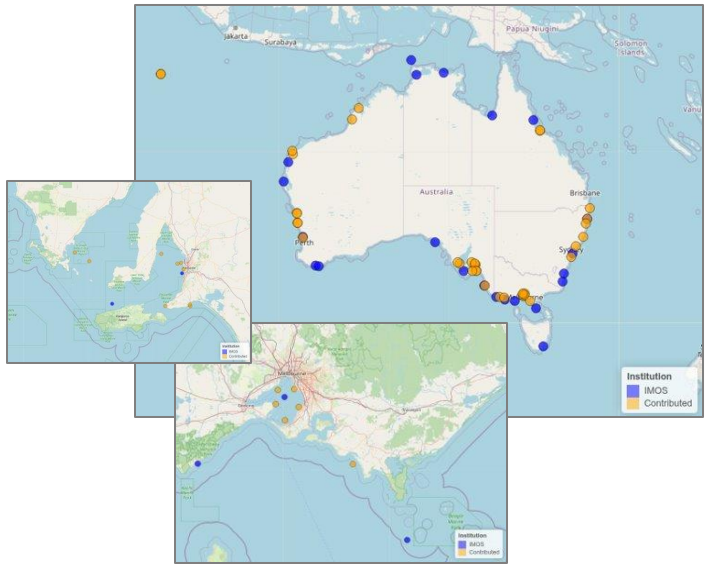
Connects IMOS sensors to the WMO via next-generation data exchange system (WIS2 replaces GTS)

IMOS Wave Data → WMO WIS2 → Global Forecast Centres

Australia's 1st WMO WIS2 Node

Ready for final acceptance by WMO

Operational WIS2 Nodes in WIS2 Global Registry



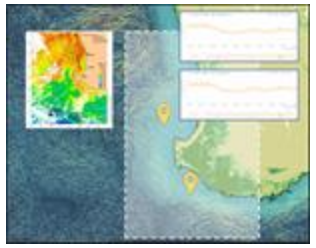
Wave buoy locations

"This is a significant step forward for Australia's marine data sharing. The integration of coastal wave buoy data into WIS 2.0 will improve situational awareness and support better coastal and ocean forecasting services globally" – Bureau of Meteorology

High Quality, Open Access, Tailored Delivery

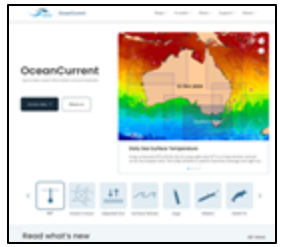
- ✓ 20 years sustained observations
- ✓ High quality data
- ✓ Open access
- ✓ Tailored delivery

IMOS Interactive Access



2. IMOS Live

1. IMOS AODN Portal



OceanCurrent / BOO

→ Non-technical users

AODN Data Services

Zarr Parquet

THREDDS + Cloud

3. WMO / WIS2.0

GIS OGC

python

Data Science Notebooks

→ Data experts

IMOS Integrated Marine Observing System

Thank you

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NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

imos.org.au

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Australia's Integrated Marine Observing System is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent.

PRINCIPAL PARTICIPANTS

University of Tasmania (Lead Agent)

Australian Government

Australian Institute of Marine Science

Australian Government Bureau of Meteorology

CSIRO

Government of South Australia

SARDI South Australian Research and Development Institute

The University of Western Australia

sims sydney institute of marine science

UTS

The University of Sydney

Macquarie University

UNSW Sydney

SIMS is a partnership invoving four universities

ASSOCIATE PARTICIPANTS

Curtin University

Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

Australian Antarctic Program

Deakin University

The University of Melbourne

IMOS thanks the many other organisations who partner with IMOS, providing co-investment, funding and operational support, including investment from the Tasmanian and Western Australian Governments.

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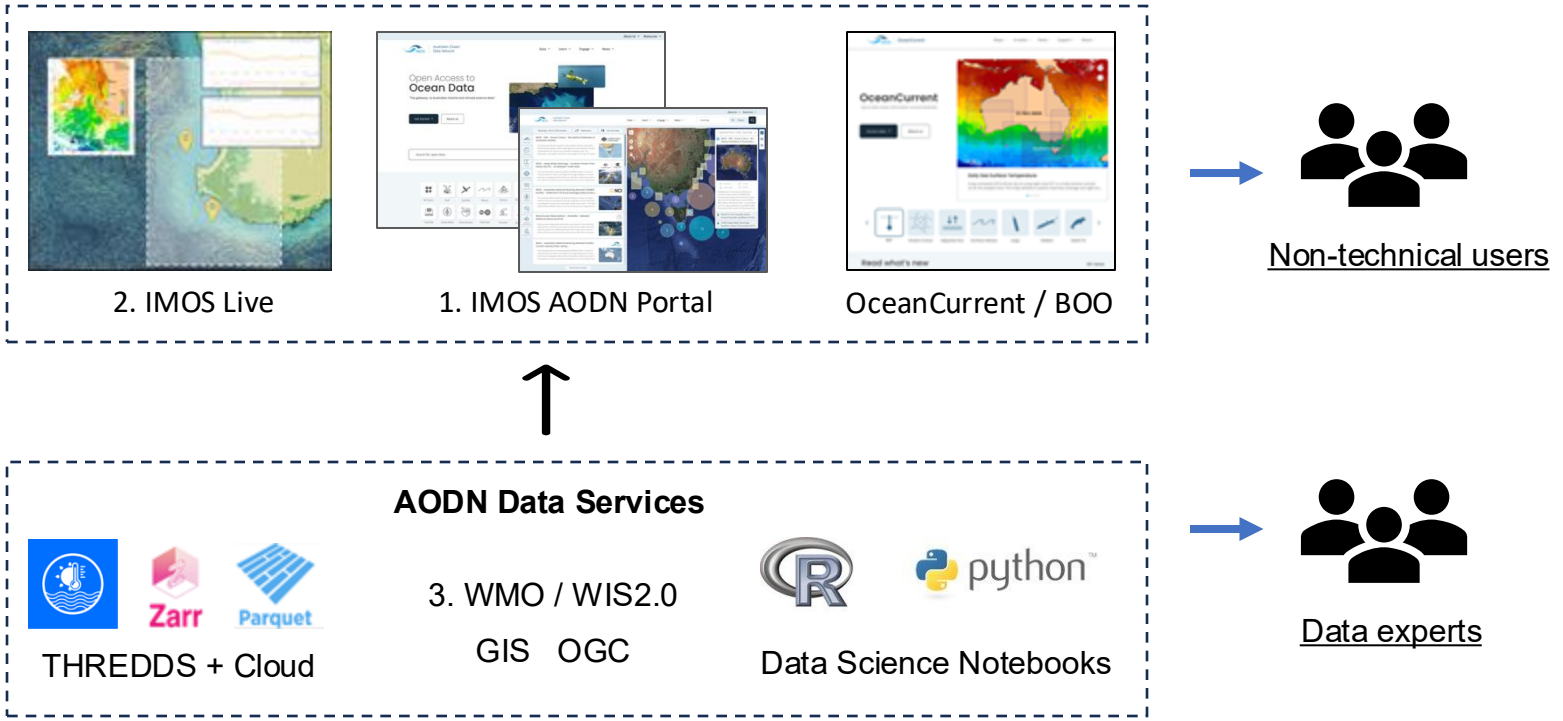
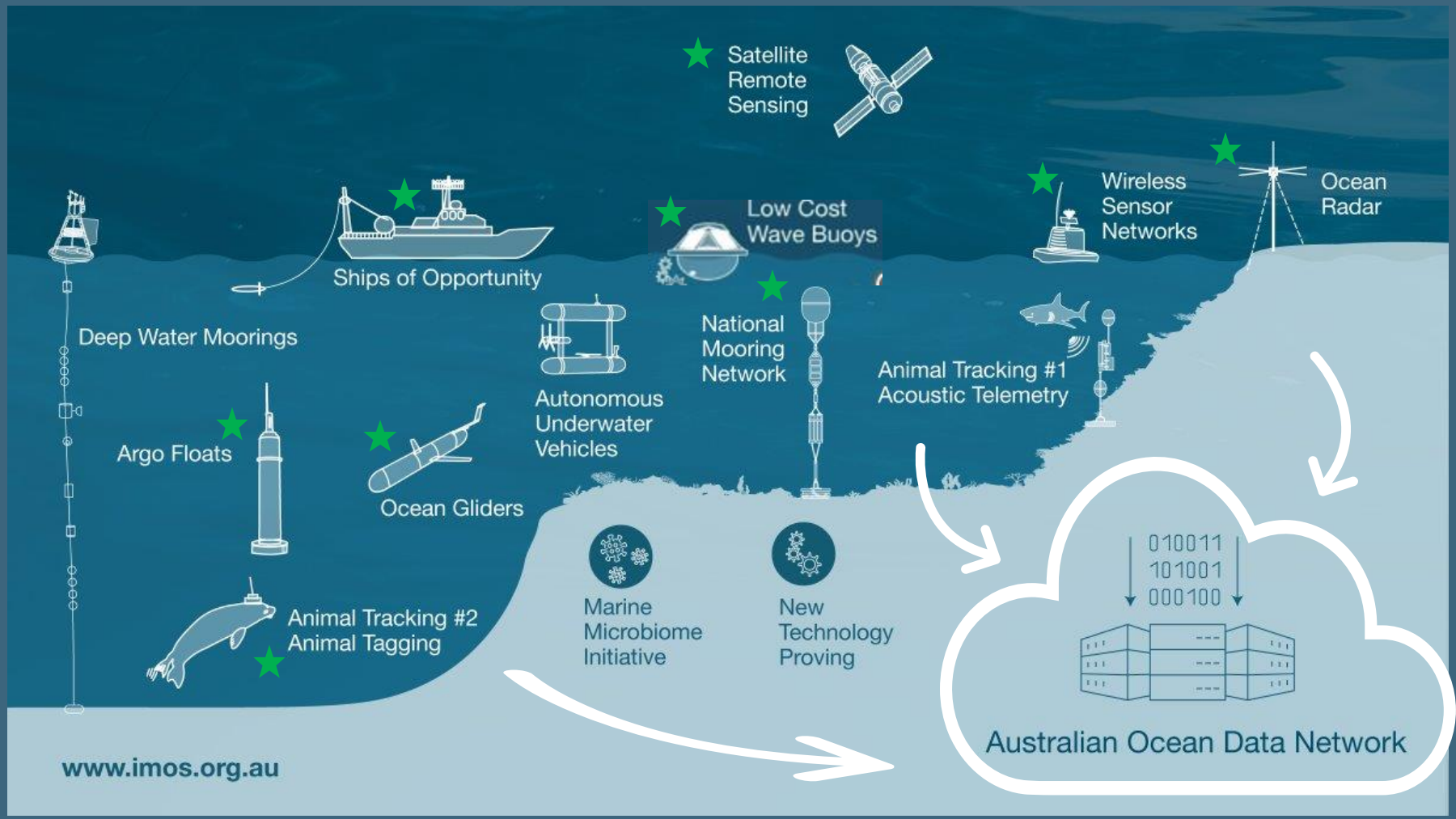
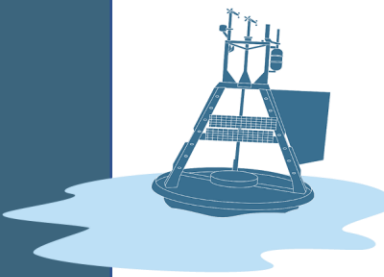


IMOS: From the Ocean to the Cloud!

Access to freely and openly accessible data

National scale datasets collected via 13 facilities, operated by the partners of the UJV





IMOS Integrated **Marine Observing** System

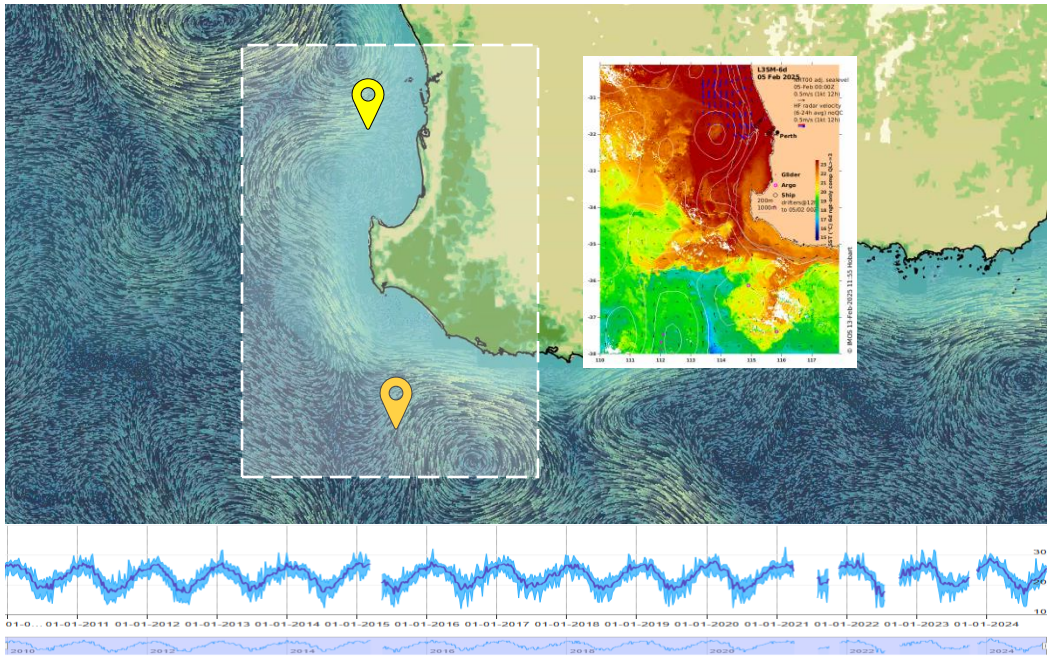
★ = near real time component

Upcoming Priorities

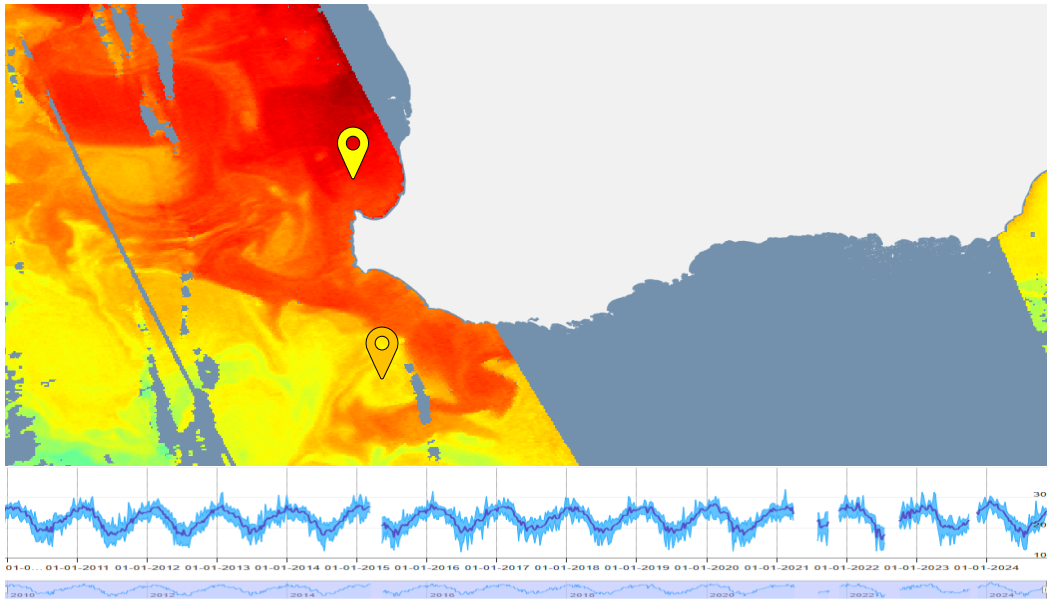
2. IMOS Live – Visualising Near Real-time (NRT) data streams

IMOS Live brings together NRT data streams, various existing IMOS visualisations.

- Animated surface currents
- Consolidates the coastal waves data delivery with other NRT data such as moorings with timeseries visualisation
- Link in with existing OceanCurrent product visualisations
- Include existing gridded satellite map visualisation
- Include the new ‘AusTemp’ heat stress products



Overlay animated vector with insitu timeseries (eg wave buoy, moorings)



Retain existing satellite data visualisations

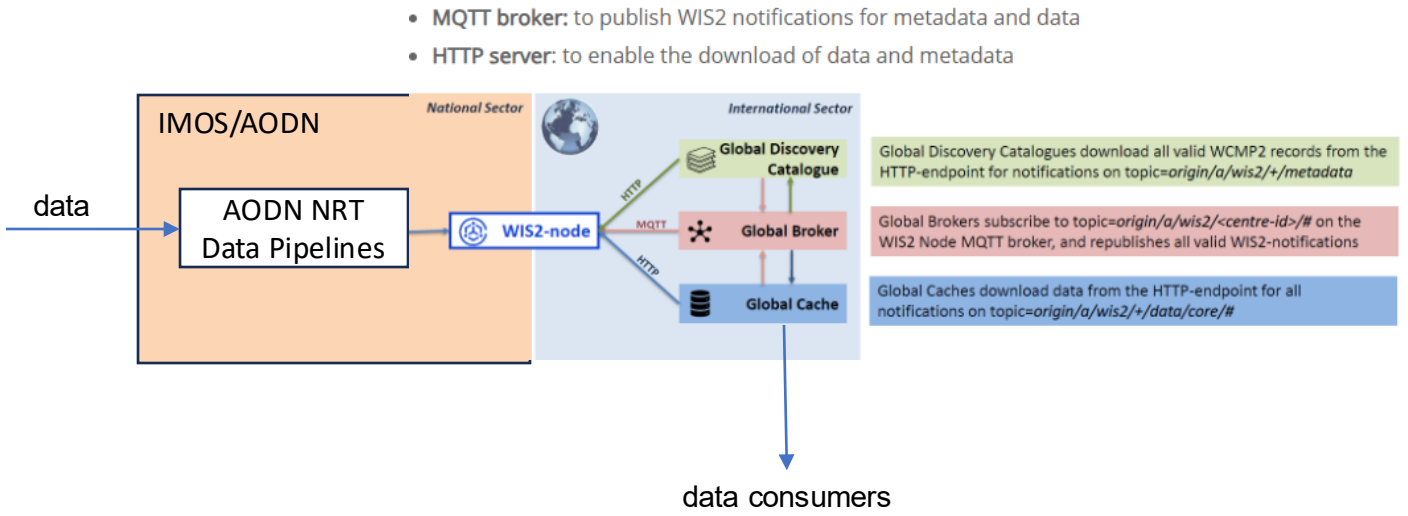
Upcoming Priorities

3. IMOS NRT Data to WMO via WIS 2.0

WIS 2.0 (WMO Information System 2.0) is the next-generation global data-sharing framework developed by the **World Meteorological Organisation (WMO)**. It is designed to modernise and replace the traditional **Global Telecommunication System (GTS)**

WIS 2.0 – Australian node registration underway

- Will gain WMO DCPC (Data Collection and Production Centre) certification
- IMOS data more easily included in global climate models and weather forecasting in near real time



Impacts

AODN

- Long-term sustained national data repository
- Centralised access to marine data from major Institutions
- Investment in interoperability, standards and other FAIR data implementations
- Aggregation of data from IMOS collections that would otherwise be disparate
- Uplift in national use of metadata standards – major institutions all have public ISO metadata catalogues

IMOS

- Better national coordination of infrastructure deployment
- Consistency of data collection, QAQC, formats and data delivery (SOP's)
    - Allowing for improved interoperability and trust
- Sustained, high quality, consistent, long-term collection, national scale datasets
- Free and open well curated datasets
- Promotes cross partner collaboration