



**Australian Ocean Data Network**

## **Newsletter #12, April 2014**

### **Director's Desk**

We have a bumper newsletter #12 indicating the considerable activity that is taking place in the AODN space.

The Bureau of Meteorology is in the spotlight with information on its new Marine Strategy, the National Environmental Information Infrastructure, and the Water Quality Dashboard from the eReefs project.

Opportunities are discussed for discovery and access to significant data holdings in Western Australia which will arise from the Managing Coastal Vulnerability program of WALIS, the WA Location Information Strategy. Staying in WA, we have a report on this year's Rottnest swim and the role ocean scientists played in forecasting conditions.

On the international front there is an article about a project, IQuOD, involving CSIRO and IMOS, tackling the important activity of the recovery of historical ocean temperature data and the quality control of long time series, and we have several reports from international meetings attended by AODN colleagues.

We have updates on new data available from IMOS, an announcement that, at last(!), the BlueNet project, the fore-runner to the AODN in some respects, is now complete with the discovery and access to more than 800 researcher datasets, and an interesting article on the extraction of internal tides from IMOS glider and XBT data.

New computing infrastructure at the Tasmanian Partnership for Advanced Computing is described – this is available for use by all Australian marine and climate scientists, and is a part of the national computing infrastructure being delivered by Nectar and the RDSI. The new IMOS Ocean Portal (1-2-3) was publicly launched in February and we provide a brief introduction to it in this newsletter.

The future direction of AODN is a matter for community development, so we present two aspects for consideration: a Technical Advisory Group has been formed for AODN which will advise and guide developments in the foreseeable future – this has established four Task Groups to develop synergy across the network; and IMOS has released a draft Strategy for 2015-2025 which indicates how the AODN information infrastructure might evolve. Comments on both developments are invited, and volunteers for the TAG Task Groups welcomed!

Happy reading!

Roger Proctor, AODN Director

# Current Activities & Collaborations

## Marine Science in the Bureau of Meteorology

Greg Stuart, BoM Manager Coastal Information Services

As part of its continuing role in the provision of environmental intelligence the Bureau of Meteorology provides a range of marine related observation, research and information services. Noting the strategic significance of oceans and coastal environments to Australians, the Bureau sees a significant opportunity to do more in marine intelligence.

*A coordinated and consultative approach:* During initial consultations demand for support in areas as diverse as marine reserve management, air-sea rescue, fisheries management, marine transport, naval defence, coastal development planning and offshore resources industry operations has been identified. In response to an increase in demand for these marine services the Bureau has begun the development of a Marine Strategy.

*A new Bureau Marine Strategy:* An initial draft document has been socialized with a range of key stakeholders and further work is underway on developing phased implementation plans.

Four key principles guiding the strategy are:

- User driven marine products and services;
- A phased approach to implementation;
- Building on core strengths; and
- Effective partnerships.

Four priority areas for action give effect to the Bureau's Marine Strategy. These priorities are either cross-cutting or enabling capabilities critical to meeting the objectives of the strategy. These priority areas are:

- Coastal and ocean hazards;
- Coastal modelling;
- Marine climate analysis and advice; and
- Sustained and coordinated networks.

*Working in Partnership:* In recognition that a number of organisations are heavily involved in the provision of marine information services, the Bureau is seeking to engage and partner with such organisations more productively in pursuit of national benefits. Through a clearer articulation of priorities and capabilities, the Bureau is looking forward to continuing its role in progressing marine activities that support Australia's growing need for marine environmental intelligence. For further information please e-mail the Bureau at [marinestrategy@bom.gov.au](mailto:marinestrategy@bom.gov.au).

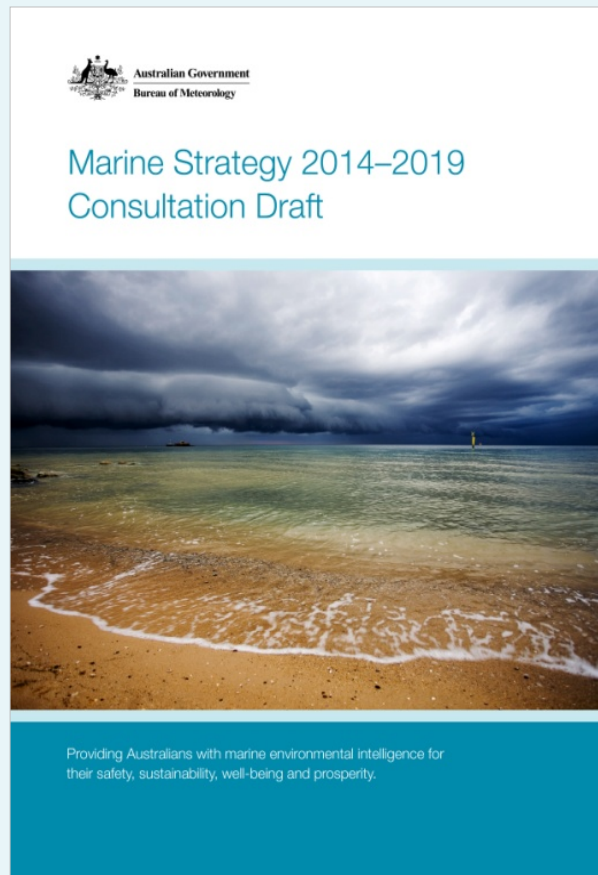


Image: The Bureau of Meteorology has released an initial draft Marine Strategy for 2014-2019

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### AODN Participation in the Western Australian Managing Coastal Vulnerability Project

Ralph Talbot-Smith, Project Manager, Managing Coastal Vulnerability

Western Australian state government marine and coastal spatial datasets that are of high use and value are to be packaged and formatted for ease of use, and made available through the AODN and the WA Shared Location Information Platform (SLIP). This will facilitate increased efficiencies in the way state government organisations access and manage marine spatial information and will increase inter-agency and inter-governmental collaboration in marine data maintenance and distribution.

The Managing Coastal Vulnerability Project is a priority project under the Western Australian [Location Information Strategy](#) with the WA [Department of Transport](#) as lead agency. The project will facilitate access, through [SLIP](#) (Shared Location Information Platform) and the [AODN](#) portals, to the most up-to-date and authoritative marine information available to support timely decision-making for activities associated with the Western Australian marine environment.

The WALIS Marine group has formulated an interim list of prioritised State Government datasets as a starting point for this project. Each dataset will be prepared for inclusion onto the AODN web portal and the SLIP infrastructure, which involves determining the most appropriate format. Most datasets will likely be supplied in several formats or styles, e.g. JPG, TIFF or PDF for images, or DWG, DXF, DGN, SHP for drafting or GIS formats. For each dataset, the processes will be developed in close consultation with agency staff, providing a sustainable system for updating and managing the dataset. Geographic coverage of the datasets is along the Western Australian coastline, and in some instances focus on the priority areas with a marine and/or coastal infrastructure interest, e.g. Barrow island (environment protection, Karratha (coastal infrastructure) etc).

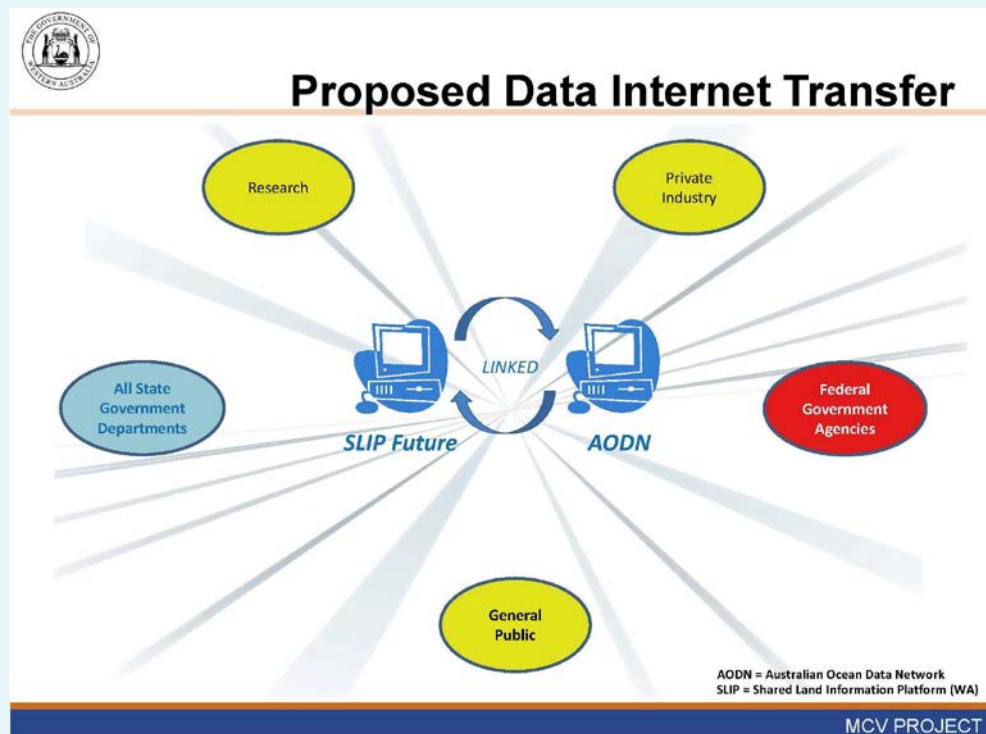


Image: The Western Australian Managing Coastal Vulnerability Project will make State Government coastal data available to stakeholders through the WA Shared Location Information Platform (SLIP) and the AODN (image supplied by WA Department of Transport)

In March 2014, Spatial Information Officer Chris Barber visited the eMII offices in Hobart to discuss and define the technical protocols & procedures for the loading of MCV Indexes and Metadata onto the AODN (Australian Ocean Data Network). Chris participated in a group round table and had one-

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on-one meetings with developers, data scientists and metadata experts to gain valuable insights into the AODN and the infrastructure and standards behind the network. eMII team members learned how the MCV Project uses ESRI and other spatial tools to map geographic features and capture associated metadata, and gained understanding of how the SLIP Futures project will operate. Chris's visit was an outstanding success in developing a close relationship with the AODN team and identifying joint solutions and a relatively clear way forward.

To stay up to date on developments in the Managing Coastal Vulnerability Project, download the project Newsletters from the web: [http://www.walis.wa.gov.au/projects/WALIS\\_Marine\\_Group](http://www.walis.wa.gov.au/projects/WALIS_Marine_Group).

### NEII: A new way to discover and access environmental data

Rachel Horswell, National Environmental Information Infrastructure programme

The National Environmental Information Infrastructure (NEII) programme will improve discovery and access to essential environmental data across Australian Government departments and agencies. This infrastructure will support evidence-based policy development and reporting in government by incorporating a network of standards-based IT components, supported by collaborating organisations, including IMOS. Standards define data exchange formats and protocols to ensure environmental data can be accessed and interpreted in a common manner.

The NEII Reference Architecture (found [here](#)), published in December 2013, details a technical blueprint for NEII functionality. It provides the technical direction to allow partners to align their technology and related capabilities to streamline discovery and access to environmental information. The primary audience for this document and the NEII are Government agencies that produce and/or use environmental information. For more information, please email [environment@bom.gov.au](mailto:environment@bom.gov.au).

### Marine Water Quality Dashboard Released

Greg Stuart, eReefs Project Director

The Marine Water Quality Dashboard, a tool to access a range of water-quality indicators for the Great Barrier Reef is now available at <http://www.bom.gov.au/marine/waterquality/>. The Dashboard uses near real-time data and more than ten years of records of sea surface temperatures, chlorophyll levels, suspended sediments, and dissolved organic matter to provide important information for decision-making. Data from the Dashboard can be displayed in different formats (map, table or chart) and downloaded for further analysis and interpretation.

The Dashboard has been developed through the eReefs project, a collaboration between the Australian Institute of Marine Science, Bureau of Meteorology,

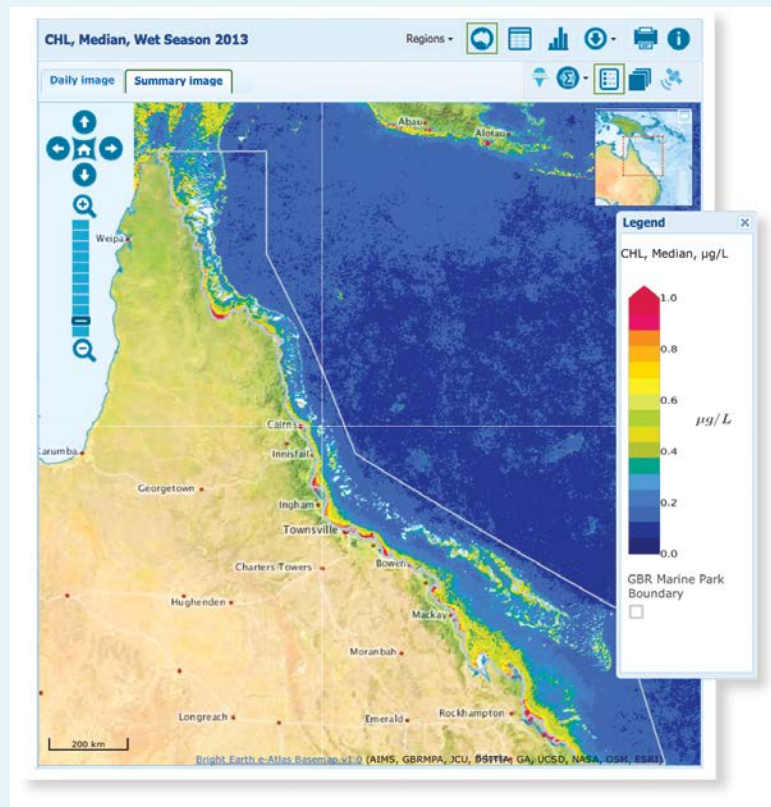


Image: An example image from the Dashboard showing chlorophyll concentration values for the 2013 wet season



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CSIRO, Great Barrier Reef Foundation and the Queensland Government.

*How does the Dashboard work?* The Bureau of Meteorology receives daily satellite information about the frequency of light which enables the water colour and the sea surface temperature to be determined for the Great Barrier Reef. This information is enhanced by the Dashboard which uses sophisticated algorithms developed by CSIRO to filter out interference from the atmosphere. This interference appears in satellite images taken at such distance from the sea surface. By comparing the colour of the water to measurements of sediments, chlorophyll and dissolved organic matter, relationships are made between satellite imagery and the actual water in the reef.

*Why is this important?* The temperature of the sea surface is an important environmental indicator. It can be used to assist decision-making where water temperature is a major factor influencing operations on or near the ocean's surface, or where it can be used to infer properties of the ocean environment just below the surface. A specific example is in helping to predict and respond to coral bleaching events.

Information about the amount of light in the water and the concentrations of chlorophyll and sediments are important for managing sea grass beds and the production of large algae that may compete with coral for space on the reef. For more information, visit [www.bom.gov.au/environment](http://www.bom.gov.au/environment) or contact [environment@bom.gov.au](mailto:environment@bom.gov.au).

### The International Quality-Controlled Ocean Database (IQuOD) initiative

Rebecca Cowley and Catia Domingues, CSIRO

Understanding climate variability and change is the most challenging application of subsurface ocean observations, as it demands the highest data quality, completeness and consistency. Particularly, long-term historical records are required to put modern changes in the context of past changes (e.g., trends), and to tease apart the influence of anthropogenic drivers from natural climate modes of variability.

Subsurface ocean temperature and salinity are two of the [Essential Climate Variables](#) which provide a direct window into understanding of changes in the Earth's planetary balance, water cycle and sea

level. Furthermore these subsurface ocean observations are widely used to either evaluate, initialize, or are assimilated into numerical models, to investigate physical mechanisms and causes of past and current changes, and to project future changes in climate.

One of today's big challenges, however, is the urgent need to maximize the full potential of an irreplaceable collection of tens of millions of historical temperature profiles (see Figure) – collected since 1900s and worth tens of billions of dollars – and apply it to a vast range of climate-related research, applications and services.

Although there have been independent efforts over the past few decades by a number of research organisations, who

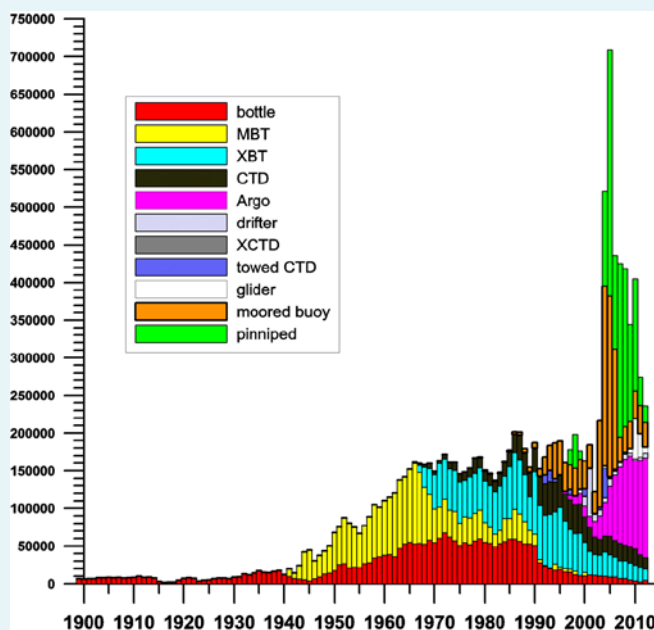


Figure: Number of subsurface ocean temperature profiles per year and instrument type since 1900s. (Courtesy of Tim Boyer, US NODC, NOAA)

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have attempted to assemble, rescue or quality-control these large datasets, the global historical archive still contains a relatively large fraction of biased, duplicated and substandard quality (e.g., lack of original and full-resolution) data and metadata that can confound climate-related applications.

To overcome this remaining impediment, a new internationally-coordinated effort – [IQuOD](#) – is being organized by the oceanography community, along with experts in data quality and management, and in consultation with end users (e.g., climate modellers) and the broader climate-related community.

The overarching goal of the IQuOD initiative is to produce and to freely distribute the highest quality, complete and consistent historical subsurface ocean temperature global database (to its maximum extent), along with (intelligent) metadata and assigned uncertainties. This goal will be achieved by developing an internationally-agreed framework and implementing it over 3-5 years (subject to funding). No individual group has the expertise/resources to complete this task. Thus, international cooperation is essential to the success of the IQuOD initiative. Present members include experts from groups in all continents: America (Canada, USA, Mexico, Brazil, Argentina), Africa (South Africa), Europe (UK, Germany, Russia, France) and Asia (India, Japan, China, Australia).

By pooling expertise and resources into a single best practice community effort, the IQuOD initiative plans to achieve the best outcome in the shortest timeframe, at the same time it avoids duplication of human and infrastructure resources, particularly welcome in times of budget cuts. Although internationally-coordinated efforts exist for the [ocean surface](#) and [atmosphere-ocean](#) observations, no similar effort has yet been undertaken for the historical subsurface ocean observations. IQuOD plans to initially focus on temperature but to extend its efforts in the future to other subsurface ocean variables, such as salinity, oxygen and nutrients (also subject to funding).

Some IQuOD expected outcomes include:

- Development/implementation of international standard practices for automated/manual quality control of historical (and modern) temperature data and provision of (intelligent) metadata and uncertainties. This involves agreement on best practices; free software development/ documentation/deployment; personnel training (capacity building); application of quality control procedures/audits.
- Template for future efforts: great community interest in improving the quality, completeness and consistency of the historical salinity observations and other ocean variables.
- Important data legacy (e.g., raw and interpolated products) and numerous downstream applications of the IQuOD dataset for Earth system/climate-related research and services of great societal benefit.

IQuOD held a Town Hall session during the 2014 Ocean Sciences Meeting (Hawaii/February) to encourage community discussions and involvement. Participation in the meeting was reported in [scidev.net](#) as “[Tidal wave of ocean data leaves scientists swamped](#)” by journalist Jan Piotrowski.

The [IQuOD 2<sup>nd</sup> Workshop](#) will be held in Washington in June 2014. For further information see the ‘Upcoming Events’ section at the end of this newsletter or visit <http://www.iquod.org/>. IQuOD discussions will also take place during the [GTSP meeting](#), in June, Ostend Belgium, and at the 2<sup>nd</sup> International Ocean Research Conference, as part of the “[Scientists sharing data: existing databases, improving access, data poor areas](#)”, 16 November, Barcelona, Spain.

## Current Activities & Collaborations

### Australian Defence Force Academy: Characterizing the Internal Tidal Field off Eastern Australia using Seagliders and XBT data

Robin Robertson and Daniel Boettger, University of New South Wales Canberra and Royal Australian Navy

Ocean mixing is attributed with maintaining the vertical stratification and the return flow for the meridional overturning circulation [Munk and Wunsch, 1998]. It also redistributes heat, salt, nutrients and larvae for biological productivity and fisheries [Stevens *et al.*, 2012], contributes to cross-shelf transport, and influences climate dynamics through contributions to dense water production. Much of the ocean mixing, particularly that deep in the water column, has been attributed to tides  $\sim 2$  TW ( $1\text{TW} = 10^{12}$  W), [Munk and Wunsch, 1998], with roughly half contributed by internal tides [Egbert and Ray, 2000]. Internal tides are generated by the interactions of tides with topography in a stratified fluid. To characterize the internal tidal fields

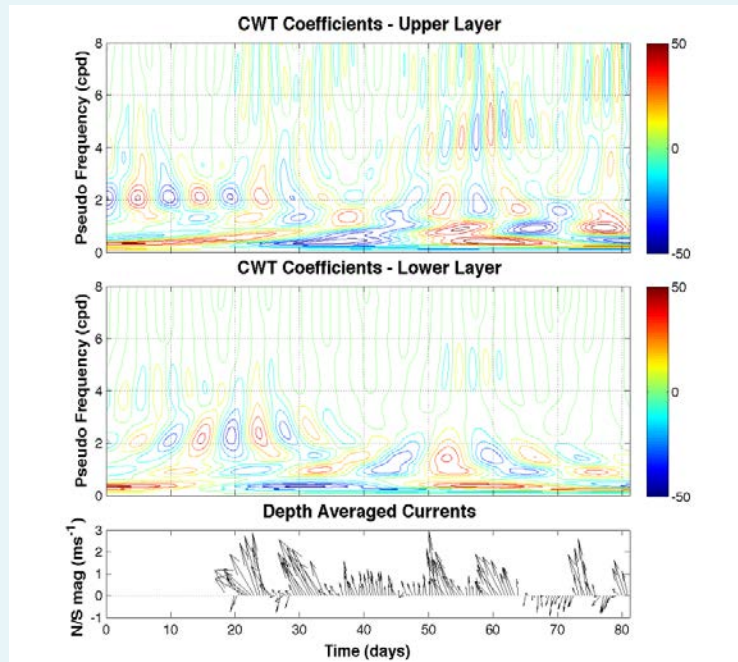


Figure 1: Wavelet analysis for the upper and lower layers of the water column (top and middle panels, respectively). CWT = Continuous Wavelet Transform. Depth averaged currents are shown for the same time period in the bottom panel.

off Eastern Australia, we used Seaglider and expendable Bathy Thermograph (XBT) data from repeat ship-of-opportunity (SOOP) transects following techniques developed by Rudnick *et al.* (2013) and Katsumata and Wijffels (2006), respectively.

Satellite altimetry suggests that tidal currents and internal tidal velocities in the waters off Eastern Australia are small, primarily  $1\text{--}5\text{ cm s}^{-1}$  [Egbert and Ray, 2000]. From correlation analysis, there were two primary layers in the water column (not shown). Wavelet analysis of isopycnal displacements in the two layers (Figure 1) from the glider deployments showed energy at semidiurnal (2 cpd), diurnal (1 cpd), and harmonic (4-6 cpd) frequencies. The energy at these frequencies differed both in time and between the two layers.

Times of strong diurnal tides (40-60 days) had weaker semidiurnal tides and times of strong semidiurnal tides (10-30 days) had weaker diurnal tides. Energy at the harmonic frequencies was much stronger in the upper layer and occurred primarily during times of

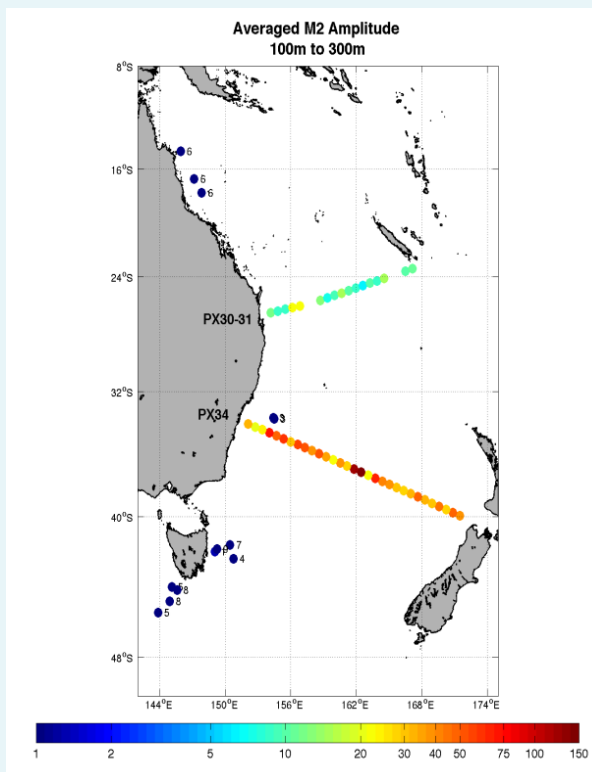


Figure 2: Amplitude of the isopycnal displacements at the semidiurnal (M2) frequency from the XBT lines and glider surveys

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weaker currents. Due to motion of the Seaglider, which was in an eddy much of the time, these temporal differences may be due to spatial variability. Estimates of semidiurnal ( $M_2$ ) velocities from the Seagliders were small,  $1\text{--}2\text{ cm s}^{-1}$  (not shown).

When translated to isopycnal displacements, the glider estimates were significantly smaller than those from the XBT data (Figure 2). The discrepancy is believed to be due to averaging of the changing coefficients in Figure 1 over the entire deployment, reducing their magnitude. New processing techniques are addressing this discrepancy. XBT analysis indicated isopycnal displacements of 10-25 m between Brisbane and Noumea and primarily 30-75 m between Sydney and Auckland with some displacements exceeding 100 m. Our goal is to add mooring, satellite altimetry, ARGO float, and additional glider data to fill out versions of Figure 2 for the diurnal, semidiurnal, and harmonic frequencies. This will provide an estimate of the internal tidal fields for use by other investigators and be used for verification of our baroclinic tidal model for this region.

Egbert, G D and R Ray (2000) Significant dissipation of tidal energy in the deep ocean inferred from satellite altimeter data, *Nature*, 405, 775-778.

Katsumata, K and S E Wijffels (2006) Semidiurnal  $M_2$  internal tides in the Indo-Australian Basin. *Geophysical Research Letters*, 33, 17601, doi:10.1029/2006GL026861.

Munk, W and C Wunsch (1998), The moon and mixing: Abyssal recipes II, *Deep-Sea Res.*, 45, 1977-2010.

Rudnick, D L, T M S Johnston, and J T Shearman (2013) High-frequency internal waves near the Luzon Strait observed by underwater gliders, *J. Geophys. Res.*, 118, doi:10.1029/

Stevens, C. L., P. J. H. Sutton, and C. S. Law (2012) Internal waves downstream of Norfolk Ridge, western Pacific, and their biophysical implications, *Limnol. Oceanogr.*, 57, 897-911, doi:10.4319/lo.2012.54.4.0897.



# Data Update

## Wrap-up of BlueNet

A mammoth task to verify and publish all metadata records and datasets from the BlueNet Project has been completed this year, with a total of 849 data records from Australian academic and government institutions now publicly available through the AODN data portal.

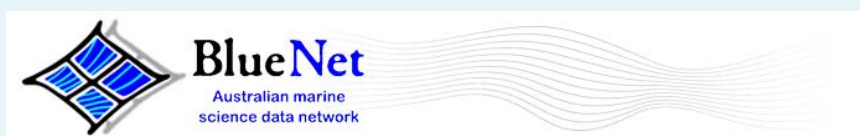


Figure: First funded in 2005, BlueNet was a consortium of research institutes who created a virtual data network for marine science researchers. The BlueNet data catalogue is now under the AODN umbrella and datasets are available through the AODN data portal.

In 2005 the University of Tasmania, as lead institute of a consortium, was granted \$3.5 million from the Australian Government to establish BlueNet - an Australian Marine Science Data Network. Funding for the project was provided through the Department of Education, Science and Training's (DEST's) Backing Australia's Ability program. The project aimed to provide a virtual data centre to support long term curation and management of data for Australia's marine science researchers. BlueNet linked data repositories and marine resources that resided in academic and government institutions both in Australia and overseas and was an extension of the nation's first on-line, virtual facility and predecessor to the AODN - the [Australian Ocean Data Centre Joint Facility \(AODCJF\)](#).

Funding for the BlueNet Project concluded in 2009 when management of the project switched to the eMarine Information Infrastructure at IMOS, who also manage the larger [Australian Ocean Data Network \(AODN\)](#).

At the end of 2011, public data records created for BlueNet were harvested and made available through the AODN metadata catalogue. It was discovered that some BlueNet metadata records were incomplete or had not been made public at the conclusion of the BlueNet Project in 2009.

The unpublished records were Australia wide, diverse ( including sediment core data, river water sampling, water quality monitoring, oceanographic studies, phytoplankton concentrations, long-term seagrass monitoring and Fiddler Crab behaviour) and included datasets from the University of Sydney, Australian National University, James Cook University, University of Melbourne, University of Western Australia, Coastalwatch, Flinders University, Australian Defence Force Academy, Curtin University, Murdoch University, Edith Cowan University, West Australia Museum, Cockburn Sound Management Council, Oceanica Pty Ltd, Ecocean and Florida International University. The earliest datasets started in 1963 and the most recent data were collected in 2012.

Publishing the records involved contacting people that had conducted the research: 466 outstanding draft records from 105 researchers, as well as 300 records with data attached that needed approval before the data was released. In total, 849 data records from Australian academic and government institutions are now publicly available by searching the AODN portal data catalogue, and 20 data collections are available directly through the AODN portal map.

We'd like to thank all of the people who have been involved in publishing data through the BlueNet project – you truly have been groundbreakers – and we look forward to working with you through the AODN into the future.

# Data Update

## A new look for the IMOS Ocean Portal



Image: The launch page for the new IMOS Ocean Portal

The IMOS Marine Information team is excited about the release of the new look [IMOS Ocean Portal](#). The website has had a major overhaul and has been redesigned to produce an Ocean Portal that is intuitive and engaging. We have improved both functionality and the user experience, so now it's as simple as 1-2-3 to download the wealth of IMOS data available for use in marine and climate research.

As well as deploying equipment in the oceans surrounding Australia, the data streams IMOS collects are building long time series. These long-term records of ocean state are the research infrastructure that IMOS is creating

and developing. The IMOS Ocean Portal ensures IMOS data is discoverable and accessible for use in the scientific and broader community.

The Marine Information team have designed the new look Ocean Portal in response to user feedback, delivering a simple mechanism for

1. Discovery and selection,
2. Collating data sets across space and time, and
3. Downloading the data in a suitable form for scientific use.

Taking the opportunity to completely redesign the Portal interface at the same time, IMOS now offers ocean data users a new web environment that 'flows' well.



Image: Three steps guide users through search, subset and download of data they're interested in

The Marine Information team believes the end result is an Ocean Portal that will tempt new and loyal users to explore the possibilities with IMOS datasets.

## New Datasets from AATAMS Satellite Tags

The Australian Animal Tagging And Monitoring System (AATAMS) is a facility of the Integrated Marine Observing System (IMOS), a contributor to the AODN. The facility deploys both acoustic and satellite tags on animals, which can collect information on animal movement and behavior as well as oceanographic parameters such as temperature, salinity and depth.

Three new datasets collected by researchers using satellite tracked tags are now available on the new-look IMOS portal:

- Satellite tracking of emperor penguin fledglings: 42 deployments (date range =2010-12-20 to 2012-12-28).

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- Tracking of short tailed shearwaters: 33 deployments (date range = 2010-10-22 to 2011-02-26).
- Near real-time CTD data from seals and sea lions: over 85000 CTD profiles are available (date range = 2009-01-08 to today) recorded by 205 animals.

Please visit the [IMOS Ocean Portal](#) to explore and download these data.

### Computing resources for marine and climate scientists

The Tasmanian Partnership for Advanced Computing (TPAC) at the University of Tasmania hosts a number of computing resources which are available to the marine and science community in Tasmania, and nationally. TPAC's services include:

- 1) *High Performance Computing* TPAC now offers twice the capacity it did 12 months ago. We have doubled the number of compute nodes, and now have 1024 CPU cores in our HPC environment, as well as doubling our storage capacity, with more high-speed disk.
- 2) *High volume disk-based storage* Through the funding of Research Data Storage Infrastructure ([www.rdsi.edu.au](http://www.rdsi.edu.au)), TPAC now have 1.45 Petabytes of high-speed storage available, along with associated server hardware available to the research community for sharing data collections of national significance, and we are progressively migrating a number of data collections to this storage facility, to greatly improve their availability.

*Do you have a collection that should be shared to the research community? If so we may be able to help.*

- 3) *Cloud Computing* Over the coming month we will be bringing online the TPAC node (2688 CPU cores) of the national NeCTAR compute cloud ([www.nectar.org.au](http://www.nectar.org.au)). The NeCTAR cloud gives researchers the ability to deploy Virtual Machines (VM) for a variety of research purposes. VM uptake nationally has been exceptional, and researchers have been quick to realize their potential, migrating services and research quickly to this new platform.

Together these upgrades and services will give local and national researchers a powerful environment to work within: an environment that can easily adapt to the needs of the research community as a whole, as well as the individual disciplines, right down to the individual researcher.

If you would like to learn more about TPAC and what we have to offer, then please visit our website: [www.tpac.org.au](http://www.tpac.org.au)

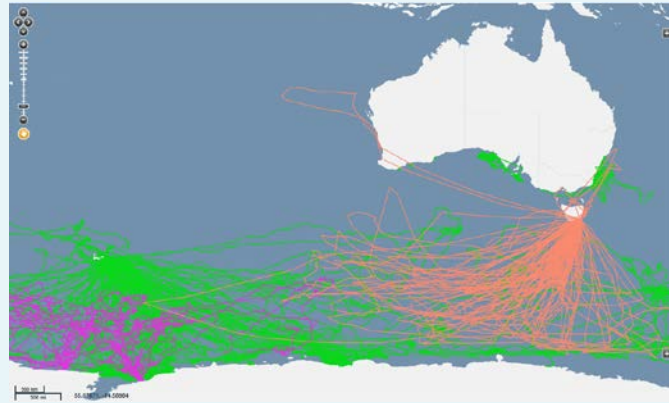


Image: IMOS AATAMS datasets from satellite tagged animals are now available through the IMOS Ocean Portal. The tracks of animals are shown on the map: pink for penguin fledglings, green for seals and sea lions and apricot for Short-tailed Shearwaters.



Image: Tasmanian Partnership for Advanced Computing

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### Swimming the Rottneest Channel: an open water race to the Island

Agi Gedeon, Manager WA node of the Integrated Marine Observing System (WAIMOS), University of WA

The beach was already warm when the race organisers, volunteers and competitors started arriving well before dawn. The air festive, but trilling with nervous anticipation. The swimmers busied themselves with registration and zinc warpaint, whilst the paddlers festooned and bedazzled their floating craft with balloons, ribbons and some outrageous costumes. As the sun began to gingerly light the water, the first swimmers took off to encouraging cheers from the crowd and the positive energy was palpable.



Image: Swimmers line up at the start of the Rottneest Channel race in February 2014 (photo by Agi Gedeon)

Race organisers, the Rottneest Channel Swim Association (RCSA), conduct the annual 19.7km open water swim from Cottesloe Beach to Rottneest Island and facilitate out-of-event solo crossings. The event, held in February each year, is a big day with solo, duo and team competitors surrounded by a flotilla network of support paddlers, boats, skippers and crew. This year the event went ahead on the 22<sup>nd</sup> February with 2300 participants from a record 3000 applications to compete.

The safety and welfare of swimmers is paramount and strong winds and choppy seas can add to the challenge as can currents, which in this channel are typically northerly but can also be southerly: *“in 2009 when we did the duo we spent a lot of time swimming north around Phillip Rock”*. The currents are strongest on the approach to Rottneest in the last few kilometres exactly when the swimmers are most tired: *“some years we’ve been swept to the north so that as you get close to Rottneest you spend as much time swimming south as you are west at exactly the time you are feeling the worst”*.

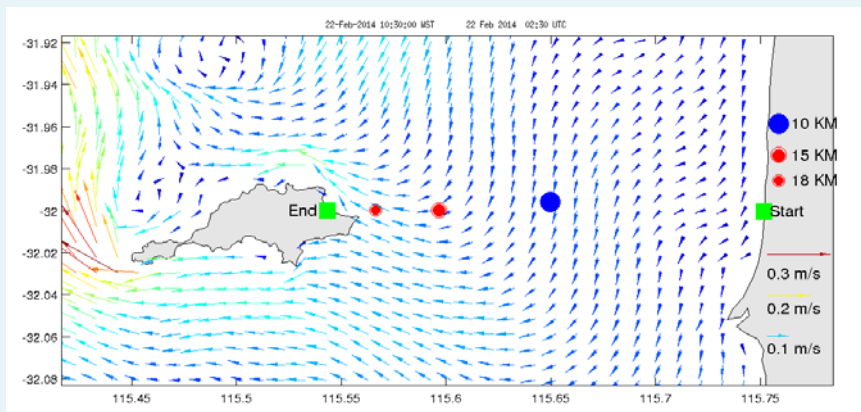


Image: Hourly ocean current predictions were prepared by Sarath Wijeratne of the UWA Oceans Institute. This image shows the hourly current prediction for 10:30 am WST on the 22<sup>nd</sup> February 2014.

The uncertainty in the current direction has skippers setting GPS coordinates km by km on a straight line, a southerly course and a northerly route as contingencies to gain benefit from the current on the day. Some strategic swimmers have shown interest in the IMOS high-frequency radar data from the Rottneest (ROT) station in

previous years, so this year WAIMOS members at UWA considered how to help one and all. Sarath Wijeratne of the UWA Oceans Institute undertook some sophisticated hydrodynamic modelling, with careful testing and observation over several months in order to release ocean current predictions before the Rottneest Swim. Several high-profile IMOS oceanographers contributed to extensive discussions and validation of the forecasts and real-time radar data. The predictive map of the mean ocean current was posted on the [IMOS OceanCurrent News](#) and the RCSA [facebook](#) page (reaching over 3000 individuals).



## Data Update



Image: And they're away! Swimmers to the right, support paddlers to the left (photo by Agi Gedeon)

As luck would have it there was no strong current on race day and the phrase *"Don't expect the usual northward current flow"* was helpful to swimmers in targeting the pub straight down the rhumb line: *"thanks for the heads-up from IMOS, you saved us deviating too vigorously to the south (which served us well last year) and saved us about 20-30mins!"* *"predictions held up nicely"*. Already, there is keen interest in more detailed predictions 'as near to realtime as possible' for next year and some are interested in analysing the effects of the current on finishing times: race pace, strategic course setting and relative distances swum in past years.

The Swim attracts open-swimmers and Olympians (like Eamon Sullivan) from across Australia and overseas, but this year a local Sorrento man brought home the victory solo in 4hr 14min 4sec, narrowly beating a German competitor by just over a minute, but 14mins short of the all-time record.

The threat of sharks did not deter competitors but in the interest of public safety the controversial baited drum lines were removed in the week before the swim. A 2m hammerhead was sighted mid-morning but apart from numerous stingers, the conditions were said to be the best in 10 years.

An undercurrent of love carried one ardent swimmer for just over 7hrs with a diamond ring taped to his ankle. He proposed on one knee at the finish line. The answer.....YES, I love you!

### AODN Technical Advisory Group (TAG)

The Technical Advisory Group (TAG) of the AODN had its first meeting on 3 December 2013 in Hobart. This group supercedes the Technical Committee of the Australian Ocean Data Centre Joint Facility and welcomes Australia-wide participation. The meeting approved new Terms of Reference (ToR) and established four Working Groups (WGs - Information Modelling, Use Cases, Vocabulary and the pre-existing Marine Community Profile Governance) to develop an all-embracing community-wide AODN.

The ToR and WG briefs for the WGs can be found at <https://sites.google.com/site/aodntag/home>. Anyone interested in joining any of these groups please contact [info@emii.org.au](mailto:info@emii.org.au).

### IMOS Strategy 2015-25

"Need, Capability, Impact" are the themes of the new draft strategy for an IMOS beyond 2015, which sets out priorities for Australia's Integrated Marine Observing System as it enters a second decade of operation. The consultation draft strategy is available at <http://imos.org.au/plans.html>, comments to IMOS Director Tim Moltmann ([tim.moltmann@imos.org.au](mailto:tim.moltmann@imos.org.au)) are welcomed.



# Presentations & Outreach

## Recent Presentations and Meetings

*December 2013:*

- *2<sup>nd</sup> Ocean Data Interoperability Platform (ODIP) Workshop, 3-6 December 2013, San Diego*

The second ODIP workshop focused on the three prototype development projects that are currently being undertaken by the ODIP partners following the outcomes of the first workshop. These are:

- 1) ODIP 1: Establishing interoperability between SeaDataNet CDI, US NODC, and IMOS MCP Data Discovery and Access services, making use of a brokerage service, towards interacting with the IODE-ODP and GEOSS portals
- 2) ODIP 2: Establishing deployment and interoperability between Cruise Summary reporting systems in Europe, US and Australia, making use of GeoNetWork, towards interacting with the POGO portal
- 3) ODIP 3: Establishing a prototype for a Sensor Observation Service (SOS) for selected sensors (SWE), installed on vessels and in real-time monitoring systems.

The programme included a dedicated session for each prototype development project which includes a short plenary to provide an overview of the prototype under development and an update of current progress / activities, followed by a discussion session which provides each group with the opportunity for face-to-face working. Two additional discussion topics were included in the meeting programme, Vocabularies & Data publication and Citation, these topics having been identified and prioritized by the ODIP project partners. Details can be found on the ODIP website ([www.odip.eu](http://www.odip.eu)).

- *Australian National Mooring Network Quality Control Summit, 10-12 December 2013, Hobart*

The third annual ANMN Quality Control summit took a workshop approach with participants from Quality Control teams across IMOS facilities – more broadly than just the ANMN facility. The three days of the summit were divided into sessions based on data streams of interest to particular working groups, including sessions on Acoustic Doppler Current Profilers, bio-optics, data streams from biogeochemical sampling, profiling CTDs and working with the IMOS Matlab toolbox. Each working group spanned multiple IMOS facilities, e.g. the National Reference Station (NRS) project of the ANMN and the PULSE project in the Australian Bluewater Observing System (ABOS) collect biogeochemical samples that need to be QC'ed and stored in an easily accessible database. Many overlaps between facilities were identified. The use of the ANMN's Matlab toolbox to parse and handle data across various facilities was also of interest, as was the development of deployment and the BioGeoChemical databases. One option for future work would be to consolidate both data QC and data handling, leading to an IMOS QC summit rather than an ANMN QC summit. A report and presentations from the 2013 ANMN QC summit are available from the IMOS website at <http://imos.org.au/qc2013.html>. These are recommended reading for people tackling the issues associated with quality control of marine data.

- *III Brazilian Workshop on Climate Change in Coastal Zones, 10-12 December 2013, Florianopolis*

IMOS Director Tim Moltmann attended this workshop and delivered a keynote address at the invitation of Professor Carlos Garcia from the Federal University of Rio Grande (FURG). The Brazilian oceanography community is small, but vibrant and growing. Many community members have strong connections to Australia, having studied and worked here, and there continues to be a steady flow of Brazilian students to Australia. There appear to be opportunities to enhance collaboration between Brazil and Australia in marine and ocean climate science, most obviously through student exchange. Information on the workshop can be found at

<http://www.mudancasclimaticas.zonascosteiras.furg.br/index.php?lang=en-US> (in Portuguese).

## Presentations & Outreach

*January 2014:*

- *POGO-15 meeting, 22-24 January 2014, Hobart*

The Partnership for Observation of the Global Oceans, POGO, held its 15<sup>th</sup> Annual Meeting in Hobart, 22-24 January 2014. The meeting, hosted by [CSIRO](#) and [IMAS](#), was held in the Hobart Function and Conference Centre. Representatives from more than 15 countries attended the 3-day meeting. The meeting consisted of both a plenary meeting, with the theme “*Challenge and Change*”, and POGO Business meetings. The morning of the 3<sup>rd</sup> day was given over to a special showcase session on Australia’s Integrated Marine Observing System (IMOS) and Australian Ocean Data Network (AODN). Details of the meeting can be found at <http://www.ocean-partners.org/meetings-and-workshops/meetings-and-workshops/pogo-15>.

*February 2014:*

- *AMOS National Conference 2014, 12-14 February 2014, Hobart*

The Australian Meteorological and Oceanographic Society (AMOS) held its 20th annual conference in Hobart, Tasmania. IMOS had a display booth at the conference where we demonstrated the new 1,2,3 data portal to attendees. It was an excellent opportunity to interact with the Oceanographic and Meteorological community of Australia and we received much positive and constructive feedback from data users within the first week of the new portal launch.



Image: The popular IMOS display at the AMOS Annual Conference at the Hobart Grand Chancellor in February 2014

- *IMOS Annual Planning Meeting, 17-19 February, Hobart*

The 8<sup>th</sup> IMOS Annual Planning meeting took place at the Old Woolstore, Hobart. As most of you are aware, IMOS supports the Australian Ocean Data Network and shares data infrastructure with the AODN. This year the meeting focussed on looking forward and discussion addressed wide-ranging needs for ocean observations. Meeting details and presentations can be found at <http://imos.org.au/apm2014.html>.

- *WAIMOS Small Group Workshops, 21 February 2014, Perth, Western Australia*

The WA node of IMOS held a workshop ‘IMOS Moorings in Western Australia/NT’ on the 21<sup>st</sup> February 2014. The key objective was to encourage data discovery on the IMOS portal. Participants heard speakers, Dirk Slawinski and Simon Spagnol give excellent overviews of WA moorings operated by CSIRO and AIMS respectively and the fundamentals of mooring data collection delivered by Ryan Crossing who could ‘neither confirm nor deny the presence of lobsters in a cray pot snagged in a mooring line’. Morning tea was generously sponsored by UVS and their Chief Operating Officer (Neil Treneman from Newcastle) provided an interesting history of the birth of Teledyne RD Instruments (TRDI) and the ADCP, followed by Ron Hippe (visiting from Teledyne RDI in San Diego) demonstrating the capabilities of the innovative Sentinel V ADCP. Alan Pearce, Paul Thompson and Christine Pequignet presented their respective research findings utilising data from the Two Rocks, National Reference Stations and northwest moorings, advancing our knowledge of seasonal and cross shelf variability governing larval dispersion of commercially important fish and marine invertebrate species; phytoplankton ecology and spatial and temporal variability of low-frequency currents on the

## Presentations & Outreach

North West Shelf. The workshop provided a wonderful opportunity for PhD students and postdocs to mingle with active oceanographers, established researchers and consultants. Dirk's demonstration of accessing the data via the IMOS and AODN portals served to whet the appetites of those keen to try some hands-on downloading.

- *Ocean Sciences Meeting, 24-28 February 2014, Honolulu, Hawaii*

The biannual Ocean Sciences Meeting (OSM2014) included over 5,000 oral and poster presentations, lunch time 'Town Hall' meetings and afternoon poster sessions. The AODN community was well represented with attendees from AIMS, CSIRO, SIMS (UNSW), UWA and UTAS. IMOS Director Tim Moltmann presented a poster on "IMOS: Observations to support research and applications in the coastal zone" and attended sessions about ocean circulation variability, ocean primary productivity, deep ocean observing, ocean acidification and coral reefs, mesoscale ocean processes, advances in coastal modelling, observations and prediction, Antarctic marginal seas and shelf/slope processes and optical remote sensing of coastal environments. Full details of the Ocean Sciences Meeting can be found at <http://www.sgmeet.com/osm2014/>.

*March 2014:*

- *National Environmental Information Infrastructure (NEII) Programme Information Forum, 6 March 2014, Canberra*

An information forum on the National Environmental Information Infrastructure (NEII) programme was presented for key stakeholders in the environmental information arena. While providing a more detailed description of the Reference Architecture for the NEII, the forum also enabled questions and discussion about the wider NEII programme; where it was heading, who was involved, and what were the key activities ahead. For more information or to get a copy of the presentations, please email [environment@bom.gov.au](mailto:environment@bom.gov.au).

- *3<sup>rd</sup> Plenary of the Research Data Alliance, 26-28 March 2014, Dublin*

The purpose of the Research Data Alliance (RDA) is to accelerate international data-driven innovation and discovery by facilitating research data sharing and exchange, use and re-use, standards harmonization, and discoverability. The 3rd Plenary focused on the theme 'The Data Sharing Community: Playing YOUR Part' and was about exploiting RDA's work to date to its full potential and was attended by Roger Proctor, AODN Director. The program contained a mixture of keynotes, panels, networking, Working and Interest Groups as well as 'Birds of a Feather' sessions on topics ranging from agriculture to particle physics, and from humanities to bioinformatics. All parts of the data lifecycle were addressed, from foundational data terminology to data publication and re-use. More than 470 participants attended the meeting. There are many Working Groups (WGs) and Interest groups (IGs) which are relevant to the marine and climate science community, including vocabularies, data citation, big data, interoperability, geospatial information. Of particular interest is the Marine Data Harmonisation Interest Group which has close ties to the ODIP project (see workshop report above). Details of the plenary can be found at <https://rd-alliance.org/rda-third-plenary-meeting.html>.

# Community Engagement

## Upcoming Events

- *European Geosciences Union (EGU) General Assembly 2014, 27 April – 2 May 2014, Vienna*

The EGU General Assembly 2014 will bring together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary and space sciences. IMOS/AODN (Roger Proctor) will present one poster and give two oral presentations. The poster will be on “Australia’s Marine Virtual Laboratory” (as part of Session OS4.3. on the 28 Apr 2014, at poster board B982, see <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-9672.pdf>). The talks are: “Australian Integrated Marine Observing System: Improving users access to data” (Session ESS1.2, 30 Apr 2014, see <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-9510.pdf>) and “Ocean Data Interoperability Platform (ODIP): supporting the development of a common global framework for marine data management through international collaboration” (Session ESS1.2, 30 Apr 2014, 16:00, see <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-14366.pdf>).

- *Big Data Week: WAIMOS Data Mining Workshop, 5 May 2014, Perth*

WAIMOS are running a Data Mining Workshop ‘ABC it’s easy as 1-2-3’ as part of the global Big Data Week festival. This practical, hands-on, small group workshop will explore the new look IMOS Ocean Portal to encourage data discovery and instil confidence in the mining of physical, chemical and biological variables. The workshop will address user’s needs for data access. It will cover the ABC of IMOS technological platforms and demonstrate how the improved portal functionality and intuitive user controls make it as easy as 1-2-3 to download the wealth of IMOS data available for use in marine and climate research. Enhanced integration of these BIG datasets builds stronger science, better collaborations and increased publications. The workshop will be held on the UWA Crawley campus. All are welcome - please RSVP to [agi.gedeon@uwa.edu.au](mailto:agi.gedeon@uwa.edu.au) by 30th April as numbers are limited.

- *IQuOD (International Quality controlled Ocean Database) 2<sup>nd</sup> Workshop, 4-6 June 2014, Washington DC*

The 2nd IQuOD meeting will bring together existing and new members of the IQuOD project to review progress since the last meeting, further refine the project goals if necessary and move forward into the next stage of the project. For more information, visit <http://www.iquod.org/>.

- *AMSA 2014 “Investigating our Marine Nation”, 6-10 July 2014, Canberra*

At AMSA 2014, AODN will participate in Symposia SS10 “Democratising data collection – Citizen science for Australia’s marine environments” where presentations about a number of current citizen science projects and tools for managing them will be provided alongside an opportunity for a robust discussion on the pluses and challenges of democratising marine data collection.



# Office News & Contacts

## Staff Updates



Image: The new IMAS building on Castray Esplanade, Hobart

The AODN office is now located in the new University of Tasmania Institute of Marine and Antarctic Science building in Salamanca place, Castray Esplanade, Hobart. The building also houses workspaces for staff and postgraduate students from the University, the Antarctic Climate and Ecosystems Cooperative Research Centre and the Australian Antarctic Division. In addition, the building accommodates student and research laboratories, teaching spaces, a computer laboratory and a public lecture theatre and exhibition area. We are on the second floor of the building. If you are in town, please drop by and say hello!

## Staff Profiles

We'd like to introduce the AODN staff who keep the technical side of our data network operating. In each newsletter we will profile two AODN staff members. We begin with our two group leaders, Sebastien Mancini (Data Services) and Peter Blain (Software and Infrastructure Development).

### *Sebastien Mancini – Data Services group leader*

Sebastien trained in marine science at a French Engineering school (ISITV, Toulon) before beginning his career as a physical oceanographer doing numerical modelling in a French multidisciplinary coastal and marine environmental services company, [CREOCEAN](#). At CREOCEAN, his primary work involved numerical modeling (coastal circulation, waves, tidal currents, sediment and pollutants transport) and design of coastal structures (e.g. sea-walls and harbour developments). Seb also participated in the collection, preparation and analysis of in-situ data.

In 2008 Sebastien moved to Australia. Since August 2008 he has worked as a project officer and more recently as Data Team Leader within the eMarine Information Infrastructure facility. eMII is in charge of data management for IMOS and AODN data. In his work with eMII, Seb has contributed to the creation and improvement of a single integrative framework for data and information management that allows discovery and access of the data by scientists, managers and the public.



Image: Sebastien Mancini, eMII Data Services group leader

### *Peter Blain – Software Development group leader*

Peter started his professional career as a freelance Software Engineer and Analyst, designing and developed software for major banks. He worked for organisations including Westpac, NAB,



## Office News & Contacts



Image: Peter Blain, eMII Software Development group leader

Commonwealth Bank, HSBC and the Bank of Tokyo and was based in Sydney, Melbourne, London and Frankfurt. In 2008, Peter commenced as software development manager for the Marine and Climate Data Discovery and Access Project (MACDDAP) where he was involved in successful bids for Tasmanian nodes of RDSI and the NeCTAR Research Cloud, which are national projects to build compute and storage infrastructure for research.

Since August 2011 Peter has been the information systems architect at eMII. Peter leads the eMII software development team which builds software for data access, discovery and visualisation. Peter's team also manages the IMOS information infrastructure, and supports data publication and reporting

activities. In his role at eMII, Peter is involved in collaborative projects such as the Marine Virtual Laboratory and the Australian Ocean Data Network. He has a Bachelor of Engineering in Computer Systems, a Masters in Professional Accounting and completed a PhD in Cognitive Science.

### Farewell

We are sorry to say farewell to software engineer Tommy Fotak, who has been a dynamic and valuable member of our group. Tommy was a key member of the software development team and contributed significantly to the new IMOS portal. We will miss him and we wish him well!

## AODN – Contacts & Links

### Follow AODN news online

Do you know that as well as our webpage, the AODN has a facebook page and a twitter account?

Find us here:

<http://www.facebook.com/AusOceanDataNet>

<http://twitter.com/AusOceanDataNet>



Director: Roger Proctor, E [Roger.Proctor@utas.edu.au](mailto:Roger.Proctor@utas.edu.au), Ph +61362261977

Helpdesk: E [info@aodn.org.au](mailto:info@aodn.org.au), Ph+61362262904, F+61362268575

AODN webpage: <http://www.imos.org.au/aodn.html>

AODN Web Portal: <http://portal.aodn.org.au>

All AODN staff member contact details: [imos.org.au/emii\\_contacts.html](http://imos.org.au/emii_contacts.html)

*Feedback on this newsletter and on the AODN Web Portal is much appreciated!*

The AODN is hosted by IMOS at the University of Tasmania in Hobart and funded under the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS).

