

# Satellite Oceanography Users Workshop Report

Bureau of Meteorology Head Office, Melbourne, Australia  
9<sup>th</sup> – 11<sup>th</sup> November 2015

**Version: 1.2 DRAFT**

**30 Nov 2015**

Helen Beggs, Gary Corlett, Robert Johnson, Elaine Miles, Chris Watson, Leon Majewski

**Meeting sponsored by:**

**Integrated Marine Observing System and Australian Bureau of Meteorology**



**Australian Government**  
**Bureau of Meteorology**

# Introduction

The Satellite Oceanography Users Workshop was a three-day workshop aimed at users of satellite-derived products of key oceanographic variables. The workshop was held at the Bureau of Meteorology Head Office in Melbourne, Australia, from 9<sup>th</sup> to 11<sup>th</sup> November 2015. It was a joint activity of the Committee on Earth Observation Satellites (CEOS) Sea Surface Temperature (SST) Virtual Constellation, the Group for High Resolution SST (GHRSSST) and the Integrated Marine Observing System (IMOS), hosted and organised by the Australian Bureau of Meteorology.

Satellites provide real time global high space and time resolution measurements of key ocean variables such as ocean colour, sea level height, sea surface temperature and ocean surface winds, which are widely used across a range of scientific and operational applications. The wider range of products and services available can be confusing to navigate through and the workshop provided an opportunity to meet with and provide feedback to the data providers.

The objectives of the workshop were to:

- Present and discuss the provision of products and services supporting satellite based ocean products;
- Provide a forum for users to present and discuss their experiences and requirements on satellite based ocean products;
- Work through practical examples of particular interest to participants.

Further details and copies of presentations can be found on the meeting web-page at

<https://www.ghrsst.org/ghrsst/Meetings-and-workshops/satellite-oceanography-user-workshop/>.

We thank Val Jemmeson, Meryl Wiseman, Silvia Bragaglia-Pike, Anu Arora, Nada Bosnjakovic, Thomas Pratt, Robert Johnson and Tony Baldwin for their help with this workshop.

Dr Helen Beggs

Leader, IMOS Satellite Remote Sensing SST Products Sub-facility;

Leader, IMOS Ship of Opportunity SST Sensors Sub-facility;

Chair, GHRSSST SST Validation Technical Advisory Group

Dr Gary Corlett

GHRSSST Project Coordinator



## Summary of Plenary and Breakout Sessions

The Satellite Oceanography Users Workshop was held at the Bureau of Meteorology Head Office in Melbourne, 9<sup>th</sup> to 11<sup>th</sup> November 2015. There were 65 attendees, seven from overseas (UK, Germany, China, Japan, US and New Zealand). They ranged from students and users from industry, the Bureau and Navy, to experienced research users and producers of satellite ocean products. The attendee list is attached below. Prior to the workshop the attendees were surveyed to ascertain their level of experience with satellite ocean data and which types of products they used. They were also surveyed for suggested breakout topics.

Day 1 of the workshop covered presentations from providers of sea surface temperature, altimetry, ocean colour and waves remote sensing products and services. Day 2 covered presentations from users of satellite ocean products, as well as presentations on ocean remote sensing portals and tools and two breakout sessions covering hands-on demonstrations of data portals and ocean remote sensing strategic issues. Day 3 involved three breakout sessions on SST, Ocean Colour and Altimetry. The final version of the agenda is attached below. The agenda was an experiment. It included a day of science presentations selected to be of interest to users of satellite ocean products, as well as user presentations and breakout sessions which provided the opportunity for users to question providers of products and services and providers to demonstrate some of the on-line services and data portals. This was the first workshop for users of satellite ocean products in Australia. It enabled users to meet with the "experts" and make useful research connections and receive feedback. Possible improvement to the agenda for future similar user workshops would focus on fewer, more targeted, "expert" presentations for users and shorter (10 minute) presentations from users focused on what they use and what they need from satellite ocean products and services.

Several workshop attendees commented that either annual or bi-annual similar user workshops would be useful in future. These possibly could be rotated around the major capital cities in order to cater for more students and users who did not have funding to attend the workshop in Melbourne. It was also clear that users don't know as much as they either want to, or should, about the data products they are using, or could be using. On-line information was not really meeting user needs and should be improved. Future user workshops could benefit (again) from a simple survey for attendees (identify interests, identify needs/questions). Attendees weren't interested in just one product, they wanted to use altimetry/SST/waves/ocean colour to build up a better picture of the marine environment.

One other outcome from the workshop is that there is strong interest, particularly amongst the ocean colour users (see ocean colour breakout report below), for a Forum for Ocean Remote Sensing, possibly in early 2016 in Hobart.

At the request of Eric Wood, Chair CEOS Capacity Building Working Group, the workshop plenary sessions were videoed. Eric has offered to edit these videos and post on-line. Contact Helen Beggs ([h.beggs@bom.gov.au](mailto:h.beggs@bom.gov.au)) if you would like access to the videos.

Brief reports from the various breakout sessions are listed below:

### Portal and Tools Breakout (Chair: Gary Corlett)

The breakout was very well attended and dealt mostly with ocean colour related questions as this appeared to be of greatest interest to those attending. Laurent Besnard demonstrated the IMOS Ocean Portal. Feedback from users was that a welcome page with information relating to the ocean products before launching into a list of the numerous IMOS products would be useful. The general agreement was that more on-line information relating to the selection and use of satellite ocean products is needed.

Helen Beggs demonstrated the COSPPac Ocean Portal and its various tailored maps of satellite ocean products (SST, sea surface height anomaly and ocean colour) and the help pages.

### Ocean Remote Sensing Strategy Breakout (Chair: Boris Kelly-Gerrey)

The group discussed what has happened to the Australian Space Initiative. How can we obtain funding for Australian scientists to work with new ocean mission data such as Sentinel-3? The Federal Government ASRP (set up by the Space Policy Unit and now disbanded) dealt with funding infrastructure, not research into using environmental satellite data.

## **SST Breakout (Chairs: Helen Beggs and Gary Corlett)**

The first two sessions dealt mainly with uncertainty estimates in SST, particularly biases, led by questions from the participants. The new IMOS SST validation web pages (developed by Janice Sisson and Helen Beggs) generated considerable interest from the expert users and producers in the audience. The problem of information flow from the producer to user was discussed. There are such a wide choice of GHRST products and beginner users asking for a list of recommended SST products and "funnels" to guide the user to an appropriate product for their application. Users need tools to help them read GHRST products. Gary Corlett demonstrated the real-time GHRST data portal hosted by JPL PO.DAAC and the GHRST Long Term SST Archive and Reanalysis Facility hosted by NCEI, as well as the ESA SST Climate Change Initiative "CCI" Analysis back to 1991. New SST sensors on Sentinel-3 and Himawari-8 were also discussed. The breakout would have benefited by having a quick introduction of attendees at the beginning and a survey of what they would be most interested in discussing. Due to the large proportion of producers and "expert" users of SST products in the breakout group, the discussion became quite technical quite early in the day and did not cater until later in the day for the novice users of SST products.

## **Ocean Colour Breakout (Chairs: Robert Johnson and Edward King)**

As a general statement, people were grateful for the opportunity to get together to discuss questions around the application of ocean colour remote sensing for their research and management fields. The breakout had a focus on coastal waters and data sharing in the first half of the day and then a strong Southern Ocean and Antarctic focus for the last half of the day. There were good and vocal representatives from UTAS-IMAS, UNSW, IMOS, Navy, and all government research agencies: CSIRO, GA, and AAD. The key outcome was that there was very strong interest in the development of a regular Marine Remote Sensing Forum in Australia. The goal of which would be to foster collaborations throughout Australia and to build a critical mass to be able to contribute on the world stage.

## **Altimetry Breakout (Chairs: Chris Watson and Elaine Miles)**

The altimeter breakout session was reasonably well attended – the users present ranged in experience across the full spectrum. Overall, the breakout session was useful to make the event a little more personalised – individual questions could be addressed and connections made between people in the community.

Very short informal presentations in the breakout helped to prompt discussion and questions that were relevant to individual users. Perhaps more of this style (e.g. sub 5 slides) could be adopted in future events.

There were a number of new users seeking information on using altimetry data. This information could be more cost-effectively provided on-line rather than via a face to face workshop.

During the breakout there was a quick run around the Altimetry group to get an idea of the user level of the participants and their interest level/requirements in products. It was also a good moment to help bond the community. One outcome from the Altimetry group was the need for operational services/researchers to contact NOAA/RADS and highlight community dependencies on their altimetry track program so as to ensure this product continues into the future.

There is also the Year of the Maritime Continent <http://www.bmkg.go.id/ymc/> coming up that encourages observations and modelling of weather and ocean phenomena (that impacts on Australia too).

Perhaps giving users a sample of the portals/datasets would be useful before the breakout sessions.



## List of Attendees

Dr.	Stewart	Allen	Research Scientist	Bureau of Meteorology	AU
Prof.	Alexander	Babanin	Centre Director	Swinburne University	AU
Mr.	Darren	Baldyga		Parks Victoria	AU
Dr.	Sue	Barrell	Deputy Director, Observations and Infrastructure	Bureau of Meteorology	AU
Mr.	Tony	Baxter	Coordinator Ocean Services	Bureau of Meteorology	AU
Dr.	Helen	Beggs	Ocean Remote Sensing Scientist	Bureau of Meteorology	AU
Mr.	Laurent	Besnard	Project officer	Integrated Marine Observing System	AU
Mr.	Tim	Birch	OIC RAAF Pearce DWSO	Bureau of Meteorology	AU
Mr.	Daniel	Boettger	METOC	Royal Australian Navy	AU
Mr.	Hans	Bonekamp	Oceanography Team Leader	EUMETSAT	DE
Dr.	Madeleine	Cahill	Physical Oceanographer	CSIRO Oceans and Atmosphere	AU
Ms.	Zhixin	Cheng	Student	UNSW-Canberra	AU
Dr.	Frank	Colberg	Senior Coastal Ocean Modeller	Bureau of Meteorology	AU
Dr.	Gary	Corlett	GHRST Project Coordinator	University of Leicester	GB
Miss	Taha	Cowen	Student	Institute for Marine and Antarctic Studies	AU
Miss	Hannah	Dawson	Student	Institute for Marine and Antarctic Studies	AU
Miss	Alice	Della Penna	Grad Student	IMAS/CSIRO/Paris 7	AU
Ms.	Michelle	Devlin	Research Scientist	James Cook University	AU
Dr.	Prasanth	Divakaran	Physical Oceanographer	Bureau of Meteorology	AU
Dr.	Aitana	Forcen	Oceanographer	NIWA	NZ
Dr.	Christopher	Griffin	Scientific Programmer	Bureau of Meteorology	AU
Dr.	David	Griffin	Principal Research Scientist	CSIRO Oceans and Atmosphere	AU
Dr.	Andrew	Harris	Assistant Research Scientist	University of Maryland	US
Dr.	Werner	Hennecke	GIS Specialist / Senior Coastal Geomorphologist	Cardno	AU
Dr.	Xinmei	Huang	Senior professional office	Bureau of Meteorology	AU
Dr.	Daniel	Ierodiaconou	Senior Lecturer	Deakin University	AU
	Haoyu	Jiang	Student	Swinburne University of Technology	AU
Mr.	Robert	Johnson	Senior Environmental Scientist	Bureau of Meteorology	AU
Dr.	Shane	Keating	Lecturer	UNSW	AU
Dr.	Boris	Kelly-Gerreyn	Manager, Observing Strategy	Bureau of Meteorology	AU
Ms.	Jessica	Keysers	Research	CRCSI	AU
Dr.	Edward	King	Satellite Oceanography Manager	CSIRO Oceans and Atmosphere Flagship	AU
Mr.	Yukio	Kurihara	Researcher	Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Center (EORC)	JP
Dr.	Ana	Lara-Lopez	IMOS Scientific Officer	Integrated Marine Observing System	AU
Dr.	Benoit	Legresy	Sea level scientist	CSIRO	AU
Dr.	John	Le Marshall	Principal Research Scientist	Bureau of Meteorology	AU
Mr.	Roger	Lurz	Manager East Sale weather office	Bureau of Meteorology	AU
Dr.	Angela	Maharaj	Lecturer	Climate Change Research Centre	AU
Mr.	Leon	Majewski	Satellite Specialist	Bureau of Meteorology	AU
Dr.	Peter	May	Assistant Director, Research and Development	Bureau of Meteorology	AU
Ms.	Felicity	McAllister	Experimental Scientist	Australian Institute of Marine Science	AU
Ms.	Elaine	Miles	Ocean Climatologist	Bureau of Meteorology	AU

Dr.	Louise	Minty	Assistant Director, Environmental Information Services	Bureau of Meteorology	AU
Dr.	Imojen	Pearce	Scientist	Australian Antarctic Division	AU
Dr.	Lixin	Qi	Senior Meteorologist	Bureau of Meteorology	AU
Dr.	Nathan	Quadros	Business Development Manager	CRC for Spatial Information	AU
Prof.	Ben	Raymond	Research Scientist	Australian Antarctic Division	AU
Dr.	Cedric	Robillot	eReefs Project Director	Great Barrier Reef Foundation	AU
Ms.	Eva	Rodriguez	Satellite Systems Specialist	Bureau of Meteorology	AU
Dr.	Stephen	Sagar	Research Scientist – Aquatic Remote Sensing	Geoscience Australia	AU
Mr.	Steve	Shelley		Parks Victoria	AU
Mrs.	Janice	Sisson	Information Technology Officer	Bureau of Meteorology	AU
Dr.	Michael	Sumner	Software and Database Engineer	Australian Antarctic Division	AU
Mr.	Andy	Taylor	Ocean Forecasting	Bureau of Meteorology	AU
Dr.	Medhavy	Thankappan	Section Leader – Earch Observation Science	Geoscience Australia	AU
Dr.	Chris	Tingwell	Senior Research Scientist	Bureau of Meteorology	AU
Mr.	Jamie	Treleaven	Coastal Information Project Manager	Bureau of Meteorology	AU
Prof.	Tom	Trull	Prof	CSIRO Oceans and Atmosphere	AU
Dr.	Christopher	Watson	Senior Lecturer	University of Tasmania	AU
Dr.	Scarla	Weeks		University of Queensland	AU
Dr.	Karen	Westwood	Scientist	Australian Antarctic Division	AU
Dr.	Qianguo	Xing	Associate Professor	Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences	CN
Mr.	Haifeng	Zhang	PhD Candidate	UNSW Canberra @ ADFA	AU
Mr.	Xiaohu	Zhang	Associate Researcher	National Satellite Meteorological Center (NSMC)/CMA	CN
Dr.	Stefan	Zieger	Wave Modeller	Bureau of Meteorology	AU

**Monday, 9<sup>th</sup> November 2015****Level 6, Conference Rooms 1 and 2**

Time	Agenda item	Speaker
08:30	Registration and uploading presentations	
09:00	Welcome and Logistics	H Beggs
	Providers of Satellite Ocean Products and Services – Overview	Chair: H Beggs
09:05	Opening Address – Bureau of Meteorology's Requirements for Satellite Ocean Products	Sue Barrell
09:20	Australia's Integrated Marine Observing System (IMOS) and its role in satellite oceanography	T Moltmann (Edward King*)
09:40	Development of Satellite Ocean Products by CMA	Feng Lu (G Corlett*)
10:00	Explaining the Marine Satellite Data Services at EUMETSAT	Hans Bonekamp
10:20	An overview of GHR SST Products and Services	Gary Corlett
10:40	Morning tea in Level 6 Wintergarden	
	Satellite SST Products and Validation	Chair: G Corlett
11:10	Australian GHR SST Products and Verification	Helen Beggs
11:30	NOAA JPSS and Himawari-8 SST Products	A Ignatov (H Beggs*)
11:45	Himawari-8 SST by JAXA	Yukio Kurihara
12:05	Himawari-8 SST from the Bureau of Meteorology	Chris Griffin
12:25	NOAA's Geo-Polar Blended SST Analysis	Andy Harris
12:45	FY-3C/VIRR SST Algorithm and Cal/Val Activities at NSMC/CMA	Xiaohu Zhang
13:05	Lunch in Level 9 Wintergarden (provided)	
	Ocean Colour Products and Services	Chair: R Johnson
14:00	IMOS Ocean Colour Products	Edward King
14:30	Phytoplankton Functional Types from Satellite	Nick Hardman-Mountford (remotely)
14:50	Bureau of Meteorology Marine Water Quality Dashboard and ReefTemp NextGen	Robert Johnson
15:10	Southern Ocean Satellite Data Needs	Robert Johnson
15:30	Afternoon tea in Level 6 Wintergarden	
	Altimetry Products and Services	Chair: C Watson
16:00	Satellite Altimetry: Navigating the RADS database	Chris Watson
16:20	Altimetry in Coastal Regions	Madeleine Cahill
16:40	Future Satellite Altimetry missions for oceanography and sea level	Benoit Legresy
	Ocean Winds and Waves	Chair: C Watson
17:00	Satellite Observations of Ocean Winds and Waves	Alexander Babanin
17:20	Satellite data for Wave Model Validation	Stefan Zieger
	Planning	
17:40	General discussion of plans for Tuesday/Wednesday breakout sessions (Note: Participants will be asked to nominate to participate in a breakout session)	Gary Corlett/Helen Beggs
17:50	Close	
18:00	Informal drinks - Bar Nacional, 727 Collins Street, Docklands ( <a href="http://www.barnacional.com.au">http://www.barnacional.com.au</a> )	

\* Presented on behalf of author

## Tuesday, 10<sup>th</sup> Nov 2015

### Level 6, Conference Rooms 1 and 2

Time	Agenda item	Speaker
08:30	Registration and uploading presentations	
09:00	Logistics	H Beggs
	Applications of Ocean Remote Sensing Products	Chair: E King
09:05	Remote sensing at work in Australia's ocean territories	David Griffin
09:20	Data assimilation of satellite observations in OceanMAPS	Paul Sandery (remotely)
09:35	Operational applications of SST analyses at the Bureau of Meteorology	Lixin Qi
09:50	Long term variability on Campbell Plateau, changes in SST and SSH	Aitana Forcen
10:05	Upper ocean statistics from super-resolved sea-surface temperature imagery	Shane Keating
10:20	Use of IMOS-GHRSST products to quantify diurnal warming over the Tropical Warm Pool	Haifeng Zhang
10:35	Testing SST capability to capture thermal features and diurnal warming on the Great Barrier Reef	Xioafang Zhu (Helen Beggs*)
10:50	Morning tea in Level 6 Wintergarden	
	Applications of Ocean Remote Sensing Products	Chair: D Griffin
11:20	Applications of Ocean Colour to Biophysical Oceanography	Scarla Weeks
11:35	Water Quality and River Plume Monitoring in the Great Barrier Reef: An Overview of Methods Based on Ocean Colour Satellite Data	Michelle Devlin
11:50	Application of the Geostationary Ocean Colour Imager (GOCI) to Mapping the Seasonal and Diurnal Dynamics of the Surface Suspended Matter in a Macro-Tidal Estuary	Zhixin Cheng
12:05	Investigating ocean life at the mesoscale: from phytoplankton to top predators	Alice Della Penna
12:20	Observational inputs to the numerical models of tsunamis: a naïve wish list	Stewart Allen
12:30	Lunch in Level 9 Wintergarden (provided)	
	Satellite Ocean Data – Portals and Tools	Chair: L Majewski
13:30	Extracting and sub-setting SRS datasets from the IMOS Ocean Portal	Laurent Besnard
13:50	Ocean Remote Sensing Visualisation and Manipulation Tools	Gary Corlett
14:10	Remote-sensed oceanography data at the Australian Antarctic Division and Antarctic Climate and Ecosystems CRC	Mike Sumner
14:30	IMOS OceanCurrent Web Site	Madeleine Cahill
14:45	Metadata in Satellite Ocean Products	Leon Majewski
15:00	Providing satellite ocean services to Pacific Island Countries using the COSPPac Ocean Portal	Grant Smith (Helen Beggs*)
15:15	NOAA SST Quality Monitor (SQUAM)	Prasanjit Dash (Helen Beggs*)
15:30	Afternoon tea in Level 6 Wintergarden	

\* Presented on behalf of author

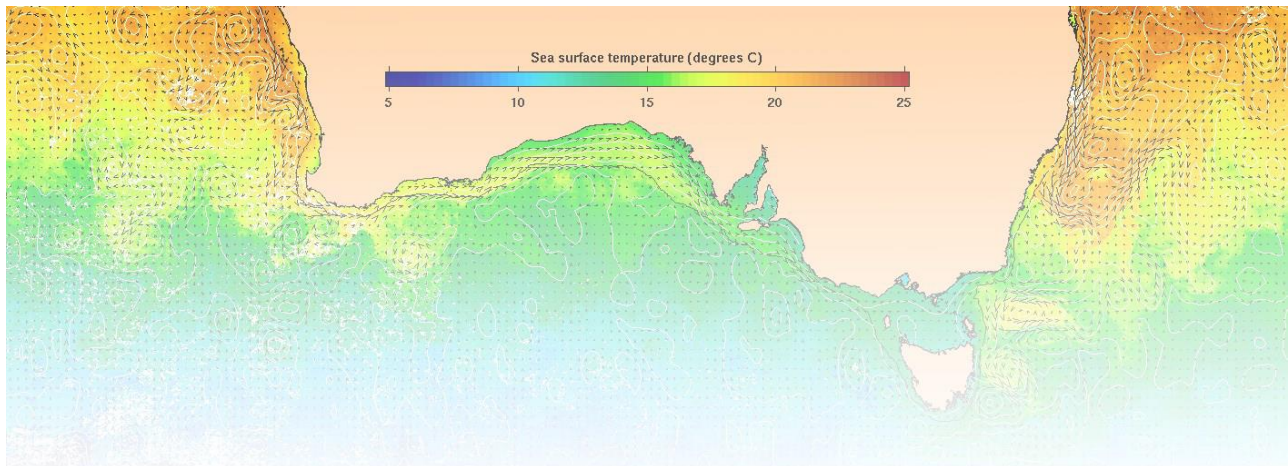


	Satellite Ocean Data – Portals and Tools Breakout Working Session	Chair: G Corlett
16:00	<p><b>Level 6 Conference Rooms 1+2</b></p> <p>Hands on Demonstration of useful ocean satellite data manipulation Tools/Portals (one-on-one or in small groups):</p> <ol style="list-style-type: none"> <li>1) Downloading/subsetting GHR SST data sets (<a href="https://www.ghrsst.org/quick-start/">https://www.ghrsst.org/quick-start/</a>)</li> <li>2) SRS SST and Ocean Colour data extraction/subsetting from the IMOS Ocean Portal (<a href="https://imos.aodn.org.au/imos123/">https://imos.aodn.org.au/imos123/</a>)</li> <li>3) Ocean Remote Sensing Visualisation and Manipulation Tools</li> <li>4) COSPPac Ocean Portal (<a href="http://cosppac.bom.gov.au/products-and-services/ocean-portal/">http://cosppac.bom.gov.au/products-and-services/ocean-portal/</a>)</li> <li>5) SST verification/Inter-comparison web sites               <ol style="list-style-type: none"> <li>a. NOAA/NESDIS SST Quality Monitor: <a href="http://www.star.nesdis.noaa.gov/sod/sst/squam/index.html">http://www.star.nesdis.noaa.gov/sod/sst/squam/index.html</a></li> <li>b. NCOF Global L4 SST Inter-comparison: <a href="http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/index.html">http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/index.html</a></li> <li>c. NCOF Validation of Global L4 SST using Argo: <a href="http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/argo/">http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/argo/</a></li> <li>d. Felyx SST validation tool: <a href="http://hrdds.ifremer.fr/">http://hrdds.ifremer.fr/</a></li> <li>e. IMOS AVHRR SST Validation: <a href="http://opendap.bom.gov.au:8080/thredds/fileServer/abom_imos_ghrsst_archive/v02.0fv02/Validation/web/index.html">http://opendap.bom.gov.au:8080/thredds/fileServer/abom_imos_ghrsst_archive/v02.0fv02/Validation/web/index.html</a></li> </ol> </li> </ol> <p>Participants are invited to bring along questions, issues and data sets. Note that although there will be wireless internet access within the conference rooms it is not suitable for large data downloads.</p>	Gary Corlett/Laurent Besnard/Helen Beggs/others?
16:00	<p><b>Level 9E Conference Room</b></p> <p>Ocean Remote Sensing Strategic Issues – e.g. Australia’s Space Policy</p>	Boris Kelly-Gerreyn
16:00	<p><b>Level 9E Meeting Room</b></p> <p>(Available for breakout meeting if required)</p>	TBD
16:00	<p><b>Level 10E Meeting Room</b></p> <p>(Available for breakout meeting if required)</p>	TBD
18:00	<b>Close</b>	
18:30	<b>Workshop dinner – Royal Melbourne Hotel, 629 Bourke St, Melbourne (<a href="http://www.rmh.com.au">http://www.rmh.com.au</a>)</b>	

## Wednesday, 11<sup>th</sup> Nov 2015

Time	SST Breakout: Level 6 Conf Room 2	Ocean Colour Breakout: Level 10W Meeting Room / Level 11 BNOc Situation Room	Altimetry Breakout: Level 6 Conf Room 1
09:00	<b>Logistics: Level 6 Conf Room 2 (H Beggs)</b>		
09:10	<p><b>Level 6 Conference Room 2</b></p> <p>Working session on SST Issues Chairs: Gary Corlett/Helen Beggs</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which SST data set should I use?</li> <li>2) Inter-comparison of SST products</li> <li>3) SST climatologies and climate data records</li> <li>4) Near-coastal SST accuracy/verification</li> <li>5) What are our key in situ validation observations and how do we sustain them?</li> <li>6) SST products from new and future missions (Himawari-8, VIIRS, GMI, Sentinel-3)</li> <li>7) What metadata do users of GHRSSST products need?</li> <li>8) What is the best approach to look for hydrothermal plumes near volcanic islands?</li> </ol>	<p><b>Level 10W Meeting Room</b></p> <p>Working Session on Ocean Colour Issues Chairs: Robert Johnson/Edward King</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which OC data set should I use?</li> <li>2) Which OC dataset is optimal to study suspended solids in Australian and Chinese coastal waters?</li> <li>3) Is the MODIS coccolithophore product meaningful and how does it work?</li> <li>4) Near-coastal OC accuracy/verification</li> <li>5) Near-coastal and open ocean OC applications</li> <li>6) What are our key in situ validation observations and how do we sustain them?</li> <li>7) OC products from new and future missions (VIIRS, Sentinel-3, GOCI-II, etc)</li> <li>8) Use of OC data in primary production algorithms</li> <li>9) Current state of using satellites to determine phytoplankton functional groups other than coccolithophores.</li> </ol>	<p><b>Level 6 Conference Room 1</b></p> <p>Working Session on Altimetry Issues Chairs: Chris Watson/Elaine Miles</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which Altimetry data set should I use?</li> <li>2) Presentation: Intercomparison of Altimetry Datasets used in OceanMAPS (Xinmei Huang)</li> <li>3) Presentation: PEACHI data for coastal altimetry? (Angela Maharaj)</li> <li>4) Near-coastal altimetry accuracy/verification</li> <li>5) What are our key in situ validation observations and how do we sustain them?</li> <li>6) Future altimetry missions (e.g. SWOT)</li> </ol>
10:30	<b>Morning Tea in Level 6 Wintergarden</b>		
11:00	<p><b>Level 6 Conference Room 2</b></p> <p>SST Working session cont.</p>	<p><b>Level 11 BNOc Situation Room</b></p> <p>Ocean Colour Working session cont.</p>	<p><b>Level 6 Conference Room 1</b></p> <p>Altimetry Working session cont.</p>
12:30	<b>Lunch in Level 9 Wintergarden (provided)</b>		
13:30	<p><b>Level 6 Conference Room 2</b></p> <p>SST Working session cont.</p>	<p><b>Level 11 BNOc Situation Room</b></p> <p>Ocean Colour Working session cont.</p>	<p><b>Level 6 Conference Room 1</b></p> <p>Altimetry Working session cont.</p>
15:00	<b>Afternoon Tea in Level 6 Wintergarden</b>		
	<b>Workshop Wrap-Up: Level 6 Conference Room 2</b>		<b>Chair: H Beggs</b>
15:30	Report from SST Breakout Session		Gary Corlett
15:40	Report from Ocean Colour Breakout Session		Robert Johnson
15:50	Report from Altimetry Breakout Session		Chris Watson

16:00	General Discussion – Ocean remote sensing issues for Australia	All
16:40	Lessons learned and next steps...	Helen Beggs
17:00	Close	
18:00	Informal Dinner for participants staying in Melbourne (TBC)	



# Satellite Oceanography Users Workshop

Bureau of Meteorology Head Office, Melbourne, Australia  
9<sup>th</sup> – 11<sup>th</sup> November 2015

## Agenda, Version: 3.3 FINAL

9 Nov 2015

Helen Beggs

Meeting sponsored by:

Integrated Marine Observing System and Australian Bureau of Meteorology



Australian Government  
Bureau of Meteorology

# ***Introduction***

Hello:

... and welcome to the Satellite Oceanography Users Workshop, a three-day workshop on satellite-derived products of key oceanographic variables. The workshop is a joint activity of the Committee on Earth Observation Satellites (CEOS) Sea Surface Temperature (SST) Virtual Constellation, the Group for High Resolution SST (GHRSSST) and the Integrated Marine Observing System (IMOS), hosted and organised by the Australian Bureau of Meteorology.

Satellites provide real time global high space and time resolution measurements of key ocean variables such as ocean colour, sea level height, sea surface temperature and ocean surface winds, which are widely used across a range of scientific and operational applications. The wider range of products and services available can be confusing to navigate through and this is an opportunity to meet with and provide feedback to the data providers.

The objectives of the workshop are to:

- Present and discuss the provision of products and services supporting satellite based ocean products;
- Provide a forum for users to present and discuss their experiences and requirements on satellite based ocean products;
- Work through practical examples of particular interest to participants.

Further details can be found on the meeting web-page at <https://www.ghrsst.org/ghrsst/Meetings-and-workshops/satellite-oceanography-user-workshop/>.

In addition to the main plenary talks, there are opportunities for anyone to make a short-talk (5 minutes per person and up to 3 slides) on their work as part of the breakout sessions.

We thank Val Jemmeson, Meryl Wiseman, Anu Arora, Nada Bosnjakovic, Thomas Pratt, Robert Johnson and Tony Baldwin for their help with this workshop, and we thank each of you for your contributions and look forward to meeting you in Melbourne for a productive and stimulating workshop.

Helen Beggs  
Leader, IMOS Satellite Remote Sensing SST Products  
Sub-facility;  
Leader, IMOS Ship of Opportunity SST Sensors Sub-  
facility;  
Chair, GHRSSST SST Validation Technical Advisory Group

Gary Corlett  
GHRSSST Project Coordinator



## Logistics

### Contacts

Helen Beggs: Mobile 0424 034 916; email [h.beggs@bom.gov.au](mailto:h.beggs@bom.gov.au)

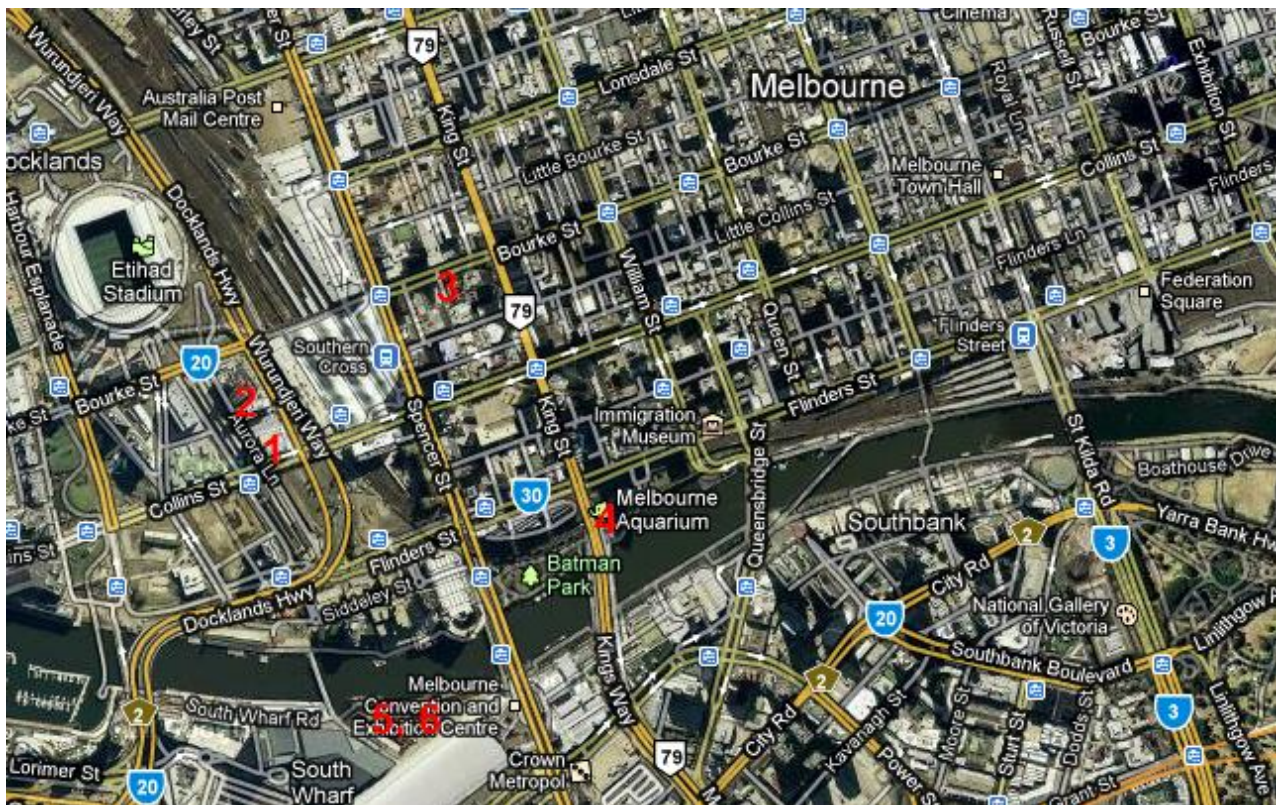
**Travel to Melbourne:** Melbourne Airport (MEL) is serviced by regular flights from most major cities.

**Shuttle Bus from Melbourne Airport to CBD (recommended):** Skybus shuttle buses to Melbourne's CBD depart every 15 minutes from Melbourne airport. The Skybus terminates in the Southern Cross Railway Station complex in Spencer Street (see map) a short walk from the Travelodge Docklands Hotel and around the corner from the Bureau of Meteorology Building. See <http://www.skybus.com.au/> for more information.

**Taxi from Melbourne Airport to CBD:** Taxis are available from the ground floor level of Melbourne Airport, outside the International Terminal and both domestic Terminals.

**Important Visa Information:** All non-residents of Australia and New Zealand require a visa or Electronic Travel Authority (ETA) to enter Australia. The easiest way to apply is via the [Australian Electronic Travel Authority](http://www.australianvisa.gov.au/) web site; otherwise please contact your nearest [Australian Visa Office](http://www.australianvisa.gov.au/). Since the primary purpose of your travel is to attend the workshop you should get a Short Stay Business Visa rather than a tourist visa. **Please contact Helen Beggs ASAP if you require an official letter of invitation from the Bureau of Meteorology to obtain a visa to visit Australia.**

### Map of Workshop venue, hotel and venues for social events



1. Bureau of Meteorology Head Office (Workshop Venue)
2. Travelodge Docklands (Recommended Accommodation)
3. Royal Melbourne Hotel (Tuesday evening Workshop Dinner)
4. Melbourne Aquarium (Optional Sunday afternoon visit)
5. The Boatbuilders Yard bar and café (Sunday informal drinks and dinner)
6. Polly Woodside Maritime Museum (Optional Sunday afternoon tour)

### Accommodation

We recommend that you book your accommodation in Melbourne as soon as possible to take advantage of "early bird" prices. The second week in November is a busy time in Melbourne as the Spring Racing Carnival ends on 7th November. We recommend the Travelodge Docklands Hotel (<http://www.travelodgehotels.com.au/Docklands>), adjacent to the Bureau of Meteorology Head Office at 700 Collins Street. However, there are many good hotels within walking distance of the Bureau of Meteorology Head Office.

### Workshop Venue

Bureau of Meteorology Head Office, 700 Collins Street, Docklands, Melbourne, Victoria, Australia. See map.

### Access to Venue

Once in the building, take the low-rise elevators up to the 6th floor, which is where the workshop will be held in Conference Rooms 1 and 2. Follow the Satellite Oceanography Users Workshop signs through the glass doors to the registration desk where you will receive your workshop name badge. This badge will serve as security identification for the three days of the meeting. The 6<sup>th</sup> Level doors to the meeting room area will be unlocked between 8:30 am and 6 pm each day of the workshop. Outside of these hours you will need to ask a Bureau staff member to let you into the conference area. Tuesday and Wednesday Breakout Sessions will be held in Level 6 Conference Rooms 1 and 2, plus meeting rooms on Levels 9, 10 and 11. **If you will be attending the breakout sessions on Levels 9, 10 or 11 you will need to first sign in at the workshop registration desk on Level 6 to obtain a Visitor Pass for access to these floors.** Visitor passes will need to be returned to Val Jemmesson or Meryl Wiseman at the registration desk at the end of the day.

### Registration

Registration has now closed. Please contact the organiser (Helen Beggs, [h.beggs@bom.gov.au](mailto:h.beggs@bom.gov.au)) if you would like to go on the wait list in case of cancellations. There is no registration cost as all lunches, morning and afternoon teas are funded by the Australian Integrated Marine Observing System (IMOS). Please notify Helen Beggs if you have any dietary requirements not already noted at registration.

### Internet Access

There will be wireless internet access available during the 3-day workshop to registrants for checking email and web browsing (not data transfers).

### Oral Presentations

Presentations should be made according to the time allotted in the Agenda. It is essential that we include time for discussion, so please allow 5 minutes for questions within your allocated time.

User presentations should include the following topics: 1) What satellite ocean products you use; 2) Where you obtain the products; 3) Whether or not you use the uncertainty information in the product; 4) Any issues you have with the data product or service.

Product/service provider presentations should concentrate on currently available products/services and key information for users.

The workshop will have a dedicated PC laptop. You will need to load your presentation onto this machine from memory stick prior to your session, or preferably email it to Helen Beggs ([h.beggs@bom.gov.au](mailto:h.beggs@bom.gov.au)) in the week prior to the workshop. All Plenary presentations will be posted on the meeting web page at <https://www.ghrsst.org/ghrsst/Meetings-and-workshops/satellite-oceanography-user-workshop/> following the workshop as a PDF. Please contact Helen Beggs if you would not like your presentation to appear on the GHRSSST web site.

### Video Recording and Live Streaming of Presentations

The plenary sessions of the workshop will be recorded for viewing at a later date. Please contact the organiser, Helen Beggs ([h.beggs@bom.gov.au](mailto:h.beggs@bom.gov.au)), if you would like to access the video recordings of the plenary presentations.

For Bureau of Meteorology staff unable to attend the workshop, you may watch the plenary sessions on 9<sup>th</sup> to 11<sup>th</sup> November 2015 via the live stream. To access the Live Streaming, click on <http://web/livestreaming1>.

**Note:** Live Streaming is **only** available using Internet Explorer and for Bureau staff using MDT Computers.

### Pre-workshop get-together

There will be an informal get-together from 17:00 on Sunday 8<sup>th</sup> November for pre-dinner drinks followed by dinner at “The Boatbuilders Yard” bar and café (<http://www.theboatbuildersyard.com>) located at 23 South Wharf Promenade, South Wharf, adjacent to the historic sailing barque, Polly Woodside (<http://www.pollywoodside.com.au/>). Those who are interested in old sailing vessels may like to join a crew induction tour of the Polly Woodside (cost AUD\$16). Join one of the ship’s First Mates and sign up as a crew member for a complete tour of the ship (highly recommended). The last tour starts at 3 pm daily and involves helping the First Mate to lower the sails! The Polly Woodside Maritime Museum closes at 4 pm.

### Catering

All morning and afternoon teas will be provided in the Level 6 Wintergarden, adjacent to Conference Rooms 1 and 2. All lunches will be provided in the **Level 9 Wintergarden**, adjacent to the Level 9 Seminar Room. Workshop attendees will be escorted by Bureau staff to the Level 9 Wintergarden each lunchtime.

### Monday Evening Drinks

Please join us for informal drinks from 6 pm on Monday 9<sup>th</sup> November 2015 at the Bar Nacional (<http://www.barnacional.com.au>), 727 Collins Street, Docklands (opposite the Bureau of Meteorology Head Office).

### Workshop Dinner

The workshop dinner will be held in the Cellblock of the historic Royal Melbourne Hotel (<http://www.rmh.com.au>) 629 Bourke Street, Melbourne, built in 1889 and located on the former site of Melbourne’s police station.

**Please confirm your attendance at the registration desk by 11:10 am 9<sup>th</sup> November 2015.** We can add extra numbers if you have not previously booked but we need to know by 11:10 am 9<sup>th</sup> November. You will be able to order from the menu at the restaurant and pay on the night. Meet for dinner at 6:30 pm (partners welcome) or meet in the Bureau Head Office Lobby (5<sup>th</sup> Level) at 6:10 pm to walk to the Royal Melbourne Hotel.

### Tourist Information

If you have time either side of the meeting you may like to visit the following sights/trips:

1. Self-drive tour of the world-famous Great Ocean Road (west of Melbourne) – see <http://www.greatoceanroad.org/>
2. Day-trip by train from Southern Cross Station (adjacent to Travelodge Docklands) to Ballarat to visit the replica gold-mining town of Sovereign Hill (<http://www.sovereignhill.com.au/?id=goldrushspecial>) (Highly recommended!). V/Line Goldrush Special train leaves Southern Cross Station for Ballarat each Saturday and Sunday. You will need to pre-purchase your rail ticket at Southern Cross Station.
3. Attend a sporting event at Etihad Stadium (immediately adjacent to Travelodge Docklands) or go on a Sports Lovers Tour of Melbourne ([http://www.melbournesportstours.com.au/city\\_sports\\_tours.html](http://www.melbournesportstours.com.au/city_sports_tours.html)).
4. Visit the historic Queen Victoria Market (a short walk from the Travelodge Docklands). It’s a cultural and culinary experience! – see <http://www.qvm.com.au/home.php>
5. Go on a self-guided walk of Melbourne CBD starting from Federation Square – obtain a free map from the Federation Square Visitors Centre (<http://www.melbourne.vic.gov.au/info.cfm?top=94&pa=756&pg=956>)
6. Hire a bicycle and cycle through Docklands and along the Yarra River bike path (<http://www.rentabike.net.au/hire.htm>)
7. Visit Melbourne’s two art galleries both in the centre of Melbourne – see <http://www.ngv.vic.gov.au/>

## Sunday, 8<sup>th</sup> November 2015

Time	Agenda item	Contact
14:45	Meet at Polly Woodside Maritime Museum to sign up for the public tour of sailing barque commencing at 15:00	Self-guided
17:00	Drinks followed by dinner at The Boatbuilders Yard (adjacent to Polly Woodside) - <a href="http://www.theboatbuildersyard.com">http://www.theboatbuildersyard.com</a>	H Beggs



## Monday, 9<sup>th</sup> November 2015

### Level 6, Conference Rooms 1 and 2

Time	Agenda item	Speaker
08:30	Registration and uploading presentations	
09:00	Welcome and Logistics	H Beggs
	Providers of Satellite Ocean Products and Services – Overview	Chair: H Beggs
09:05	Opening Address – Bureau of Meteorology's Requirements for Satellite Ocean Products	Sue Barrell
09:20	Australia's Integrated Marine Observing System (IMOS) and its role in satellite oceanography	T Moltmann (Edward King*)
09:40	Development of Satellite Ocean Products by CMA	Feng Lu (G Corlett*)
10:00	Explaining the Marine Satellite Data Services at EUMETSAT	Hans Bonekamp
10:20	An overview of GHR SST Products and Services	Gary Corlett
10:40	Morning tea in Level 6 Wintergarden	
	Satellite SST Products and Validation	Chair: G Corlett
11:10	Australian GHR SST Products and Verification	Helen Beggs
11:30	NOAA JPSS and Himawari-8 SST Products	A Ignatov (H Beggs*)
11:45	Himawari-8 SST by JAXA	Yukio Kurihara
12:05	Himawari-8 SST from the Bureau of Meteorology	Chris Griffin
12:25	NOAA's Geo-Polar Blended SST Analysis	Andy Harris
12:45	FY-3C/VIRR SST Algorithm and Cal/Val Activities at NSMC/CMA	Xiaohu Zhang
13:05	Lunch in Level 9 Wintergarden (provided)	
	Ocean Colour Products and Services	Chair: R Johnson
14:00	IMOS Ocean Colour Products	Edward King
14:30	Phytoplankton Functional Types from Satellite	Nick Hardman-Mountford (remotely)
14:50	Bureau of Meteorology Marine Water Quality Dashboard and ReefTemp NextGen	Robert Johnson
15:10	Southern Ocean Satellite Data Needs	Robert Johnson
15:30	Afternoon tea in Level 6 Wintergarden	
	Altimetry Products and Services	Chair: C Watson
16:00	Satellite Altimetry: Navigating the RADS database	Chris Watson
16:20	Altimetry in Coastal Regions	Madeleine Cahill
16:40	Future Satellite Altimetry missions for oceanography and sea level	Benoit Legresy
	Ocean Winds and Waves	Chair: C Watson
17:00	Satellite Observations of Ocean Winds and Waves	Alexander Babanin
17:20	Satellite data for Wave Model Validation	Stefan Zieger
	Planning	
17:40	General discussion of plans for Tuesday/Wednesday breakout sessions (Note: Participants will be asked to nominate to participate in a breakout session)	Gary Corlett/Helen Beggs
17:50	Close	
18:00	Informal drinks - Bar Nacional, 727 Collins Street, Docklands ( <a href="http://www.barnacional.com.au">http://www.barnacional.com.au</a> )	

\* Presented on behalf of author

**Tuesday, 10<sup>th</sup> Nov 2015****Level 6, Conference Rooms 1 and 2**

Time	Agenda item	Speaker
08:30	Registration and uploading presentations	
09:00	Logistics	H Beggs
	Applications of Ocean Remote Sensing Products	Chair: E King
09:05	Remote sensing at work in Australia's ocean territories	David Griffin
09:20	Data assimilation of satellite observations in OceanMAPS	Paul Sandery (remotely)
09:35	Operational applications of SST analyses at the Bureau of Meteorology	Lixin Qi
09:50	Long term variability on Campbell Plateau, changes in SST and SSH	Aitana Forcen
10:05	Upper ocean statistics from super-resolved sea-surface temperature imagery	Shane Keating
10:20	Use of IMOS-GHRSST products to quantify diurnal warming over the Tropical Warm Pool	Haifeng Zhang
10:35	Testing SST capability to capture thermal features and diurnal warming on the Great Barrier Reef	Xioafang Zhu (Helen Beggs*)
10:50	Morning tea in Level 6 Wintergarden	
	Applications of Ocean Remote Sensing Products	Chair: D Griffin
11:20	Applications of Ocean Colour to Biophysical Oceanography	Scarla Weeks
11:35	Water Quality and River Plume Monitoring in the Great Barrier Reef: An Overview of Methods Based on Ocean Colour Satellite Data	Michelle Devlin
11:50	Application of the Geostationary Ocean Colour Imager (GOCI) to Mapping the Seasonal and Diurnal Dynamics of the Surface Suspended Matter in a Macro-Tidal Estuary	Zhixin Cheng
12:05	Investigating ocean life at the mesoscale: from phytoplankton to top predators	Alice Della Penna
12:20	Observational inputs to the numerical models of tsunamis: a naïve wish list	Stewart Allen
12:30	Lunch in Level 9 Wintergarden (provided)	
	Satellite Ocean Data – Portals and Tools	Chair: L Majewski
13:30	Extracting and sub-setting SRS datasets from the IMOS Ocean Portal	Laurent Besnard
13:50	Ocean Remote Sensing Visualisation and Manipulation Tools	Gary Corlett
14:10	Remote-sensed oceanography data at the Australian Antarctic Division and Antarctic Climate and Ecosystems CRC	Mike Sumner
14:30	IMOS OceanCurrent Web Site	Madeleine Cahill
14:45	Metadata in Satellite Ocean Products	Leon Majewski
15:00	Providing satellite ocean services to Pacific Island Countries using the COSPPac Ocean Portal	Grant Smith (Helen Beggs*)
15:15	NOAA SST Quality Monitor (SQUAM)	Prasanjit Dash (Helen Beggs*)
15:30	Afternoon tea in Level 6 Wintergarden	

\* Presented on behalf of author



	Satellite Ocean Data – Portals and Tools Breakout Working Session	Chair: G Corlett
16:00	<p><b>Level 6 Conference Rooms 1+2</b></p> <p>Hands on Demonstration of useful ocean satellite data manipulation Tools/Portals (one-on-one or in small groups):</p> <ol style="list-style-type: none"> <li>1) Downloading/subsetting GHR SST data sets (<a href="https://www.ghrsst.org/quick-start/">https://www.ghrsst.org/quick-start/</a>)</li> <li>2) SRS SST and Ocean Colour data extraction/subsetting from the IMOS Ocean Portal (<a href="https://imos.aodn.org.au/imos123/">https://imos.aodn.org.au/imos123/</a>)</li> <li>3) Ocean Remote Sensing Visualisation and Manipulation Tools</li> <li>4) COSPPac Ocean Portal (<a href="http://cosppac.bom.gov.au/products-and-services/ocean-portal/">http://cosppac.bom.gov.au/products-and-services/ocean-portal/</a>)</li> <li>5) SST verification/Inter-comparison web sites               <ol style="list-style-type: none"> <li>a. NOAA/NESDIS SST Quality Monitor: <a href="http://www.star.nesdis.noaa.gov/sod/sst/squam/index.html">http://www.star.nesdis.noaa.gov/sod/sst/squam/index.html</a></li> <li>b. NCOF Global L4 SST Inter-comparison: <a href="http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/index.html">http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/index.html</a></li> <li>c. NCOF Validation of Global L4 SST using Argo: <a href="http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/argo/">http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/argo/</a></li> <li>d. Felyx SST validation tool: <a href="http://hrdds.ifremer.fr/">http://hrdds.ifremer.fr/</a></li> <li>e. IMOS AVHRR SST Validation: <a href="http://opendap.bom.gov.au:8080/thredds/fileServer/abom_imos_ghrsst_archive/v02.0fv02/Validation/web/index.html">http://opendap.bom.gov.au:8080/thredds/fileServer/abom_imos_ghrsst_archive/v02.0fv02/Validation/web/index.html</a></li> </ol> </li> </ol> <p>Participants are invited to bring along questions, issues and data sets. Note that although there will be wireless internet access within the conference rooms it is not suitable for large data downloads.</p>	Gary Corlett/Laurent Besnard/Helen Beggs/others?
16:00	<p><b>Level 9E Conference Room</b></p> <p>Ocean Remote Sensing Strategic Issues – e.g. Australia’s Space Policy</p>	Boris Kelly-Gerreyn
16:00	<p><b>Level 9E Meeting Room</b></p> <p>(Available for breakout meeting if required)</p>	TBD
16:00	<p><b>Level 10E Meeting Room</b></p> <p>(Available for breakout meeting if required)</p>	TBD
18:00	<b>Close</b>	
18:30	<b>Workshop dinner – Royal Melbourne Hotel, 629 Bourke St, Melbourne (<a href="http://www.rmh.com.au">http://www.rmh.com.au</a>)</b>	

**Wednesday, 11<sup>th</sup> Nov 2015**

Time	SST Breakout: Level 6 Conf Room 2	Ocean Colour Breakout: Level 10W Meeting Room / Level 11 BNOc Situation Room	Altimetry Breakout: Level 6 Conf Room 1
09:00	<b>Logistics: Level 6 Conf Room 2 (H Beggs)</b>		
09:10	<p><b>Level 6 Conference Room 2</b></p> <p>Working session on SST Issues Chairs: Gary Corlett/Helen Beggs</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which SST data set should I use?</li> <li>2) Inter-comparison of SST products</li> <li>3) SST climatologies and climate data records</li> <li>4) Near-coastal SST accuracy/verification</li> <li>5) What are our key in situ validation observations and how do we sustain them?</li> <li>6) SST products from new and future missions (Himawari-8, VIIRS, GMI, Sentinel-3)</li> <li>7) What metadata do users of GHRSSST products need?</li> <li>8) What is the best approach to look for hydrothermal plumes near volcanic islands?</li> </ol>	<p><b>Level 10W Meeting Room</b></p> <p>Working Session on Ocean Colour Issues Chairs: Robert Johnson/Edward King</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which OC data set should I use?</li> <li>2) Which OC dataset is optimal to study suspended solids in Australian and Chinese coastal waters?</li> <li>3) Is the MODIS coccolithophore product meaningful and how does it work?</li> <li>4) Near-coastal OC accuracy/verification</li> <li>5) Near-coastal and open ocean OC applications</li> <li>6) What are our key in situ validation observations and how do we sustain them?</li> <li>7) OC products from new and future missions (VIIRS, Sentinel-3, GOCI-II, etc)</li> <li>8) Use of OC data in primary production algorithms</li> <li>9) Current state of using satellites to determine phytoplankton functional groups other than coccolithophores.</li> </ol>	<p><b>Level 6 Conference Room 1</b></p> <p>Working Session on Altimetry Issues Chairs: Chris Watson/Elaine Miles</p> <p>Topics:</p> <ol style="list-style-type: none"> <li>1) Which Altimetry data set should I use?</li> <li>2) Presentation: Intercomparison of Altimetry Datasets used in OceanMAPS (Xinmei Huang)</li> <li>3) Presentation: PEACHI data for coastal altimetry? (Angela Maharaj)</li> <li>4) Near-coastal altimetry accuracy/verification</li> <li>5) What are our key in situ validation observations and how do we sustain them?</li> <li>6) Future altimetry missions (e.g. SWOT)</li> </ol>
10:30	<b>Morning Tea in Level 6 Wintergarden</b>		
11:00	<p><b>Level 6 Conference Room 2</b></p> <p>SST Working session cont.</p>	<p><b>Level 11 BNOc Situation Room</b></p> <p>Ocean Colour Working session cont.</p>	<p><b>Level 6 Conference Room 1</b></p> <p>Altimetry Working session cont.</p>
12:30	<b>Lunch in Level 9 Wintergarden (provided)</b>		
13:30	<p><b>Level 6 Conference Room 2</b></p> <p>SST Working session cont.</p>	<p><b>Level 11 BNOc Situation Room</b></p> <p>Ocean Colour Working session cont.</p>	<p><b>Level 6 Conference Room 1</b></p> <p>Altimetry Working session cont.</p>
15:00	<b>Afternoon Tea in Level 6 Wintergarden</b>		
	<b>Workshop Wrap-Up: Level 6 Conference Room 2</b>		<b>Chair: H Beggs</b>
15:30	Report from SST Breakout Session		Gary Corlett
15:40	Report from Ocean Colour Breakout Session		Robert Johnson
15:50	Report from Altimetry Breakout Session		Chris Watson

16:00	General Discussion – Ocean remote sensing issues for Australia	All
16:40	Lessons learned and next steps...	Helen Beggs
17:00	Close	
18:00	Informal Dinner for participants staying in Melbourne (TBC)	

## List of Attendees

Dr.	Stewart	Allen	Research Scientist	Bureau of Meteorology	AU
Prof.	Alexander	Babanin	Centre Director	Swinburne University	AU
Mr.	Darren	Baldyga		Parks Victoria	AU
Dr.	Sue	Barrell	Deputy Director, Observations and Infrastructure	Bureau of Meteorology	AU
Mr.	Tony	Baxter	Coordinator Ocean Services	Bureau of Meteorology	AU
Dr.	Helen	Beggs	Ocean Remote Sensing Scientist	Bureau of Meteorology	AU
Mr.	Laurent	Besnard	Project officer	Integrated Marine Observing System	AU
Mr.	Tim	Birch	OIC RAAF Pearce DWSO	Bureau of Meteorology	AU
Mr.	Daniel	Boettger	METOC	Royal Australian Navy	AU
Mr.	Hans	Bonekamp	Oceanography Team Leader	EUMETSAT	DE
Dr.	Madeleine	Cahill	Physical Oceanographer	CSIRO Oceans and Atmosphere	AU
Ms.	Zhixin	Cheng	Student	UNSW-Canberra	AU
Dr.	Frank	Colberg	Senior Coastal Ocean Modeller	Bureau of Meteorology	AU
Dr.	Gary	Corlett	GHRST Project Coordinator	University of Leicester	GB
Miss	Taha	Cowen	Student	Institute for Marine and Antarctic Studies	AU
Miss	Hannah	Dawson	Student	Institute for Marine and Antarctic Studies	AU
Miss	Alice	Della Penna	Grad Student	IMAS/CSIRO/Paris 7	AU
Ms.	Michelle	Devlin	Research Scientist	James Cook University	AU
Dr.	Prasanth	Divakaran	Physical Oceanographer	Bureau of Meteorology	AU
Dr.	Aitana	Forcen	Oceanographer	NIWA	NZ
Dr.	Christopher	Griffin	Scientific Programmer	Bureau of Meteorology	AU
Dr.	David	Griffin	Principal Research Scientist	CSIRO Oceans and Atmosphere	AU
Dr.	Andrew	Harris	Assistant Research Scientist	University of Maryland	US
Dr.	Werner	Hennecke	GIS Specialist / Senior Coastal Geomorphologist	Cardno	AU
Dr.	Xinmei	Huang	Senior professional office	Bureau of Meteorology	AU
Dr.	Daniel	Ierodiaconou	Senior Lecturer	Deakin University	AU
	Haoyu	Jiang	Student	Swinburne University of Technology	AU
Mr.	Robert	Johnson	Senior Environmental Scientist	Bureau of Meteorology	AU
Dr.	Shane	Keating	Lecturer	UNSW	AU
Dr.	Boris	Kelly-Gerreyn	Manager, Observing Strategy	Bureau of Meteorology	AU
Ms.	Jessica	Keysers	Research	CRCSI	AU
Dr.	Edward	King	Satellite Oceanography Manager	CSIRO Oceans and Atmosphere Flagship	AU
Mr.	Yukio	Kurihara	Researcher	Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Center (EORC)	JP
Dr.	Ana	Lara-Lopez	IMOS Scientific Officer	Integrated Marine Observing System	AU
Dr.	Benoit	Legresy	Sea level scientist	CSIRO	AU
Dr.	John	Le Marshall	Principal Research Scientist	Bureau of Meteorology	AU
Mr.	Roger	Lurz	Manager East Sale weather office	Bureau of Meteorology	AU
Dr.	Angela	Maharaj	Lecturer	Climate Change Research Centre	AU
Mr.	Leon	Majewski	Satellite Specialist	Bureau of Meteorology	AU
Dr.	Peter	May	Assistant Director, Research and Development	Bureau of Meteorology	AU
Ms.	Felicity	McAllister	Experimental Scientist	Australian Institute of Marine Science	AU

Ms.	Elaine	Miles	Ocean Climatologist	Bureau of Meteorology	AU
Dr.	Louise	Minty	Assistant Director, Environmental Information Services	Bureau of Meteorology	AU
Dr.	Imojen	Pearce	Scientist	Australian Antarctic Division	AU
Dr.	Lixin	Qi	Senior Meteorologist	Bureau of Meteorology	AU
Dr.	Nathan	Quadros	Business Development Manager	CRC for Spatial Information	AU
Prof.	Ben	Raymond	Research Scientist	Australian Antarctic Division	AU
Dr.	Cedric	Robillot	eReefs Project Director	Great Barrier Reef Foundation	AU
Ms.	Eva	Rodriguez	Satellite Systems Specialist	Bureau of Meteorology	AU
Dr.	Stephen	Sagar	Research Scientist – Aquatic Remote Sensing	Geoscience Australia	AU
Mr.	Steve	Shelley		Parks Victoria	AU
Mrs.	Janice	Sisson	Information Technology Officer	Bureau of Meteorology	AU
Dr.	Michael	Sumner	Software and Database Engineer	Australian Antarctic Division	AU
Mr.	Andy	Taylor	Ocean Forecasting	Bureau of Meteorology	AU
Dr.	Medhavy	Thankappan	Section Leader – Earch Observation Science	Geoscience Australia	AU
Dr.	Chris	Tingwell	Senior Research Scientist	Bureau of Meteorology	AU
Mr.	Jamie	Treleaven	Coastal Information Project Manager	Bureau of Meteorology	AU
Prof.	Tom	Trull	Prof	CSIRO Oceans and Atmosphere	AU
Dr.	Christopher	Watson	Senior Lecturer	University of Tasmania	AU
Dr.	Scarla	Weeks		University of Queensland	AU
Dr.	Karen	Westwood	Scientist	Australian Antarctic Division	AU
Dr.	Qianguo	Xing	Associate Professor	Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences	CN
Mr.	Haifeng	Zhang	PhD Candidate	UNSW Canberra @ ADFA	AU
Mr.	Xiaohu	Zhang	Associate Researcher	National Satellite Meteorological Center (NSMC)/CMA	CN
Dr.	Stefan	Zieger	Wave Modeller	Bureau of Meteorology	AU