



Forum for Operational
Oceanography

Surface Waves Working Group



SWWG Membership

INDUSTRY PILLAR

- Matthew Zed (Woodside)

GOVERNMENT PILLAR

- Paul Boswood (Qld Govt)
- Diana Greenslade (BoM)
- Daryl Metters (Qld Govt)
- ~~Barbra Parker (Defence)~~

SERVICE PROVIDER PILLAR

- Greg Williams (RPS)
- Tom Durrant (Oceanum, NZ)

R&D PILLAR

- Mark Hemer (Chair, CSIRO)
- Chloe Babari (Secretary, IMOS)
- Alex Babanin (UoM)
- Mitch Harley (UNSW)
- Ryan Lowe (UWA)
- Sebastien Mancini (IMOS, AODN)
- Craig Steinberg (AIMS)

Seeking stronger Industry, Service Provider & Defence representation!

Activities since last FOO

(Since July 2017)

- Australian Waves Symposium (Oct 2017)
 - Commenced research priorities process
- 8x Quarterly meetings
- Two community surveys
 - Priorities survey
 - Data survey
- One paper (Greenslade et al., 2019)
- FOO whitepaper (Greenslade et al., 2019a)

BAMOS
Dec 2017
18

Conference report

The Third Australian Wind-Waves Symposium

Ryan Lowe¹, Diana Greenslade², Mark Hemer³, Alex Babanin⁴, Jeff Hansen¹, Scott Draper¹, Hugh Wolgamot¹

¹The University of Western Australia, Crawley, WA
²Bureau of Meteorology, Melbourne, VIC
³CSIRO Marine and Atmospheric Research, Hobart, TAS
⁴The University of Melbourne, Parkville, VIC

The inaugural Australian Wind Waves Symposium occurred in May 2010 at the Gold Coast, Queensland with the objective “to develop an awareness of related research amongst Australian waves scientists, to unite waves research across sites and organisations, to discuss future directions and current gaps in Australian waves research, and to provide a forum for the development of possible collaborative activities” (Greenslade et al., 2010; Day et al., 2010). This was followed by a Second Symposium held in Melbourne in June 2013 (Greenslade et al., 2013).

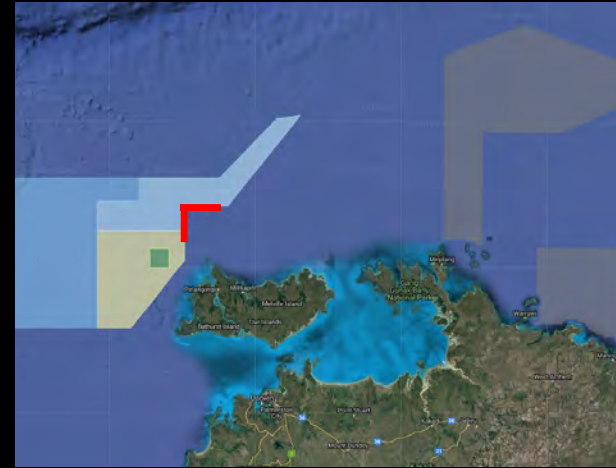
Over the period since the Second Symposium was held in 2013, a number of significant developments relevant to Australia’s wave community have occurred. Perhaps most notably has been the establishment of the [Australia Forum for Operational Oceanography \(FOO\)](#) in 2015, which is designed to bring together Australia’s Government agencies, Research and Development and service providers, and marine industries to identify key priority areas in operational oceanography to meet challenges faced by Australia’s marine community. Surface waves were identified as one of two priority areas for FOO to focus its efforts, following the first FOO meeting in July

2015. In response, a Surface Waves Working Group (SWWG) has been established, with members from all four FOO pillars represented, to encourage cross-sectoral dialogue and resolve associated challenges to be addressed by the Australian marine community. With this recognition of the need for further wave information, the [Integrated Marine Observing System \(IMOS\)](#) has also engaged more strongly in monitoring waves, with a new waves satellite remote sensing sub-facility of IMOS established in 2017 to deliver national wind-wave datasets for use by the broader community. With these developments, along with a growth in the Australian wind-waves community and emerging fields including, for example, some notable renewable wave energy projects, it was deemed timely for the community to come together for the Third Symposium.

The Third Symposium was held over two and a half days (24–26 October) in 2017 at the [Indian Ocean Marine Research Centre](#) at the University of Western Australia campus in Perth. The symposium was attended by over 60 waves researchers and end users from across universities, the Bureau of Meteorology, CSIRO, State government agencies, and industry, including a few participants from New Zealand. The Symposium included

Participants at the Third Australian Wind-waves Symposium.

IMOS Wave-Buoy sub-facility plans



Support for two sites, identified by Greenslade et al. (2018) as gaps in the Australian wave observing network.

- Eastern Tasmania
- Northern Territory

Site selection priorities

- Identified as gap in network
- Accessible
- Support Satellite cal/val
- Near, not within, MPA

Greenslade, D.J.M., Zanca, A., Zieger, S. and M.A. Hemer. (2018) Optimising the Australian wave observation network, *Journal of Southern Hemisphere Earth Systems Science*, 68, doi: 10.22499/3.6801.010

IMOS SRS Waves sub-facility

- Develop a national long-term database of satellite wave observations
- Support Australian scientific and industrial community
- Feedback our efforts back to international agencies



SAR

Directional ocean swell systems: swell Hs, period and direction



Altimetry

Significant wave height (Hs) and wind at 10 m

Young and Ribal, 2019. Multiplatform evaluation of global trends in wind speed and wave height. *Science*. DOI: 10.1126/science.aav9527

Ribal and Young, 2019. 33 years of globally calibrated wave height and wind speed data based on altimeter observations. *Scientific Data*, 6, 77.

IMOS Facilities

[Argo Floats](#)

[Ships of Opportunity](#)

[Deep Water Moorings](#)

[Ocean Gliders](#)

[Autonomous Underwater Vehicles](#)

[National Mooring Network](#)

[Ocean Radar](#)

[Animal Tracking](#)

[Wireless Sensor Networks](#)

[Satellite Remote Sensing](#)

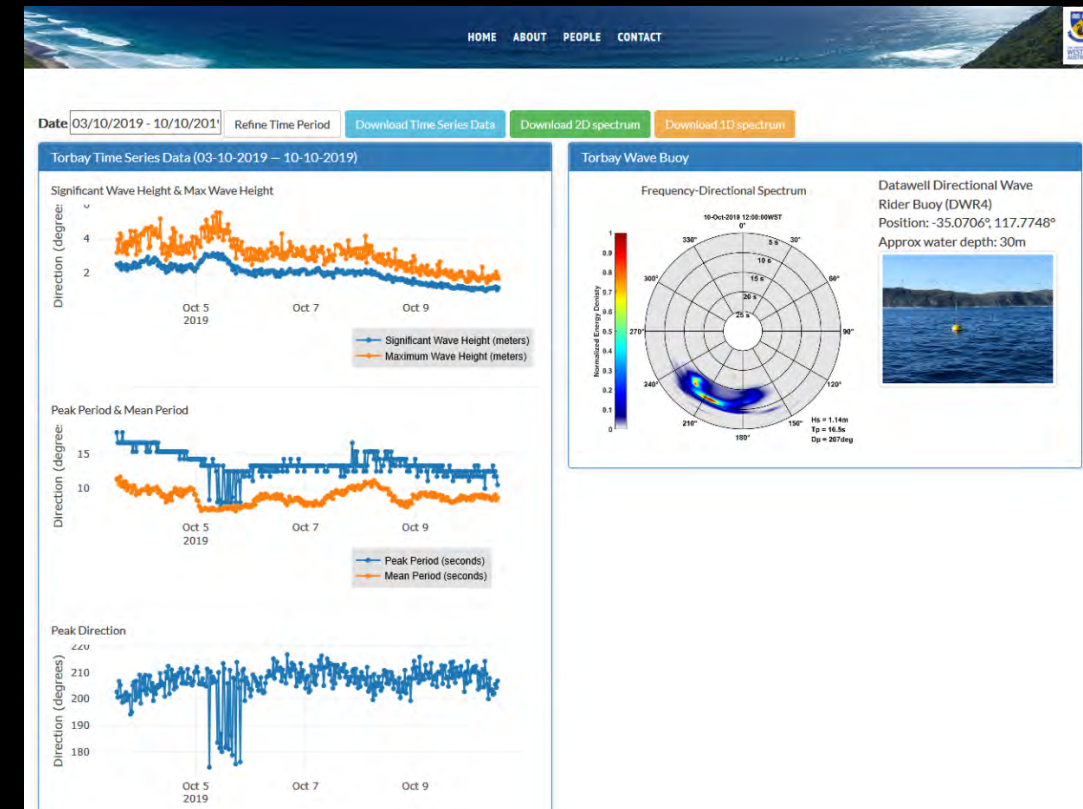
[Australian Ocean Data Network](#)



Standing Agenda Item

Other wave observation programs

- IMOS Technology Proving program
 - UWA - Accelerating the integration of low cost wave buoy technology within in situ observing networks (SOFAR Spotter Buoys + other technologies)
 - University of Melbourne - SRS Surface Wave Sub-Facility Wind Speed and Direction Extension
- Vic DELWP Wave Climate Monitoring – UoM
 - Three Triaxys wave buoys to monitor open Victorian coasts. 2020 Deployment
- UWA Albany Wave data
 - Wawaves.org
 - Waveriders deployed as part of UWA Wave Energy Research Centre
- NSW DPIE + partners (UNSW, Unewcastle, USyd)
 - 1-12 month mini waverider/spotter to validate transformation tool

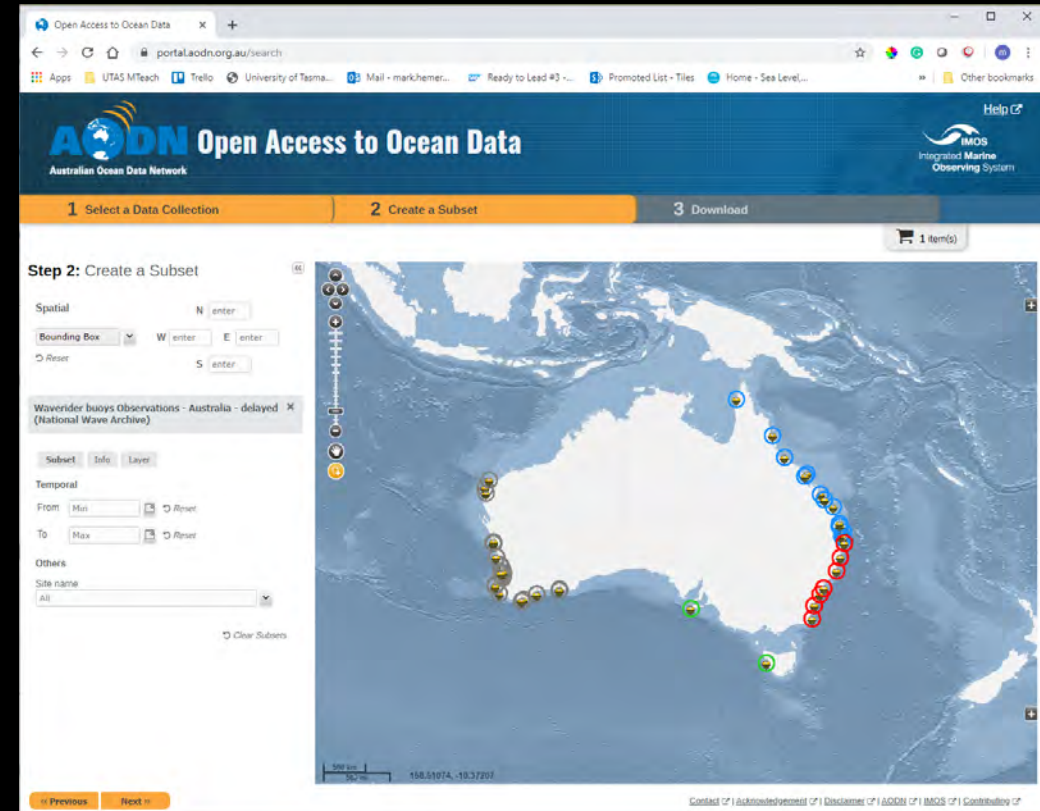


Standing Agenda Item

IMOS National Wave Archive (AODN)

NRT & Delayed mode feed of wave height, wave period and direction, from multiple custodians:

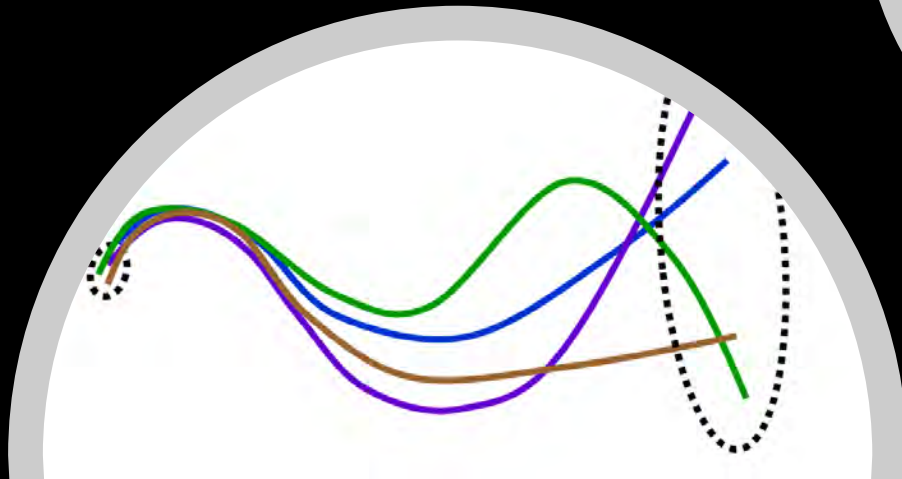
- BoM
- Qld DES
- WA DOT
- NSW DPIE MHL (Delayed Mode Only)



The screenshot displays the AODN Open Access to Ocean Data portal. The browser address bar shows 'portal.aodn.org.au/search'. The page header includes the AODN logo and the text 'Open Access to Ocean Data Australian Ocean Data Network'. A navigation bar at the top indicates the current step: '2 Create a Subset'. The main content area is titled 'Step 2: Create a Subset' and features a map of Australia with several colored markers (blue, red, green) representing data collection sites. On the left side of the map, there are input fields for 'Spatial' (N, W, E, S) and 'Bounding Box', a 'Reset' button, and a dropdown menu for 'Waverider buoys observations - Australia - delayed (National Wave Archive)'. Below the map, there are sections for 'Temporal' (From, To) and 'Others' (Site name). At the bottom of the page, there are navigation buttons for 'Previous' and 'Next', and a footer with contact information for AODN, IMOS, and the Commonwealth of Australia.

Major SWWG activities

- Wave research, development and infrastructure priorities
 - See Diana's talk next - Concluded June 2019



Major SWWG activities

Standardisation of Australian wave data archive practices (Commenced June 2019)

Issue/Objective:

- Many wave data custodians across Australia.
- Many parameters are used to define a wave field (H_s , T_{m01} , T_{m02} , T_p , T_e , H_{max} , H_{sea} , H_{swell} , θ_m , θ_p , m_0 , m_1 , ...)
- Derived from across many platforms (Waverider, Triaxys, Spotter, ADCP, SRS,....)
- Use/Archive of these parameters is inconsistent across custodians.
- Review current practices across custodians
- Define best practice / standardise wave data archives across Australia

Industry have protocols in place (e.g., Woodside Engineering Standard MetOcean Data Requirements)

Survey monkey circulated August 15, 2019. Closed 4th September, 2019.

Major SWWG activities

Standardisation of Australian wave data archive practices (Commenced June 2019)

Survey questions focussed on:

Do you measure wave data?

What do you use wave data for?

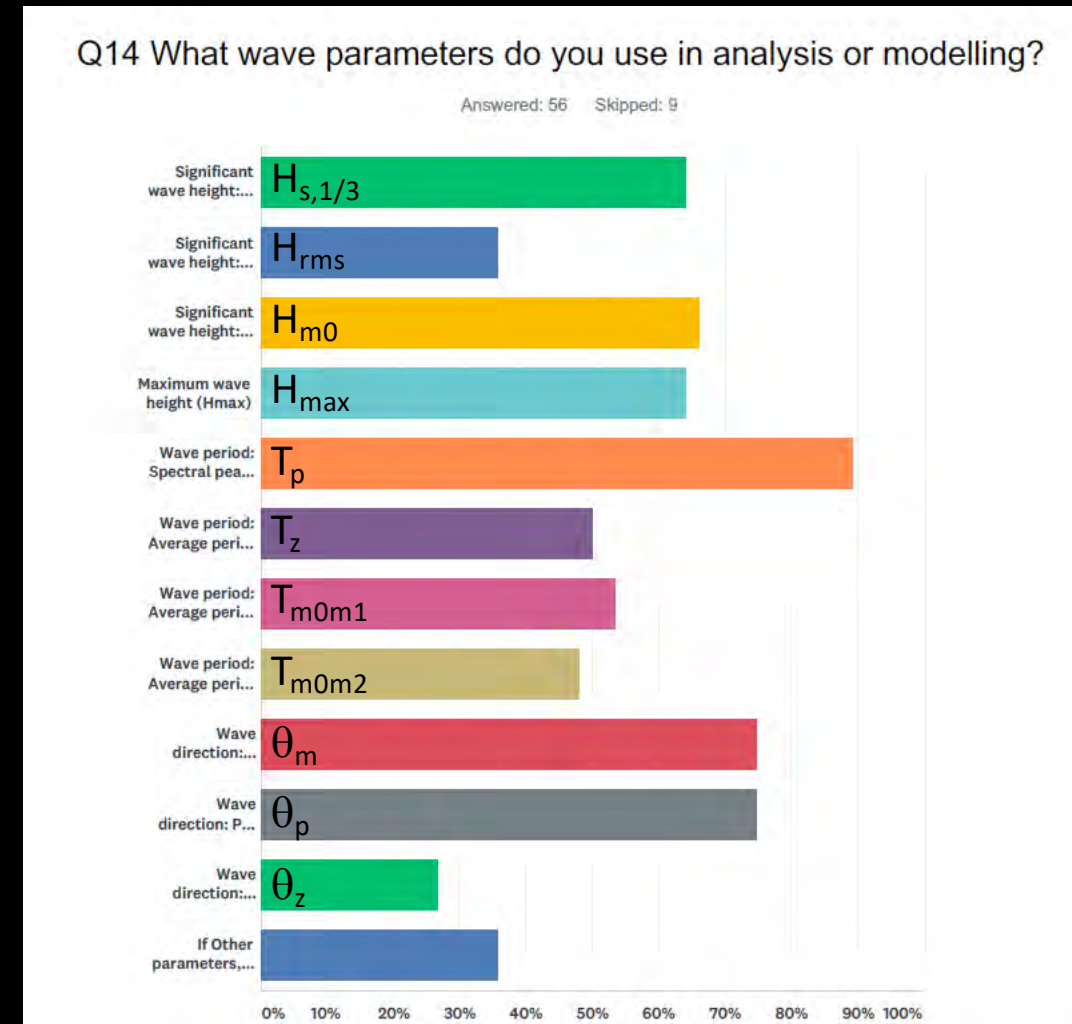
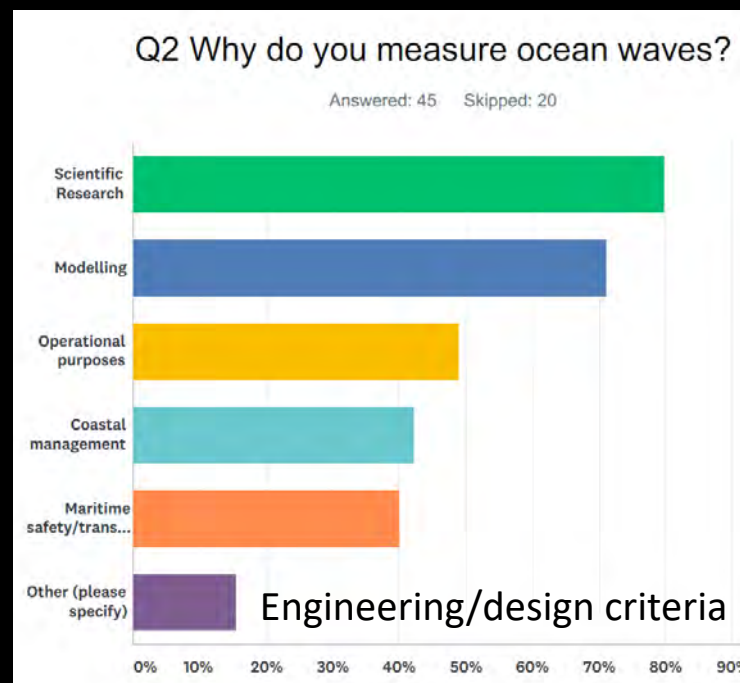
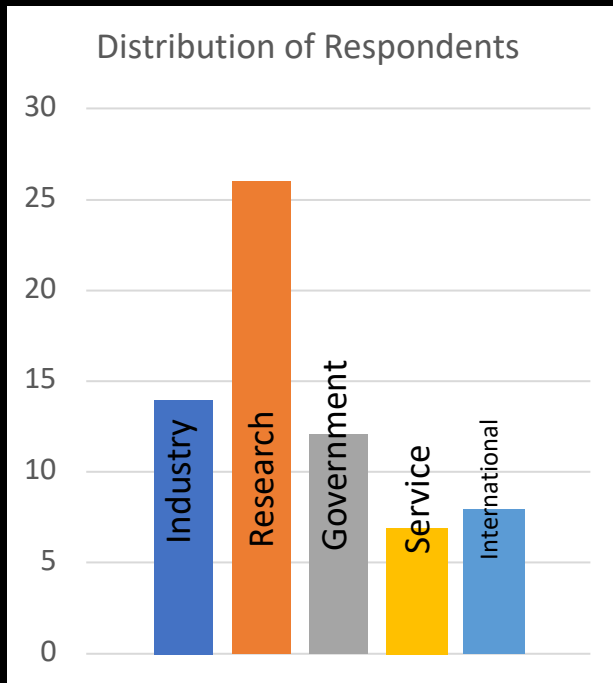
What wave measurement platform do you use?

What variables do you use/archive?

Is the data available for others, and if so how?

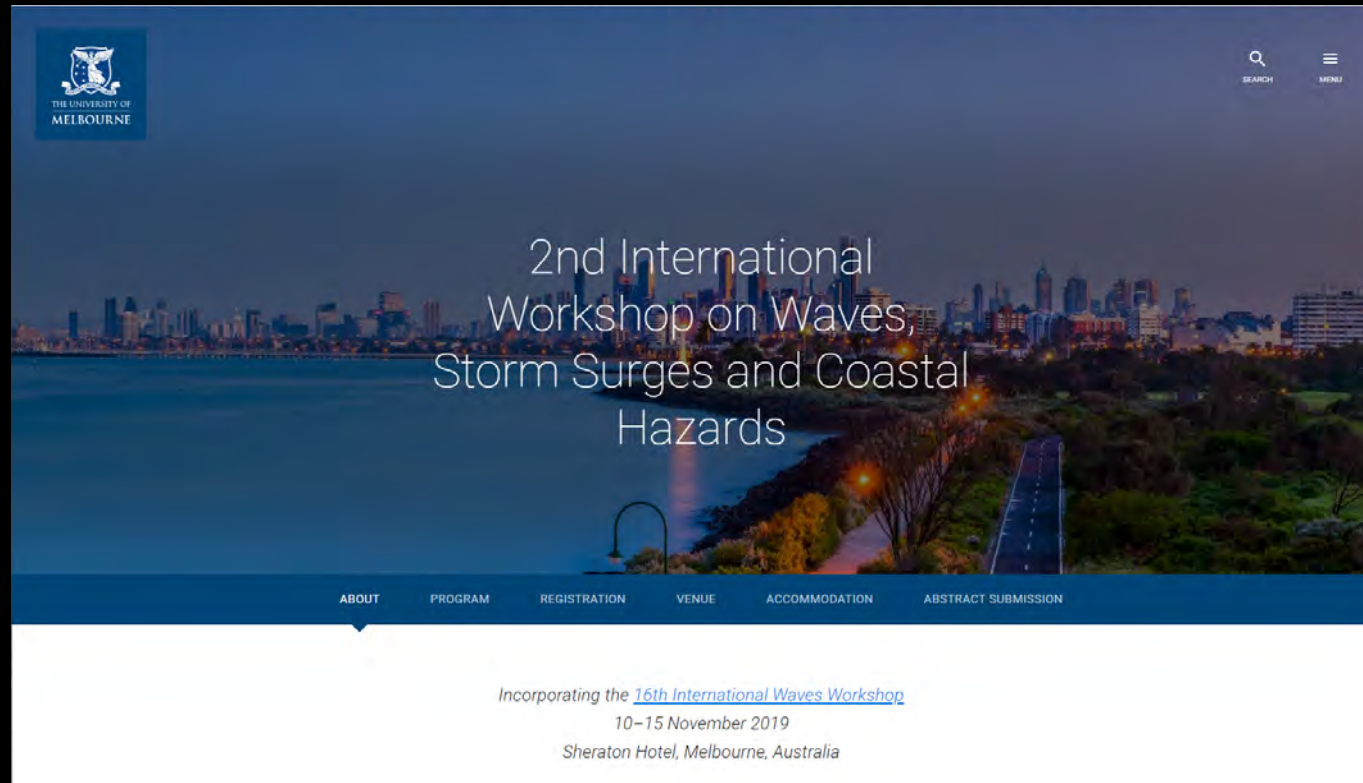
Very Preliminary Survey Outcomes

65 Respondents: 45 of whom observe waves and collect data



Summary Remarks

- SWWG is making key contributions to Australia's operational oceanography landscape
- Has momentum to continue to deliver
- Would benefit from greater industry and service provider representation (across multiple sectors)
- Provides a focal point for Australia's wave research and user communities (AWWS & Wave Workshop)



The screenshot shows a website for a workshop. At the top left is the University of Melbourne logo. At the top right are search and menu icons. The main content area features a cityscape at night with the text: "2nd International Workshop on Waves, Storm Surges and Coastal Hazards". Below this is a navigation bar with links: ABOUT, PROGRAM, REGISTRATION, VENUE, ACCOMMODATION, and ABSTRACT SUBMISSION. At the bottom, it states: "Incorporating the [16th International Waves Workshop](#) 10-15 November 2019 Sheraton Hotel, Melbourne, Australia".