



Forum for Operational Oceanography

Surface Waves Working Group

Salman Khan (presenting on behalf of the working group)



FOO SWWG aims to advise on:

- Wind-wave research and infrastructure priorities to support operational oceanography in Australia
- Potential improvements to Australia's capability, particularly in response to emerging fields in the area

And to liaise with the broader community through presentations and interaction at meetings, workshops, and conferences



SWWG Membership (recent participation)

INDUSTRY

Craig Longmuir (Dalrymple Bay
Ports)

GOVERNMENT

Stefan Zieger (BoM)
Nick Naderi (Qld Govt)
Matthew Bell (Defence)
Tom Doyle (NSW DPE)
Mark Kulmar (MHL)
Daryl Metters (Qld DES)
Hugo Bastos de Oliveira (SARDI)
~~Diana Greenslade (BoM)~~

SERVICE PROVIDER

Greg Williams (Co-Chair, RPS)
Andrew Bradford (Baird)
Alex Zadnick, Alexis Berthot
(MetOcean Solutions)
Burak Uslu/Carsten Hoffman
(OMC)

R&D

Salman Khan (Co-Chair, CSIRO)
Richard Saunders (Secretary,
IMOS)
Mark Hemer (CSIRO)
Ryan Lowe, **Jeff Hansen (UWA)**
Benedicte Pasquer (AODN)
Mitch Harley (UNSW)
Ron Hoeke (CSIRO)
Graziela Miot da Silva (Flinders)
Hemerson Tonin (AIMS)
Mike Kinsela (Newcastle Uni)
Madeleine Cahill (AIMS)
Alex Babanin (Melb Uni)
~~Paul van Ruth (IMOS)~~
~~Sebastien Mancini, Guillaume
Galibert, Ana Berger (AODN)~~

Seeking stronger Industry, Service Provider & Defence representation!

Activities and discussions since last FOO (Nov 2022)

Australian wave buoy operations and data management guidelines – Hansen & Kinsela 2023

ARDC National in-situ waves project

Status and future of NTP low-cost wave buoy project

State of satellite data products

On-going focus on capture and distribution of content

Nearshore bathymetry data availability, needs etc. AusSeabed talk Fri

Opportunities & pitfalls (see Greg's talk Fri)

Next-gen data portals (e.g., CDSE), STAC etc. Relevant to Mark Rehbein's talk on Fri

Measurements



Auxiliary data



standards



3 WG meetings



Data sharing



Data flow, archive & portals



Meeting summaries

Feb 2023

- 20+ attendees
- 3 x [Talks]
 - NTP low-cost wave buoys (Lowe)
 - ARDC national in-situ wave buoy (Berger)
 - ARDC community connect program (Galibert)

Apr 2023

- 11+ attendees
- [Talk] Australian wave buoy best practices (Hansen)
- [Discussion] Nearshore bathymetry emerging needs

Aug 2023

- 13 attendees
- [Talk] Data sharing
- 3 x [Discussion]
 - Capture and distribution of WG content
 - State of satellite products
 - Next-gen data portals

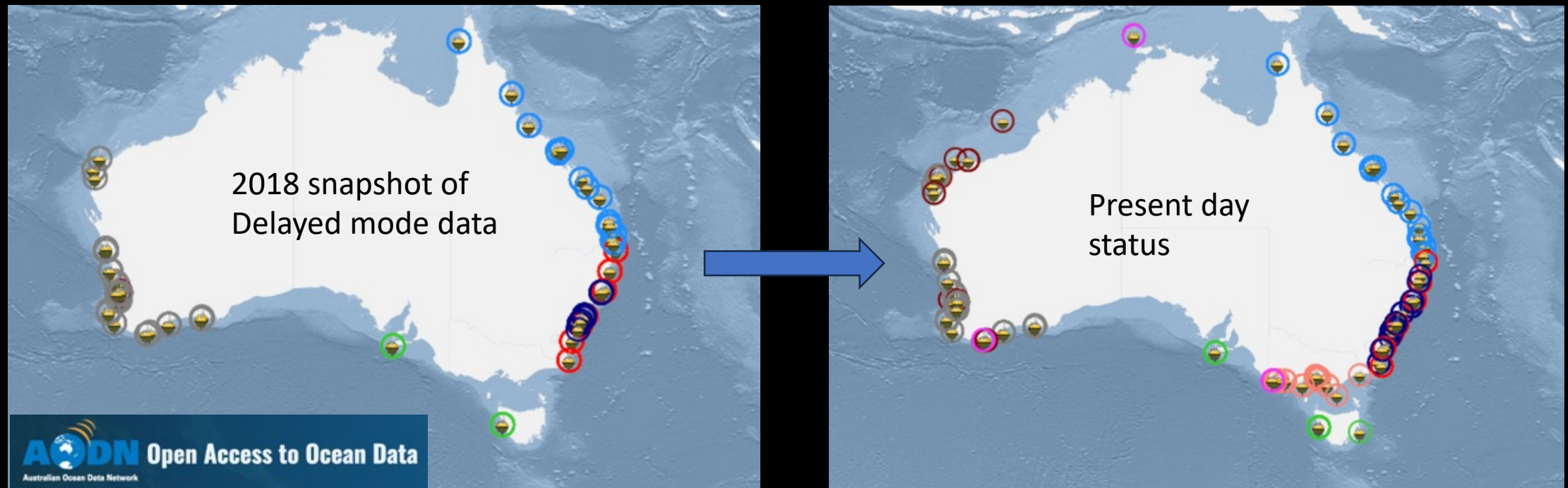
Next meeting on 11th Dec 23, main agenda:

- Ongoing focus on capture, distribution, completion of past activities
- Perspectives from FOO and direction setting

Infrastructure update

IMOS National Wave Archive (AODN)

- SWWG has been a vehicle for establishing need, expert opinion, inter-stakeholder dialogue, for new improvements to the national wave archive
 - “Maintain and enhance the in-situ buoy network” – 3rd top priority (Greenslade et al., 2020)
 - The AODN-led ARDC national wave infrastructure project was born in SWWG, and benefited from the national discussions and activities organized by the WG



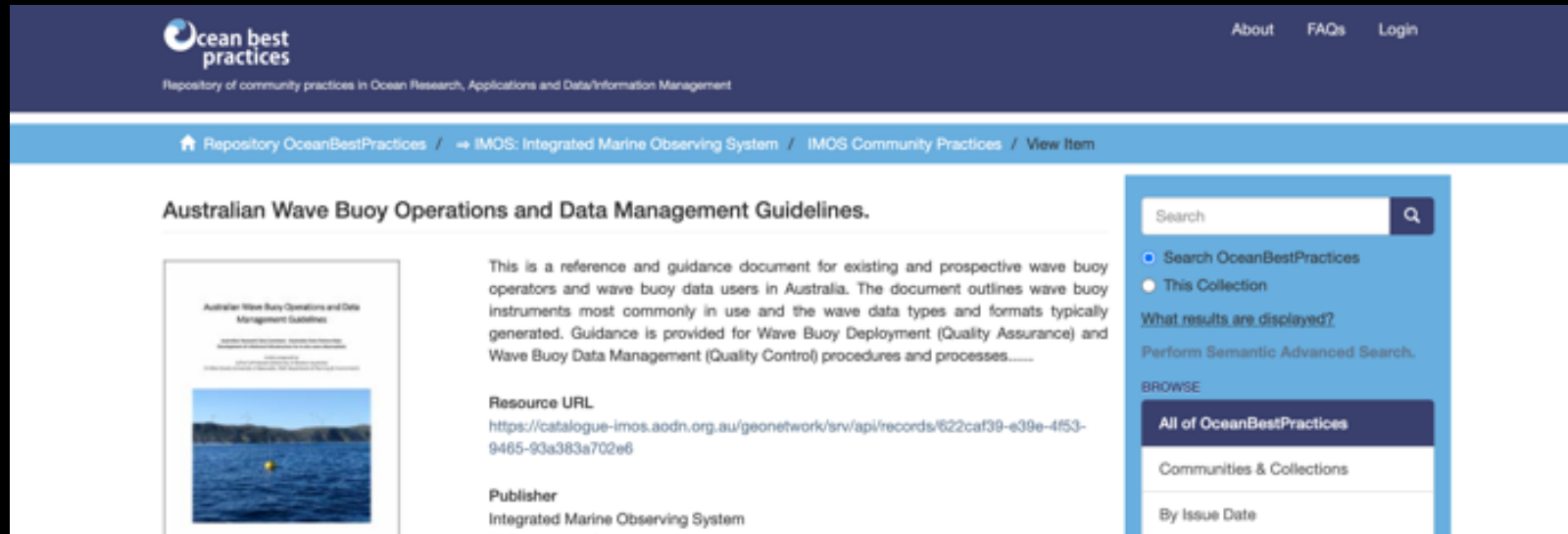
Infrastructure update

IMOS National Wave Archive (AODN)

These WG activities laid the foundations which were materialised (in part) by the work of Hansen and Kinsela in documenting and publishing the Australian Wave Buoy Operations and Data Management Guidelines (Hansen & Kinsela; 2023).

Rationale:

- Significantly lower cost and smaller size of new wave buoy technology has increased user base
- Value in high level guidance on deployment logistics, data curation; targeted at new and inexperienced users



The screenshot displays the Ocean Best Practices website interface. At the top, the logo for 'Ocean best practices' is visible, along with navigation links for 'About', 'FAQs', and 'Login'. Below the header, a breadcrumb trail reads: 'Repository OceanBestPractices / → IMOS: Integrated Marine Observing System / IMOS Community Practices / View Item'. The main content area features the title 'Australian Wave Buoy Operations and Data Management Guidelines.' and a thumbnail image of a wave buoy. To the right of the thumbnail, there is a descriptive paragraph: 'This is a reference and guidance document for existing and prospective wave buoy operators and wave buoy data users in Australia. The document outlines wave buoy instruments most commonly in use and the wave data types and formats typically generated. Guidance is provided for Wave Buoy Deployment (Quality Assurance) and Wave Buoy Data Management (Quality Control) procedures and processes.....'. Below this, the 'Resource URL' is listed as 'https://catalogue-imos.aodn.org.au/geonetwork/srv/api/records/622caf39-e39e-4f53-9465-93a383a702e6' and the 'Publisher' is identified as 'Integrated Marine Observing System'. On the right side of the page, there is a search bar and a sidebar with options to 'Search OceanBestPractices' or 'This Collection', and a 'BROWSE' section with buttons for 'All of OceanBestPractices' and 'Communities & Collections'.

Infrastructure update

IMOS National Wave Archive (AODN)

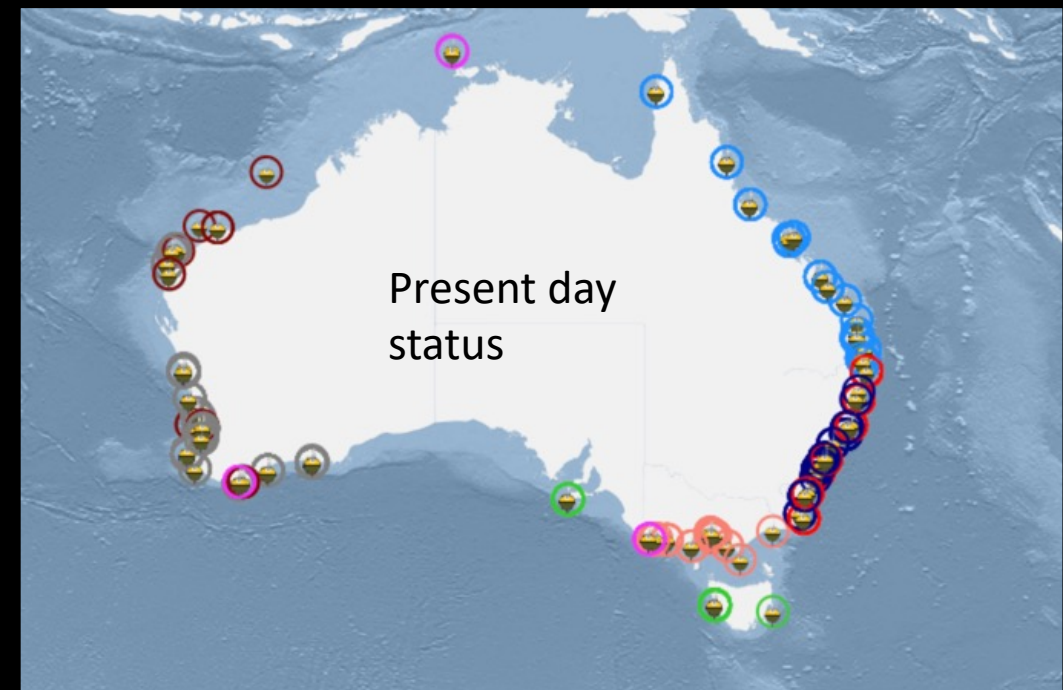
Data captured from national custodians

- State Dept. (NSW DPE + MHL, Qld DES, WA DoT), BoM, Pilbara Port Authority and Universities (Deakin, UWA, FlindersU) & SARDI
- Traditional waverider + Sofar spotter



The enhanced National wave archive has

- Scalable workflows
- Documented standards and metadata
- Integral wave parameters
- Spectral data, Raw displacements (DM only)



Infrastructure update

IMOS NTP low-cost wave buoy project

UWA lead

- Performance evaluation of low-cost wave buoys (vs traditional moored, long-term reliability, drifting mode, and data flow and QA/QC)
- Good agreement in wave stats from several comparisons between Spotters vs traditional platforms
→ National/global proliferation
- Smart mooring, Bristlemouth (plugnplay)



Infrastructure update

IMOS Wave-Buoy sub-facility

Bureau of Meteorology lead; CSIRO and AIMS collaboration

Triaxys buoy deployments at two sites identified as gaps in the Australian wave observing network (Greenslade et al. 2018)

- Maria Island (Eastern Tasmania)
- Goodrich Bank (Northern Territory – Timor Sea)

Status: Maria island operated well for 2 years but missing since a ~month, NT had several issues, most recently mooring broke (redeployment likely May 2024+)



Infrastructure update

IMOS SRS Waves sub-facility

CSIRO lead

About

- National capability of long-term (3+ decades) collection of satellite wave (and wind) observations
- Available via AODN and data descriptors published
- Regularly maintained and extended in time

Value

- Australian access to vast amount of fundamental ocean data
- Support Australian scientific and industrial community
- High national and international uptake
- Feeding back efforts, best practice to international agencies
- Strengthen partnerships with international agencies



Altimetry

*Significant wave height
and wind at 10 m*

+

Scatterometry

Wind vectors at 10 m



SAR

*Directional ocean swell
systems*

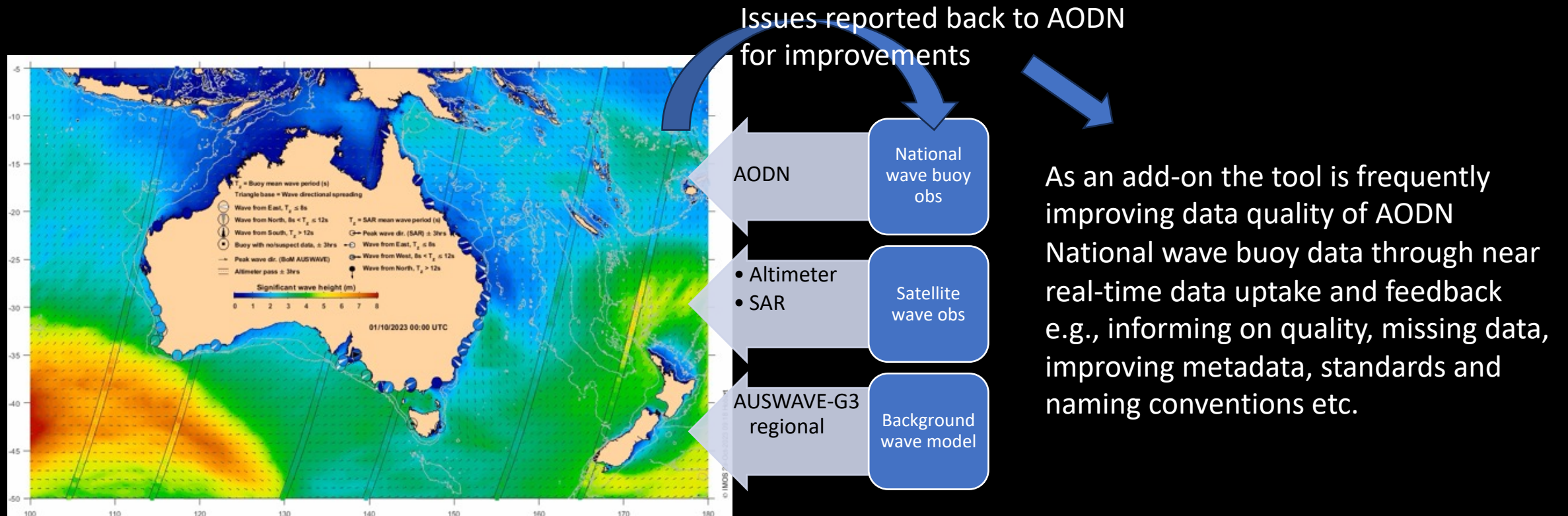
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*Coastal high-res wind
vectors at 10 m*

Infrastructure update

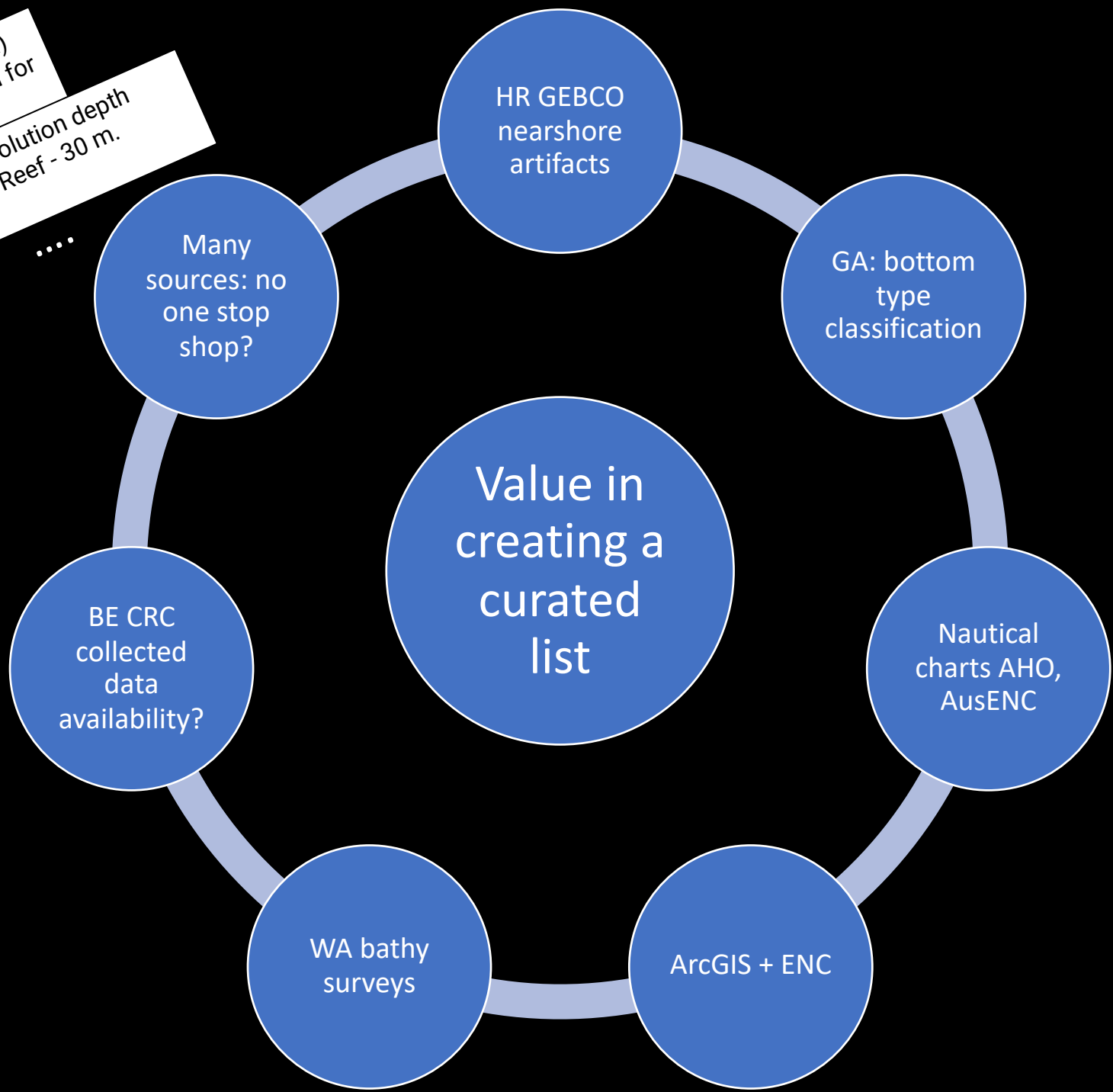
IMOS OceanCurrent Surface Waves

- Provide National-scale **up to date, integrated** observed wave information around Australia to the broader community
- Developed with WG inputs and feedback
- Leveraging enhancements in AODN national wave archive



Nearshore Bathymetry needs (in progress)

O'Grady et al. 2021: Updated Australian bathymetry: merged 250m bathyTopo. v2.
Beaman, R. AusBathyTopo 250m (Australia) 2023 Grid - A High-resolution Depth Model for Australia (20230004C).
Beaman, R.J. 2017. High-resolution depth model for the Great Barrier Reef - 30 m. Geoscience Australia, ...



Summary Remarks

- SWWG provides a focal point for Australia's wave research and user communities
- It is making key contributions to Australia's operational oceanography landscape
- Would benefit from greater industry and service provider representation (across multiple sectors)
- Recognition that Group is a unique mix of wave users and offers considerable benefit to community, but capture and distribution of learnings should remain an ongoing focus