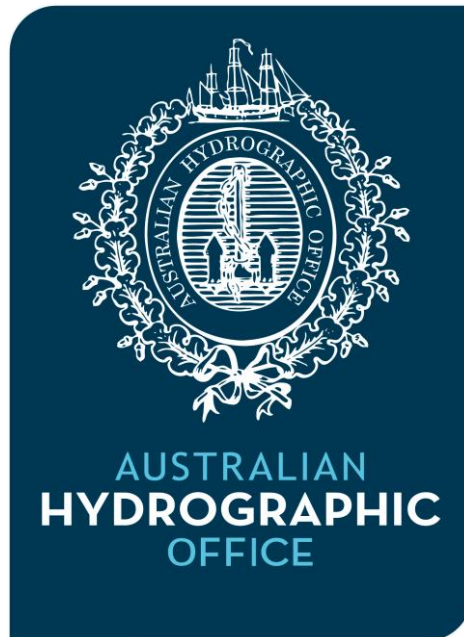


**19TH MEETING OF THE NORTH INDIAN OCEAN HYDROGRAPHIC
COMMISSION (NIOHC19)
Muscat, Oman, 25 - 28 March 2019**



NATIONAL REPORTS FROM AUSTRALIA TO THE NIOHC19

Reference: IHO Resolution 2/1997 as amended

1. Executive summary

The Australian Hydrographic Office (AHO) is the Department of Defence agency responsible for the publication and distribution of nautical charts and other information required for the safety of ships navigating in Australian waters. The AHO is also responsible for the provision of operational surveying support and maritime Military Geographic Information (MGI) for Australian Defence Force (ADF) operations and exercises.

HydroScheme Industry Partnership Program

SEA 2400 Phase 1 – Hydrographic Data Collection Capability will introduce an effective combination of military and commercial maritime environmental data collection capabilities, driving fundamental change to how these services will be delivered by Defence into the future. To implement these changes the SEA2400-1 Project will bring into service two distinct capabilities: (i) the HydroScheme Industry Partnership Program (HIPP) will provide the capability needed for Defence to meet its obligations under national and international legislation; and (ii) the Strategic Military Survey Capability (SMSC) that will focus on meeting Defence’s military requirements for data in the maritime environment.

2. Surveys:

Hydroscheme continues to be reviewed and targeted to best meet national and regional requirements. HydroScheme 2017-2020 was published in October 2017. HydroScheme 2017-2020 is available at www.hydro.gov.au.

Laser Airborne Depth Sounder (LADS)

LADS conducted a range of HydroScheme tasks in 2018 in the Great Barrier Reef (multiple HI) and Papua New Guinea (HI612).

Hydrographic Ships (HS) LEEUWIN and MELVILLE

Both ships spent much of 2018 conducting surveys in Papua New Guinea waters to support the Asia-Pacific Economic Cooperation (APEC) 18 Forum in Port Moresby and to improve charting quality for the area. During the year *Melville* was fitted with a Reson SeaBat T50-P Multibeam Echosounder.

Survey Motor Launch (SML) MERMAID, PALUMA, SHEPPARTON and BENALLA

HMAS *Paluma* and *Mermaid* completed surveys in Torres Strait (HI610) and the Timor Sea (HI615). HMAS *Shepparton* and *Benalla* conducted a survey in the Kimberley region of north Western Australia (HI611) to improve navigation safety for tourism operators.

The AHO receives survey data from a variety of sources. In 2018, 173 Bathymetric surveys were received.

3. New charts & updates:

a) ENCs

In August 2017 Australia became the PCA for the Solomon Islands and subsequently published SB prefixed ENCs on their behalf. Australia maintains 894 ENC cells including 41 SB cells and 159 covering PNG waters.

Recent groundings have highlighted a disconnection between universally accepted chart generalisation practices and ECDIS performance at route planning and route monitoring stages. During chart compilation it is usual practice to 'convert' area features into point features when the corresponding point symbology 'covers' the area feature at the product's compilation scale. Under this practice ECDIS checks the routes with no consideration of the size of the symbol, it only performs an 'intersect' with the true centre of the symbol. By depicting the real shape and size of shoals, the number of 'false negatives' reported by the ECDIS check route routine can be reduced.

The AHO is remediating the existing Aus ENC portfolio by double encoding OBSTRN area features at the same location as UWTRC and OBSTRN point features. The new OBSTRN area feature will have all the same attributes as the 'source' point object.

b) ENC Distribution method

Australia is a member of IC-ENC and distributes its ENCs internationally through this arrangement.

Australia's full portfolio of published ENC, known as the 'AusENC' service supports vessels operating within Australian, Solomon Islands and Papua New Guinean waters. It is sold in a range of large and small geographical area packs at affordable prices. A free fortnightly web-based update service is included in the subscription price. More information can be found at www.hydro.gov.au/prodserv/digital/ausENC/enc.htm

- c) RNCs
The AHO no longer produces RNC
- d) INT charts
Nil
- e) National paper charts

In August 2017 Australia became the PCA for the Solomon Islands and 14 new navigation charts and an Index chart were published under the 'SLB' prefix.

Australia currently maintains 482 paper charts in its portfolio. Detailed information of the full Australian chart portfolio can be found on the AHO website at <http://www.hydro.gov.au/prodserv/paper/auspapercharts.htm>

The AHO continues to focus on system and process upgrades. Implementation of Bathy Database and enhancements to Chart Product Management System, Tides Information System, Wrecks Database, Maritime Boundaries database, Product Delivery System, Workflow and Survey Planning systems are underway.

- f) Other charts
Nil
- g) Problems encountered
Nil

4. New publications & updates:

- a) New Publications

2019 Australian National Tide Tables and Aus Tides digital service
2019 Solomon Island National Tides Tables.

- b) Updated publications

Edition 5 Seafarers Handbook for Australian Waters is planned for April 2019 release.

- c) Means of delivery

Investigating digital publication options, in particular to replace the aging AusTides.

5. MSI

a) Existing infrastructure for transmission

Australia is the coordinator for NAVAREA X, which extends from the Antarctic coast to the equator and from 080E to 170E longitudes. The Self-Assessment report for NAVAREA X for the period July 2017 to June 2018 was submitted to the IHO World-Wide Navigational Warning Service (WWNWS) Sub-Committee Meeting (WWNWS10). The meeting also comprised the 2nd Joint meeting of the IHO WWNWS-SC and the World Meteorological Organization (WMO) Committee on the World-Wide Met-Ocean Information Warning Service (WMMIWS). A copy of the Self-Assessment report provided to the WWNWS10 meeting has been submitted for consideration under the SWPHC16 Meeting.

b) New infrastructure in accordance with GMDSS Master Plan

Inmarsat completed its migration of Inmarsat-C satellite services from the I3 to I4 constellation on 12 December 2018. The I4 satellites have substantially different satellite service footprints and this has altered the provision of services within NAVAREA X. All Australian SafetyNET Coastal Warning broadcasts are now promulgated only through the new POR satellite. NAVAREA X SafetyNET Long-Range Navigational Warnings continue to be promulgated by both the IOR and POR satellites. All other details remain unchanged. The GMDSS Masterplan and relevant nautical publications are in the process of being revised.

New forecast and warning service for Southern Ocean

As of 6 February 2019, the Bureau of Meteorology provides forecast and ocean wind warning Maritime Safety Information (MSI) services for a new 'Southern' area that extends from 50°S to 65°S, and between 80°E and 160°E. Ocean wind warnings for this area will be issued as needed and updated every 6 hours. The products are primarily distributed to ships via the Global Maritime Distress and Safety System on the satellite SafetyNET system. They will also be available on the Bureau's website, MarineLite and HF radio services.

For maps of the high seas forecast and warning areas visit <http://www.bom.gov.au/marine/high-seas.shtml>

MarineLite service upgraded to include charts

The Bureau's MarineLite webpages are designed for mariners, such as those on cruising yachts and commercial vessels, whose offshore access is limited to satellite internet communication channels, or in areas of marginal mobile phone coverage. Previously these pages contained text-only forecasts and warnings, but this upgrade will include the provision of "lite" charts with small file sizes.

The inclusion of "lite" charts enables users to be better informed, aiding decision making and situational awareness to improve safety outcomes.

<http://www.bom.gov.au/marine/lite/>

c) Problems encountered

Monitoring of NAVAREA X MSI transmissions in accordance with the requirements of Resolution A.706(17) promulgated via the new I4 generation IOR satellite has proven problematic. This is due to the IOR satellite footprint now falling well outside of Australia. It introduces major challenges and additional costs associated with physically siting the

equipment in a remote location and then the ability to modify that equipment to make it suitable for remote monitoring for EGC broadcasts. Australia continues to work with Inmarsat and equipment manufacturers to implement an effective solution.

6. C-55 and P-5

Nil

7. Capacity Building Offer of and/or demand for Capacity Building

a) Training received, needed, offered

LCDR Andrew Sheils successfully completed the National Institute of Hydrography Long Hydrographic Course in Goa, India in 2018.

RAN Hydrographic School

The RAN Hydrographic School provides training courses in Hydrographic surveying for officers and sailors from Australia and the region under the Defence Cooperation Programme.

The RAN Hydrographic School provides three levels of training consisting of a basic, intermediate and advanced level. Australian sailors traditionally attend the basic and intermediate courses while sailors and officers from Australia and the region attend the advanced level course (H2).

The basic and intermediate courses are recognised nationally while the H2 training provided is in accordance with the FIG/IHO International Board on Standards of Competence for Hydrographic Surveyors Category B course with Option 1 (Hydrography for Nautical Charting) and Option 6 (Military Hydrography).

In 2018 the H2 course consisted of students from Australia (10), Pakistan (1), Malaysia (1) and New Zealand (3). The majority of places on the 2019 H2 course have not been identified as yet.

Two Basic Courses and one Intermediate Course were conducted for RAN sailors in 2018 with 24 students attended the Basic Courses (14 weeks duration) and 9 students attended the Intermediate Course (8 weeks duration).



8. Oceanographic activities

a) Tide gauge networks

The Bureau of Meteorology operates two permanent tide gauge networks in the region.

The Australian Baseline Sea Level Monitoring Array currently consists of 16 permanent gauges monitoring sea level and ancillary meteorological parameters around the Australian Coastline, including one at Cocos Island. The locations of the gauges are shown in Figure 1 (below). Old information

Monthly reports are published by the Bureau and can be located on their website at: www.bom.gov.au/oceanography/projects/abslmp/reports.shtml

The Pacific Sea Level Monitoring Project currently consists of 14 permanent gauges monitoring sea level and ancillary meteorological parameters throughout the South Pacific region. The locations of the gauges are shown in Figure 1 (below).

Monthly reports are published by the Bureau and can be located on their website at: <http://www.bom.gov.au/pacific/projects/pslm/index.shtml>

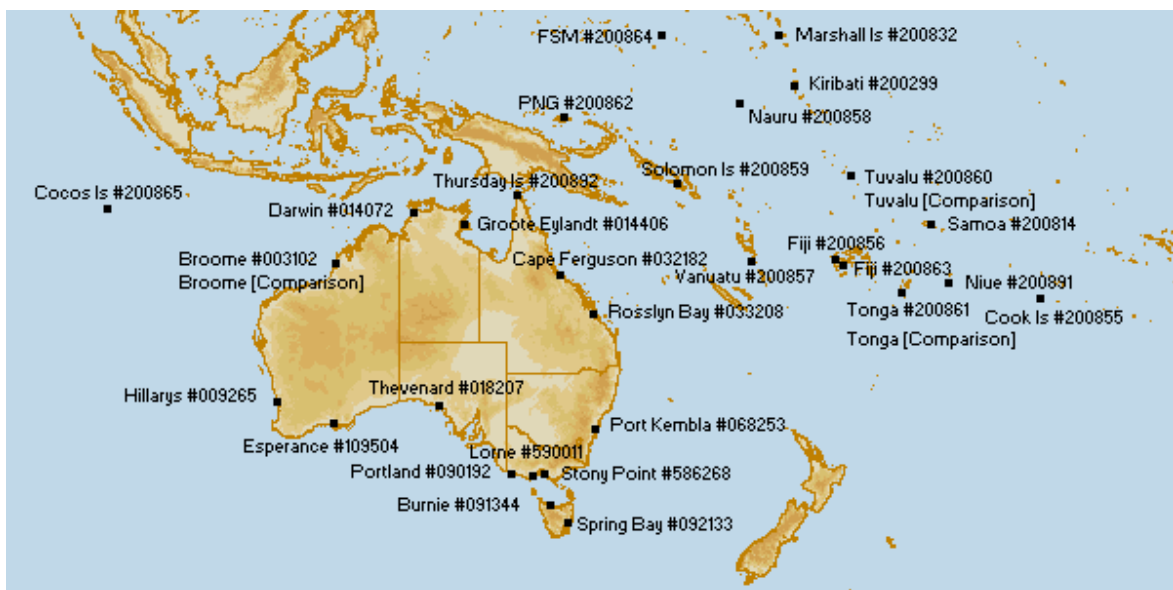


Figure 1: Permanent tide gauge network operated by the Bureau of Meteorology, including the Australian Baseline Sea Level Monitoring Array (16 sites) and Pacific Sea Level Monitoring Project (14 sites).

The permanent tide gauges were last upgraded in 2009-2010 (Baseline) and 2011-2013 (Pacific) with modernised data loggers, real-time satellite communications and additional radar-type water level sensors. Co-located comparison stations were installed at Broome and Tuvalu in 2017 and at Tonga in 2018 in preparation for becoming the permanent operational tide gauges at those locations due to wharf refurbishments.

The Australian Tsunami Warning System (ATWS) is supported by the 30 permanent Australian and Pacific tide gauges (**Figure 1**) as well as an additional network of 17 radar-

type tide gauges at four Pacific and 13 Australian sites as shown in **Figure 2**. An array of six deep-ocean tsunameters (DART buoys) brings the Australian tsunami-monitoring network to 53 sites in all.

The primary purpose of these additional stations is for the detection of tsunami with real time data made available to support the operations of the Pacific Tsunami Warning System. Further information about the Australian Tsunami Warning System is available at <http://www.bom.gov.au/tsunami/about/atws.shtml>

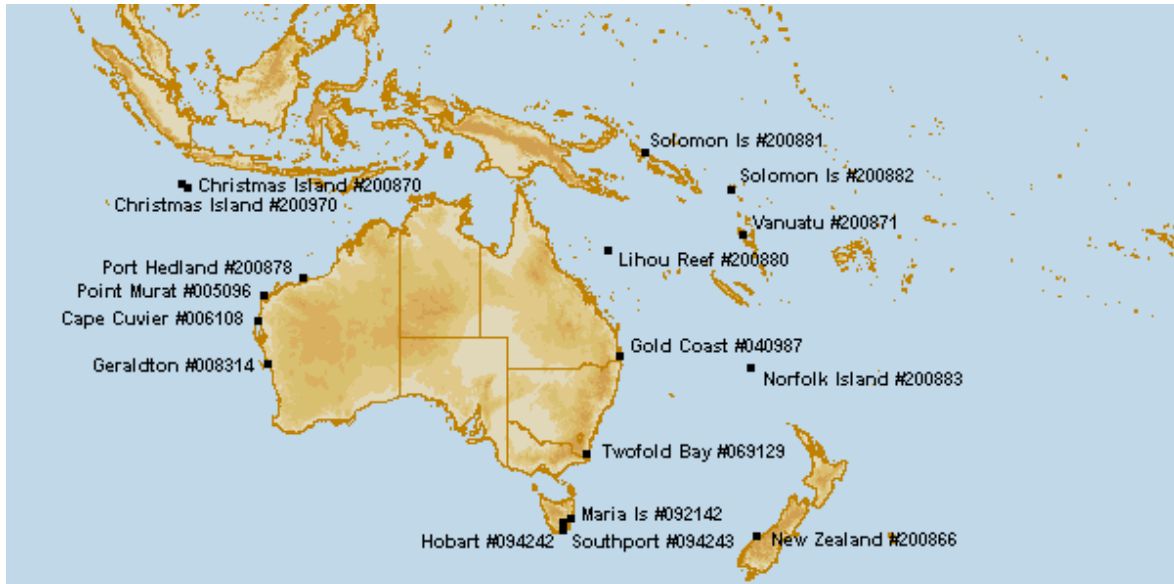


Fig. 2: Additional ATWS radar gauges (17 sites) that used in conjunction with the permanent tide gauge network for monitoring tsunamis in the Australian region.

b) New equipment

Surveyable mounting of the secondary radar water level sensors and integration of mounting pillars for continuous GNSS/GPS equipment on the tide gauge infrastructure are slowly being introduced into the network, while acoustic water level sensors remain the primary sensor at most sites.

c) Problems encountered

Generally, the gauges operate autonomously in between calibration and servicing on a routine 18-month schedule, with average data return from the permanent tide gauge network exceeding 95%. The variety of day-to-day problems that do arise include power supply, data logger, data communications and sensor malfunctions, which are managed either remotely, by voluntary first in maintenance support or through contingency field trips.

9. Other activities

Australia – India MetOc Discussions – Kochi, India May 2018

An Australian Navy delegation consisting of Director General Hydrography METOC and an Operational METOC Centre Operations Officer visited Indian Navy Southern Naval Command, Kochi, India, in May 2018. The purpose of the visit was to gain mutual awareness of each countries METOC capabilities.

Participation in IHO Working Groups

	Meeting	Chair/ Vice Chair	Member/ Associate/ Observer
	Council		M
HSSC	Hydrographic Services and Standards Committee		M
NCWG	Nautical Cartography Working Group		M
ENCWG	ENC Working Group		M
DQWG	Data Quality Working Group		M
MSDIWG	Marine Spatial Data Infrastructure Working Group		M
NIPWG	Nautical Information Provision Working Group		M
HSPT	S-44 Hydrographic surveys Project Team		M
TWCWG	Tidal, Water Level and Currents Working Group		M
WEND	World-Wide Electronic Navigational Chart Database		M
ABLOS	Advisory Board on the Law of the Sea		O
CSBWG	Crowd Sourced Bathymetry Working Group		O
S-100	S-100 Working Group		M
S-101	Working Group		M
IRCC	Inter Regional Coordination Committee		M
CBSC	Capacity Building Sub-Committee		
HCA	HCA Hydrographic Commission on Antarctica		M
NIOHC	North Indian Ocean Hydrographic Commission		A
SAIHC	Southern Africa and Islands Hydrographic Commission		O
SWPHC	South-West Pacific Hydrographic Commission	Y	M
EAHC	East Asian Hydrographic Commission		O
WWNWS	World-wide Navigational Warning Service Sub-Committee		M

FIG/IHO/ICA	International Board on Standards of competence for Hydrographic Surveyors and Nautical Cartographers		M
GEBCO	Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of Oceans (GEBCO)		M
IHO-IOC GGC	GEBCO Guiding Committee		M
SCUFN	GEBCO Sub Committee on Undersea Feature Names		M

a) Meteorological data collection

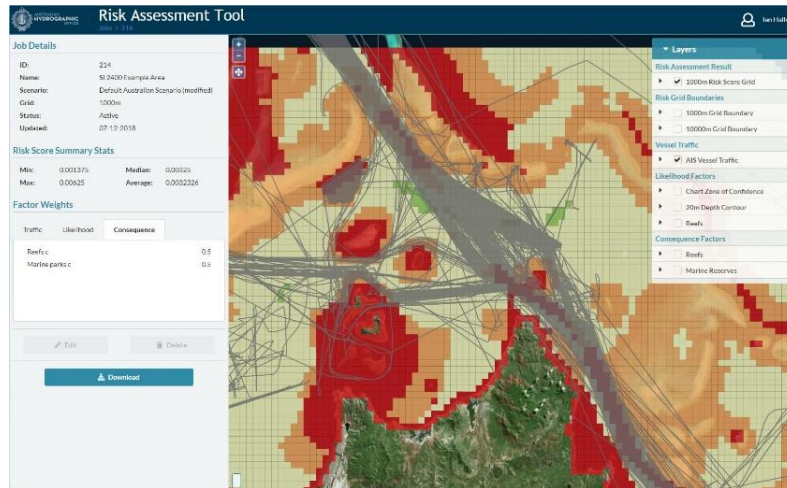
Australia, through the Bureau of Meteorology, collects meteorological data at sea via a number of methods:

- 55 voluntary ships recording and reporting weather observations
- 4 voluntary ships performing Expendable Bathythermograph (XBT) sampling
- 2 moored buoys measuring waves
- 1 moored buoy measuring air pressure and sea surface temperature
- 43 drifting buoys recording air pressure and sea surface temperature
- 4 ARGO profiling floats per annum contributed to the ARGO Australia fleet (total: 405 floats currently active) profiling sea temperature and salinity

b) Use of risk to support survey and chart updating priorities

Survey Planning Risk Assessment Tool

The AHO has developed a risk assessment tool based on the methodology adopted by Land Information New Zealand (LINZ). The source code for the risk assessment was supplied by LINZ to the AHO and the code has been re-developed into open source code and tools on an Amazon Web Service (AWS) cloud instance. The first phase of development will be completed in March 2019 and will enable the AHO to incorporate AIS data (supplied monthly by Australian Maritime Safety Authority (AMSA)) and geospatial data overlays to determine a graphical risk display (see image - Cape Melville, QLD). The user has the flexibility to adjust Traffic, Likelihood and Consequence factor weights to develop use case scenarios. Future development will include increasing the number of geospatial themes, scenario library handling and feedback from AHO users



10. Conclusions

AHO continues to prepare for the introduction of HIPP with upgrades to systems and processes, workflow and data management protocols.

MSI Self Assessment for NAVAREA X

The latest report (Aug 2018) can be found at:

http://www.iho.int/mtg_docs/rhc/SWPHC/SWPHC16/SWPHC16-12A-NAVAREA_X-Report.pdf