Marine Weather Services

A GUIDE TO AUSTRALIA'S MARINE WEATHER FORECASTS & WARNINGS

CHECK
Always check the weather both before and while on the water

Marine weather services

The Bureau of Meteorology provides the Australian and international maritime communities with weather forecasts, warnings and observations for coastal waters areas and high seas around Australia. Generally most of these services are provided routinely throughout the day, while marine weather warnings may be issued at any time when the need becomes apparent.

Because of the complex nature of the sea, the Bureau of Meteorology uses advanced computer models to predict the physical characteristics of the ocean.

These computer forecasts are used by meteorologists in the preparation of marine forecasts and warnings. The forecasts include wind, weather, sea and swell and are intended to describe the average conditions over specified areas.

Marine forecasts have now been enhanced by the inclusion of ocean currents and sea-surface temperature forecasts through the BLUElink ocean forecasting initiative. These forecasts are available at: www.bom.gov.au/oceanography/forecasts/

Marine forecasts and warnings

Coastal waters forecasts are for areas within 60 nautical miles of the coast (see map for coastal waters areas). Coastal waters and local waters forecasts are issued by Regional Forecasting Centres in each capital city generally twice daily and monitored continuously for changes which may occur. Updates may be issued at other times.

High seas forecasts are issued twice daily by the Regional Forecasting Centres in Perth, Darwin, Brisbane and Melbourne for the areas beyond the coastal waters surrounding Australia.

Warnings for coastal waters are issued whenever strong winds, gales, storm force or hurricane force winds are expected. The initial warning attempts to provide around 24 hours lead-time and warnings are renewed every 6 hours.

Warnings to shipping on the high seas are issued whenever gale, storm force or hurricane force winds are expected. The initial warning attempts to provide around 24 hours lead-time and warnings are renewed every 6 hours.

Australian Government
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Definitions and terminology

Wind speed is the **average** speed of the wind over a 10-minute period at a height of 10 metres above the surface. As a guide, double the wind speed in knots to convert to kilometres per hour; for example 20 knots is approximately 40 km/h.

Gusts are increases in wind speed lasting for just a few seconds. The speeds are typically 30 to 40 per cent higher than the average wind speed, but stronger gusts are likely in the vicinity of showers, thunderstorms and frontal systems.

A **squall** is an abrupt and large increase in wind speed with a duration of the order of minutes and which diminishes rather suddenly.

Strong wind warning: 26 to 33 knots. **Gale warning**: 34 to 47 knots. **Storm force wind warning**: 48 to 63 knots.

Hurricane force wind warning: 64 knots or more.

Wind direction is given in 8 compass points for forecasts and 16 for observations and is the direction the wind is coming from.

Sea (or wind) waves are generated by the local prevailing wind and vary in size according to the length of time a particular wind has been blowing, the fetch (distance the wind has blown over the sea) and the water depth.

Swell waves are the regular longer period waves generated by distant weather systems. There may be several sets of swell waves travelling in different directions, causing a confused sea state.

Sea state describes the combination of sea (wind) waves and swell.

Wave height (trough to crest) for both sea and swell in Bureau observations and forecasts refers to **'significant wave height'** which represents the average height of the highest one-third of the waves.

King or rogue waves are waves typically greater than twice the significant wave height. These very large waves are known to occur in areas where ocean currents run opposite to the prevailing sea and swell and where waves overrun each other, generating steep and dangerous seas. Mariners should be prepared for a rogue wave encounter.

UTC (Coordinated Universal Time): time references in warnings for high seas are given in UTC. Australian Eastern Standard Time is UTC+10 h. Central Standard Time is UTC+9.5 h. Western Standard Time is UTC+8 h.

Forecasts of winds

Wind direction and speed are determined by the patterns of highs, lows and fronts seen on weather maps and by local effects such as sea-breezes and thunderstorm downdrafts. Closely spaced isobars (lines of equal pressure on weather maps) are indicative of strong winds. That is, the higher (or tighter) the pressure gradient, the stronger the wind speed.

Stronger wind speeds are associated with tropical cyclones, deep lows and cold fronts. Sudden squalls are associated with thunderstorms, heavy showers or the passage of a cold front or low pressure trough and can happen in clear skies (e.g. the Southerly Buster in NSW). The very strongest winds are caused by tropical cyclones, deep mid-latitude low pressure systems and tornadoes/water spouts.

The Bureau forecasts of wind speed and direction are average (or mean) values over a 10 minute period at a height of 10 metres. Wind speeds usually increase with height above the sea-surface. When there are expected variations along a coastal area a range may be given, for example 15 to 25 knots.

Forecasts of gusts are not included as routine, however statistically it is estimated that gusts typically exceed the average wind speed by about one third. For example, if the forecast (average) wind speed is 15 knots, and one third of 15 is 5, gusts of around 20 knots can be expected. Gusts are generally associated with showers, thunderstorms and fronts.

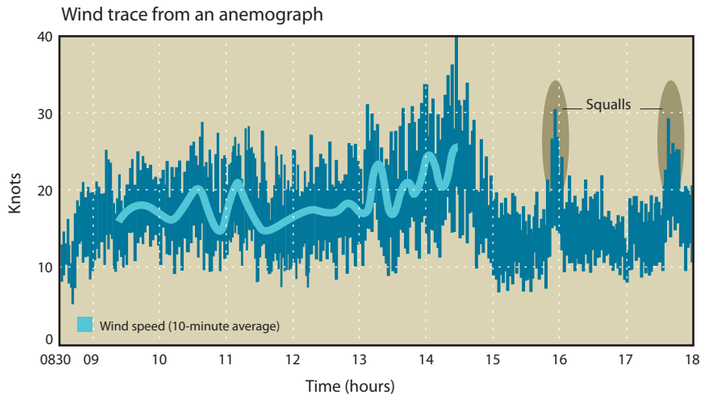


Figure 1 Wind trace from an anemograph. This shows a recording of instantaneous wind speed. The dark blue trace illustrates the variability (gustiness) of wind speed. The higher wind speeds are typically one-third above the average. Squalls are also evident. These may have occurred as showers or thunderstorms passed over the recording site.

Sea and swell forecasts

Because of the apparently chaotic situation of waves propagating in different directions and changing in character as they move, the Bureau of Meteorology uses statistical analysis when forecasting sea (wind) waves and swell wave conditions.

Forecasts of sea and swell in coastal waters forecasts are given in metres and describe the height, which is the average height of the highest one-third of the waves (see definitions and terminology).

Some waves will be higher and some lower than the forecast and observed height.

The Bureau of Meteorology does not forecast maximum wave heights in routine forecasts.

Statistically it is estimated that about one in every 2000 to 3000 waves (three to four times a day) will be approximately twice the height of the significant wave. Forecasts for high seas describe sea and swell using terms such as slight, moderate, rough etc. in place of wave heights in metres. For more details, check the web at: www.bom.gov.au/marine and click on 'Glossary', then click on 'Sea and Swell' for a description of sea and swell parameters.

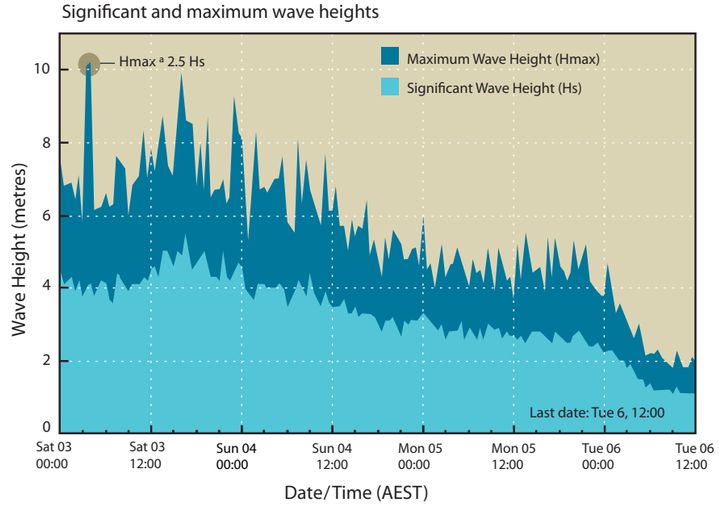


Figure 2 Significant and Maximum wave heights at Cape Sorell, west coast of Tasmania. The recording illustrates that maximum wave heights can be twice the significant wave height. It shows a maximum wave height of two and a half times the significant wave height (4am, 3 April 2004). This is sometimes referred to as a Rogue or King wave.

Forecast and warning delivery systems

Internet
The Bureau provides weather information and schedules for radio, fax and telephone services as well as links to State and Territory distress safety services for mariners, at the website www.bom.gov.au/marine .

VHF voice radio
The marine transport and safety agencies of the State and Territory governments provide maritime safety information, including weather information, for small craft on VHF radio: contact your State/Territory government for details. The Bureau also offers limited VHF services in QLD and WA: check the web at www.bom.gov.au/marine for details.

Recorded telephone services*
The Bureau provides recorded forecasts, warnings and reports for mariners. Dial 1900 926 113* for a list of your local numbers.

Telephone – weather by fax*
The Bureau operates a polling fax service* providing current weather charts, satellite images, coastal waters forecasts and tropical cyclone threat maps. Set your fax in 'Poll Receive' mode and dial 1902 935 200 for a directory of services . Access is also available via Inmarsat. Contact your Satcom provider for details.

Public radio/TV broadcasts
The Bureau distributes coastal waters forecasts and warnings to various television and radio networks.

Satellite communications
As part of the Global Maritime Distress and Safety System (GMDSS) the Bureau transmits via Inmarsat SafetyNET marine weather warnings and forecasts. High seas forecasts and warnings are broadcast over the Pacific Ocean satellite, whilst the Western area is broadcast over the Indian Ocean satellite. Some coastal waters forecasts are broadcast via SafetyNET and currently include Northern Territory, Western Australia and Bass Strait forecasts. A schedule is available at the Bureau website www.bom.gov.au/marine .

*Call costs apply (correct at time of print): for 1900 services, 77c per minute; for 1902 polling fax services, $1.38 per minute. (Call costs include GST and are higher from mobile and public phones).

Forecast and warning delivery systems (continued)

HF voice radio

Marine warnings are broadcast every hour, on the hour UTC while **forecasts and reports** are broadcast on a fixed schedule repeated every four hours. Schedules are available at www.bom.gov.au/marine. Voice schedules are also available in a booklet available through your local Bureau office and through many boating organisations.

VMC Broadcasts on Frequencies (kHz)	
Daytime (7am–6pm) EST	4426, 16546
Night-time (6pm–7am) EST	2201, 6507
Anytime	8176, 12365

VMW Broadcasts on Frequencies (kHz)	
Daytime (7am–6pm) WST	4149, 16528
Night-time (6pm–7am) WST	2056, 6230
Anytime	8113, 12362

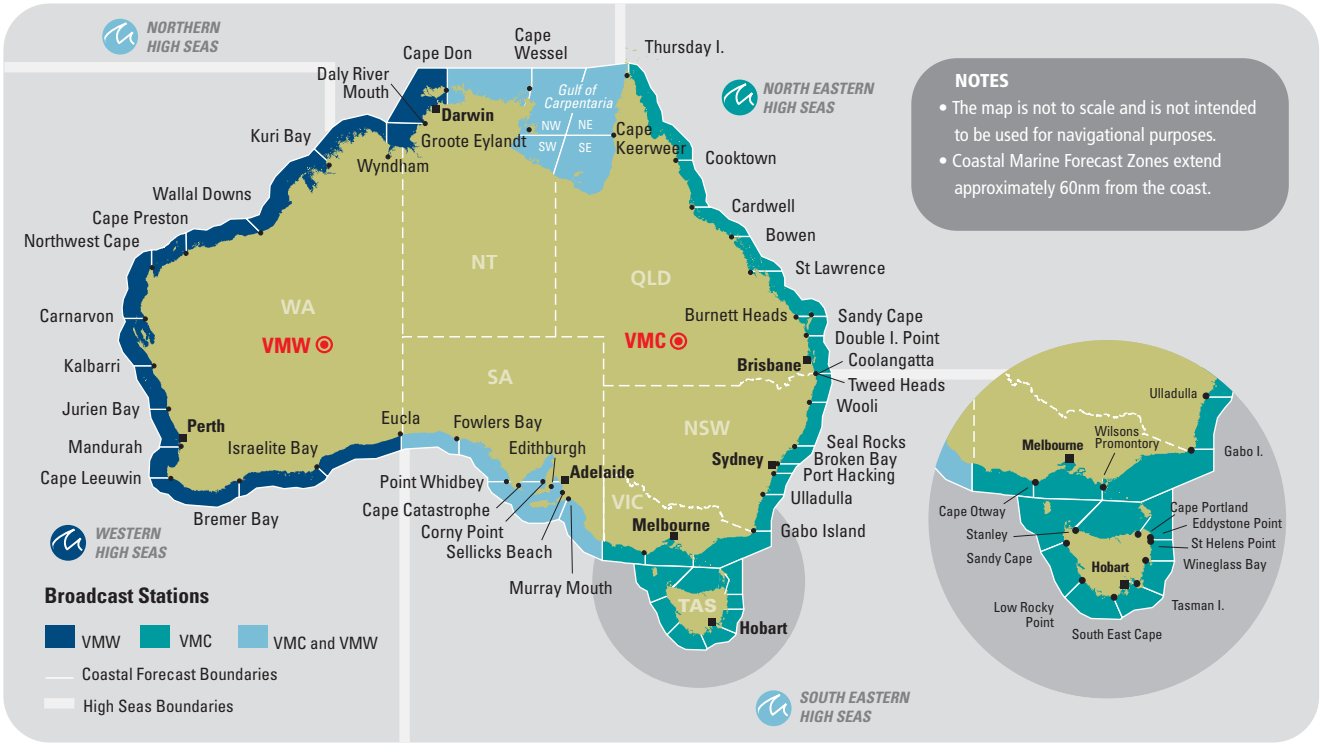
HF radiofax

The Bureau transmits weather charts and warning summaries (not including routine forecast text or satellite images) on a schedule repeated every 24 hours. Schedules are available from the Bureau's website www.bom.gov.au/marine or by phoning one of the Bureau's capital city offices. Reception requires a marine fax unit attached to your HF radio or a personal computer connected through an HF modulator.

VMC Broadcasts on Frequencies (kHz)	
Daytime (5am–7pm) EST	20469
Night-time (7pm–5am) EST	2628
Anytime	5100, 11030, 13920

VMW Broadcasts on Frequencies (kHz)	
Daytime (5am–7pm) WST	18060
Night-time (7pm–5am) WST	5755
Anytime	7535, 10555, 15615

High seas and coastal waters forecast areas



Further Information

Bureau of Meteorology telephone contacts

Brisbane	07 3239 8700
Sydney	02 9296 1555
Melbourne	03 9669 4000
Hobart	03 6221 2000
Adelaide	08 8366 2600
Perth	08 9263 2222
Darwin	08 8920 3800

Bureau website

www.bom.gov.au/marine

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Acknowledgement Third image, page one, 'Kylie' a trawler built by Adelaide Ship Construction International.

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