

MARINE WEATHER SERVICES

Marine Forecasts and Warnings

Routine coastal waters and high seas forecasts and warnings are produced by the Bureau of Meteorology and broadcast by Telstra marine radio and are available from a variety of other sources.

Routine Coastal Waters Forecasts are for areas within 60 nautical miles (nm) of the coast (see map for coastal waters sections). They are issued by Regional Forecasting Centres in each capital city several times daily and monitored for changes which may occur.

Routine 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 or hurricane-force winds are expected. The initial warning attempts to achieve a 12 to 24-hour lead-time and warnings are renewed every 6 hours.

Warnings to Shipping on the High Seas are issued whenever gale, storm or hurricane-force winds are expected. The initial warning attempts to achieve a 12 to 24-hour lead-time and warnings are renewed every 6 hours.

NOTE: Australian and International practice refers to weather system positions for marine use in DEGREES and TENTHS of a degree. For example 25.4 South is the latitude of twenty five decimal four degrees south, NOT twenty five degrees four minutes south. To convert the decimal to minutes, multiply by 6, i.e. 0.4 degrees = 24 minutes.

Winds

Winds flow in order to more evenly distribute heat between the equator and polar regions. Wind direction and speed is determined by the patterns of highs, lows and fronts seen on weather maps and by local effects such as sea-breezes. When the isobars (lines of equal pressure) around highs and lows become more closely spaced, then winds increase. That is, the higher (or tighter) the pressure gradient, the stronger the wind speed.

Stronger wind speeds are associated with tropical cyclones, 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.

Definitions and Terminology

Wind speed mentioned in forecasts and coastal observations is measured as the average speed over a 10-minute period. Gusts may be 40 per cent stronger than the speed.

Wind direction is given in the 16 compass points and is the direction the wind is coming from. A knot (kn) is the unit given to a speed of one nautical mile per hour.



Strong wind: 25 to 33 kn (remembering this is a 10-minute average) **Gale force:** 34 to 47 kn **Storm force:** 48 to 63 kn **Hurricane force:** more than 63 kn.

Wave height is the vertical distance between the top of the crest and the bottom of the trough.

Wind (or sea) 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 that were generated by the winds of distant weather systems. There may be more than one set of swell waves travelling in different directions, causing a confused sea state.

Sea state is the combination of wind waves and swell.

The forecasts of wave and swell height are meant to represent the average of the highest one-third of the waves. Hence some waves will be higher and some lower than the forecast wave height.

King waves occur when wind waves and/or a combination of swell waves join to form a very high wave. The shape and depth of the seabed is also important.

UTC (Universal Time Coordinate): time references in warnings for high seas are given in UTC.

Forecast & Warning Delivery Systems

Coastal Marine Radio

Telstra operate marine radio transmitters around the Australian coastline with marine (Coastal and High Seas) forecasts and warnings broadcast at scheduled times on the following frequencies:

2201, 4426, 6507, 8176, 12365 kHz, and VHF Channel 67

Contact Townsville (VIT), Brisbane (VIB), Melbourne (VIM), Perth (VIP) and Darwin Radio (VID) for a list of their scheduled times. When a weather warning is issued it will be broadcast when first received, and then at routine scheduled broadcast times.

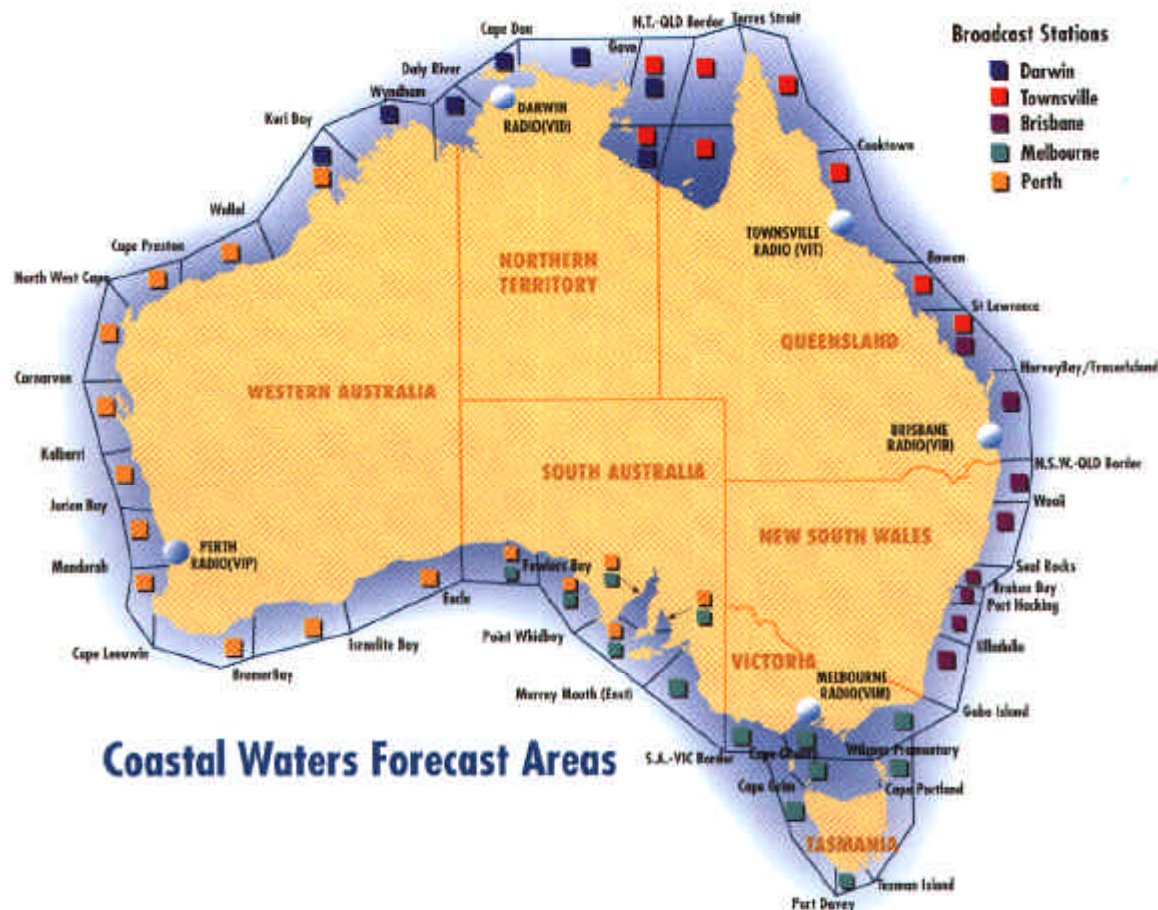
Public Broadcast Radio/TV Stations

The Bureau distributes coastal waters forecasts and warnings to the ABC and commercial networks (both city & country stations). Broadcasting of these varies between stations.

Recorded Telephone Services

The Bureau operates the following recorded services for coastal waters forecasts and warnings:

- **Local Waters Forecasts:** The Bureau & Telstra operate a number of Dial-it services with a '11' prefix. Check your local telephone directory or poll Weather By Fax on 019 725 254 for a list of your local numbers.
- **Severe Weather Warning Service:** This service carries coastal waters warnings. Check your local telephone directory or poll Weather By Fax on 019 725 254 for a list of your local numbers.



Coastal Waters Forecast Areas

- **0055 Marine Forecasts:** This service carries the coastal waters forecasts and latest reports. Check your local telephone directory, dial 0055 26113 or poll Weather By Fax on 019 725 254 for a list of your local numbers.

Weather By Fax

The Bureau of Meteorology uses the Telstra polling Fax system (Infafax) and provides over 120 fax products, including weather charts (updated 3-hourly), satellite photos (updated hourly) and the latest warnings and the routine coastal waters forecasts. Reports of current wind and sea conditions are also available.

Set your Fax in 'Poll Receive' mode and dial 1800 630 100 for a Free Main Directory. This system can also be accessed through a personal computer or lap-top using a modem. Access is also available via Seaphone and Inmarsat.

AXM/AXI HF Radio Fax

This system is operated by the Royal Australian Navy on behalf of the Bureau of Meteorology using two HF radio transmitters at Canberra and Darwin. Reception requires a marine fax unit attached to your HF radio or a Personal Computer connected through a HF demodulator.

HF Radio Fax transmits a range of weather charts and warning summary on a 24-hour schedule which is available via Weather By Fax on 019 725 046 or by phoning one of the Bureau's capital city offices. It does not transmit routine forecast text or satellite pictures.

Satellite Communications

Telstra's Satcom services and Inmarsat can be used to access faxed marine weather forecasts and warnings through the Infafax system. Optus MobileSat currently can only be used to access recorded voice products. As part of the Global Marine Distress & Safety System (GMDSS) Telstra transmits via Satcom-C a complete range of marine safety information, including weather warnings, free of charge.

Internet

A full range of Bureau of Meteorology forecast and warning products is available on the Internet via the World Wide Web. The access address on the Internet is: <http://www.bom.gov.au>. Included on the Web menu is the latest satellite photo, weather maps, marine forecasts and warnings and a range of educational pages.

Bureau of Meteorology Contacts

Brisbane:	Tel: 07 3864 8400	Sydney:	Tel: 02 9296 1555
Melbourne:	Tel: 03 9669 4915	Hobart:	Tel: 03 6221 2000
Adelaide:	Tel: 08 8366 2600	Perth:	Tel: 09 263 2222
Darwin:	Tel: 08 8982 2800		

Wind, Waves, Weather Booklet

A more detailed explanation of meteorological systems and local weather effects is available for a number of sections of the Australian coastline in a Bureau of Meteorology Boating Weather Series booklet entitled *Wind, Waves, Weather*. Contact the Bureau office in your capital city for details on availability.

Safety Hints

1. Know the local factors that influence sea conditions and know where to reach shelter quickly.
2. Learn how to read the weather map (pamphlet available).
3. Be aware that the weather map in the morning newspaper was drawn the day before.
4. Always check the latest forecast and warnings before going to sea and know what conditions exceed your safety limits.
5. Beware of rapidly darkening and lowering cloud – squalls may be imminent.
6. When at sea, listen to the weather reports on public or Telstra marine radio.
7. Be flexible – change your plans if necessary.



BUREAU OF METEOROLOGY
DEPARTMENT OF THE ENVIRONMENT, SPORT AND TERRITORIES

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WEATHER BY FAX

A white fax machine is shown in the foreground, printing a weather map. The map features a grid and a lightning bolt. In the background, a windmill and a building are silhouetted against a dramatic, cloudy sky.

**check the
weather!**

Freefax Directory 1800 630 100

WEATHER BY FAX



Check the Weather! It may save you time, money, your property or even your life! If you are about to harvest, concrete, go fishing or sailing, or plan on doing something outdoors, you can access the latest information to help you make critical, weather related decisions. Bureau forecasts, warnings and supporting information, such as satellite and radar pictures are also available.



Radar pictures are the latest new service letting you know the location and amount of rain falling near you. The three levels of intensity are depicted as: light, moderate and heavy rain. Local area and regional mosaic pictures are available for over 40 radar sites around Australia and are updated about every 10 minutes. Notes to help you interpret these pictures can be obtained from 1902 93 5751.



Satellite pictures provided on **Weather by Fax** are from the Japanese geostationary meteorological satellite and provided with the permission of the Japan Meteorological Agency. There will be occasions when the hourly imagery will be unavailable due to a fault or ground station scheduled maintenance. In these cases, the latest available picture will remain on the number. The outage schedule for the week is available from 1902 93 5479



Directory Updates can be checked at any time on 1800 630 100 freefax.

International and Inmarsat access to Weather by Fax? This is available through +61 3 9273 8xxx, where xxx is the last 3 digits of the 1902 93 5xxx service. Call costs for International, Inmarsat and mobile access may be higher than 60c per minute.



The following **Weather by Fax** numbers are current as of 1 June 1998.

Service	Number	Ap
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Main Directory 1800 630 100 freefax

Directories

Quick Reference	1902 93 5200
FarmWeather	1800 061 404
Voice Weather Services	1902 93 5254

Meteorological Explanations and Support

Weather Maps	1902 93 5256
Severe Storms	1902 93 5425
Surviving Tropical Cyclones	1902 93 5474
Flood Warnings	1902 93 5471
El Niño	1902 93 5257
Ozone	1902 93 5258
Radar Interpretation	1902 93 5751
Satellite Interpretation	1902 93 5255
Aneroid Barometer Use	1902 93 5263
Design IFD Rainfall Curves (Order Form)	1902 93 5077
'Farming a Sunburnt Country' (Order Form)	1902 93 5359
Cyclone Plotting Map	1902 93 5473

Weather Charts

Analyses and Forecasts

Australian Region MSLP Analysis	1902 93 5210
Australian Region +24hr Forecast	1902 93 5211
Australian Region 4 day Forecast	1902 93 5002
Australasian MSLP Analysis	1902 93 5351
Indian Ocean MSLP Analysis	1902 93 5212
Pacific Ocean MSLP Analysis	1902 93 5009
Upper Level Pressure Analysis	1902 93 5353
Australasian Gradient Wind Analysis	1902 93 5213
SH Long Wave Component Analysis	1902 93 5349
LAPS Analysis +24hr Forecast	1902 93 5438
SH + GASP 48hr Forecast	1902 93 5007
GASP 2/3day Forecast	1902 93 5728
GASP 4/5day Forecast	1902 93 5003
GASP 6/7day Forecast	1902 93 5004

National Services 1800 061 440 freefax

Miscellaneous

National Warnings Summary	1902 93 5001
TC Advice and Gales	1902 93 5250
Australian Capital Cities Observations	1902 93 5718
Australian Cities Brief Forecast	1902 93 5472
Combined 201, 210 and 211	1902 93 5252
UV Index Forecast Map	1902 93 5018
3-month Climate Outlook	1902 93 5251
Australian Drought Statement	1902 93 5259
Southern Oscillation Index and Sea Surface Temperature Update	1902 93 5432

Directory Listings

Service	Number	Approx Time
Temperatures at Selected International Cities	1902 93 5047	1
Rainfall		
Australian Daily Rainfall Bulletin	1902 93 5253	4
Daily Rainfall Map	1902 93 5010	2
Weekly Australian Region Rainfall	1902 93 5261	3
Weekly Rainfall Map	1902 93 5011	2
Weekly Temperatures and Rainfall Extremes	1902 93 5430	2
Weekly Temperature and Rainfall Summary	1902 93 5431	2
Month to Date Rainfall Map	1902 93 5016	2
Monthly Rainfall Totals	1902 93 5700	2
1&3-month Australian Region Rainfall	1902 93 5262	2
Marine Forecasts and Analyses		
Directories		
AXM/AXI RadioFax Schedule (Via Inmarsat +61 3 9273 8046)	1902 93 5046	1
<i>Coastal Forecasts and Warnings See Under States</i>		
Forecasts - Text		
South Eastern High Seas	1902 93 5268	1
Western High Seas	1902 93 5420	1
Northern High Seas	1902 93 5421	1
North Eastern High Seas	1902 93 5267	1
Forecasts - Sea Surface Wind (SSW)		
Eastern Australian (+12,+24,+36h)	1902 93 5475	4
Western Australian (+12,+24,+36h)	1902 93 5435	4
Forecasts - Waves		
Australian Region Total Wave	1902 93 5031	3
Australian Region Wind Wave	1902 93 5030	3
Australian Region Swell	1902 93 5266	3
Southern Pacific Total Wave +48hr	1902 93 5008	1
Analyses - Sea Surface Temperature (SST)		
Daily:		
- New South Wales	1902 93 5264	1
- Victoria/Tasmania	1902 93 5742	1
- South Australia and Bight	1902 93 5743	1
- South of Western Australia	1902 93 5265	1
- North of Western Australia	1902 93 5744	1
- Northern Territory	1902 93 5745	1
- Queensland	1902 93 5741	1
Satellite Pictures		
Hourly		
Australian Region	1902 93 5201	3
South Eastern Australia	1902 93 5203	3
South Western Australia	1902 93 5205	3
Western Australia	1902 93 5204	3

Service	Number	Approx Time
North Eastern Australia	1902 93 5202	3
Solomon Islands	1902 93 5208	3
Noumea	1902 93 5209	3
3 Hourly		
Full Earth Disc	1902 93 5206	3
Full Earth Disc Eastern Pacific & US	1902 93 5207	3
Scheduled Outages for Satellite Pictures	1902 93 5479	1
NSW & ACT Directory 1800 061 439 freefax		
Forecasts		
Notes on the Weather (+4day Forecast)	1902 93 5422	3
Coastal Waters	1902 93 5220	2
Sydney Metropolitan	1902 93 5222	1
South Eastern Districts	1902 93 5221	2
North Eastern Districts	1902 93 5781	2
Western Inland	1902 93 5791	2
Where are the District Boundaries?	1902 93 5032	1
ACT and Canberra Lakes	1902 93 5260	1
Snowy Mountains	1902 93 5227	1
Lord Howe Island	1902 93 5701	1
Norfolk Island	1902 93 5702	1
Warnings		
Marine	1902 93 5071	1
Severe Weather	1902 93 5073	1
ACT/NSW Land Warnings	1902 93 5072	1
ACT/NSW Fire Weather	1902 93 5074	1
Coastal Flood	1902 93 5075	1
ACT/NSW Inland Flood	1902 93 5076	1
Observations		
Greater Sydney	1902 93 5226	1
Latest Coastal	1902 93 5229	1
Daily Rainfall Bulletin	1902 93 5223	2
River Heights Bulletin	1902 93 5020	1
Summaries		
State Monthly	1902 93 5224	3
Sydney Monthly	1902 93 5225	2
Canberra Monthly	1902 93 5470	2
Victorian Directory 1800 061 433 freefax		
Forecasts		
Notes on the Weather (+4day Forecast)	1902 93 5423	3
Boat Weather Port Philip and Western Port Bays	1902 93 5237	1
Coastal Waters	1902 93 5230	2
Greater Melbourne and Bays	1902 93 5232	1
Southern Districts	1902 93 5231	2
Northern Districts	1902 93 5731	2
Where are the District Boundaries?	1902 93 5033	2

Service	Number	Approx Time
Alpine	1902 93 5238	1
Fire Weather	1902 93 5039	2
Warnings		
Marine	1902 93 5012	1
Land	1902 93 5013	1
Flood (North of the Divide)	1902 93 5015	1
Flood (South of the Divide)	1902 93 5014	1
Observations		
Latest Coastal	1902 93 5239	1
Weather Bulletin at 9am and 3pm	1902 93 5029	1
Daily Rainfall Bulletin	1902 93 5233	2
River Heights Bulletin	1902 93 5028	1
Summaries		
State Monthly	1902 93 5234	3
Melbourne Monthly	1902 93 5235	2

Tasmanian Directory 1800 061 437 freefax

Forecasts

Notes on the Weather (+4day Forecast)	1902 93 5424	3
Coastal Waters (Text)	1902 93 5240	3
Coastal Waters (Map)	1902 93 5246	3
State, Cities and Towns	1902 93 5242	2
Districts	1902 93 5241	2
Where are the District Boundaries?	1902 93 5037	1

Warnings

Marine	1902 93 5049	1
Land	1902 93 5048	1
Flood	1902 93 5050	1

Observations

Latest Coastal	1902 93 5249	1
Daily Rainfall Bulletin	1902 93 5243	1

Summaries

Hobart Monthly	1902 93 5245	1
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South Australian Directory 1800 061 435 freefax

Forecasts

Notes on the Weather (+4day Forecast)	1902 93 5428	3
Coastal Waters	1902 93 5280	2
State and Adelaide	1902 93 5282	1
Districts	1902 93 5281	2
Provincial Towns	1902 93 5043	1
Where are the District Boundaries?	1902 93 5035	1

Warnings

Fire, Sheep and Severe Weather	1902 93 5079	1
Marine	1902 93 5078	1
Flood	1902 93 5080	1

Observations

Latest Coastal	1902 93 5289	1
Daily Rainfall Bulletin	1902 93 5283	2

Service	Number	Approx Time
Summaries		
State Monthly	1902 93 5284	6
Adelaide Monthly	1902 93 5285	2
Rain Monthly	1902 93 5286	1

Western Australian Directory 1800 061 436 freefax

Forecasts

Notes on the Weather (+4day Forecast)	1902 93 5429	3
State, Perth & Metro	1902 93 5292	2
BoatWeather:		
- Perth Boatweather	1902 93 5720	3
- North West Coast	1902 93 5040	3
- West Coast	1902 93 5041	3
- South Coast	1902 93 5042	3
Coastal Waters:		
- Carnarvon to Eucla	1902 93 5290	3
- Wyndham to Jurien Bay	1902 93 5721	3
Districts	1902 93 5291	2
Where are the District Boundaries?	1902 93 5036	1
SW Land Division 4-day	1902 93 5296	1
Fire Weather for SW Land Division	1902 93 5295	1
Temperature for WA Towns	1902 93 5439	1
Christmas Island	1902 93 5703	1

Warnings

Tropical Cyclone and Gales	1902 93 5298	1
Tropical Cyclone Outlook	1902 93 5730	1
Tropical Cyclone Threat Map	1902 93 5297	1
Marine	1902 93 5066	1
Land	1902 93 5067	1
Flood	1902 93 5068	1

Observations

Latest Coastal	1902 93 5299	1
Daily Rainfall Bulletin	1902 93 5293	1

Summaries

Perth Monthly	1902 93 5294	2
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Northern Territory Directory 1800 061 438 freefax

Forecasts

Notes on the Weather (+4day Forecast)	1902 93 5417	3
Coastal Waters	1902 93 5214	3
State and Provincial	1902 93 5215	2
Where are the District Boundaries?	1902 93 5038	1

Warnings

Tropical Cyclone and Gale	1902 93 5218	1
Marine	1902 93 5069	1
Fire, Land and Gale	1902 93 5070	1

Observations

Latest Coastal	1902 93 5219	1
Daily Rainfall Bulletin	1902 93 5216	1

Summaries

Darwin and Alice Springs Monthly	1902 93 5217	2
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Directory Listings

Service	Number	Approx Time	Service	Number	Approx Time
Queensland Directory 1800 061 434 freefax			Warnings		
Forecasts			Tropical Cyclones, Severe Weather and Tsunami	1902 93 5278	1
Notes on the Weather	1902 93 5709	1	Tropical Cyclone Threat Map	1902 93 5277	1
Notes on the Weather (+4day Forecast)	1902 93 5427	3	Marine	1902 93 5063	1
Coastal Waters	1902 93 5270	2	Thunderstorm, Fire Weather and Sheep Graziers Warnings	1902 93 5064	1
SE Queensland Boating Weather	1902 93 5704	1	Flood	1902 93 5065	1
BoatWeather Forecasts:			Observations		
- All Coastal Waters	1902 93 5710	4	Latest Coastal	1902 93 5279	1
- South Eastern Coastal Waters	1902 93 5711	3	Daily Rainfall Bulletin	1902 93 5273	2
- Eastern Gulf	1902 93 5734	3	Daily Rainfall Map	1902 93 5274	3
- Torres Strait to Cooktown	1902 93 5735	3	River Height Bulletins:		
- Cooktown to Cardwell	1902 93 5736	3	- Nerang, Logan-Albert	1902 93 5051	1
- Cardwell to Bowen	1902 93 5737	3	- Brisbane, Bremer	1902 93 5052	1
- Bowen to St Lawrence	1902 93 5738	3	- Maroochy, Noosa, Mary	1902 93 5053	1
- St Lawrence-Burnett Heads	1902 93 5739	3	- Burnett, Kolan		
- Hervey Bay	1902 93 5740	3	Cherwell-Burrum, etc	1902 93 5054	1
State, Brisbane and South East	1902 93 5272	1	- Dawson, Mackenzie, Fitzroy	1902 93 5055	1
All Districts	1902 93 5271	2	- Pioneer, Proserpine, Haughton, Burdekin, etc	1902 93 5056	1
Northern Districts & Towns	1902 93 5705	1	- Herbert, Tully, Johnstone, Barron	1902 93 5057	1
Central Districts & Towns	1902 93 5706	1	- Macintyre, Dumaresq, Weir, Moonie	1902 93 5058	1
South Eastern Districts & Towns	1902 93 5708	1	- Condamine, Balonne, Maranoa, Wallam, etc	1902 93 5059	1
Western Districts & Towns	1902 93 5707	1	- Warrego, Paroo, Bulloo	1902 93 5060	1
Cities Precis	1902 93 5019	1	- Thomson, Barcoo, Cooper, Diamantina, etc	1902 93 5061	1
Where are the District Boundaries?	1902 93 5034	1	- Flinders, Norman, Gilbert, Leichardt, etc	1902 93 5062	1
4 Day Rainfall Map	1902 93 5045	1	Summaries		
Rural Weather Services:			Brisbane Monthly	1902 93 5275	2
- North Queensland	1902 93 5712	3	Townsville Monthly	1902 93 5044	1
- Central Queensland	1902 93 5713	3			
- Western Queensland	1902 93 5714	3			
- South Eastern	1902 93 5715	3			
- South East Coastal	1902 93 5716	3			



Access difficulties?

Contact the Telstra Infofax Help Desk between 8am and 8pm,
Monday to Friday on Freecall **1800 636 183**.

Faults with Bureau services?

These can be reported directly to our Help Desk quoting the
service number, the time and the nature of the fault on
+61 3 9662 2182 or **webops@bom.gov.au**.

Feedback and suggestions?

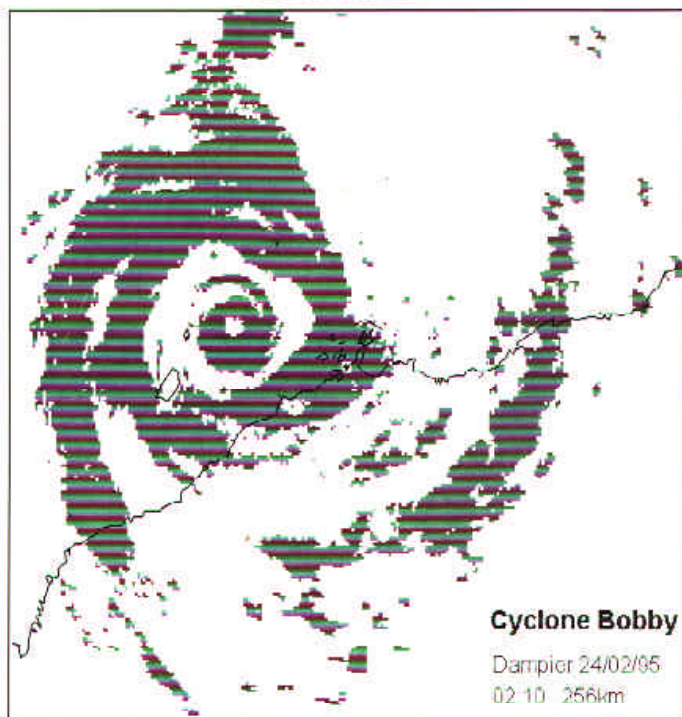
These may be forwarded straight to the Bureau's Service Manager
on freefax **1800 630 101** or **webreg@bom.gov.au**.

Other sources of Bureau forecasts and warnings:

- Weathercall Services (Voice): **1800 687 999** (Freecall Directory)
- Internet : **http://www.bom.gov.au**

RADAR PICTURES

new service



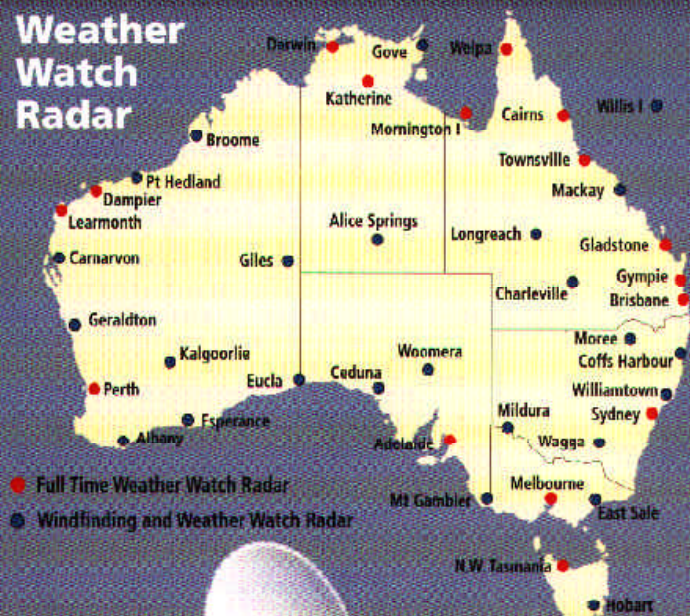
12600 Dampier 08:10770 24/02/95 128km

Dampier 12:10pm EST 24/2/95



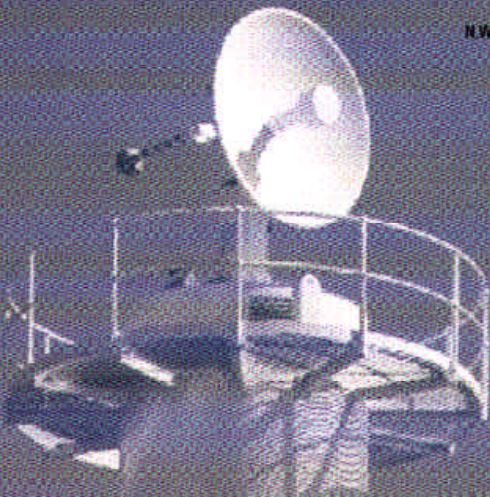
No rain Light rain Moderate rain Heavy rain No data

Weather Watch Radar



● Full Time Weather Watch Radar

● Windfinding and Weather Watch Radar



Service	Scale	Number	Approx Time
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BS or LS denotes Broad or Local Scale picture
* Denotes the radar is sometimes used for other purposes and a picture may not be available.
Notes on interpreting radar pictures can be obtained from 1902 93 5751.

NSW

Sydney	BS	1902 93 5749	1
Sydney	LS	1902 93 5228	1
Williamstown *	BS	1902 93 5767	1
Coffs Harbour *	BS	1902 93 5765	1
Moree *	BS	1902 93 5766	1
Moree*	LS	1902 93 5777	1
Wagga *	BS	1902 93 5768	1

Victoria

State	BS	1902 93 5750	1
Melbourne	LS	1902 93 5236	1
East Sale*	BS	1902 93 5792	1
Mildura *	BS	1902 93 5778	1
Mildura*	LS	1902 93 5725	1

Tasmania

State	BS	1902 93 5724	1
Hobart*	LS	1902 93 5790	1

South Australia

State	BS	1902 93 5746	1
Adelaide	LS	1902 93 5287	1
Mt Gambier*	BS	1902 93 5793	1
Woomera*	BS	1902 93 5794	1
Ceduna*	BS	1902 93 5798	1
Eucla*	BS	1902 93 5795	1

Western Australia

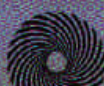
SW WA	BS	1902 93 5747	1
Perth	LS	1902 93 5719	1
Kalgoorlie *	BS	1902 93 5773	1
Esperance *	BS	1902 93 5772	1
Albany *	BS	1902 93 5771	1
Geraldton *	BS	1902 93 5774	1
Carnarvon *	BS	1902 93 5775	1
Learmonth	BS	1902 93 5754	1
Dampier	BS	1902 93 5753	1
Port Hedland *	BS	1902 93 5779	1
Broome*	BS	1902 93 5752	1
Giles*	BS	1902 93 5797	1

Northern Territory

Darwin	BS	1902 93 5723	1
Darwin	LS	1902 93 5727	1
Gove *	BS	1902 93 5769	1
Katherine	BS	1902 93 5755	1
Alice Springs *	BS	1902 93 5770	1

Queensland

SE Qld	BS	1902 93 5748	1
Brisbane	LS	1902 93 5276	1
Gympie (Mt Kanighan)	BS	1902 93 5756	1
Gladstone	BS	1902 93 5757	1
Mackay *	BS	1902 93 5762	1
Townsville	BS	1902 93 5758	1
Cairns	BS	1902 93 5759	1
Cairns	LS	1902 93 5776	1
Willis Island*	BS	1902 93 5796	1
Weipa	BS	1902 93 5760	1
Mornington Island	BS	1902 93 5761	1
Longreach *	BS	1902 93 5763	1
Charleville *	BS	1902 93 5764	1



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DEPARTMENT OF THE ENVIRONMENT



BUREAU OF METEOROLOGY

DEPARTMENT OF THE ARTS, SPORT, THE ENVIRONMENT AND TERRITORIES

The Weather Map

The weather map is one of the most familiar images in the community. The best known map is the mean sea level analysis, compiled from hundreds of weather observations (synoptic data) taken simultaneously around the Australian region. It is seen daily on television and in the newspapers.

Its dominant features are the smooth, curving patterns of sea level isobars — lines of equal atmospheric pressure — which show the central elements of our weather systems: highs, lows (including tropical cyclones) and cold fronts. It incorporates the effects of atmospheric processes at higher levels.

Television and newspapers also often carry forecast weather maps which indicate how the weather patterns are expected to develop.

Meteorologists use a wide range of information and techniques to formulate weather forecasts. The weather map does not and cannot show all of these factors. It is a fairly simple representation of past and probable future locations of surface weather systems (highs, lows, fronts, etc.). Nevertheless it provides a useful guide to the weather.

Everyone benefits from a better understanding of the weather map, especially people whose activities are particularly weather-sensitive — pilots, farmers, mariners, builders, outdoor sports enthusiasts — who often find the maps valuable, sometimes essential, to enhance their understanding of media forecasts and help form their own ideas based on local experience.

Preparing the weather map

The weather map can be likened to a giant jigsaw puzzle, assembled several times a day (usually three-hourly) from thousands of observations taken at internationally agreed times. The Bureau of Meteorology, like all the world's Meteorological Services, operates a network of its own stations to gather surface and upper air observations. More than 440 paid and volunteer part-time observers also make daily surface observations essential to the national picture.

Surface reports usually comprise observations of mean sea level pressure, wind direction and speed, present and past weather, temperature, dew-point (a measure of atmospheric moisture), cloud and visibility. Their information is formatted in an international code and transmitted nationally, often globally. Complementary, if less detailed, surface data come from the Bureau's expanding system of more than 100 automatic weather stations, ship reports, and from drifting buoys in the surrounding oceans.

Specialist observers gather **upper air** information on wind speed and direction by radar-tracking weather balloons, which may also carry instrument packages to transmit temperature and dew-point information at various heights (pressures) in the atmosphere. Some aircraft transmit upper air data.

Weather satellite data are a vital part of the analysis process. Australian meteorologists focus on hourly images from the Japanese Geostationary Meteorological Satellite operating in geostationary orbit 36,500 kilometres over the equator. Computer enhancement adds colour for easier interpretation. The animated sequences often shown on television are a particularly powerful analysis tool.

The Bureau's National Meteorological Centre in Melbourne also draws on similarly enhanced images from US and European geostationary satellites, as well as high-resolution images and atmospheric temperature profiles from polar-orbiting US satellites.

Vast numbers of observations on national and global scale flow to the supercomputers at the Bureau's Melbourne headquarters. The computers' mathematical models (equations) simulate atmospheric processes to produce three-dimensional broadscale weather analyses and prognostic maps which form the basis of weather forecasts for up to four days ahead. The models simulate the physical processes that determine how the atmosphere reacts to constantly changing pressure, temperature and humidity.

Fine-scale surface weather maps are prepared manually in Bureau forecasting offices, particularly the Regional Forecasting Centres in each State capital and Darwin, and Meteorological Offices in Canberra and Townsville.

Meteorologists take account of the centrally produced computer surface and upper air predictions, local data and manual charts, and animated satellite and radar images when preparing forecasts and warnings.

What do weather maps show?

The most obvious features of the media's weather maps (Figure 1 is an example) are the patterns of high and low pressure, and the barbed lines identifying cold fronts. In the southern hemisphere, the earth's rotation causes air to flow clockwise around low pressure systems and anticlockwise around high pressure systems. (The opposite applies in the northern hemisphere.) Friction over the earth's surface causes the winds to be deflected slightly inwards towards low pressure centres, and slightly outwards from high pressure systems. Wind strength is directly proportional to the distance between isobars — the closer the lines, the stronger the winds. This rule does not apply in the tropics where the effect of

the earth's rotation is weak. For this reason, tropical meteorologists usually replace isobars

with streamline arrows which indicate wind and direction without directly relating to the pressure gradient. Shaded areas on weather maps show where there has been rain in the previous 24 hours, and wind direction is shown with arrows that have a series of barbs on their tails to indicate speed.

The coverage on media weather charts is usually limited to the continent and surrounding oceans. The Bureau also produces global charts to take account of weather systems interacting with each other over great distances. Global charts are necessary when preparing forecasts up to four days ahead, and framing the monthly climate monitoring bulletins.

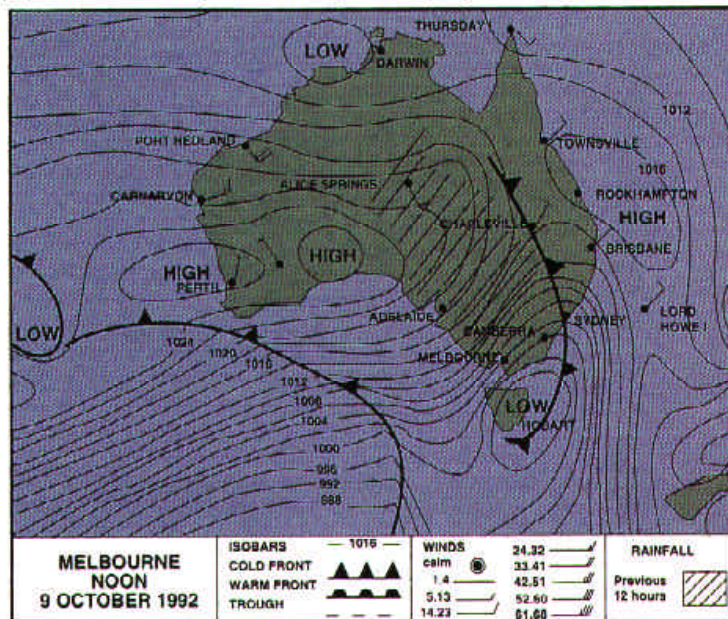


Figure 1 Typical newspaper weather map.

Typical weather map pattern:

An understanding of some systematic weather patterns is needed when interpreting a map.

- **Easterly winds** over the tropics and subtropics incorporate wave-like disturbances which usually travel westward. Important features of the tropical easterlies include the southeast trade winds, monsoon lows and sometimes tropical cyclones (known as hurricanes in the Americas and typhoons in Asia).
- A **high pressure belt in the mid-latitudes** (usually 30-50 degrees latitude) contains centres of varying strengths which generally move from west to east. Fluctuations in the intensity of these highs ('anticyclones') strongly influence the behaviour of the trade winds and the development and decay of tropical lows.
- The **belt of westerly winds** south of the high pressure region contains disturbances

which usually travel from west to east. Barbed lines indicate the leading edge of travelling cold (and occasionally warm) fronts, the boundaries between different types of air. The term 'front' was applied during World War I by European meteorologists who saw similarities between atmospheric structures and the large-scale conflict along battle fronts.

- Nearer the pole, a **series of deep subpolar lows** is usually centred between latitudes 50-60 degrees South.
- A **high pressure area over Antarctica** — associated with extremely cold and dense air — is ringed by easterly winds which form the boundary with the subpolar low pressure belt.

These typical features vary in intensity and location according to the season. For instance, in summer the high pressure belt is usually found

just south of Australia, while the subtropical easterlies cover most of the continent. Monsoon flows and associated lows over the tropics bring significant summer rain; tropical cyclones may develop. In winter the high pressure belt is usually located over the continent, allowing westerlies and strong cold fronts to affect southern Australia.

It is important to be alert to significant exceptions to this 'normal' situation when, for example, strong high pressure systems move slowly across the oceans well south of Australia. Closed or 'cut off' lows may then move across southern Australia or intensify over the Tasman Sea, possibly causing prolonged heavy rain.

It is also important to remember that all weather systems have a life cycle of development, maturity and decay. They occasionally show unusual behaviour. They may become stationary or even briefly reverse their usual direction of travel.

Hot or cold?

Remembering that air flows clockwise around low pressure systems and anticlockwise around high pressure systems, a fairly typical summer weather map (Figure 2) shows:

- **Northerly winds over eastern Australia** on the western flank of a Tasman Sea high. They carry hot, dry air from inland Australia southward over Victoria and Tasmania. With winds strengthening ahead of an approaching front, this represents a classic weather situation with extreme bushfire risk.

- **Moist, easterly flow** onto the Queensland coast causes very warm, humid and sultry weather east of the Great Dividing Range. This air, often susceptible to the development of showers and thunderstorms, is described as 'unstable'.

- The **cold front** passing South Australia replaces the hot, dry northwesterlies with southerlies carrying cooler, often relatively humid air from waters south of the continent.

Such summer fronts are often quite shallow and may not penetrate far inland, particularly if they are distorted and slowed over the Victorian mountains.

In Figure 3, a relatively common winter weather map shows:

- **Very cold, unstable air** from well south of Tasmania flows northward over Tasmania, Victoria and southeast New South Wales, reducing normal day temperatures typically by

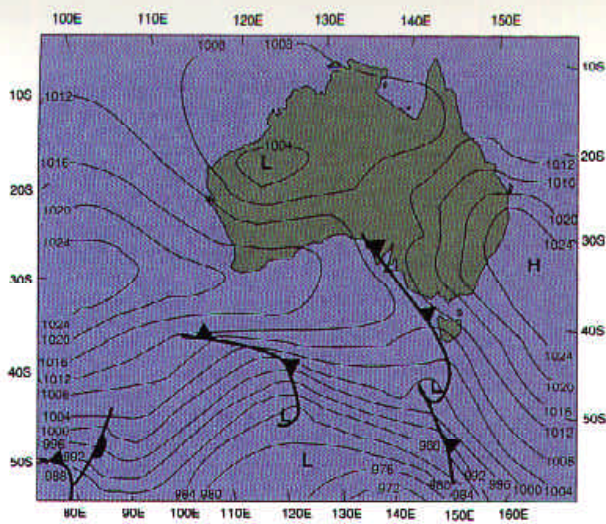


Figure 2 A summer weather map.

five degrees or more. Note the cold front, the deep low pressure (pressures below 976 hectopascals) south of Tasmania and the high (1020 hectopascals) south of the Bight. Occasionally, rapid interaction with other weather systems around the southern hemisphere can almost halt the pattern's eastward movement, causing successive cold fronts to

bring a prolonged spell of cold, showery weather to southern Australia.

- **Easterly winds** over inland Australia. Although southern cold fronts become shallow and diffuse as they move into northern Australia they often trigger a surge in the strength of the easterlies and this, combined

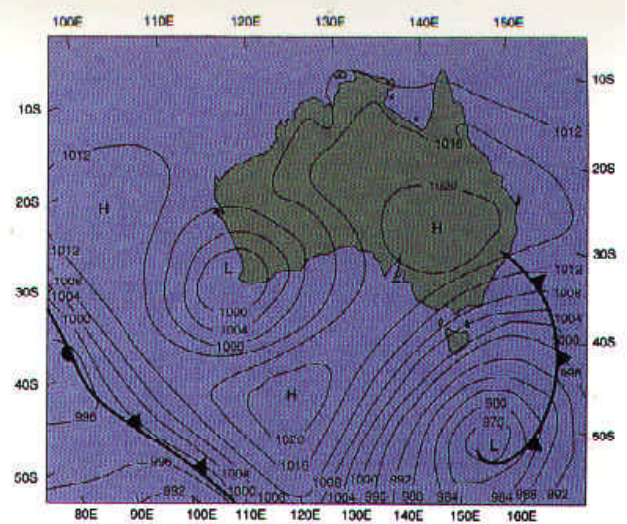


Figure 3 A winter weather map.

with their extreme dryness, creates a very high fire danger in the tropical savanna region.

- **active low pressure system** near Perth is 'cut off' from the southern westerlies. Situations of this type may cause rain and rather cold weather over southern parts of Western Australia.

Rain or fine?

Features on the surface weather chart indicate likely rainfall patterns as well as temperature distribution and wind strength. In general, highs tend to be associated with subsiding (sinking) air and generally fine weather, while lows are associated with ascending (rising) air and usually produce rain or showers.

While cloud can exist without rain, the opposite is not the case.

Clouds form by the condensation of water vapour through cooling. Causes of cooling include:

- **Convection**, which may be caused through air mass instability. It may be initiated by warming of low-level air, forced ascent over mountainous country, or dynamic causes associated with severe weather systems. Cumulus clouds often form as a result of convection. The most exceptional forms are often associated with severe thunderstorms and occasionally, tornadoes. Cumulonimbus, for instance, may reach altitudes above 15,000 metres.
- **Systematic ascent of moist air** over large areas linked with large-scale weather systems such as low pressure systems, including tropical cyclones. In mid-latitudes this systematic ascent often occurs ahead of active fronts, or with 'cut off' lows. This type of rain may be persistent and heavy and cause floods, especially if enhanced by forced (orographic) ascent over mountains.
- **Orographic ascent** which occurs when air is forced upwards by a barrier of mountains or hills. Cloud formation and rainfall is often the result. Australia's heaviest rainfall occurs on the Queensland coast and in western Tasmania, where prevailing maritime airstreams are forced to lift over mountain ranges.
- **Cold and warm fronts** which also cause systematic ascent. A cold front is the boundary where cold air moves to replace, and undercut, warmer and less dense air. Associated cloud and weather may vary enormously according to the properties of the air masses,

but tends to be concentrated near the front. As a typical cold front approaches, winds freshen from the north or northwest, and pressure falls. After the front passes, winds shift direction anticlockwise ('backing' to the west or southwest) and pressure rises. Cold fronts are much more frequent and vigorous over southern Australia than elsewhere. Warm fronts, relatively infrequent over Australia, are usually found in high latitudes where they can occasionally cause significant weather. They are often shown on weather charts over the Southern Ocean. Warm fronts progressively displace cool air by warmer air.

- **Convergence lifting** which occurs when more air flows into an area at low levels than flows out, leading to forced rising of large air masses. Convergence is often associated with wave-like disturbances in tropical easterlies and may also occur with broad tropical air masses flowing to the south. Given sufficient atmospheric moisture and instability, it may cause large cloud clusters and rain.

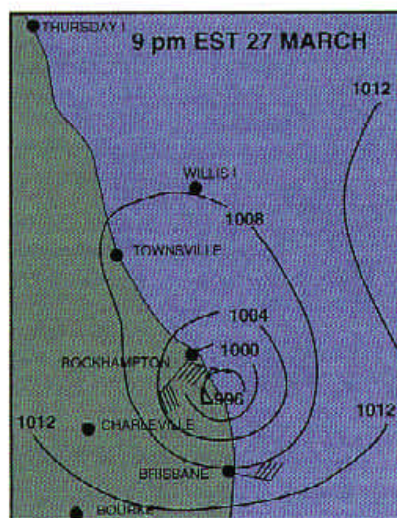
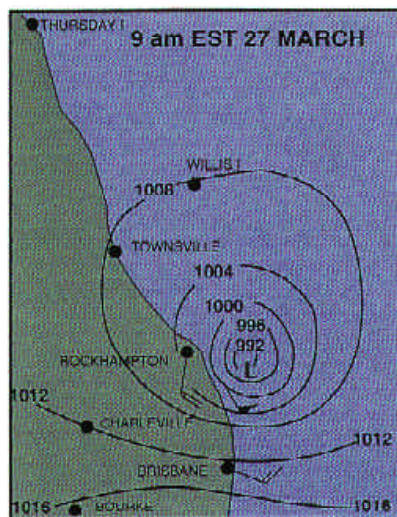
How strong will the winds be?

A mean sea level pressure chart shows the direct relationship between isobar spacing (pressure gradient) and orientation, and the strength and direction of surface winds. The general rule is that winds are strongest where the isobars are closest together. Thus the strongest winds are usually experienced near cold fronts, low pres-

sure systems and in westerly airstreams south of the continent. Winds are normally light near high pressure systems where the isobars are widely spaced.

However, because of a latitude effect winds in middle latitudes are lighter than those in the tropics with similarly spaced isobars.

In Australia, the most destructive winds over broad areas are generated by tropical cyclones. (Tornadoes, associated with some severe thunderstorms, have the potential to generate higher wind speeds, but areas affected are much smaller than these tropical storms.)



Figures 4 (a) and (b) Charts of a cyclone moving from the Coral Sea to the Queensland coast demonstrate how isobars indicate wind speed and direction.

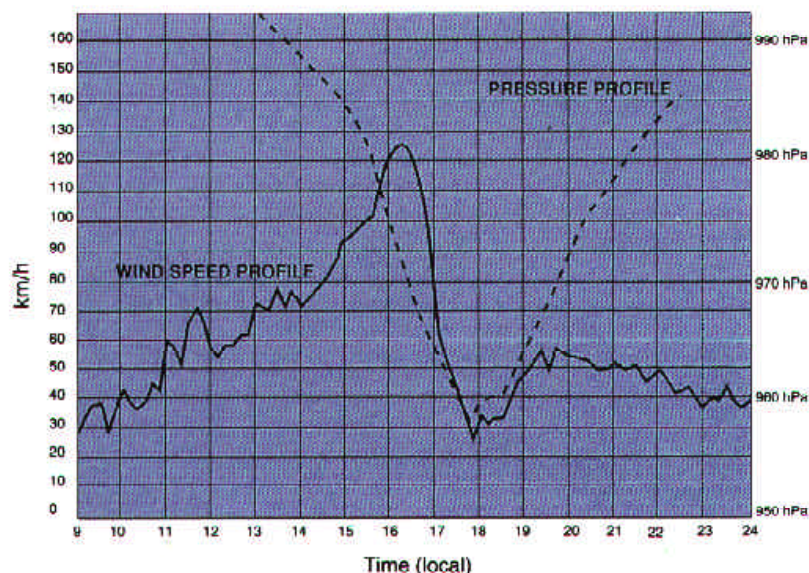


Figure 5 Typical wind speed and pressure relationships for a tropical cyclone - cyclone Winifred, Cowley Beach, Queensland, February 1986.

Tropical cyclones are low pressure systems in the tropics which, in the southern hemisphere, have well defined clockwise circulations with mean surface winds (averaged over ten minutes) exceeding gale force (63 kilometres per hour) surrounding the centre. Tropical cyclones exhibit a relatively clear eye, surrounded by dense wall clouds and a series of spiral rain-bands. The Bureau tracks cyclones with weather watch radar, special service reports and frequent satellite images. Figures 4(a) and (b) show a tropical cyclone approaching, and crossing the Queensland coast near Rockhampton. The pressure gradient is very steep towards the cyclone's centre and wind

speeds on the nearby coast in this case would have been about 110 kilometres per hour with gusts 50 per cent or more above this mean wind speed. In Figure 4(b), 12 hours later, the cyclone has moved inland. Cut off from its heat energy source, the ocean (it requires sea-surface temperatures above 26.5°C), its intensity has decreased and wind speeds have dropped to 85-90 kilometres per hour. Figure 5 graphs the relationship between wind speed and pressure as the eye of tropical cyclone Winifred crossed Cowley Beach, in Queensland, in February 1986. The relationship is characteristic of tropical cyclones.

Using weather charts

Preparation of weather charts which predict surface and upper level flow patterns up to several days ahead is integral to weather forecasting. The best and most objective way of doing this is to use computer models incorporating the equations which represent the motion of the atmosphere, and its associated physics. The Bureau's supercomputers run mathematical models on a global and regional scale for both daily forecasting and for research.

While predicted (prognostic) weather charts are essential to the forecast process, they must be interpreted by meteorologists to prepare specif-

ic weather forecasts and warnings. Forecast errors still occur, due to limitations in data or the forecast models, and the inherent complexity of the atmosphere, but forecast accuracy has increased very significantly since the introduction of satellite information and mathematical modelling. Prognostic charts shown routinely on television and in newspapers predict conditions up to three days ahead.

An inexpensive aneroid barometer enables weather map watchers to follow changes in surface air pressure over time, giving important clues to subtle alterations in weather systems.

By combining information from the barometer, weather maps and forecasts from the media, and personal experience from sky watching, they can make the most of the Bureau's weather service.

It will be realised by now that a single weather map is only a forecasting aid and that a great deal of other data and information must be gathered and processed before a forecast is issued. However, the information in this leaflet should assist in understanding and interpretation.

For further information contact the Bureau of Meteorology Regional Office in your State or Territory

WEATHER WORDS

Meteorologists preparing weather forecasts and warnings compress a lot of information into standardised, brief messages. Their predictions for electronic media and newspaper 'headline' forecasts must be particularly concise.

Working under frequent deadlines (all capital city forecasts, for instance, are updated several times a day), forecasters summarise information using consistent terminology to minimise the risk of misunderstanding.

Because forecasts are written for a specific timespan and area, they should not carry too much detail, as they must be valid over large areas, perhaps 10 000 square kilometres for a capital city.

The following definitions of some common forecasting terms will help you extract the maximum information from forecasts.

In particular, note that *fine* means the absence of rain or other precipitation such as hail or snow—not 'good' or 'pleasant' weather.

CLOUD COVER

Clear Sunny

Free from cloud, fog, mist or dust haze.

Little chance of the sun being obscured by cloud. (*Note: High level cirrus clouds are often thin and wispy, allowing a considerable amount of sunlight to penetrate them, sufficient to produce shadows. In this case the day could be termed 'sunny' even though more than half the sky may be covered in cirrus cloud.*)

Cloudy

Predominantly more cloud than clear sky. For example, during the day the sun would be obscured by cloud for substantial periods of time.

Overcast

Sky completely covered with cloud.

- Forecasts of cloud cover normally give an average, if no significant variations are expected. A *clear day*, for example, may at some times see a few cloud patches.
- Forecasters expecting significant variations in cloud amount may use such terms as *sunny periods*, *sunny breaks*, *cloudy periods*, *cloudy at times*, *mostly/mainly sunny*, *mostly/mainly cloudy*.
- If expecting a major change in cloud cover, they usually indicate a distinct trend, e.g. *becoming sunny* or *cloud increasing*.

DRIZZLE

Fairly uniform precipitation composed exclusively of very small water droplets (less than 0.5 mm in diameter) very close to one another.

DRY

Free from rain. Normally used when preceding weather has also been relatively dry, and dry weather is expected to continue for at least a day or so.

FINE

No rain or other precipitation (hail, snow, etc). The use of *fine* is generally avoided in excessively cloudy, windy, foggy or dusty conditions.

FOG

Suspension of very small water droplets in the air, reducing visibility at ground level to less than a kilometre.

FROST

Deposit of soft white ice crystals or frozen dew drops on objects near the ground; formed when surface temperature falls below freezing point.

MIST

Similar to fog, but visibility remains more than a kilometre.

PRECIPITATION

Any or all of the forms of water particles, whether liquid (e.g. rain, drizzle) or solid (e.g. hail, snow), that fall from a cloud or group of clouds and reach the ground. (See Drizzle, Rain)

WEATHER WORDS

PRECIPITATION: HOW LONG? HOW INTENSE? HOW WIDESPREAD?

Length

Brief	Short duration.
Intermittent	Precipitation which ceases at times.
Occasional	Precipitation which while not frequent, is recurrent.
Frequent	Showers occurring regularly and often.
Continuous	Precipitation which does not cease, or ceases only briefly.
Periods of rain	Rain is expected to fall most of the time, but there will be breaks.

Intensity

Slight or light

Rain	Individual drops easily identified, puddles form slowly, small streams may flow in gutters.
Drizzle	Can be felt on the face but is not visible. Produces little run off from roads or roofs. Generally visibility is reduced, but not less than 1000 m.
Snow	Small sparse flakes. Visibility generally reduced but not less than 1000 m.
Hail	Sparse hailstones of small size, often mixed with rain.

Moderate

Rain	Rapidly forming puddles, downpipes flowing freely, some spray visible over hard surfaces.
Drizzle	Window and road surfaces streaming with moisture. Visibility generally between 400 and 1000 m.
Snow	Large numerous flakes and visibility generally between 400-1000 m.
Hail	Particles numerous enough to whiten the ground.

Heavy

Rain	Falls in sheets, misty spray over hard surfaces, may cause roaring noise on roof.
Drizzle	Visibility reduced to less than 400 m.
Snow	Numerous flakes of all sizes. Visibility generally reduced below 400 m.
Hail	A proportion of the hailstones exceed 6mm diameter.

Distribution of showers (or other weather phenomena)

Few	Indicating timing, not an area.
Isolated	Showers which are well separated in space during a given period.
Local	Restricted to relatively small areas.
Patchy	Occurring irregularly over an area.
Scattered	Irregularly distributed over an area. Showers which, while not widespread, can occur anywhere in an area. Implies a slightly greater incidence than isolated.
Sporadic	Scattered or dispersed in respect of locality or local distribution. Characterised by occasional or isolated occurrence.
Widespread	Occurring extensively throughout an area.

RAIN

Precipitation of liquid water drops greater than 0.5 mm in diameter. In contrast to showers, it is steadier and normally falls from stratiform (layer) cloud.

SHOWERS

Falls of rain, hail or snow which usually begin and end suddenly. Relatively short-lived, but may last half an hour. Often, but not always, separated by blue sky.

WEATHER WORDS

SMOG

Smog (contraction for 'smoke fog') is a fog in which smoke or other forms of atmospheric pollutant have an important part in causing the fog to thicken, and have unpleasant and dangerous physiological effects.

THUNDERSTORM

One or more sudden electrical discharges manifested by a flash of light (lightning) and a sharp rumbling sound (thunder). A **severe thunderstorm** produces one or more of hail at the ground with diameter of 2 cm or more; wind gusts at the ground of 90 kmh or more; tornadoes; very heavy rain likely to cause flash flooding.

TORNADO

A violent whirl, generally clockwise, averaging about 100 m in diameter.

WIND TERMS

The wind is a continuous succession of gusts and lulls associated with equally rapid changes of direction over a range which may exceed 30°. The mean wind speed over a period of time is therefore the mean of many gusts and lulls. Usually only the mean wind is forecast, unless the gusts are expected to be a significant feature. For instance, *Fresh, gusty southwest winds* indicates that the mean wind speed will be between 17 and 21 knots and the mean wind direction will be from the southwest, but that there will also be gusts to speeds significantly higher than the mean.

Gust

A gust is any sudden increase of wind of short duration, usually a few seconds.

Squall

A squall comprises a rather sudden increase of the mean wind speed which lasts for several minutes at least before the mean wind returns to near its previous value. A squall may include many gusts.

Wind descriptions (derived from the Beaufort Wind Scale)

	Limits in knots	km/h	Description on land	Description at sea
CALM	-		Smoke rises vertically.	Sea like a mirror.
LIGHT WINDS	10 knots or less	19 km/h or less	Wind felt on face; leaves rustle; ordinary vanes moved by wind.	Small wavelets, ripples formed but do not break; a glassy appearance maintained.
MODERATE WINDS	11-16 knots	20-30 km/h	Raises dust and loose paper; small branches are moved.	Small waves - becoming longer; fairly frequent white horses.
FRESH WINDS	17-21 knots	31-39 km/h	Small trees in leaf begin to sway; crested wavelets form on inland water.	Moderate waves, taking a more pronounced long form; many white horses are formed - a chance of some spray.
STRONG WINDS	22-27 knots	41-50 km/h	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty.	Large waves begin to form; the white foam crests are more extensive with probably some spray.
	(Strong wind warning issued at 25 knots - 46 km/h)			
GALE	28-33 knots	51-61 km/h	Whole trees in motion; inconvenience felt when walking against wind.	Sea heaps up and white foam from breaking waves begins to be blown in streaks along direction of wind.
	34-40 knots	62-74 km/h	Twigs break off trees; progress generally impeded.	Moderately high waves of greater length; edges of crests begin to break into spin drift; foam is blown in well marked streaks along the direction of the wind.
STORM	41-47 knots	75-87 km/h	Slight structural damage occurs - roofing dislodged; larger branches break off.	High waves; dense streaks of foam; crests of waves begin to topple, tumble and roll over; spray may affect visibility.
	48-55 knots	88-102 km/h	Seldom experienced inland; trees uprooted; considerable structural damage.	Very high waves with long overhanging crests; the resulting foam in great patches is blown in dense white streaks; the surface of the sea takes on a white appearance; the tumbling of the sea becomes heavy with visibility affected.
	56 knots plus	103 km/h	Very rarely experienced - widespread damage.	Exceptionally high waves; small and medium sized ships occasionally lost from view behind waves; the sea is completely covered with long white patches of foam; the edges of wave crests are blown into froth.

WEATHER NOUIS

SEA TERMS

Sea waves	Sea waves are those generated by the wind blowing at the time, and in the recent past, in the area of observation.
Swell waves	Waves which have travelled into the area of observation after having been generated by previous winds in other areas. These waves may travel thousands of kilometres from their origin before dying away. There may be swell present even if the wind is calm and there are no 'sea' waves.
Wave period	The average time interval between passages of successive crests (or troughs) of waves.
Wave height	Generally taken as the height difference between the wave crest and the preceding trough.
Wave length	The mean horizontal distance between successive crests (or troughs) of a wave pattern.

Sea (wind sea) and swell states

SEA (in open sea)

Description	Height (metres)	Effect
Calm (glassy)	0	No waves breaking on beach
Calm (rippled)	0 - 0.1	No waves breaking on beach
Smooth	0.1 - 0.5	Slight waves breaking on beach
Slight	0.5 - 1.25	Waves rock buoys and small craft
Moderate	1.25 - 2.5	Sea becoming furrowed
Rough	2.5 - 4	Sea deeply furrowed
Very rough	4 - 6	Sea much disturbed with rollers having steep fronts
High	6 - 9	Sea much disturbed with rollers having steep fronts (damage to foreshore)
Very high	9 - 14	Towering seas
Phenomenal	over 14	Precipitous seas (experienced only in cyclones)

SWELL

Description	Wave length	Period	Wave height
Low swell of short or average length	0 - 200 m	Less than 11 sec	0-2 m
Long, low swell	over 200 m	Greater than 11 sec	0-2 m
Short swell of moderate height	0-100 m	Less than 8 sec	2-4 m
Average swell of moderate height	100-200 m	Greater than 8 sec, less than 11 sec	2-4 m
Long swell of moderate height	over 200 m	Greater than 11 sec	2-4 m
Short heavy swell	0-100 m	Less than 8 sec	over 4 m
Average length heavy swell	100-200 m	Greater than 8 sec, less than 11 sec	over 4 m
Long heavy swell	over 200 m	Greater than 11 sec	over 4 m

WEATHER MONITOR





BUREAU OF METEOROLOGY

WEATHER INFORMATION FOR THE SYDNEY- HOBART, TELSTRA CUP, and SYDNEY-COFFS HARBOUR YACHT RACES

Web Sites

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

The Australian Bureau of Meteorology home page. Add /marine for ocean products.

http://www.bom.gov.au/reguser/sp_ev/sydhob.shtml

(Note: Remember to include the underscore "_" in sp_ev)

Web page set up by the Bureau of Meteorology especially for Sydney – Hobart Yacht Race competitors, including latest hourly coastal observations, weather charts and high resolution wind, sea and swell prognoses.

<http://www.bom.gov.au/info/wmd/olympic/>

Latest observations and forecasts around Sydney Harbour.

Link to the Manly Hydraulics Laboratory near real time NSW wave data and graphs. For the MHL home page go to <http://www.mhl.nsw.gov.au>

http://www.marine.csiro.au/yacht_races/

For the best satellite imagery of Sea Surface Temperatures from CSIRO.

(Note the underscore "_" in yacht_races)

<http://www.syd-hob.telstra.com.au/weather/index.cfm>

Telstra's Sydney-Hobart weather page.

Weather by Fax (INFOFAX – Bureau fax based polling service)

Main Directory – Freepoll		1800 630100
Sydney-Hobart race forecast - Sydney to 38S		1902 935811
Sydney-Hobart race forecast - 38S to Hobart		1902 935812
Sydney-Hobart Coastal Observations		1902 935813
N.S.W. Coastal Waters forecasts		1902 935220
N.S.W. Marine warnings		1902 935071
N.S.W. Latest Coastal observations		1902 935229
Victorian Coastal Waters forecasts		1902 935230
Victorian Marine warnings		1902 935012
Victorian Latest Coastal observations		1902 935239
Tasmanian Coastal Waters forecasts -text		1902 935240
Tasmanian Coastal Waters forecasts - map		1902 935246
Tasmanian Marine warnings		1902 935049
Tasmanian Latest Coastal observations		1902 935249
Notes on the Weather (+4 day forecast)	NSW	1902 935422
	VIC	1902 935423
	TAS	1902 935424
Sydney Metropolitan forecast		1902 935222
Current Sydney weather radar image		1902 935228
Lord Howe Island Forecast		1902 935701
Tasmanian State, Cities & Towns		1902 935242
Aust region MSL Analysis chart		1902 935210
Aust region +24 Forecast chart		1902 935211
Aust region GASP 2-3 day Forecast charts		1902 935728
Aust region GASP 4-5 day Forecast charts		1902 935003
Aust region GASP 6-7 day Forecast charts		1902 935004
Latest satellite pictures (Australia)		1902 935201
Latest satellite pictures (SE Australia)		1902 935203
Model forecast winds – East Australia +12, +24, +36 hr		1902 935475
Aust region Total Wave		1902 935301
Aust region Swell		1902 935266
Recorded Telephone Service		
NSW coastal waters		1900 926101
		1900 969955
Sydney Forecast		1900 926100
Victorian coastal waters		1900 926110
		1900 969966
Tasmanian coastal waters		1900 969940
Hobart Forecast		1900 926157