



OCEAN RACING CLUB OF VICTORIA

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# WEATHER FOR SAILORS

FUNDAMENTALS & PLANNING FOR A 3+ DAY PASSAGE

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# Interact with Us

## Train



Navigation  
On Water Rip Tour  
Weather  
Foredeck Essentials

## Race



Destination Races to:  
Devonport, King Island, Hobart  
Apollo Bay, Port Fairy,  
Coastal Sprints

## Volunteer



Support  
Many Roles  
Race Management, Media,  
Training Support, Mentoring





1

# House rules & explanation


The sessions will go for approximately 2 hours including presentations, chats and exercises  
 There will be a 10 min break in the middle


**Teams – protocols and tools**

Chat – general chit-chat. Attendee participation is very much encouraged 


Q&A – specific Questions & Answers 


- oModerator – might not raise a question to the presenter if they know the topic is coming up

Raise hand 

Audio and Video 

- oCamera
- oMute

Polls, Quiz's 

Select "View" the  Focus on content" will provide a better experience

2



Ray Shaw



Simon Dryden

3

# Poll

## What type boating do you do



4

# Poll

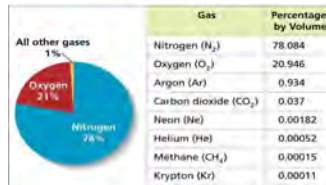
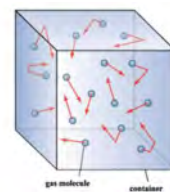
What are the most important things for you for a sail in the bay



5

## Some Basic Concepts

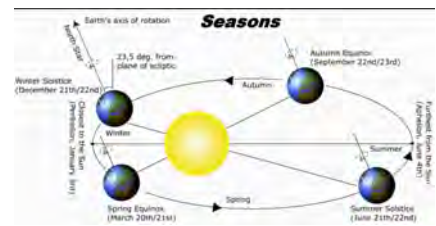
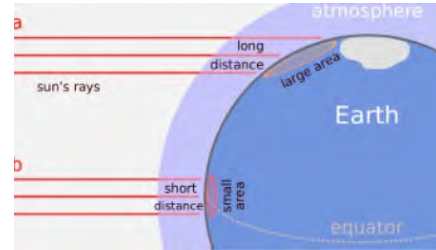
- Weather
- Climate
- Air
- Temperature
- Pressure
- Humidity
- Wind - speed and direction
- Force – causes things to accelerate



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# What Causes Changes in the Weather?

- Heating of the Earth by the Sun
- Uneven due to terrain, oceans, cities causing temperature differences
- Equatorial Regions heated more than the Polar Regions
- Night and Day Caused by the Earth's rotation about its axis
- Seasons caused by the Earth's tilt to its axis of rotation and the revolution about the Sun



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## Measurement of Weather Data is Key



Temperature



Air Pressure

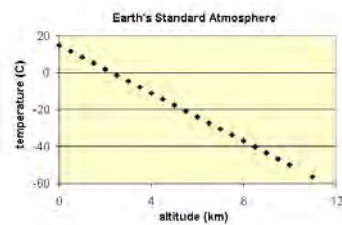
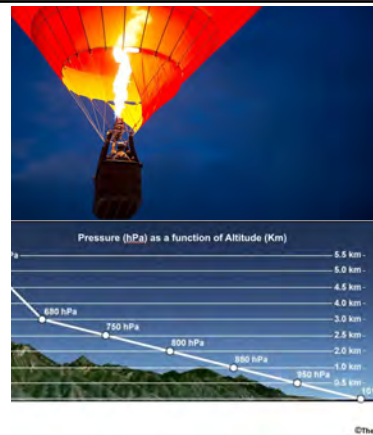


Wind Speed and Direction

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## More Basic Concepts

- Hot air rises – lower density
- Cold air descends - heavier
- Air Pressure decreases with altitude
- Air Temperature decreases with altitude in the Troposphere
- Air flows from regions of high pressure to lower pressure



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## Air Pressure

- Air pressure is the weight of the column of air above an area on Earth's surface
- Air pressure decreases with altitude
- Differences in air pressure key to wind speed and direction

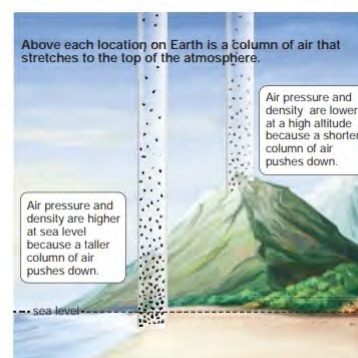


Figure 1.10 Atmospheric pressure acts like a column

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## Poll

Is the wind direction where it is coming from or where it is blowing to?



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## Poll

Does temperature increase or decrease with height in the Troposphere?



12

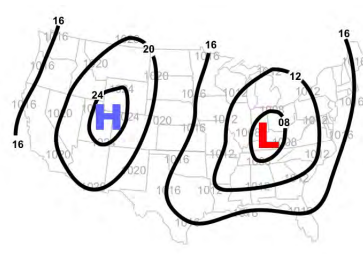
# Poll

Are the seasons caused by the Earth's rotation on its axis or its revolution about the sun?



13

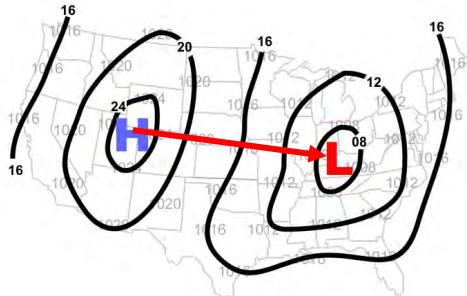
## Measurement of Atmospheric Pressure



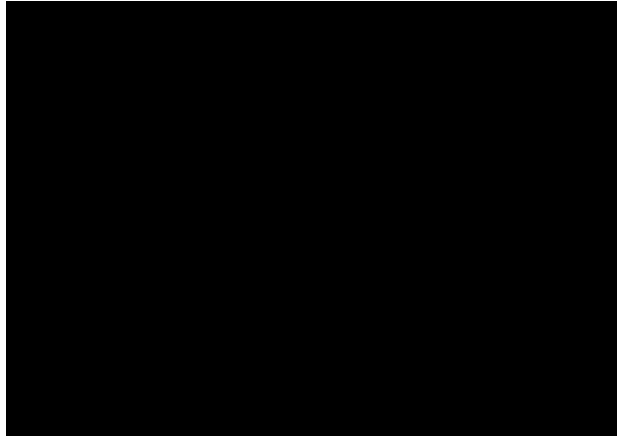
- Measure the pressure all over the country at sea level
- Join all the points with the same pressure to form isobars
- Identify the high and low pressure regions

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## Wind Direction?

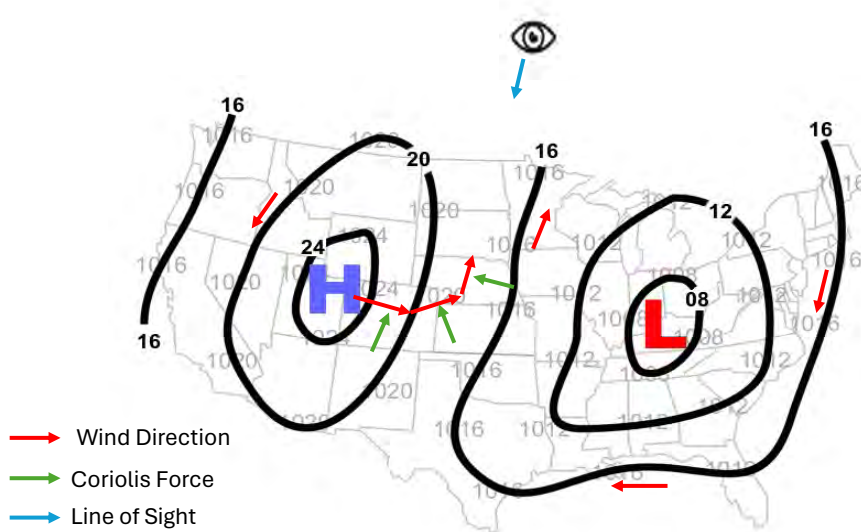


- Would expect the wind to blow directly from high to low pressure, but the Earth rotates!
- No Coriolis force at the Equator and maximum at the poles



15

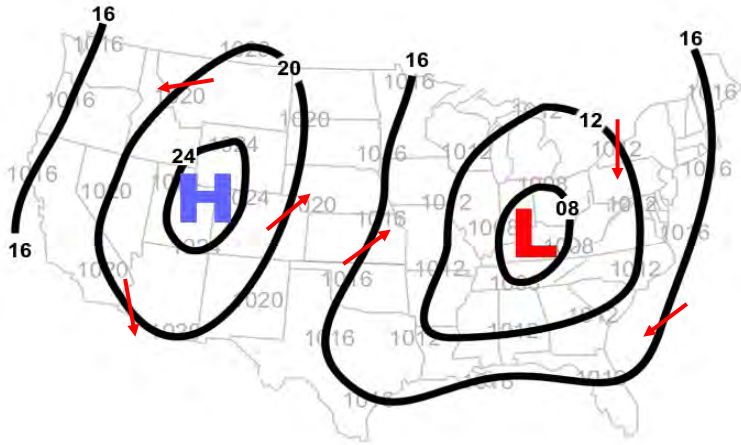
## Effect of Coriolis on Wind Direction



- Wind starts off going from high to low pressure but is bent by the Coriolis force
- Wind direction parallel to the isobars in the upper atmosphere
- Shown for the Southern Hemisphere
- Clockwise around a low,
- Anticlockwise around a high
- Opposite Direction in the Northern Hemisphere
- Gives rise to Buys Ballots Law: face the wind and the high pressure is on the right (Southern Hemisphere)

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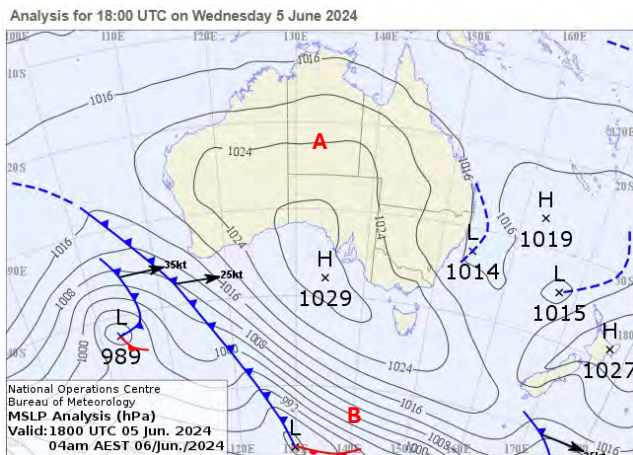
# One Final Wrinkle!



- Friction at the Earth's surface due to land, seas, waves, cause the wind to be not quite parallel to the isobars
- Wind direction angled at about 15 degrees to the isobars as shown
- Clockwise about a low pressure system, towards the centre, anticlockwise about a high pressure system, away from the centre
- Opposite for the northern hemisphere

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# Australian Weather Map



## Points to Notice

- Regions of high and low pressure (1013 mb is the reference pressure)
- Red and blue lines denote fronts, troughs and ridges to which we will return
- Closer spaced isobars mean stronger winds – latitude dependant
- Winds even stronger when isobars are really curved
- MSLP Analysis means current situation
- Prognosis means the future outlook

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# Poll

What is the wind direction at A on the weather map?



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# Poll

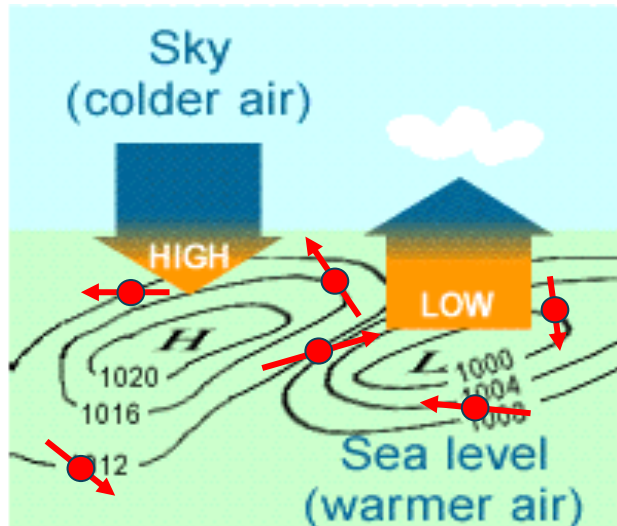
What is the wind direction at B on the weather map?



20

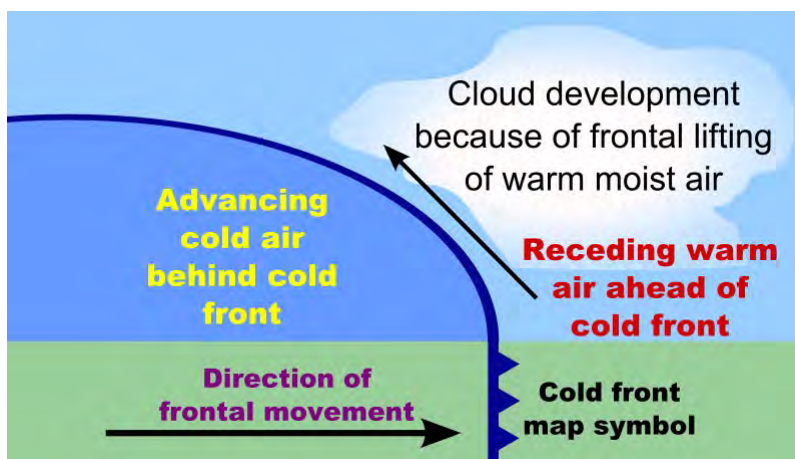
## Highs and Lows

- High – High Pressure System. Descending, colder air (heavier), warming as it descends, any water droplets evaporate, clear skies
- Low – Low Pressure System. Rising, warmer air (lighter), air cools as it rises, water vapour condenses to form water droplets, cloudy skies
- Monitor changes in pressure by watching the barometer



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## FORMATION OF A COLD FRONT

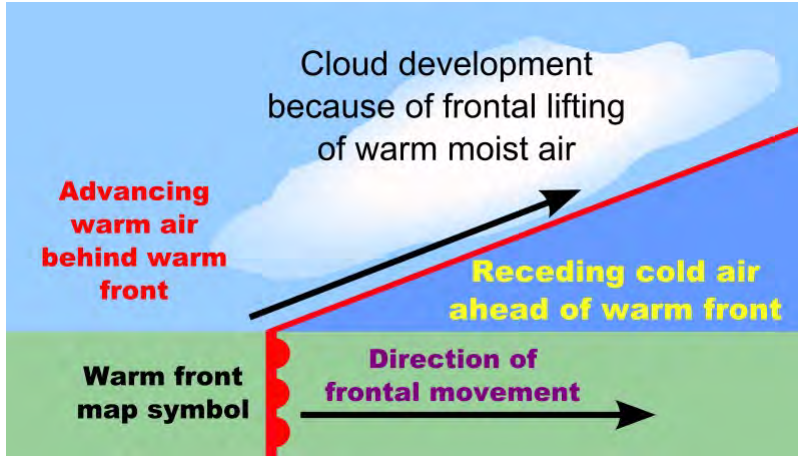


- Approaching cold air wedges under warmer air
- Warmer air rises, water vapour condenses, rain and even storms
- Change in wind direction with the passage of the front, gusty winds, can be quite violent
- Significant drop in temperature



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## FORMATION OF A WARM FRONT

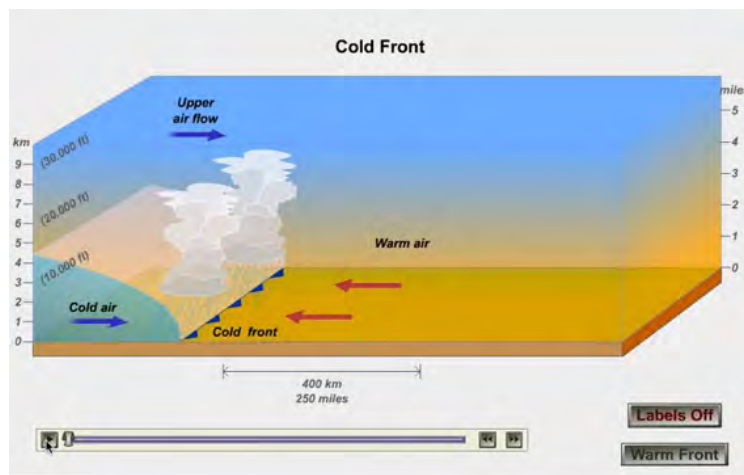


- Not common in Australia
- Tend to form south of the continent and move further south
- Usually slow moving and broad coverage
- Rising moist air produces clouds and usually rain
- Warmer temperatures behind the front



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## ANIMATION OF FRONT FORMATION



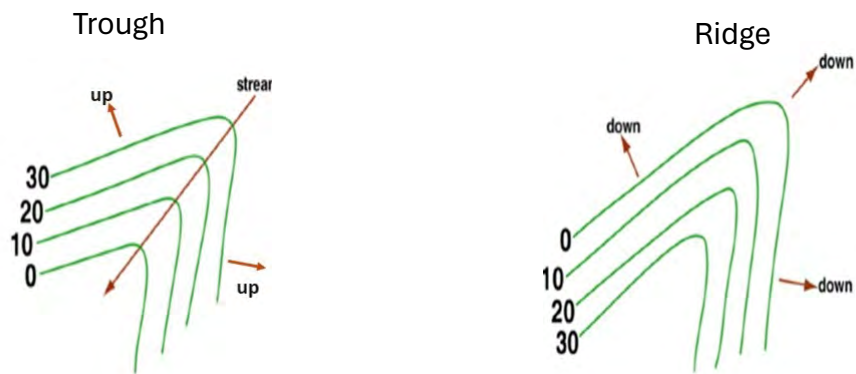
24

# COLD FRONTS IN AUSTRALIA



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# Isobar Ridges and Troughs



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## RIDGES AND TROUGHS

- Conditions along the ridge, under the influence of the high-pressure systems dry and descending air, tend to be stable and drier.
- Troughs often result in increased cloud cover and precipitation. Rain, snow, or even thunderstorms can develop along and near the trough axis.

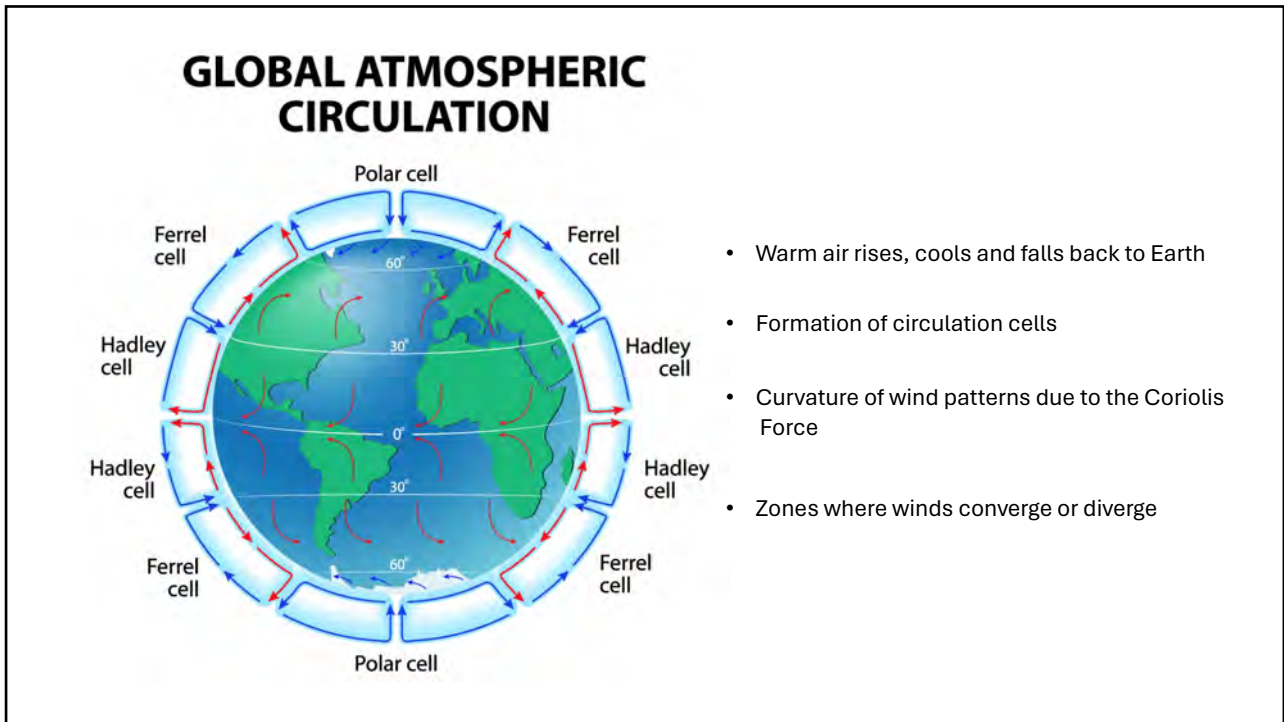
27

## Poll

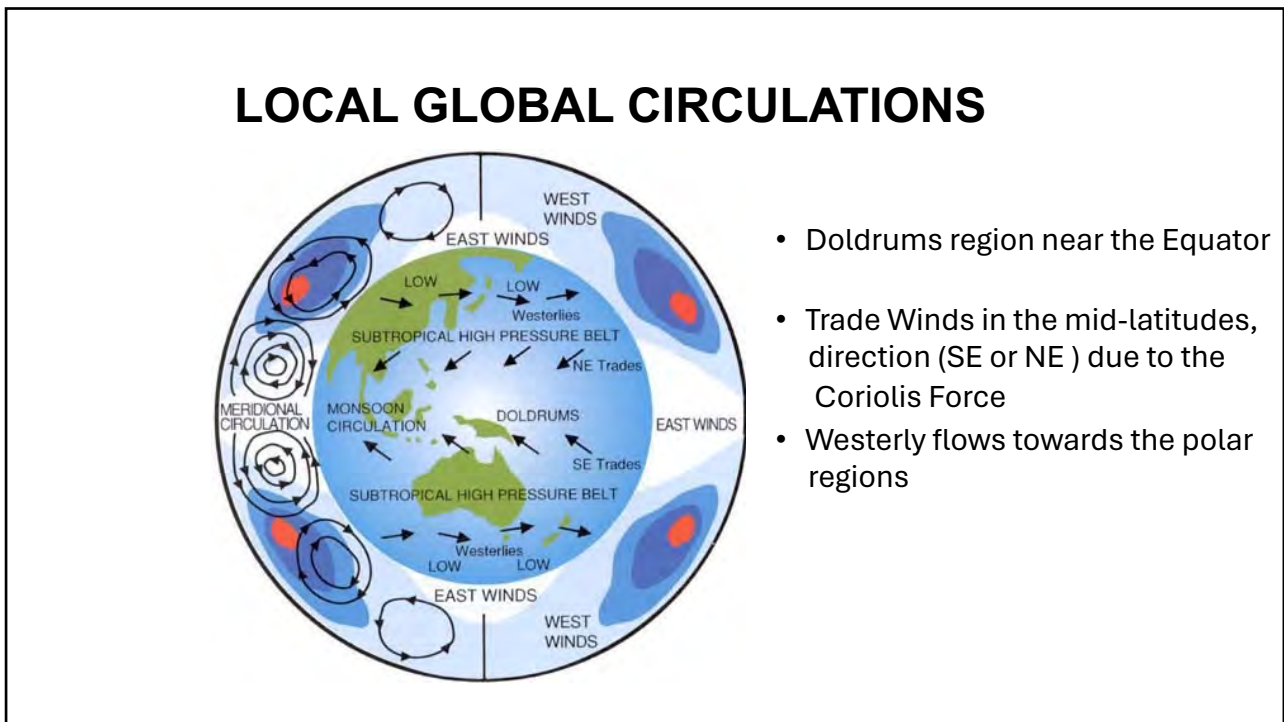
Does air rise or fall in a high-pressure system ?



28



29



30

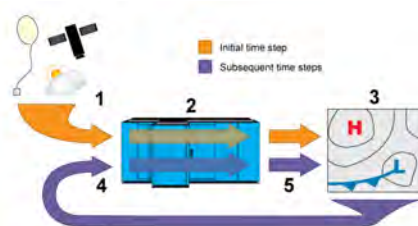
## WEATHER FORECASTING

- It all starts with actual observations at a given point in time
- Data from ground stations, ships, balloons, planes, satellites
- The more observations the better
- Traditionally, the weather map is produced and past experience used to forecast future weather
- More modern approach is to use computer modelling

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## Computer Modelling

- Describe the atmosphere as a three-dimensional grid volume
- Collect all the data as usual for as many grid volumes as possible
- Use the laws of physics to determine how the air will move in a unit of time
- Take the result and feed it back into the computer to calculate the next time interval
- Produce the forecast



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## Computer Modelling

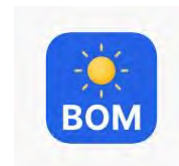
- Many different computer models from various countries
- Models very good in the short term ( 3-5 days)
- Model forecasts very sensitive to the input data quality ( the Butterfly Effect)
- Vary the input data slightly and re-run the models to assess forecast sensitivity and improve longer term outlook



ECMWF MODEL



GFS MODEL



ACCESS MODEL

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## Poll

The best computer weather model is:

- ECMWF
- GFS
- ACCESS
- ALL OF THE ABOVE



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# Weather Technology

Short Term tools

Medium Term tools

Long Term Tools



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## Some of the Weather Tech that we will look at

- BOM
- BOM App
- MetEye
- ECMWF long range synoptic charts
- Windy 3 models
- Predictwind 6 models
- Grib files

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The screenshot shows the BlueWaterTracks website interface. At the top, there is a navigation bar with links for HOME, ABOUT, MEDIA, and CONTACTS, along with a search bar. Below this is a yellow banner for 'Warnings current' with state abbreviations (NSW, VIC, QLD, WA, SA, TAS, ACT, NT) and a 'Warning services' dropdown. The main content area features a satellite map of Australia with state boundaries labeled. A red arrow points from the map to a 'Severe weather update' video thumbnail. To the right of the map is a 'BOM Weather' advertisement for the mobile app, with download links for the App Store and Google Play. At the bottom, there is a blue bar for 'Weather for Tuesday 11 June' and a 'City observations' dropdown.

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A meteorologist, Sarah Scully, is presenting a 'Severe weather update' on a large screen. The screen displays a map of Australia with a yellow warning area over the southeast coast, including Melbourne, Canberra, and Sydney. The update is dated 10 Jun 2024 and includes icons for rain and wind. The current time is 3:30pm AEST 10/06/2024. Sarah Scully is wearing a dark blazer and glasses.

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BlueWaterTracks  
https://portal.bluewatertracks.com/account

HOME | ABOUT | MEDIA | CONTACTS Enter search terms Search

NSW VIC QLD WA SA TAS ACT NT AUSTRALIA ANTARCTICA

**Warnings current**  
NSW VIC QLD WA SA TAS ACT NT Warning services

**Severe weather updates**  
Severe Weather Update: Damaging winds for South East Australia, 10 June

**BOM Weather**  
Get warning notifications, direct to your device

Download on the App Store GET IT ON Google Play

**Weather for Tuesday 11 June** City observations

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Q Safety Beach, VIC

**12.8°**  
Feels like 7.2°

15° 8° 2-15mm  
Max Overnight min Rain

**Showers. Wind easing.**

Show less about today

**Current weather** NNW 28 km/h Wind 54 km/h Gust  
77% Humidity 0mm Rain since 9am

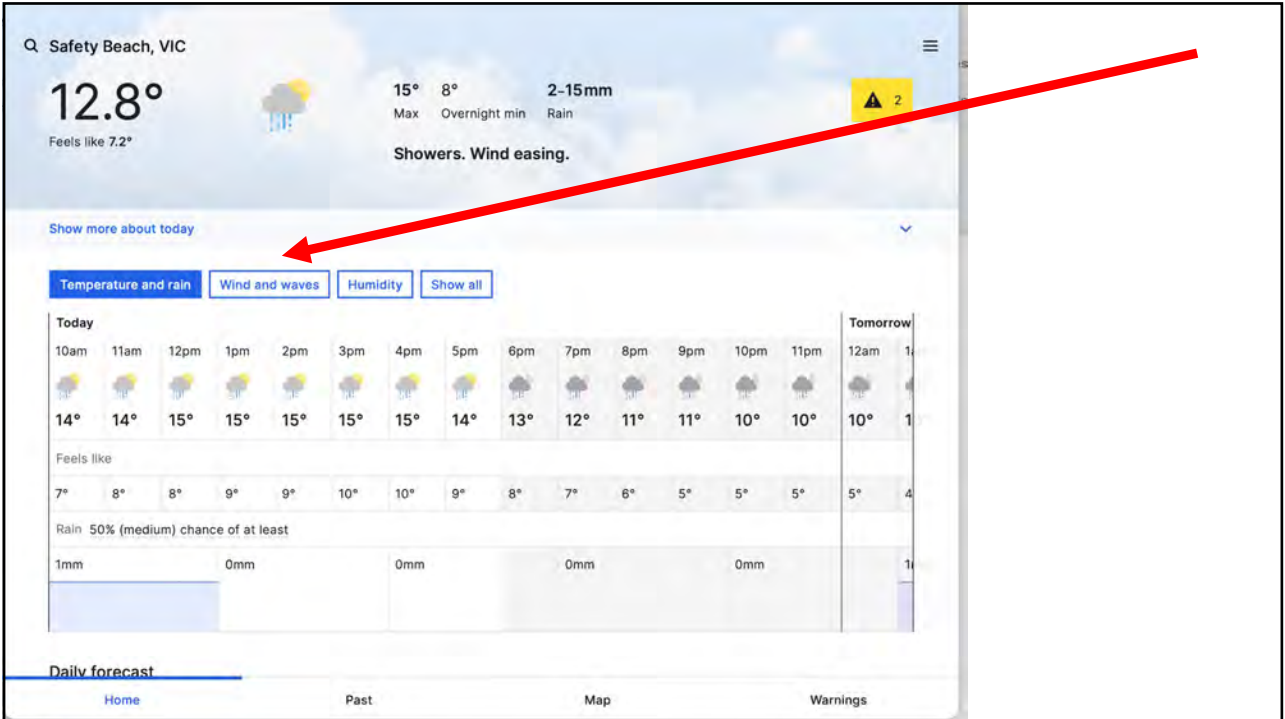
**Rain** 75% (high) chance of at least 2mm  
50% (medium) chance of at least 6mm  
25% (low) chance of at least 15mm

**Mornington Peninsula area** Cloudy. Very high chance of showers, becoming less likely this afternoon. The chance of a thunderstorm late this afternoon and evening, possibly severe. Winds northerly 30 to 45 km/h turning westerly 25 to 40 km/h in the early afternoon.

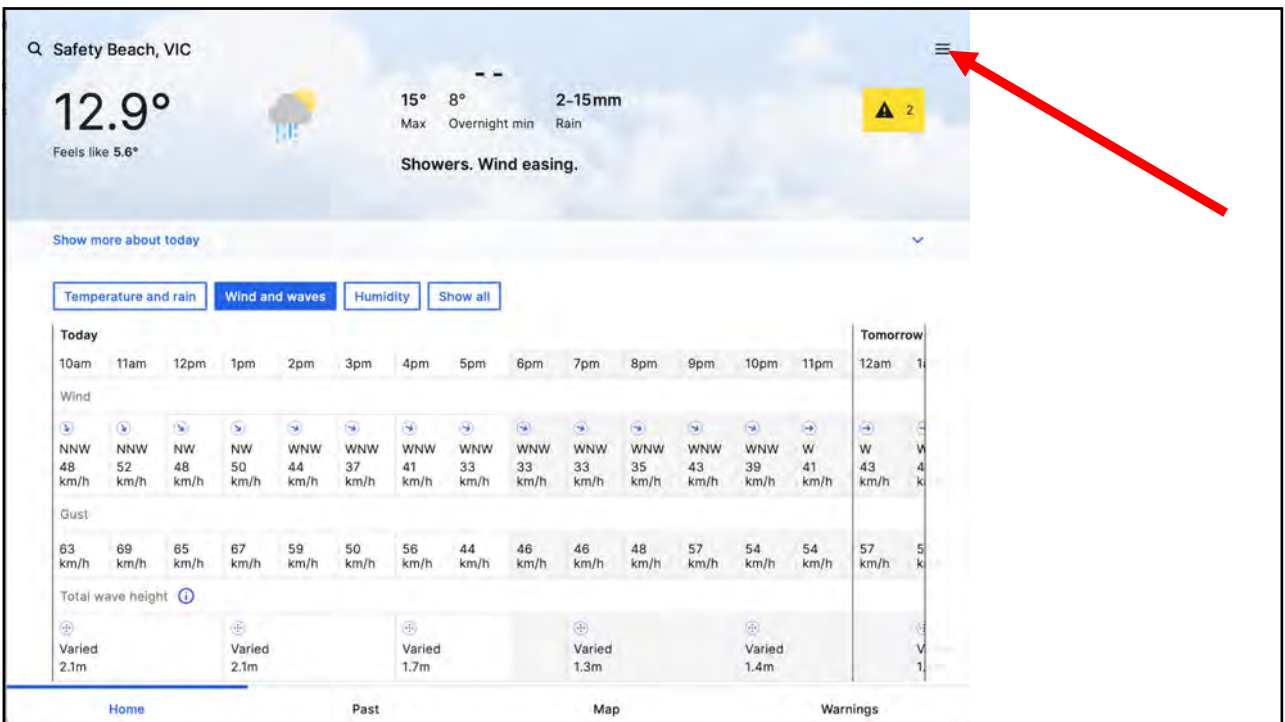
**Sun, moon and UV** 7:34 am Sunrise  
5:07 pm Sunset  
Waxing crescent Moon phase  
First quarter, 14 June Next moon phase

Home Past Map Warnings

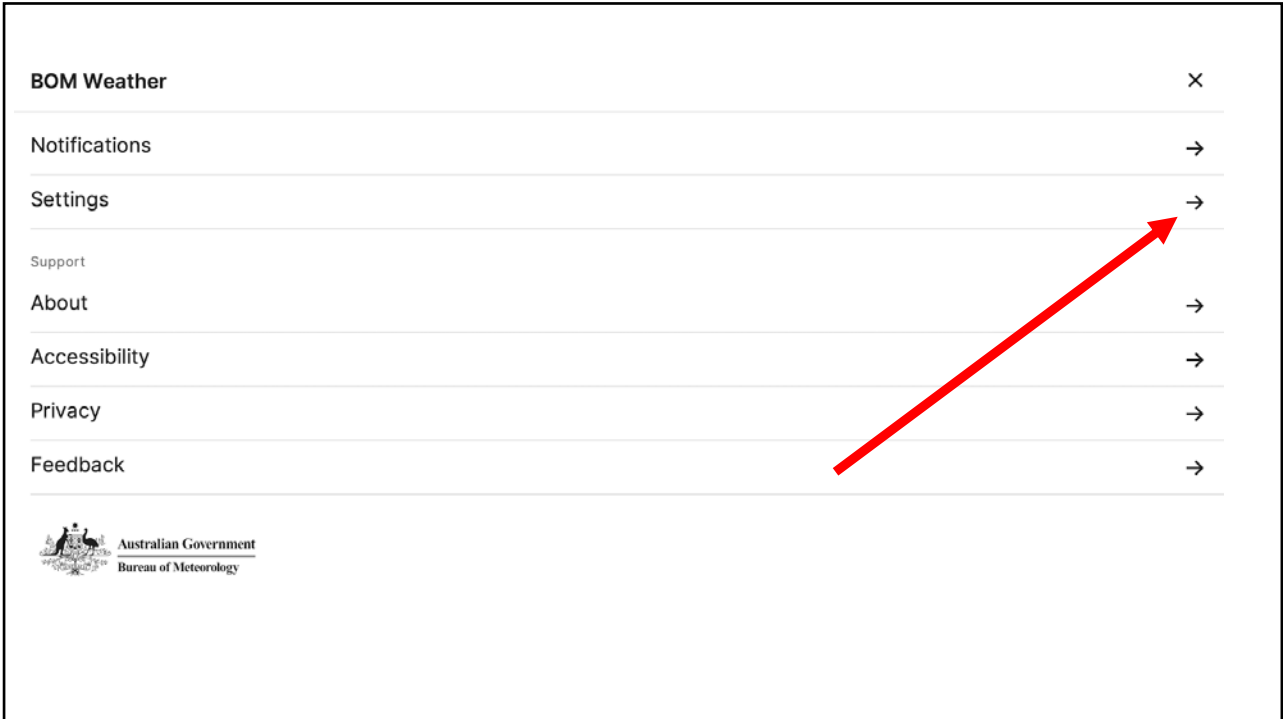
40



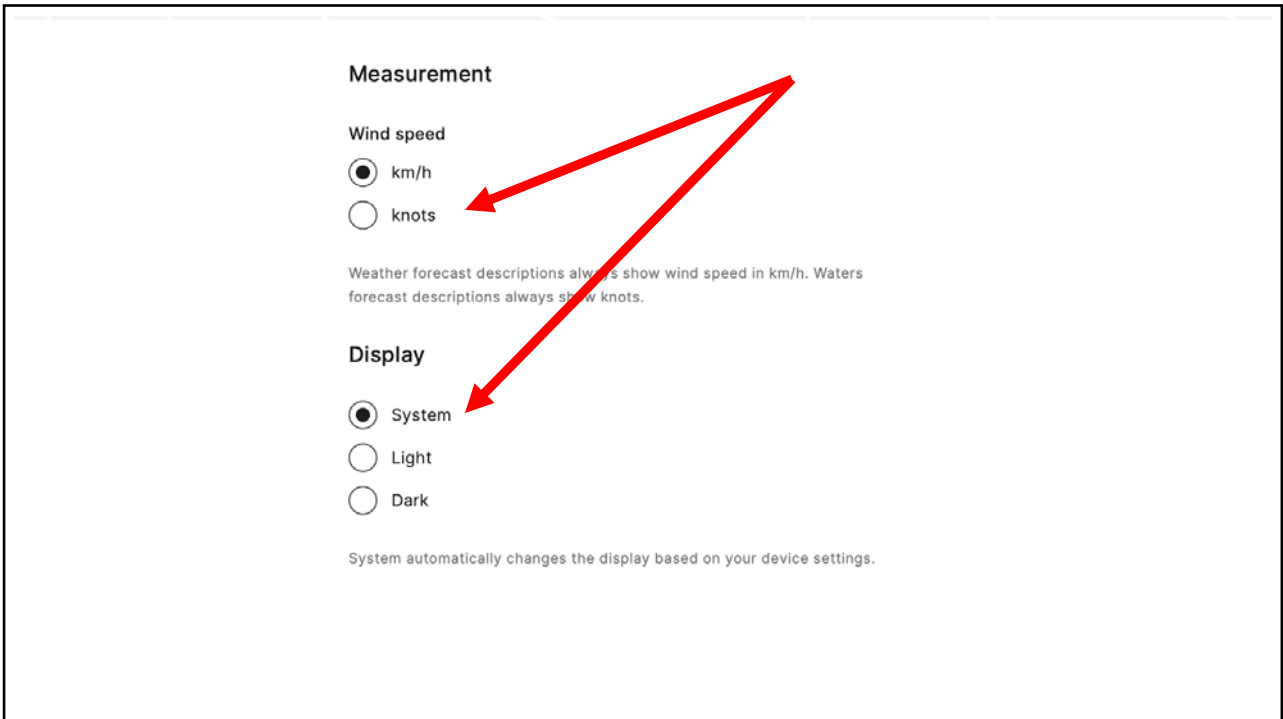
41



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43



44

Show more about today ⌵

Temperature and rain
Wind and waves
Humidity
Show all


Today														Tomorrow	
10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm	12am	1pm
Wind															
⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵	⌵
NNW	NNW	NW	NW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	W
26	28	26	27	24	20	22	18	18	18	19	23	21	22	23	23
knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots
Gust															
34	37	35	36	32	27	30	24	25	25	26	31	29	29	31	31
knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots	knots
Total wave height ⓘ															
⊕			⊕			⊕			⊕			⊕			⊕
Varied			Varied			Varied			Varied			Varied			Varied
2.1m			2.1m			1.7m			1.3m			1.4m			1.4m

45

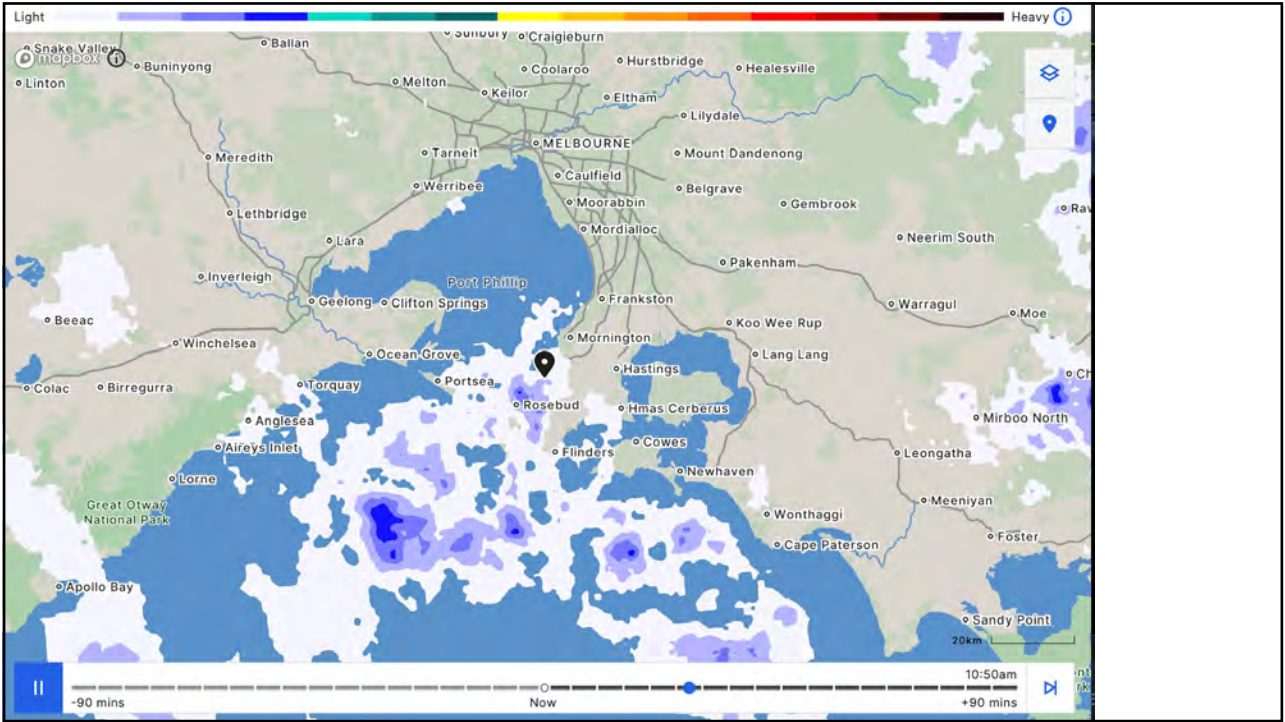
Daily forecast

Weather
Waters and tides

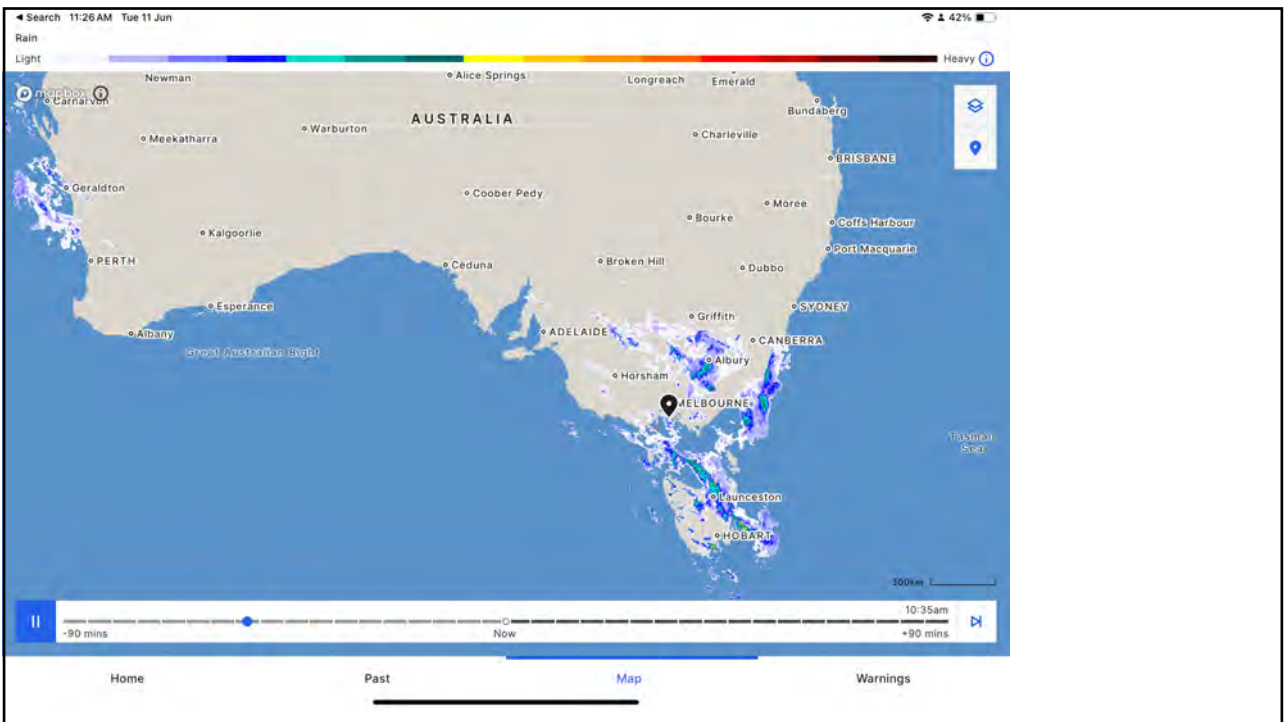
Port Phillip

Today	11 June
	<b>Gale warning</b>
Wind	Northwesterly 20 to 30 knots, reaching up to 35 knots in the morning. Winds tending westerly 15 to 25 knots in the late afternoon then increasing to 20 to 30 knots in the late evening.
Seas	1 to 2 metres, decreasing to 1 to 1.5 metres during the afternoon.
Weather	Cloudy. 80% chance of showers.
Tides	Hovell Pile ↓ 12:00 am, 0.69m Low ↑ 5:07 am, 0.99m High ↓ 11:49 am, 0.41m Low ↑ 7:01 pm, 1.07m High

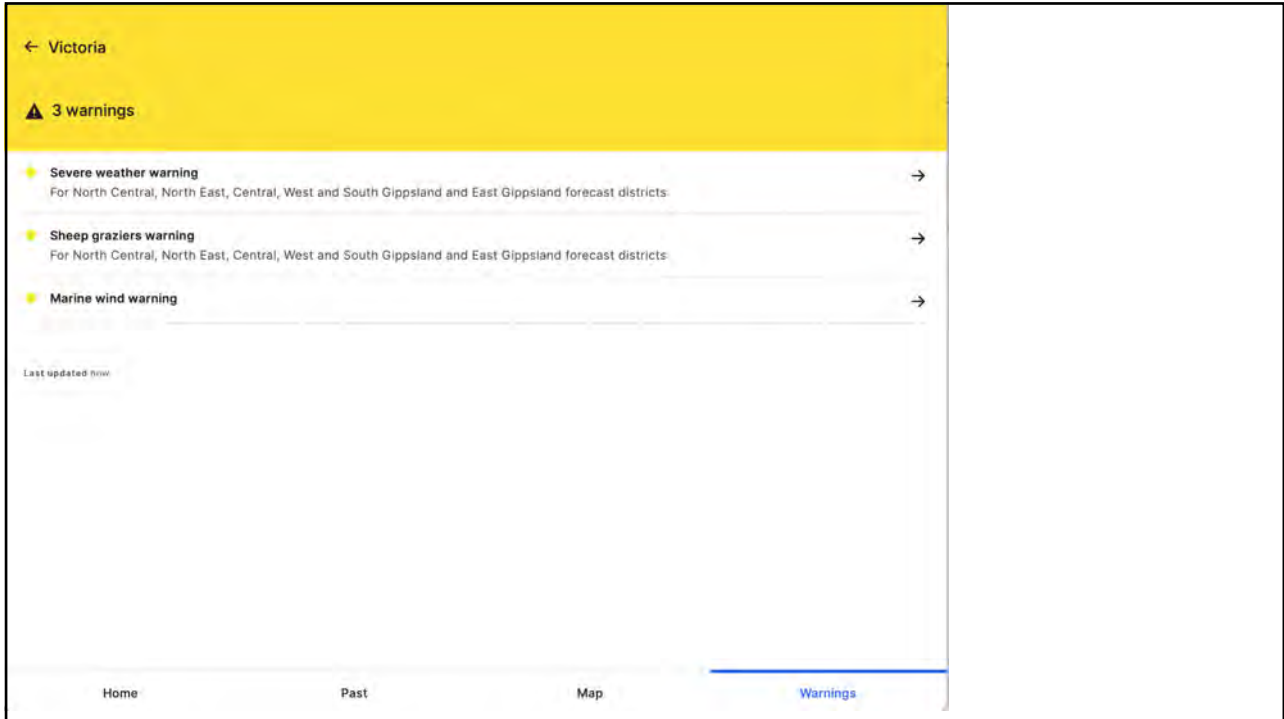
46



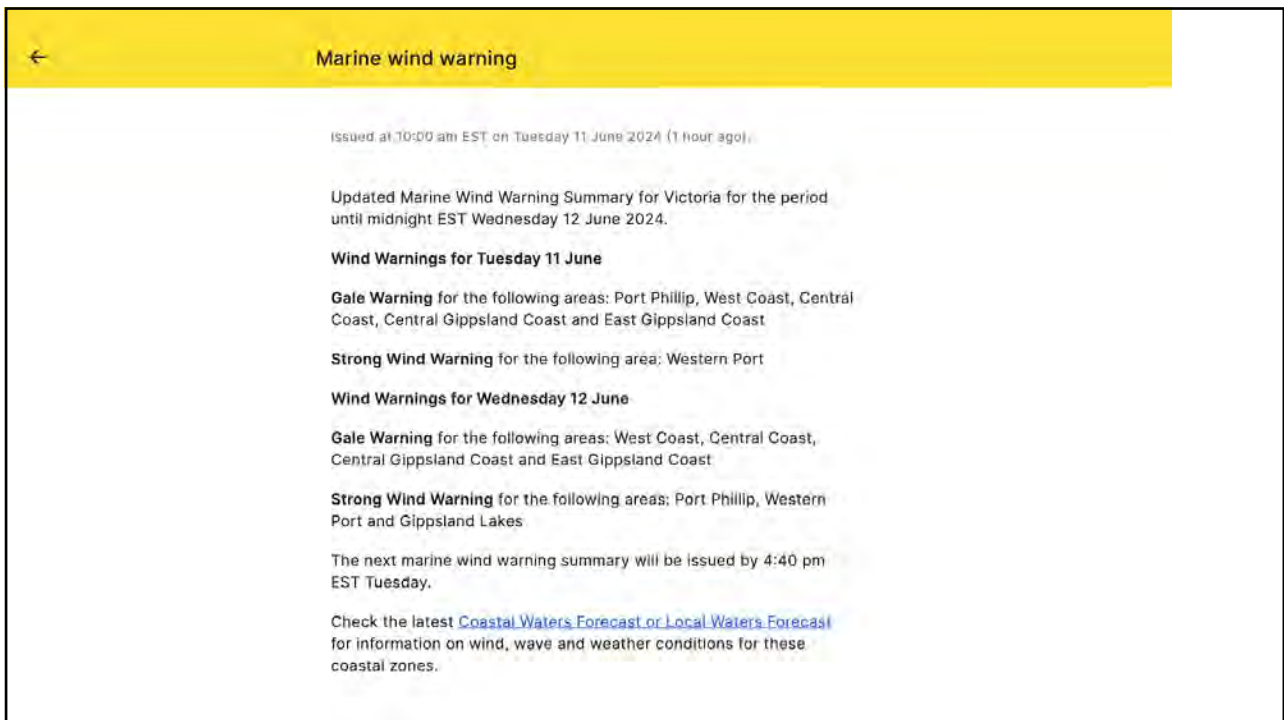
47



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49



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# Poll

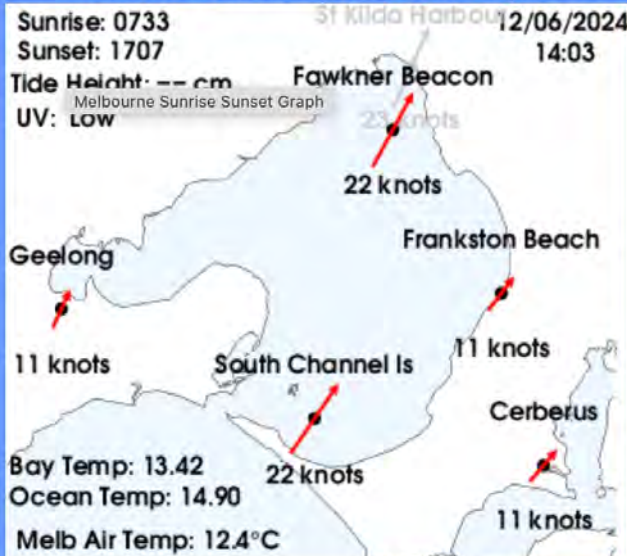
What are the advantages of the BOM App?



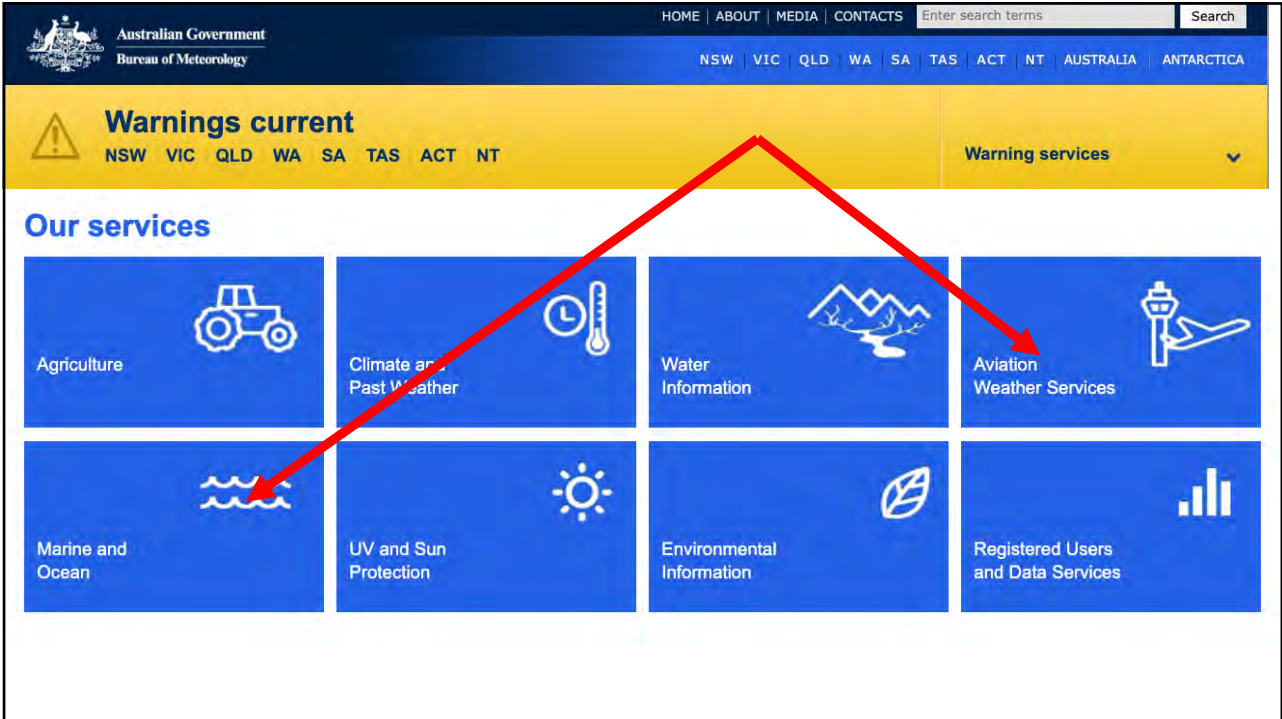
51

## OBSERVATIONS LAST UPDATED: 14:03 Wednesday 12 June 2024

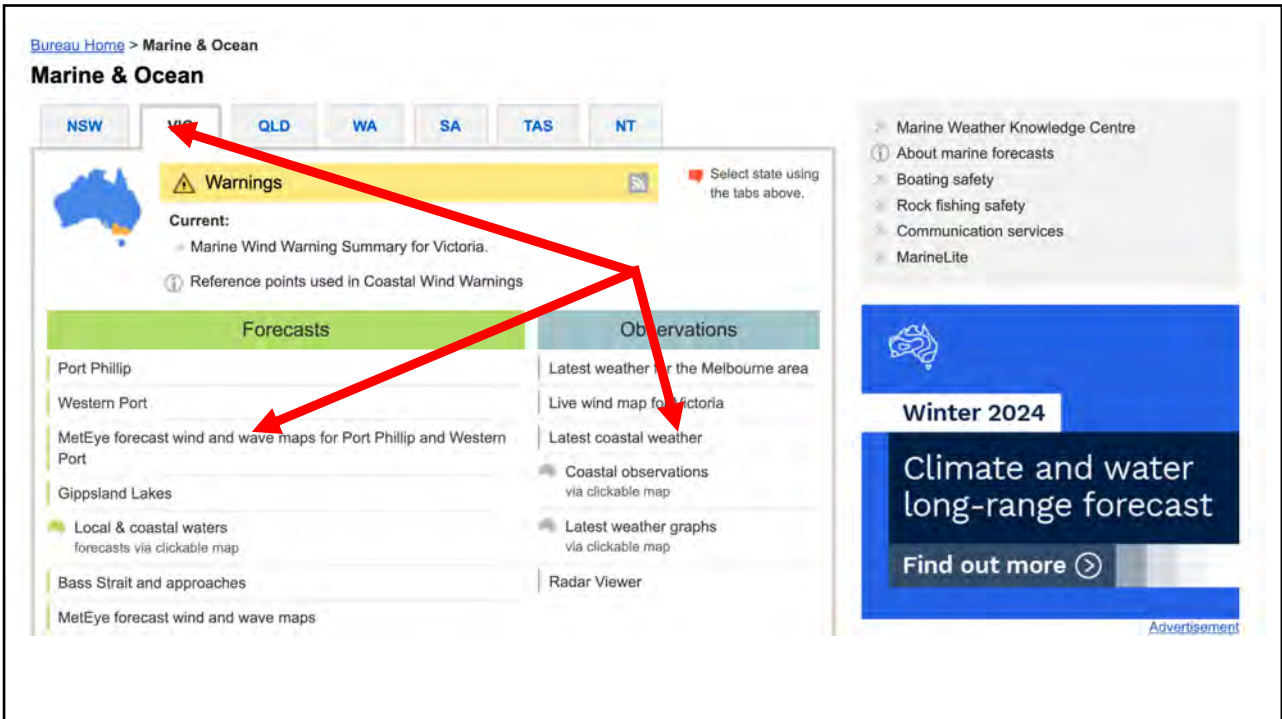
Click on the Arrows for Today's Wind Graphs



52



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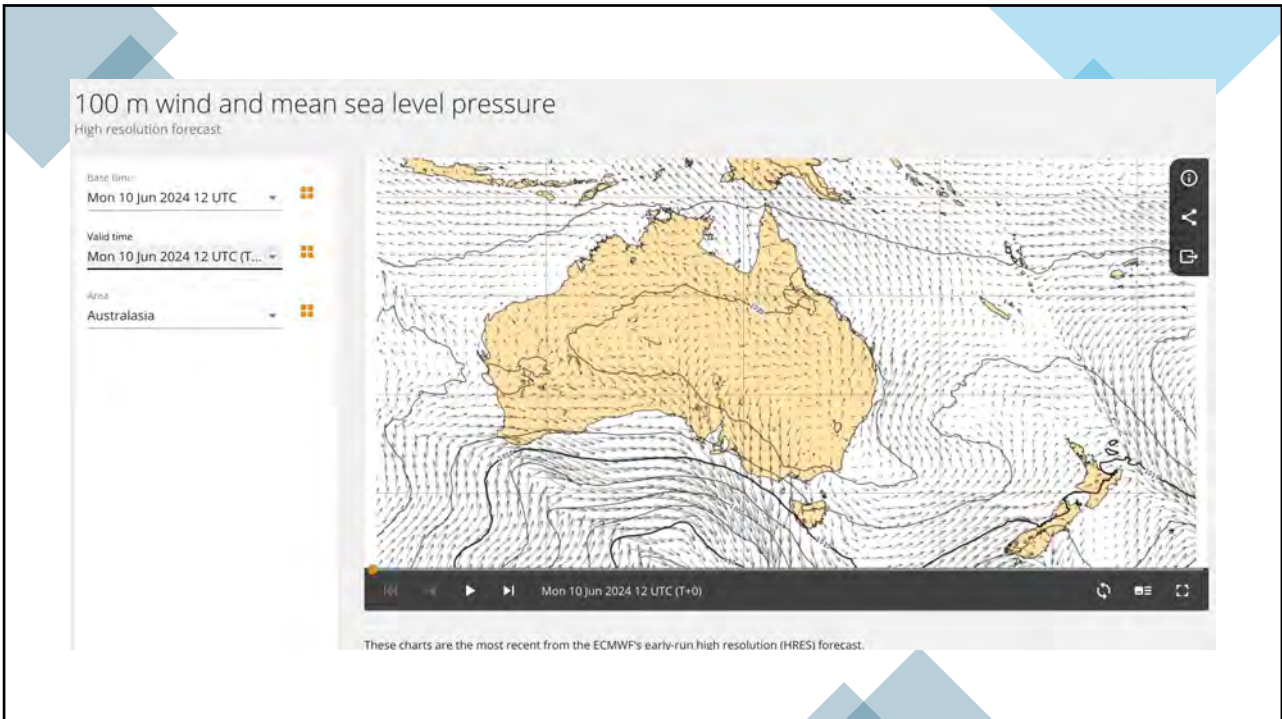
54

WEST COAST																	
	Date/Time EST	Wind			Highest Wind Gust		Sea Height		Swell			Vis km	Cloud	Weather	Temp °C	Press MSL hPa	Rain since 9am mm
		Dir	Spd kts	Gust kts	Dir	kts time	Height m	Height m	Period s	Dir							
<a href="#">Portland Airport</a>	11/11:30am	WNW	17	25	NNW	37	04:25am	-	-	-	-	10	Partly cloudy	-	14.9	1007.9	0.2
<a href="#">Portland Harbour</a>	11/11:01am	WNW	16	27	-	-	-	-	-	-	-	-	-	-	16.0	1007.1	-
<a href="#">Cape Nelson</a>	11/11:30am	WNW	22	33	NNW	42	04:32am	-	-	-	-	-	-	-	15.6	1007.0	0.0
<a href="#">Port Fairy</a>	11/11:30am	WNW	15	22	NNW	31	01:54am	-	-	-	-	-	-	-	16.3	1006.9	0.0
<a href="#">Warrnambool</a>	11/11:30am	NW	21	27	NNW	41	02:18am	-	-	-	-	10	Partly cloudy	-	15.9	1007.3	0.0

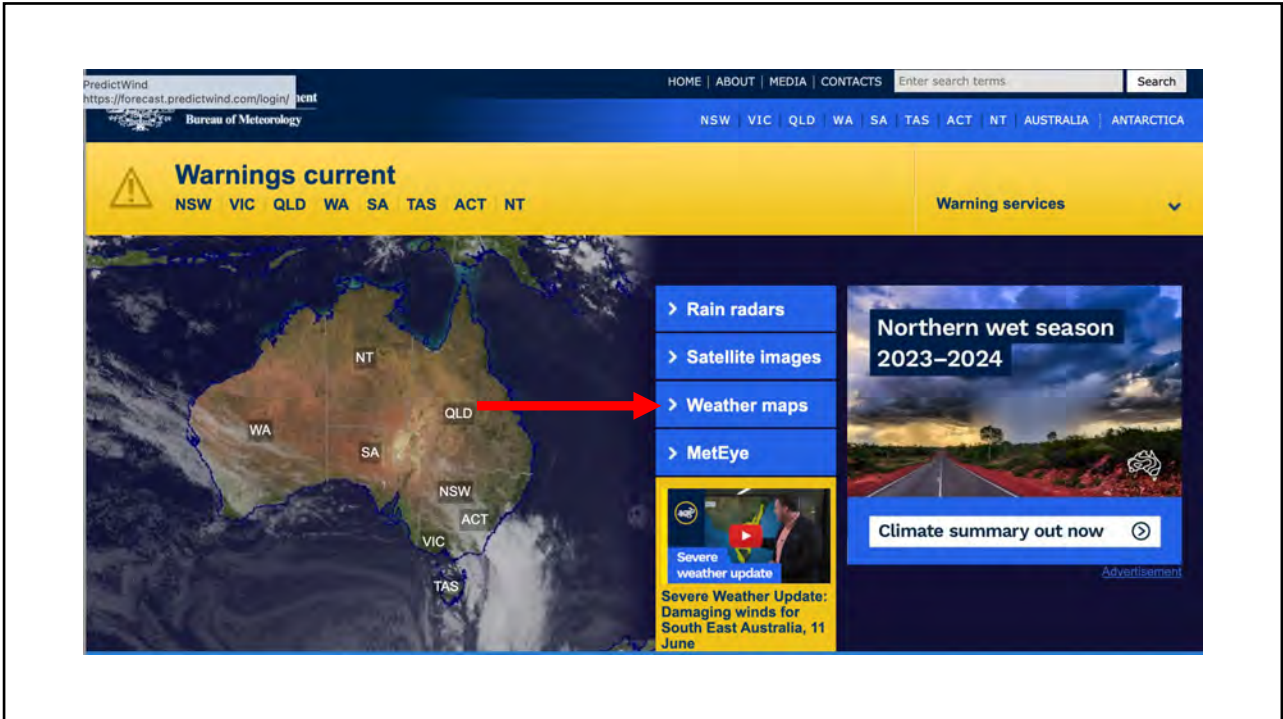
  

CENTRAL COAST																	
	Date/Time EST	Wind			Highest Wind Gust		Sea Height		Swell			Vis km	Cloud	Weather	Temp °C	Press MSL hPa	Rain since 9am mm
		Dir	Spd kts	Gust kts	Dir	kts time	Height m	Height m	Period s	Dir							
<a href="#">Cape Otway</a>	11/11:30am	WNW	18	27	N	41	01:01am	-	-	-	-	-	-	-	13.5	1001.6	1.6
<a href="#">Aireys Inlet</a>	11/11:30am	NW	16	19	NNW	42	08:09am	-	-	-	-	-	-	-	12.0	-	2.4
<a href="#">Geelong Racecourse</a>	11/11:30am	NW	21	29	NW	34	08:53am	-	-	-	-	-	-	-	14.1	-	0.6
<a href="#">Point Wilson</a>	11/11:30am	NW	30	34	NW	36	11:26am	-	-	-	-	-	-	-	-	-	-
<a href="#">Avalon</a>	11/11:30am	NW	24	30	NNW	45	05:15am	-	-	-	-	7	Partly cloudy	-	13.9	1007.8	0.0
<a href="#">Point Cook</a>	11/11:30am	N	16	27	N	42	03:52am	-	-	-	-	10	Partly cloudy	-	15.8	1007.3	0.2
<a href="#">Laverton</a>	11/11:30am	NW	15	21	N	32	02:55am	-	-	-	-	75	Mostly clear	-	15.7	1007.9	0.0
<a href="#">Melbourne (Olympic Park)</a>	11/11:30am	N	11	17	N	33	07:15am	-	-	-	-	10	-	-	13.9	1008.4	0.0
<a href="#">Fawkner Beacon</a>	11/11:30am	N	21	25	N	51	03:54am	-	-	-	-	-	-	-	-	-	-
<a href="#">South Channel Island</a>	11/11:30am	NW	26	32	N	48	04:58am	-	-	-	-	-	-	-	-	-	-
<a href="#">St Kilda Harbour BMYS</a>	11/11:30am	N	12	16	NNE	41	06:06am	-	-	-	-	-	-	-	-	-	-
<a href="#">Moorabbin Airport</a>	11/11:30am	NNW	22	29	N	41	04:24am	-	-	-	-	10	Partly cloudy	-	13.4	1007.9	0.0

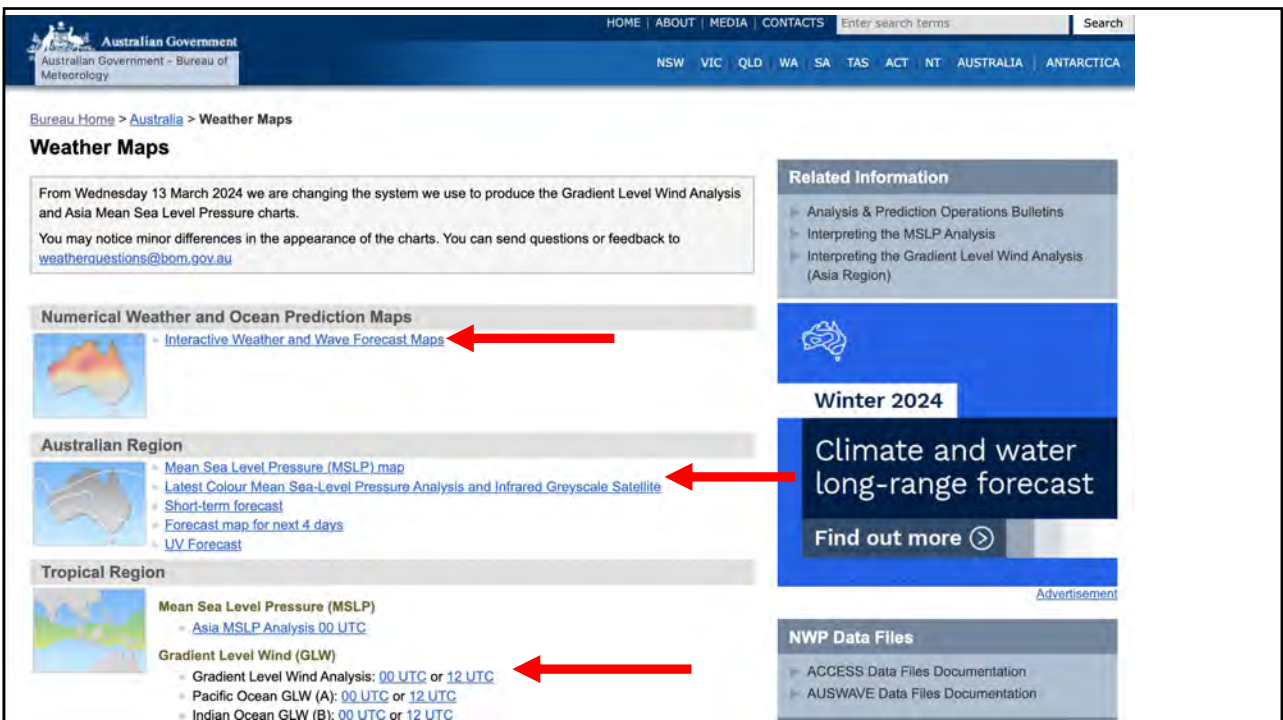
55



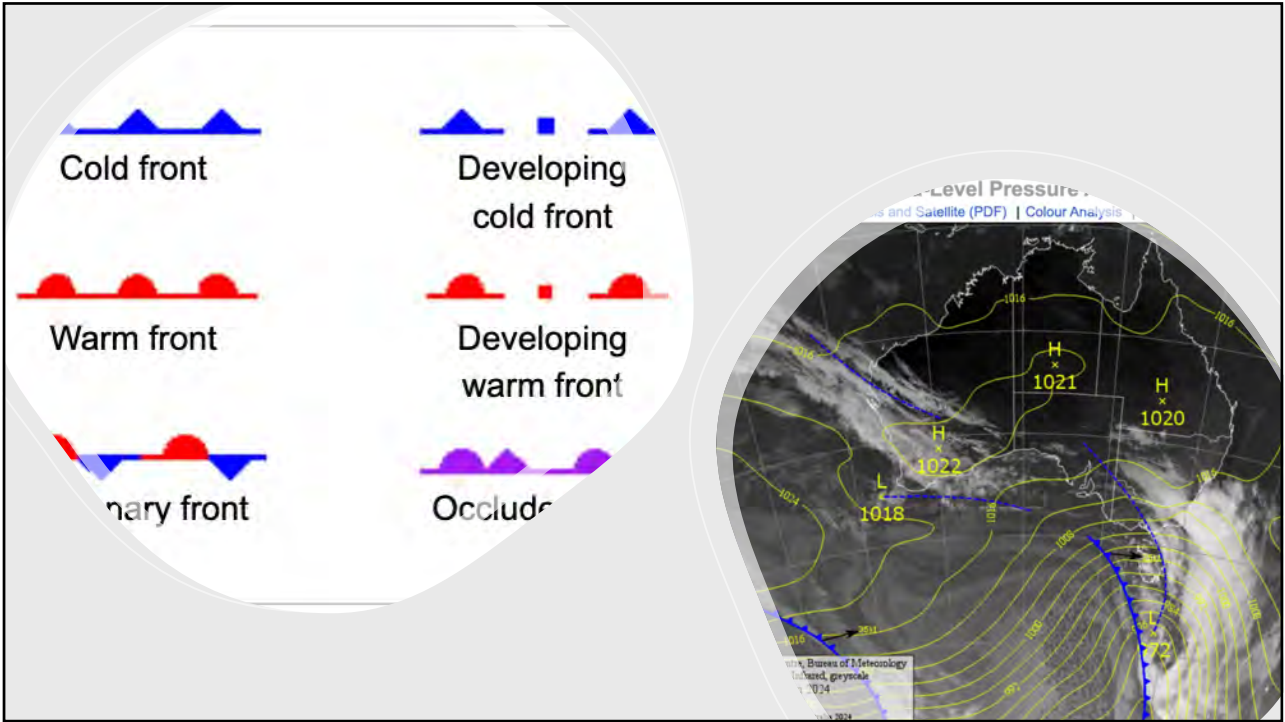
56



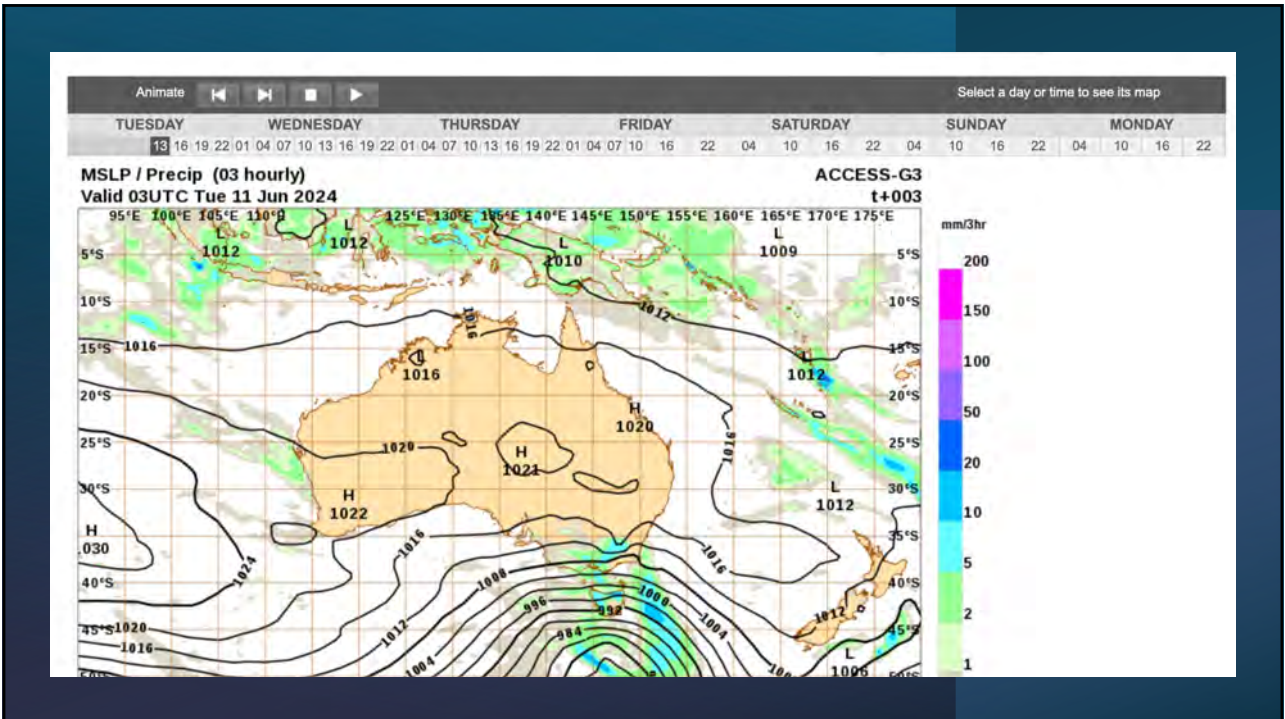
57



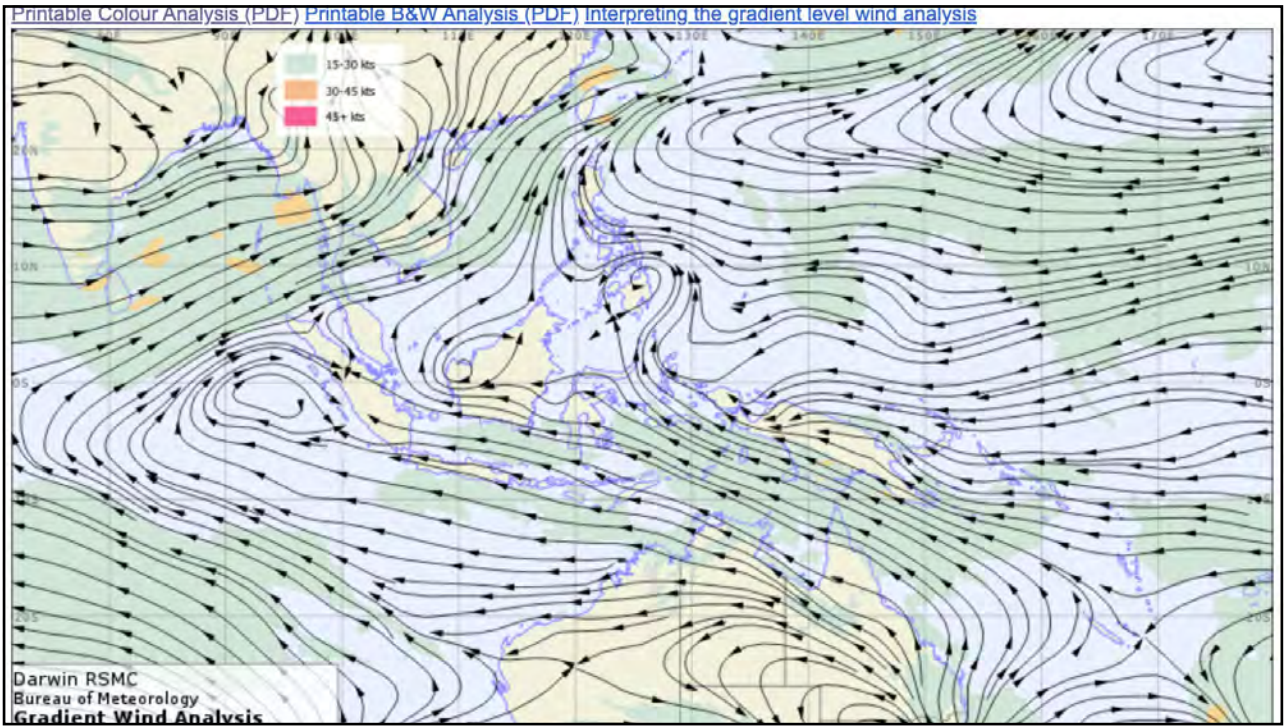
58



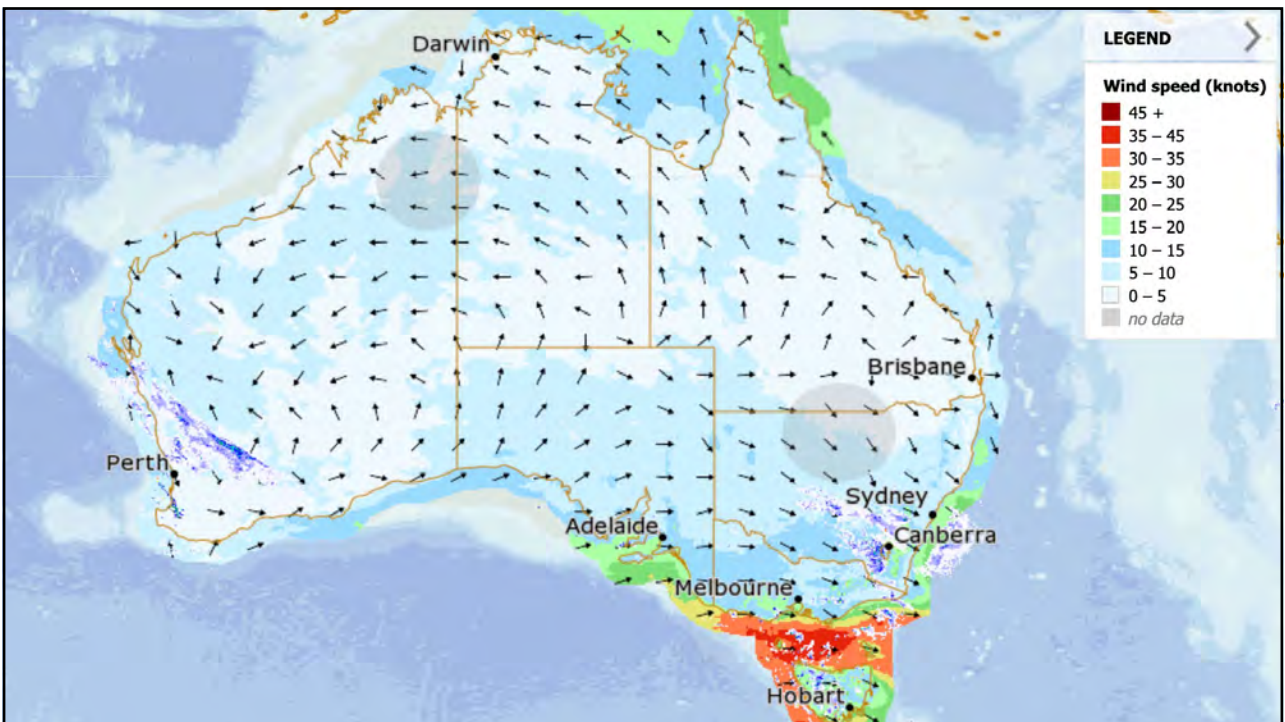
59



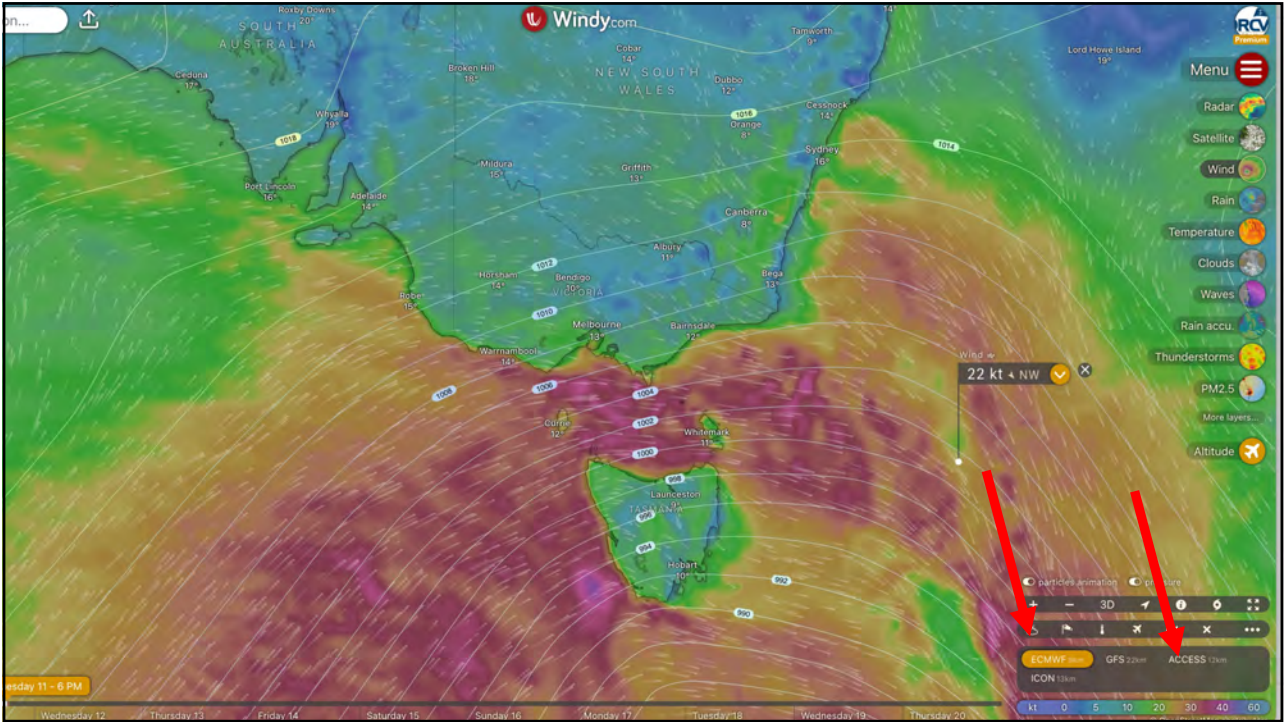
60



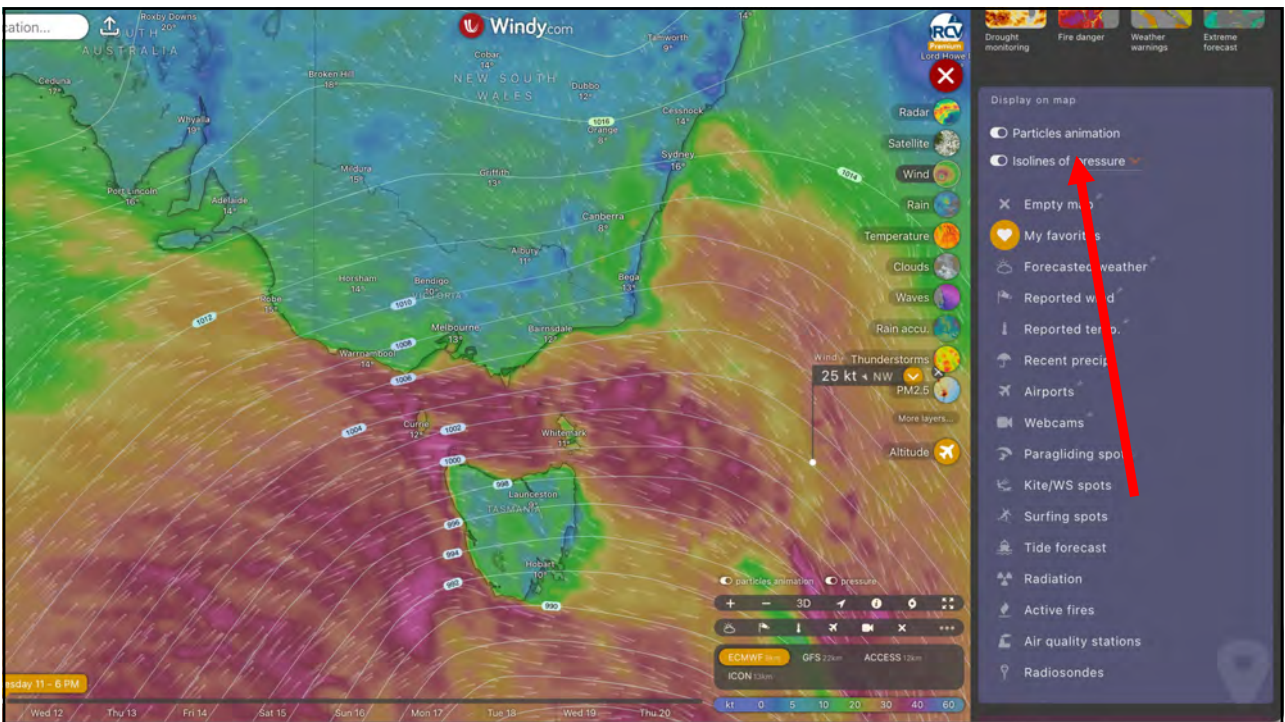
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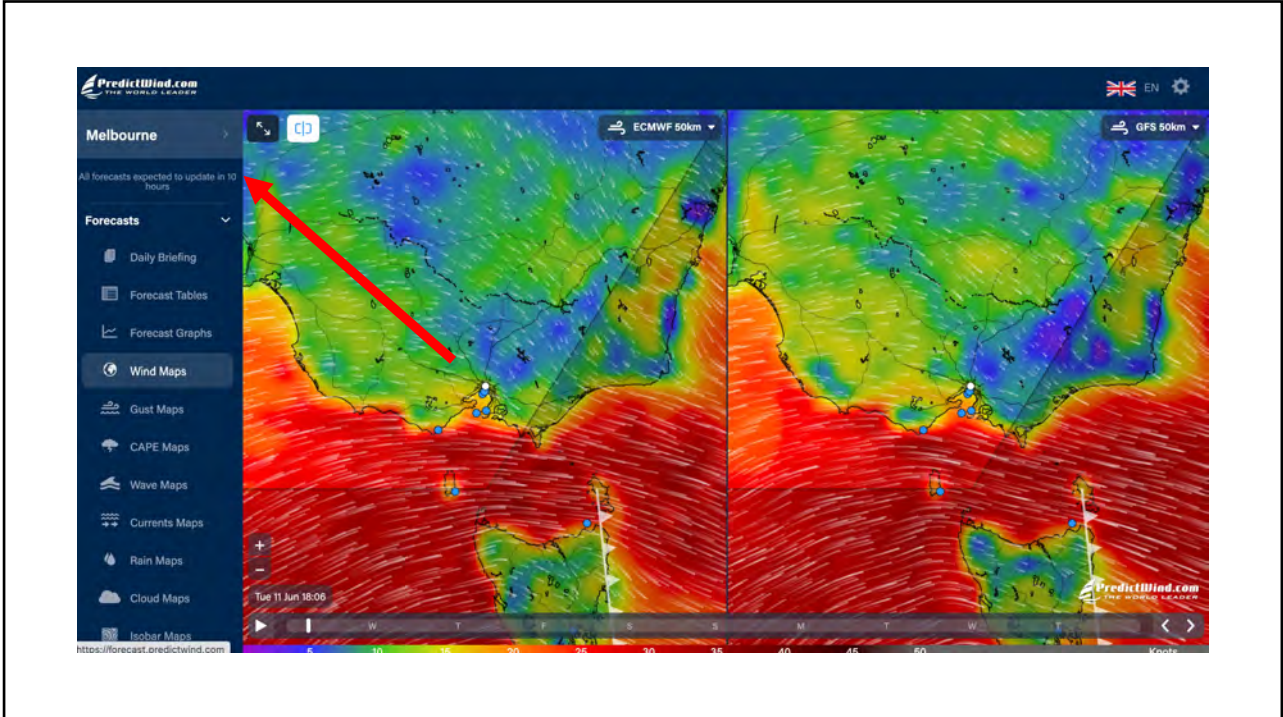
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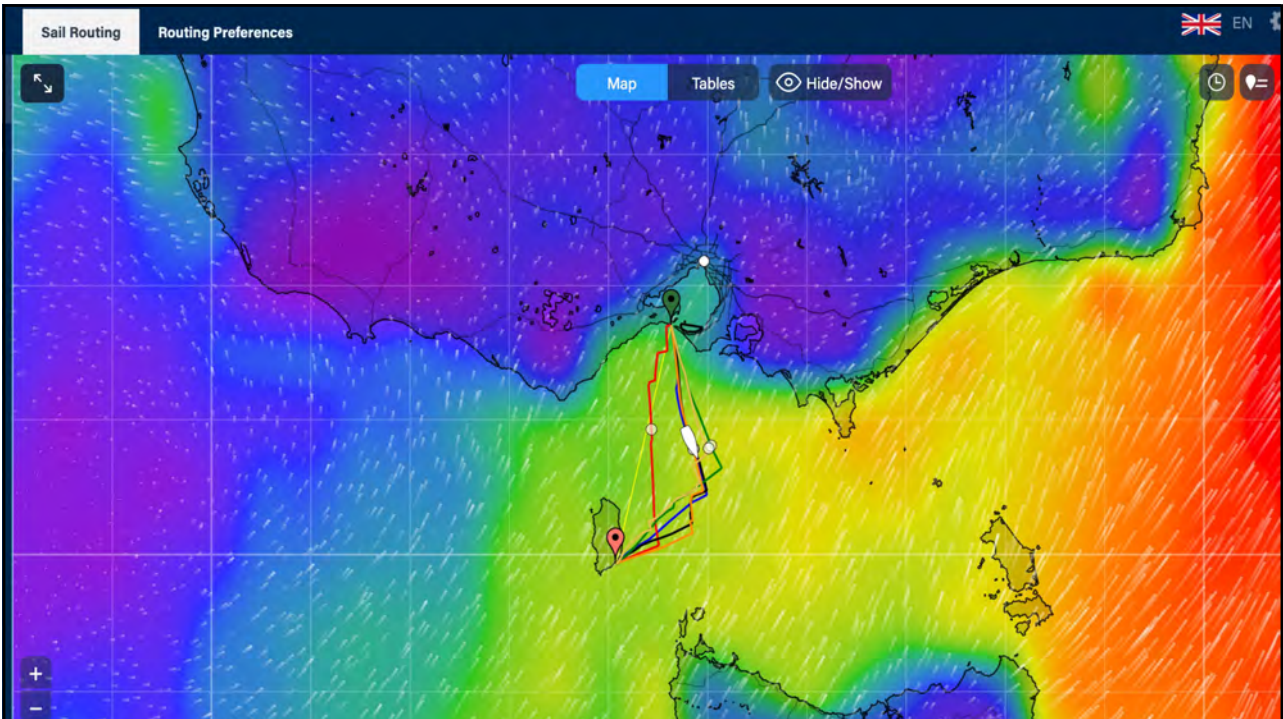
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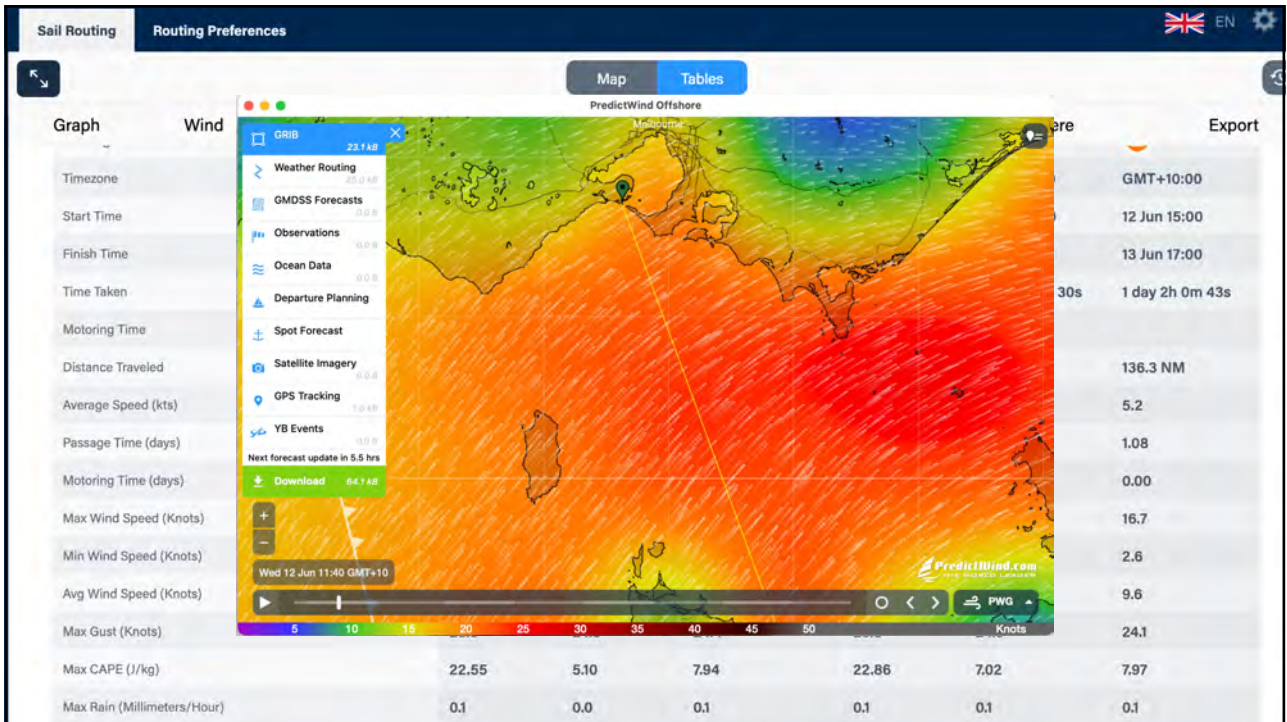
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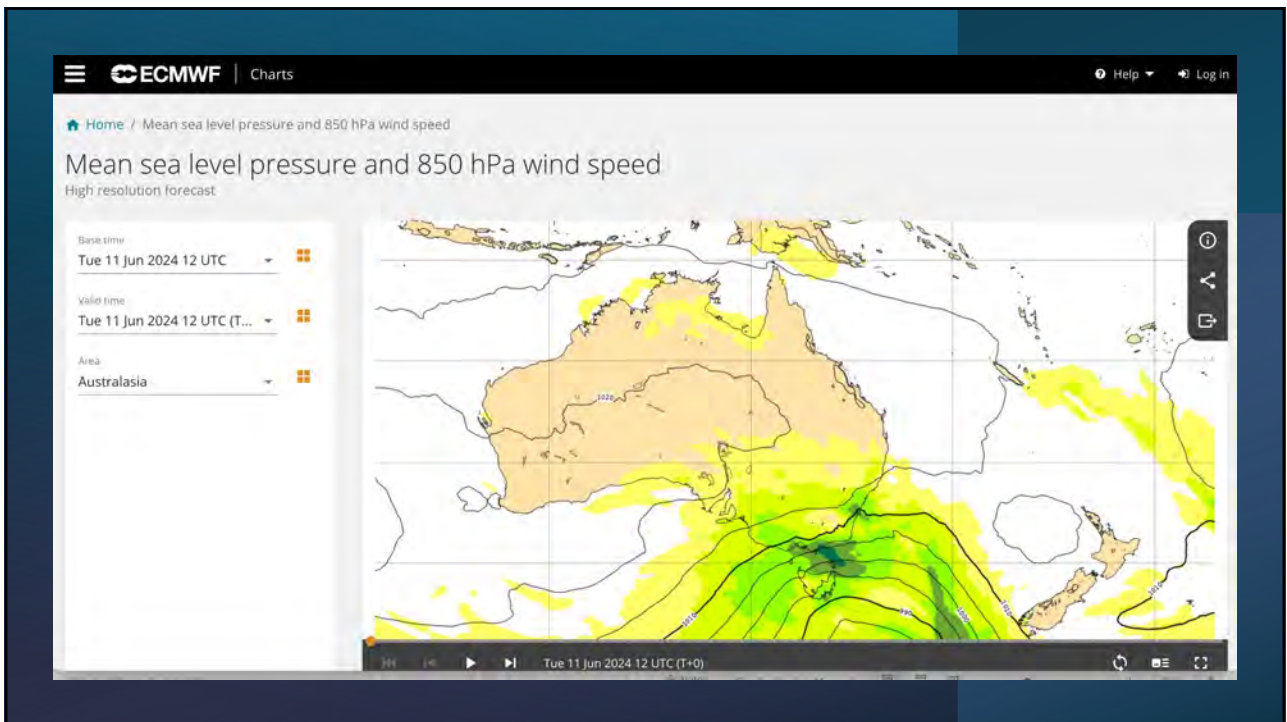
65



66



67



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# Interact with Us

## Train



Navigation  
On Water Rip Tour  
Weather  
Foredeck Essentials

## Race



Destination Races to:  
Devonport, King Island, Hobart  
Apollo Bay, Port Fairy,  
Coastal Sprints

## Volunteer



Support  
Many Roles  
Race Management, Media,  
Training Support, Mentoring



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## Home Work

- Complete your online course
- Complete the knowledge books 1 and 2
- Familiarize yourself with all links
- Upload the GPX file to Windy and plan that you will be leaving on Friday the 21 June on your journey to Lakes Entrance
- **Contact Ray and Simon [students@orcv.org.au](mailto:students@orcv.org.au)**



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ORCV is dedicated to promoting ocean sailing, growing its participation, providing sea safety programs and value to our members.

Support the ORCV by joining as a member  
[www.orcv.org.au/join](http://www.orcv.org.au/join)

## Learn more about the ORCV Programs

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[Safety & Sea Survival Courses](#)

[Weather Courses](#)

[Navigation Courses](#)

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