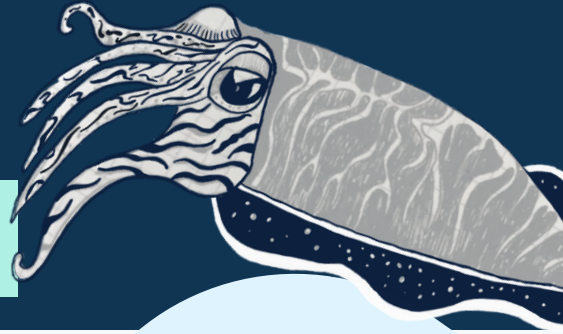




FACT SHEET

MARINE HEATWAVES



A **marine heatwave (MHW)** is a period of unusually high ocean temperatures that last for days, weeks, or even months. During this time, the **sea surface temperature (SST)** in a specific region experiences an **anomaly**, where it is significantly warmer than the long-term average for that location and season.

Marine heatwaves are characterised by their **cumulative intensity**, which captures the heatwave's overall strength and impact and provides a way to measure and compare events. These events can trigger coral bleaching, influence algal blooms, contribute to wild weather events, and alter the distribution and health of marine species.

WHAT CAUSES MARINE HEATWAVES?

Even though they occur through physical interactions between the ocean and atmosphere, **climate change makes marine heatwaves longer, hotter, and more frequent**. Warming in Australia's oceans is already exceeding record levels, and marine heatwaves are becoming longer and hotter. If greenhouse gas emissions are not reduced, our oceans could experience marine heatwave conditions for more than half of the year by 2100, with devastating consequences.



greenhouse gas emissions trap heat in the Earth's atmosphere and **raise air temperatures**

hotter air conditions lead to **lighter winds** and **clearer skies**

other climate drivers like **El Niño** can contribute to changes in the atmosphere and ocean

less air movement means the **ocean becomes calmer**

added heat is transferred to the upper layer of the ocean, which **increase sea surface temperatures**

ocean currents move and **concentrate warm water masses**

calmer conditions mean warm **surface water does not mix** with cooler, deeper water

MARINE HEATWAVE CONDITIONS DEVELOP

warmer dives, coral bleaching, loss of seagrass & kelp, algal blooms, shifting species, extreme weather...

SOME USEFUL WORDS

Marine heatwave

Any period when sea surface temperatures are in the top 10% of temperatures recorded for that location at that time of year, for five or more days in a row.

Sea surface temperature

Average temperature of the top few metres of the water column, measured by ships, buoys, and satellites.

Anomaly

The °C difference from long-term 'normal' conditions (sometimes called the 'climatological average'), which usually an average of conditions over a 30-year period.

Cumulative intensity

The sum of the marine heatwave's daily temperature anomalies based on its intensity, or how hot the heatwave was, and how long it lasted.

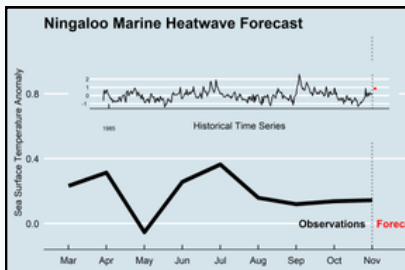
THINK BACK TO YOUR DIVES...

Have you noticed any of your recent dives being **unusually warm** compared to the same period in different years?

Have you seen any **sudden changes in currents** during your dives?

Look at the **temperature data in your dive computer** or logbook - are there any trends or abnormalities?

HOW DO I KNOW IF A MARINE HEATWAVE IS COMING?



1

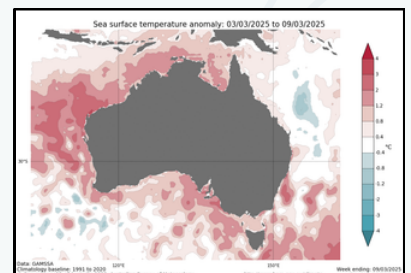
Look at a marine heatwave forecast.

CSIRO's Marine Heatwave Forecasting Tool provides up to three months advance warning of the likelihood, intensity, and timing of unusually high ocean temperatures and marine heatwaves. Divers can use this to monitor if unusually warm water conditions might be present at their dive sites.

2

Look at the current temperature of the ocean.

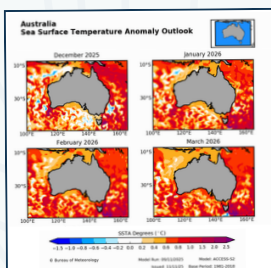
The Bureau of Meteorology's Sea Surface Temperature maps presents weekly and monthly anomaly data for Australia's water, showing how current sea surface temperatures deviate from long-term averages. This forecast can help divers understand if marine heatwaves are likely to develop based on projected warming of water and longer periods of sustained warming.



3

Look into forecast SST anomalies.

The Bureau of Meteorology's Ocean Temperature Outlooks provide seasonal forecasts for sea surface temperature, temperature anomalies, and thermal stress around Australia's waters. Divers can use this outlook to understand the current state of the ocean, and look back at recent recordings to see if temperatures are increasing or decreasing.



Divers for Climate is here to help the dive community to build resilience, share knowledge, and influence climate action, to help protect our oceans - and the livelihoods that rely on them - from the worst impacts of climate change. To learn more, including actions you can take, visit www.diversforclimate.com