Monthly Pacific Climate and Ocean Bulletin

April 2025

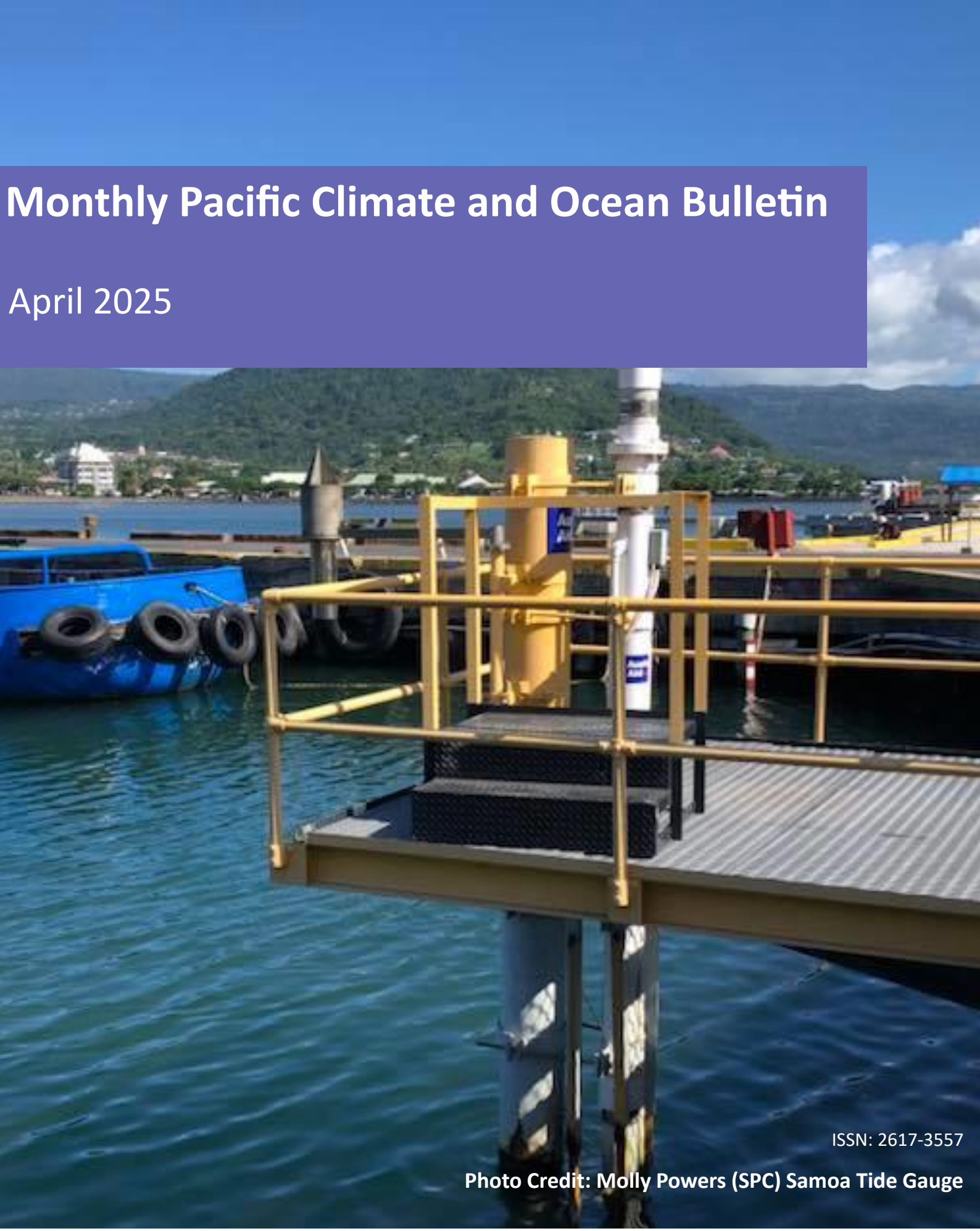

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Photo Credit: Molly Powers (SPC) Samoa Tide Gauge

SPREP
Secretariat of the Pacific Regional Environment Programme

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FOREIGN AFFAIRS & TRADE
Manatū Aorere

Australian Aid

Climate and Oceans Support Program in the Pacific

Pacific Community
Communauté du Pacifique

CONTENTS

Issued 15 May 2025

- The El Niño Southern Oscillation (ENSO) is neutral.
- The Madden Julian Oscillation (MJO) has recently strengthened near Africa.
- In April, the Intertropical Convergence Zone (ITCZ) was located mainly in the western Pacific along the equator around southern FSM. The South Pacific Convergence Zone (SPCZ) was active and displaced south of PNG and stretching southeastwards over Pitcairn Islands.
- Sea surface temperatures (SSTs) for April 2025 were average or near normal in waters eastwards of 150 °E along the tropical equatorial Pacific.
- The Coral bleaching Outlook to 26 May shows 'Alert Level 2' over PNG, and western Solomon Islands.
- For May to July 2025 the models agree that above normal rainfall is likely or very likely for Palau, southwest FSM, and northern CNMI in the northern hemisphere. Another band stretches from southeastern PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, Wallis and Futuna, Samoa, southern American Samoa, southern Cook Islands, and central French Polynesia. The models agree that below normal rainfall is likely or very likely for northern FSM, RMI, and northeast French Polynesia.
- The weekly tropical cyclone forecasts from the ACCESS-S model shows some risks for Palau, and eastern FSM from 19 to 25 May.

EL NIÑO–SOUTHERN OSCILLATION

El Niño-Southern Oscillation (ENSO) and Indian Dipole are neutral

Click link to access Climate Driver Update issued on 06 May 2025

The El Niño-Southern Oscillation (ENSO) is neutral. The latest Niño3.4 value for the week ending 4 May is -0.03 °C. Neutral ENSO values are between -0.8 °C and +0.8 °C. Sea surface temperatures (SSTs) in the western Pacific region during April 2025 were warmer than average. The Bureau's model predicts neutral ENSO (neither El Niño nor La Niña) until at least September. This is consistent with forecasts from a range of international models. However, skill for ENSO forecasts at this time of the year has historically been low beyond winter.

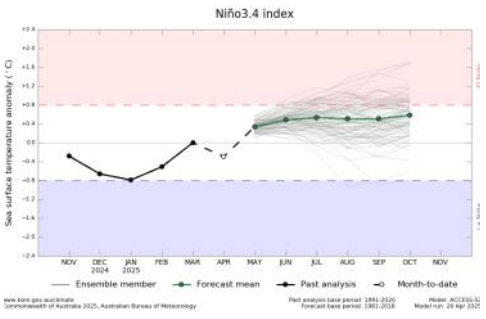
The Indian Ocean Dipole (IOD) is neutral. The Bureau's model predicts an overall neutral state of the IOD until at least August. This is consistent with a range of international models that are also predicting neutral IOD for at least the next 2 months. Skill for IOD forecasts made at this time of the year has historically been low for forecasts beyond a month ahead.

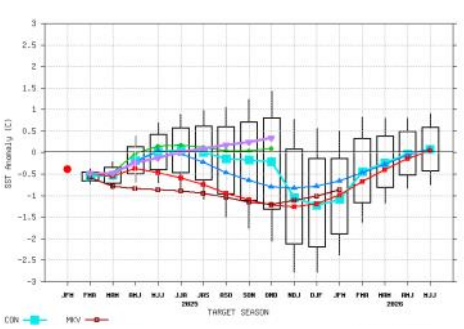
Global sea surface temperatures (SSTs) remain substantially above average. Each month in 2025 has been the second warmest recorded for its respective month, only slightly cooler than 2024.

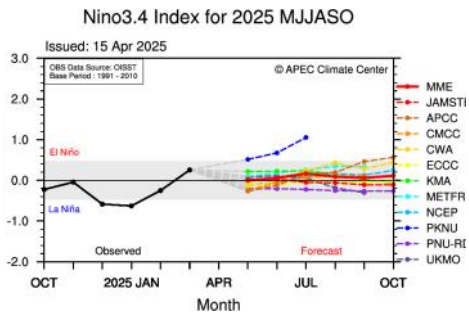
The Southern Annular Mode (SAM) is neutral as of 3 May. Forecasts show the SAM will likely return to a positive phase within the next fortnight, with a tendency towards positive SAM index values throughout May being likely.

The 30 day average of the Southern Oscillation Index (SOI) for the period ending 06 May was -2.6.

International Model Outlooks







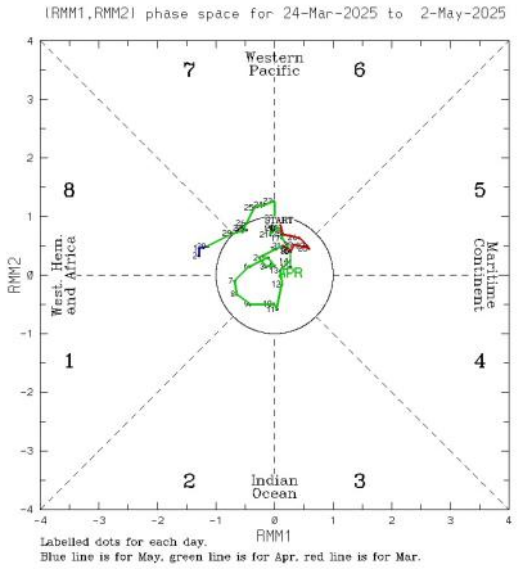
MADDEN–JULIAN OSCILLATION

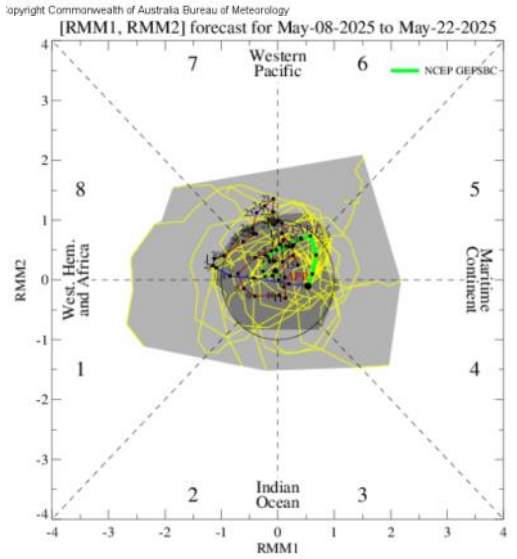
Click link to access *Tropical monitoring and outlook* [Issued on Tuesday 06 May 2025]

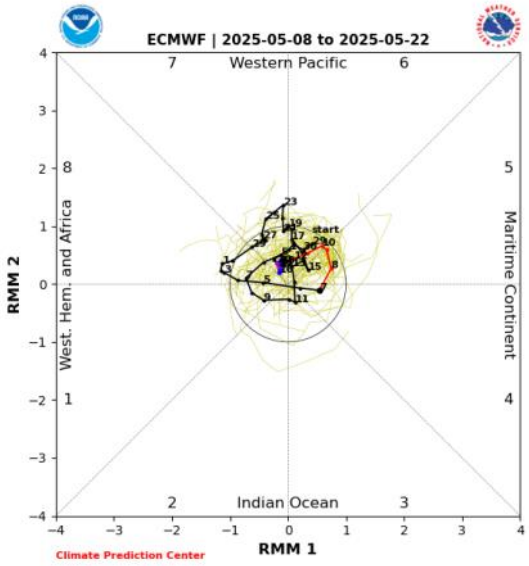
A weak pulse of the Madden-Julian Oscillation (MJO) occurred during April.

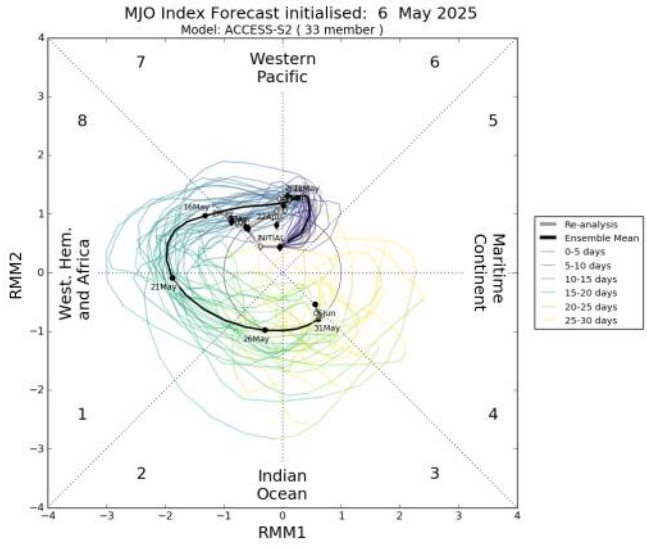
The Madden-Julian Oscillation (MJO) to 4 May, has recently strengthened near Africa, however the ACCESS-S outlook suggests the strengthening is unlikely to last and the MJO signal will weaken over the coming days.

This is an abbreviated version of the Tropical monitoring and outlook. Click on the *Tropical Update* for more information .







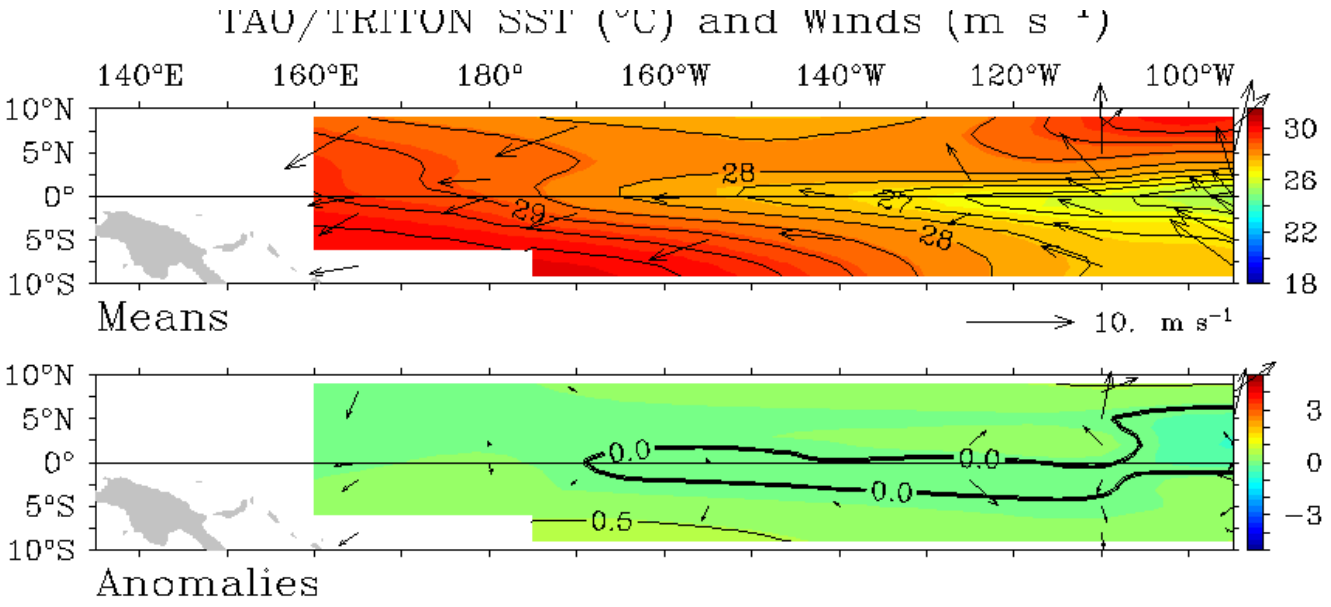


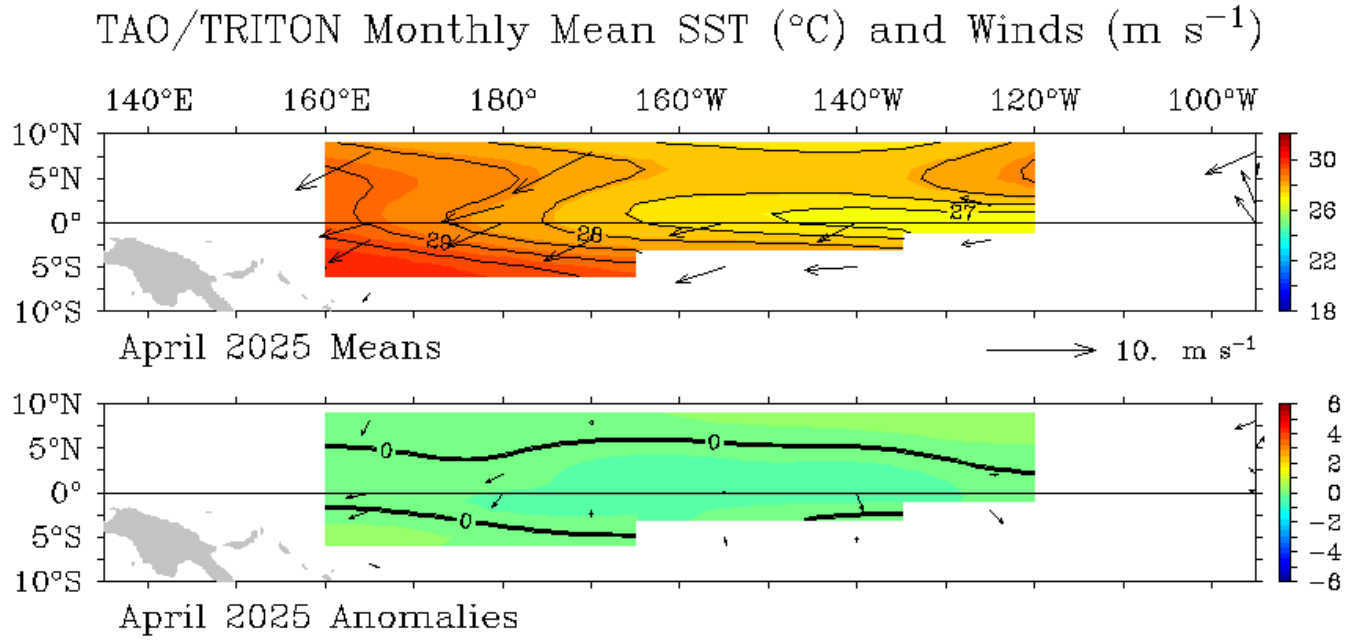
WIND

Click link to access [Wind plots link]

During April, the trade winds were generally average over the equatorial Pacific. For the five days ending 07 May 2025, the trades were stronger than average in the western equatorial Pacific west of the Dateline.

During El Niño events there is a sustained weakening, or even reversal, of the trade winds across much of the tropical Pacific, while during La Niña, there is a sustained strengthening of the trade winds.





TAO Project Office/PMEL/NOAA

May 8 2025

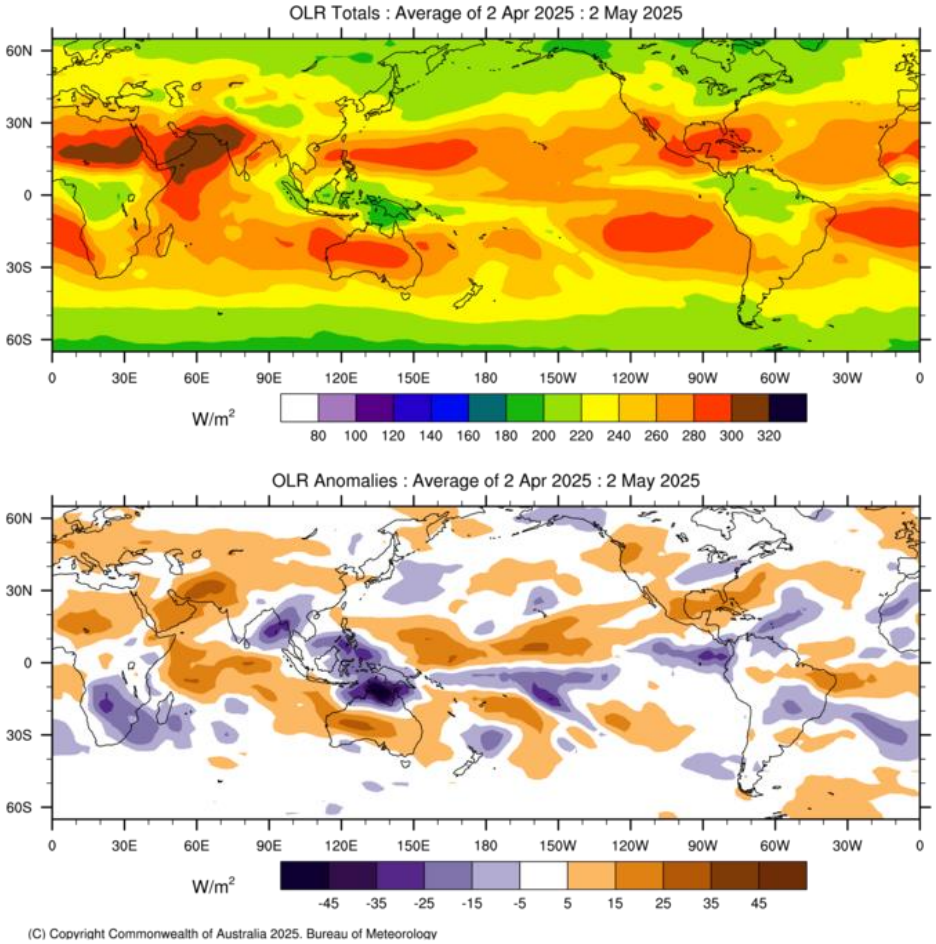
CLOUD AND RAINFALL

Click link to access OLR

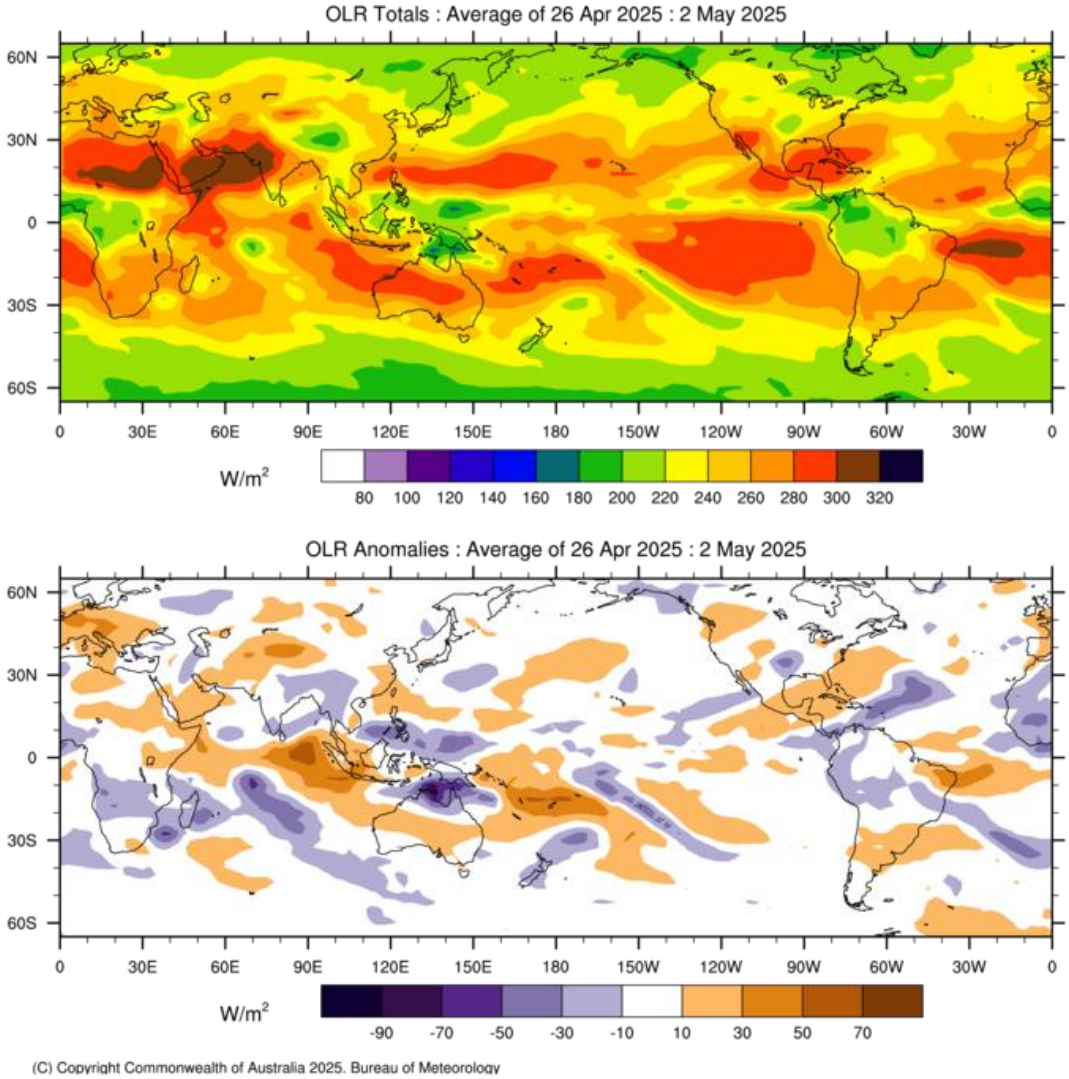
The April 30-day OLR anomaly map shows a region of negative OLR (increased convection) in a band stretching eastwards along the South Pacific Convergence Zone (SPCZ) from PNG, Solomon Islands, Tuvalu, Tokelau, and Cook Islands. Areas of anomalously high OLR (decreased convection) were evident over parts of PNG Islands, FSM, RMI, Nauru, and Kiribati in the north Pacific. Decreased convection were also evident over New Caledonia, Vanuatu, Fiji, Wallis and Futuna, Samoa, American Samoa, and Niue in the south Pacific.

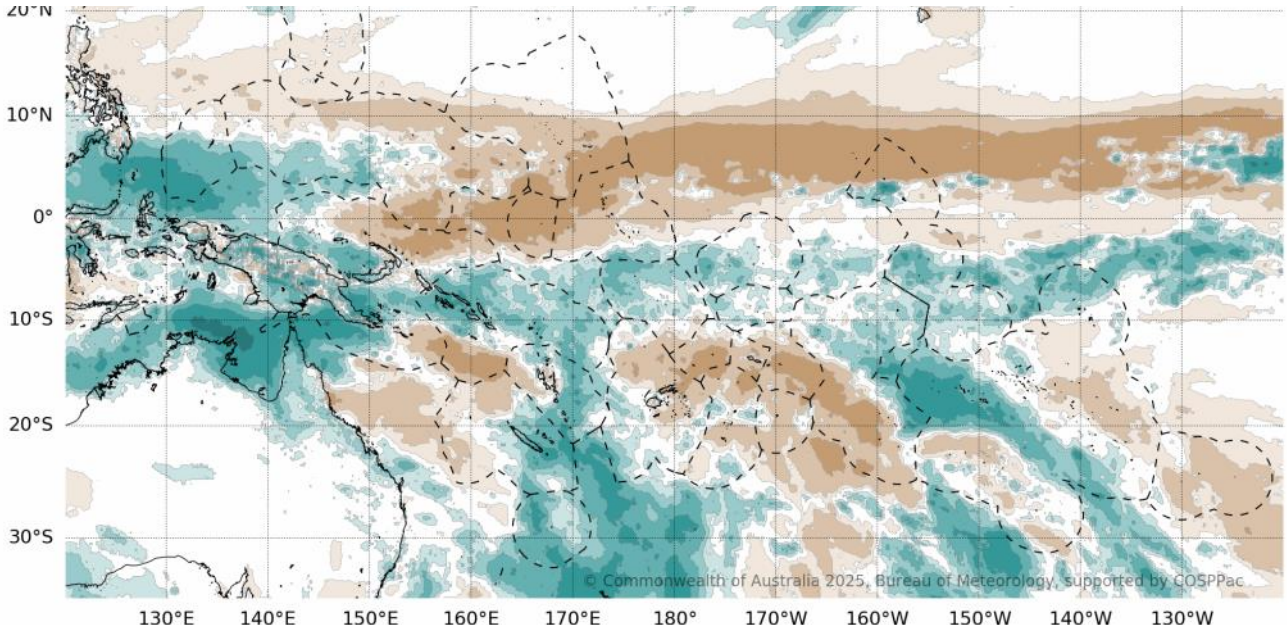
Note: Global maps of OLR below highlight regions experiencing increased or decreased cloudiness. The top panel is the total OLR in Watts per square metre (W/m^2) and the bottom panel is the anomaly (current minus the 1979-1998 climate average), in W/m^2. In the bottom panel, negative values (blue shading) represent above normal cloudiness while positive values (brown shading) represent below normal cloudiness.

OLR Total and Anomalies, 30 Day OLR

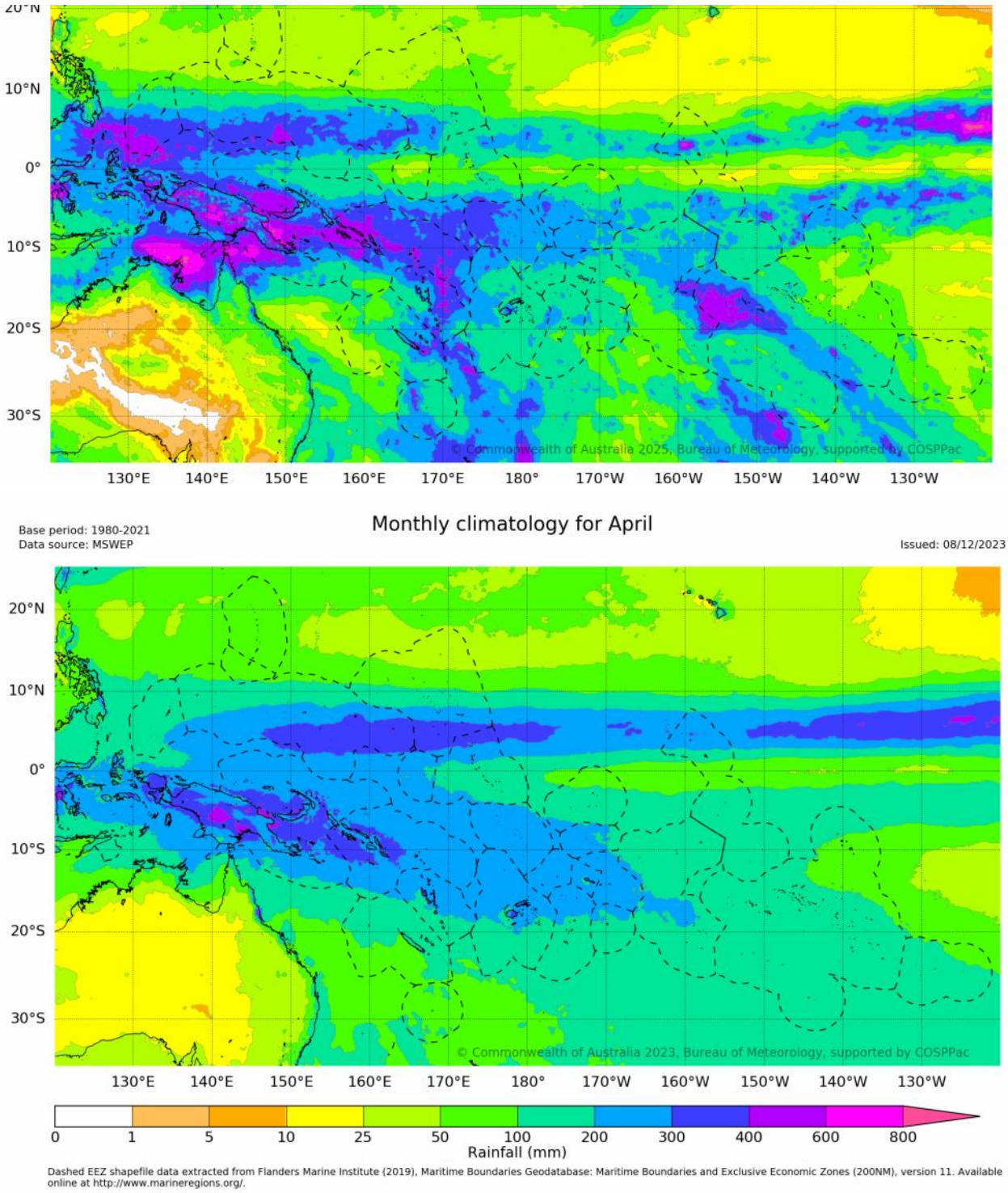


OLR Total and Anomalies, 7 Day OLR





30-Day Rainfall Accumulated



Global and Pacific ACCESS-S outlook and Pacific Climate Monitoring - ACCESS-S precipitation:
http://access-s.clide.cloud/

OCEAN CONDITIONS

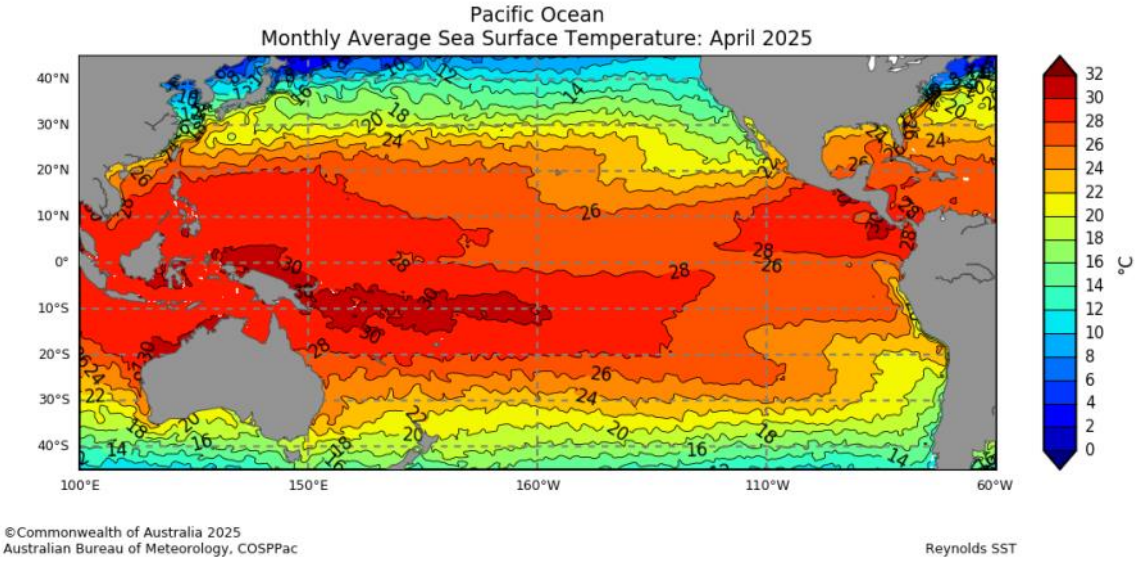
SEA SURFACE TEMPERATURE

Click link to access Pacific Community COSPPac Ocean Portal

Sea surface temperatures (SSTs) for March 2025 were cooler than average waters in waters between 155 °E and 150 °W along the equatorial Pacific, which was surrounded by average waters. Surrounding the cool and average waters were the warmer than average waters in the western, north and south Pacific.

Highest-on-record April SSTs occurred over part of Palau, eastern PNG, southern Solomon Islands, Fiji, Tonga and New Caledonia. The SSTs in decile 10 (very much above average) stretched northeastwards from Palau, northern FSM, to northern RMI. Another band stretched southeastwards from PNG, central Solomon Islands, Vanuatu, Fiji, Tuvalu, Tonga and Niue. Patches of SSTs in decile 10 (very much above average) were observed in Samoa, American Samoa, central Cook Islands, and southern French Polynesia. Above average (8-9) deciles stretched northeastwards from Palau, northern FSM, to northern RMI. Another 8-9 deciles band spanning eastwards from PNG, Solomon Islands, Vanuatu, northern Fiji, Tonga, Tuvalu, Tokelau, Samoa, Wallis and Futuna, Kiribati (Phoenix Islands), Samoa, American Samoa, Niue, Cook Islands, French Polynesia, and Pitcairn Islands. Average SSTs (4-7) and below average (2-3 decile) were observed in southeast FSM, southern RMI, Kiribati (Gilbert, Phoenix and northern Line Is.)

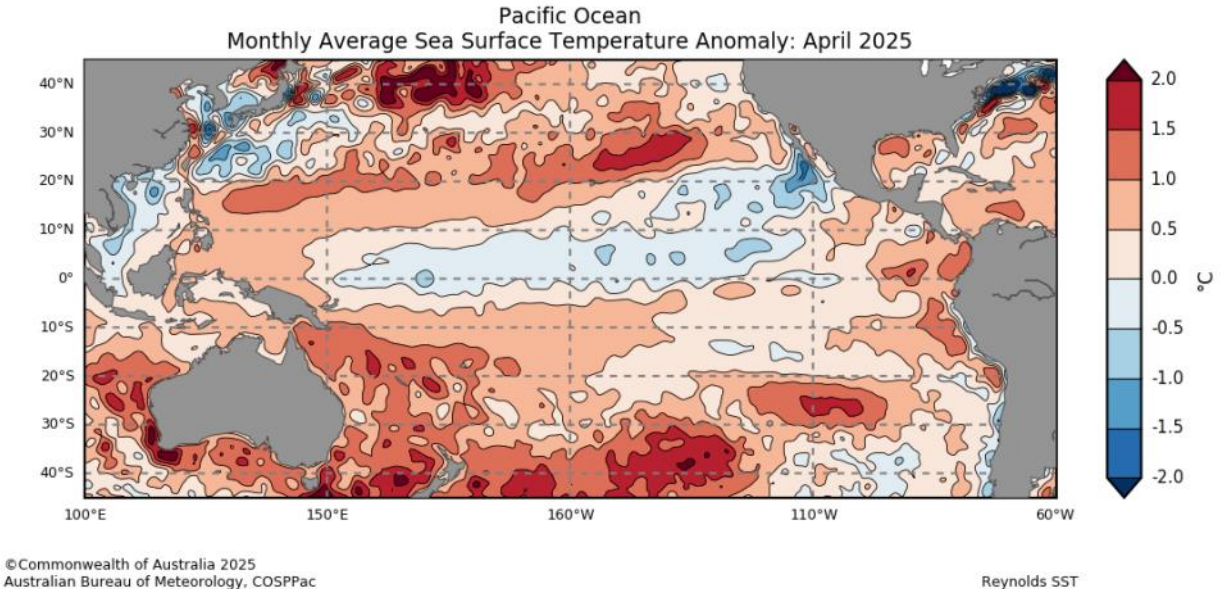
Mean Sea Surface Temperature

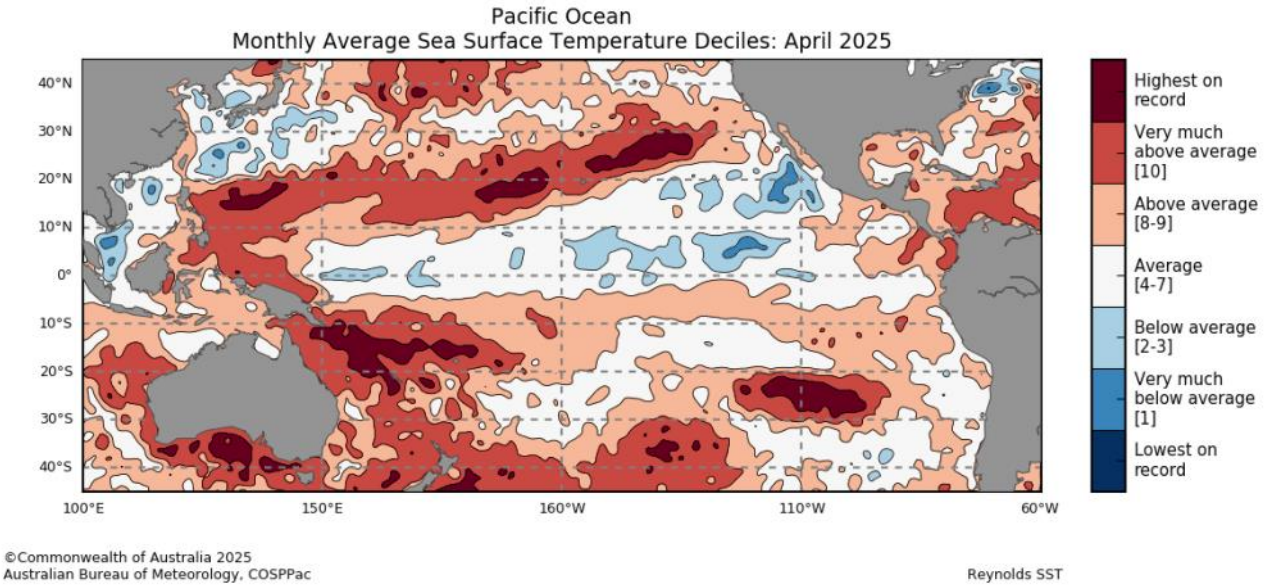


OCEAN CONDITIONS

Click link to access SEA SURFACE TEMPERATURE

Anomalous Sea Surface Temperature



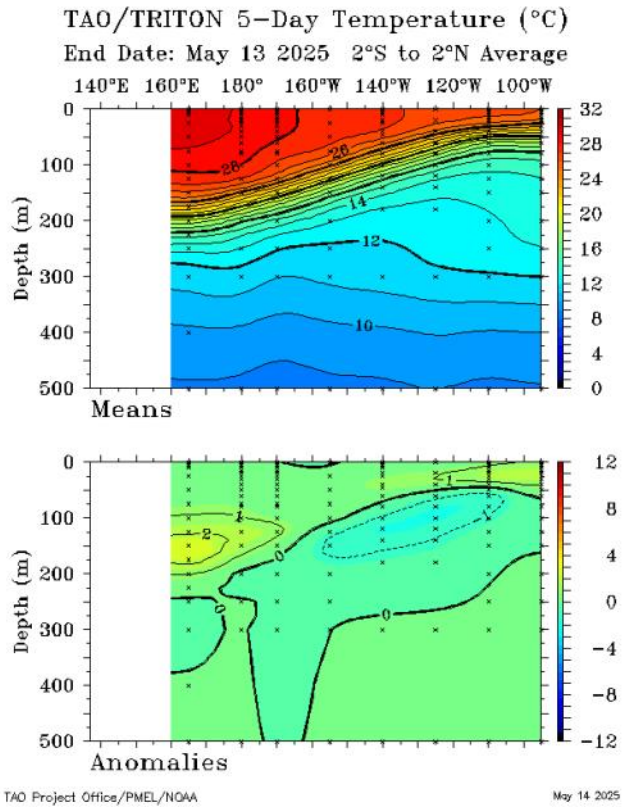


OCEAN CONDITIONS

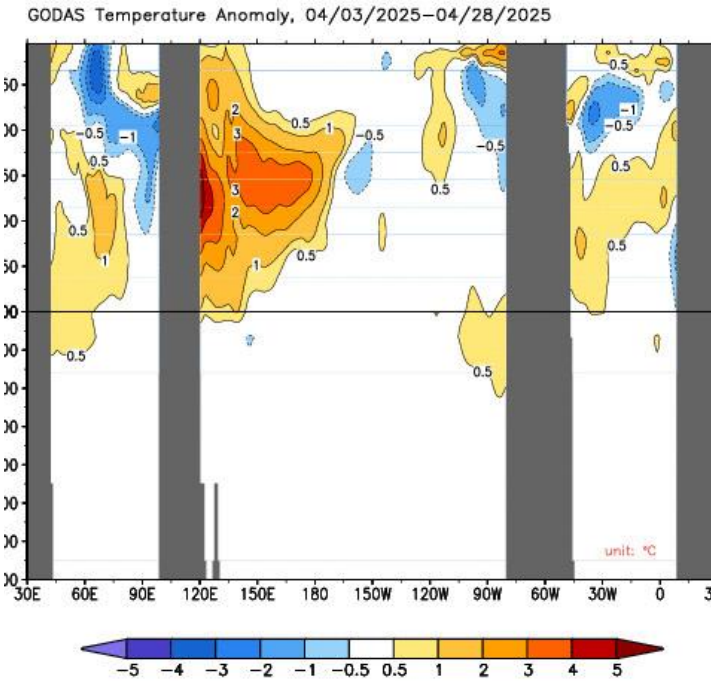
SUB SURFACE

The April equatorial Pacific sub-surface temperature anomalies for the 30 days ending 28 April 2025 show warmer than average waters in the far eastern Pacific of the equatorial region down to about 50 m depth; beneath 50m depth are cooler waters extending in depth to 200m. Warmer than average waters in the western half of the equatorial Pacific down to about 300 m depth in the far western Pacific. Waters are 3 to 4 °C warmer than average in the far western Pacific between 100m and 150m depth underneath the warm pool area.

Weekly Temperatures Mean and Anomalies



Monthly Temperatures Anomalies



Bureau of Meteorology Sea Temperature Analysis: http://www.bom.gov.au/marine/sst.shtml

TAO/TRITON Data Display: http://www.pmel.noaa.gov/tao/jsdisplay/

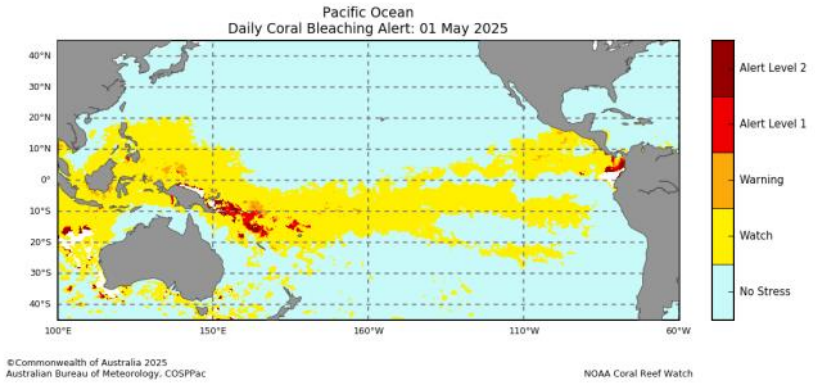
OCEAN CONDITIONS

CORAL BLEACHING

The daily Coral Bleaching Alert status for 1 May 2025 shows as of Alert Level 2 and 1 over PNG, Solomon Islands, Vanuatu, and New Caledonia. Alert Level 1 patches over the part of northern Fiji. Warning over the southern Palau, northern Solomon Islands, Tokelau, Samoa, American Samoa, and Cook Islands. Watch or No stress for the rest of the countries. The four week Coral Bleaching Outlook to 26 May shows Alert 2 over PNG, western Solomon Islands. Alert Level 1 in part of southern Palau and central Solomon Islands. Warning covers most of Palau, the southern part of FSM, the Solomon Islands and PNG. A patch of Warning over Phoenix Islands, Tuvalu, and Nauru. Watch or No Stress over the rest of the countries.

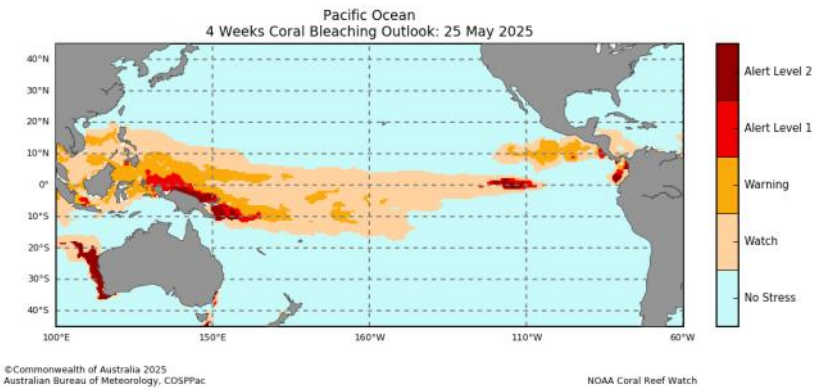
Daily Coral Bleaching Alert

(Source: Pacific Community COSPPac Ocean Porta Coral Bleaching)



4 Weeks Coral Bleaching Outlook

(Source: Pacific Community COSPPac Ocean Portal)



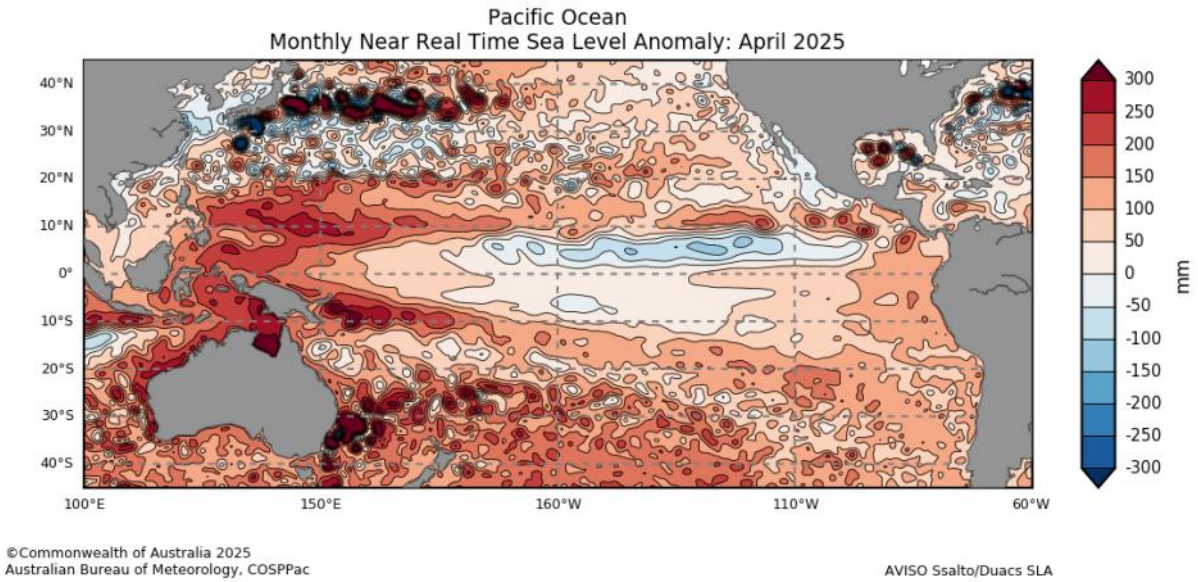
OCEAN CONDITIONS

OCEAN SURFACE CURRENTS AND SEA LEVEL

Sea levels observed in April were above normal over most COSPPac countries. Patches of anomalies from -250mm were observed over eastern PNG and western Solomon Islands, Palau and FSM. Anomalies of 150-250 mm were observed in Palau, FSM, central RMI. Another band of 150-250 mm stretching from northern PNG, Solomon Islands to central Tuvalu; a patch over southern Tonga. Anomalies with values between 50-150 mm were observed over southern FSM, southern RMI, Tuvalu, Kiribati, Samoa, Niue, Fiji, Tonga, Vanuatu, Cook Islands and Tokelau. The rest of the region were observed with anomalies between +50 to -50 mm.

Monthly Sea Level Anomalies

Source: Pacific Community COSPPac Ocean Portal

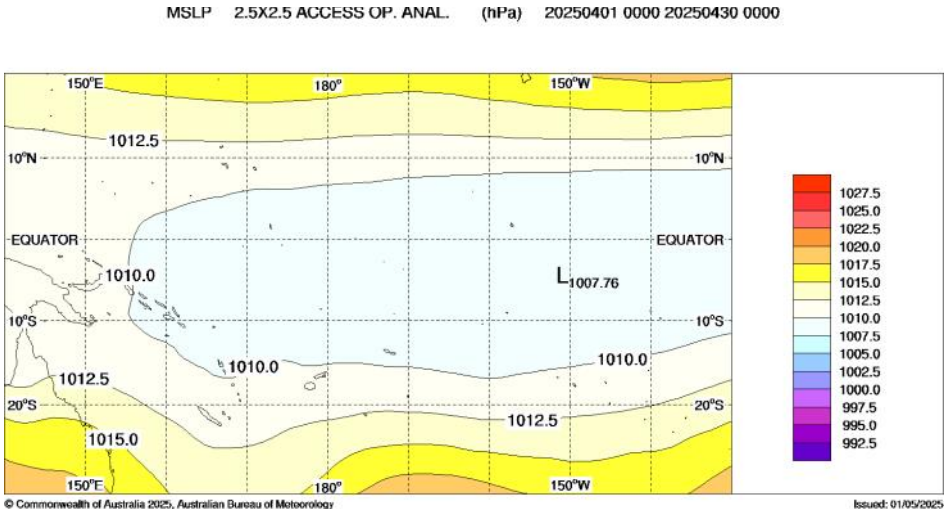


MEAN SEA LEVEL PRESSURE

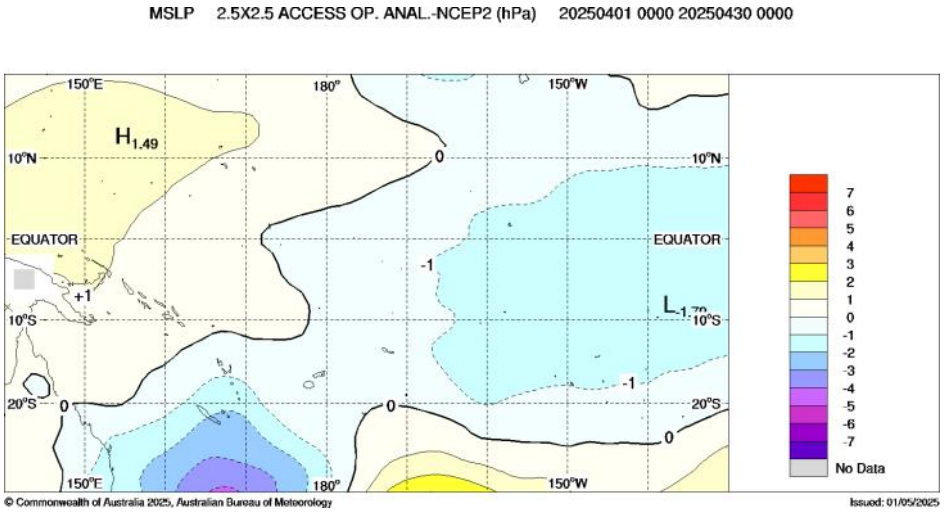
The April mean sea level pressure (MSLP) anomaly map displays positive anomalies of 1 hPa or greater over northern PNG mainland, Palau, Guam, CNMI, FSM, RMI, PNG Islands, Solomon Islands, Vanuatu, Fiji, Tonga, Tuvalu, Wallis and Futuna, Samoa, Niue, southern Cook Islands, and southern French Polynesia. A small patches of negative anomalies of 1 hPa or greater was observed over eastern Australia.

Areas of above (below) average MSLP usually coincide with areas of suppressed (enhanced) convection and rain throughout the month.

Mean



Anomalous



Bureau of Meteorology South Pacific Circulation Patterns: http://www.bom.gov.au/cgi-bin/climate/cmb.cgi?variable=mslp&area=spac&map=anomaly&time=latest

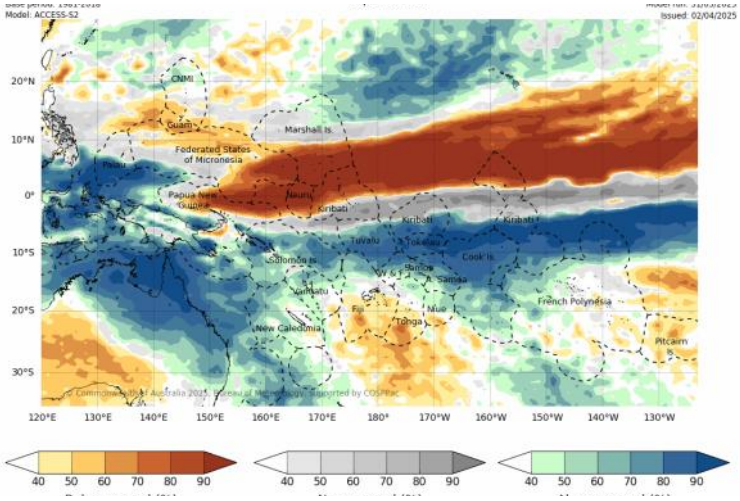
SEASONAL RAINFALL OUTLOOK

May—July 2025

The ACCESS-S model forecast for May 2025, shows above normal rainfall is likely or very likely for majority of Palau, western FSM, and northern CNMI in the northern Pacific. Above normal rainfall is likely or very likely for most of PNG, Solomon Islands, eastern New Caledonia, Vanuatu, majority of Fiji, northern Tonga, Wallis and Futuna, Samoa, American Samoa, Niue, Cook Islands, and northern and southern French Polynesia. Patches of above normal rainfall is likely or very likely for Kiribati (southern Phoenix), and Pitcairn Islands. Below normal rainfall is likely or very likely in a band stretching eastwards from southern CNMI, Guam, northern FSM to central RMI. Patches of Below normal rainfall is also likely or very likely for western New Caledonia, Tuvalu, eastern French Polynesia, and Pitcairn Islands.

The ACCESS-S three-month rainfall outlook (May to July 2025) is very similar to the May outlook, but the drier than normal region covers northern RMI and further into central FSM. The above normal rainfall region has a more stronger signal but only extend to Cook Islands. Another band of above normal rainfall is likely or very likely from southern Phoenix to central Line Islands (Kiribati).

Monthly ACCESS-S Maps



The Copernicus multi-model outlook for May to July 2025 is very similar to the ACCESS-S outlook, but the above normal rainfall region is likely or very likely over CNMI.

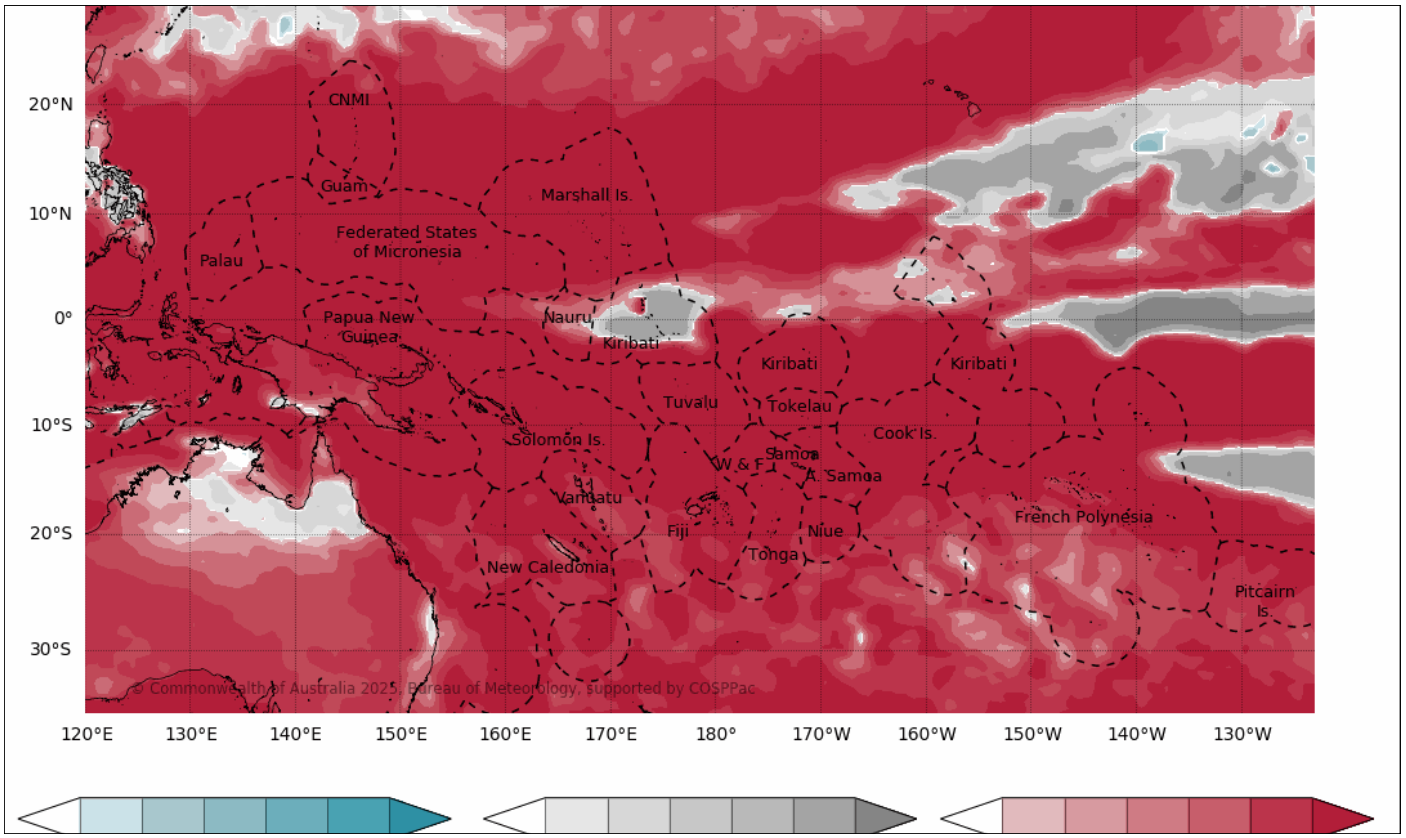
The APEC Climate Centre multi-model outlook (May to July 2025) is similar to the other two models.

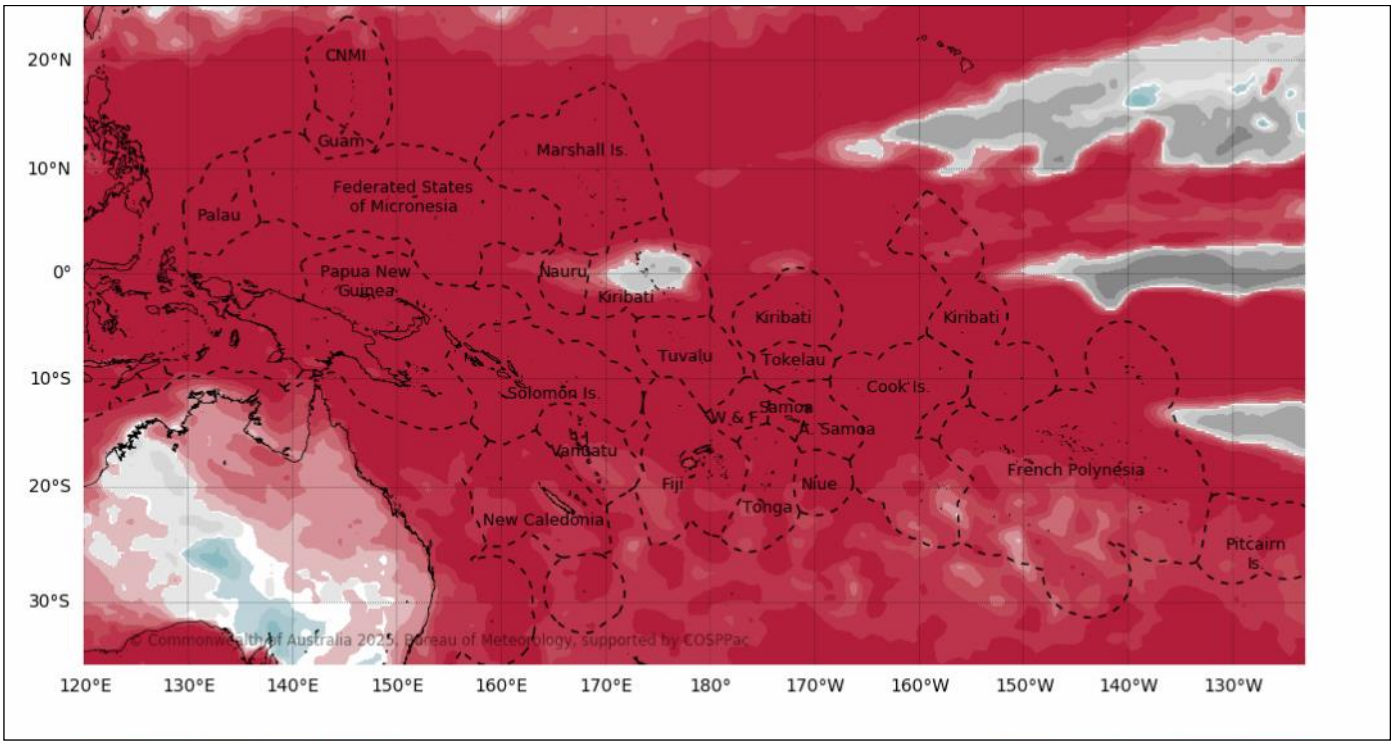
For May to July 2025 the models agree that above normal rainfall is likely or very likely for Palau, southwest FSM, and northern CNMI in the northern hemisphere. Another band stretches from southeastern PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, Wallis and Futuna, Samoa, southern American Samoa, southern Cook Islands, and central French Polynesia. The models agree that below normal rainfall is likely or very likely for northern FSM, RMI, and northeast French Polynesia.

SEASONAL TEMPERATURE OUTLOOK

May—July 2025

Monthly Tmax and Tmin ACCESS-S Maps

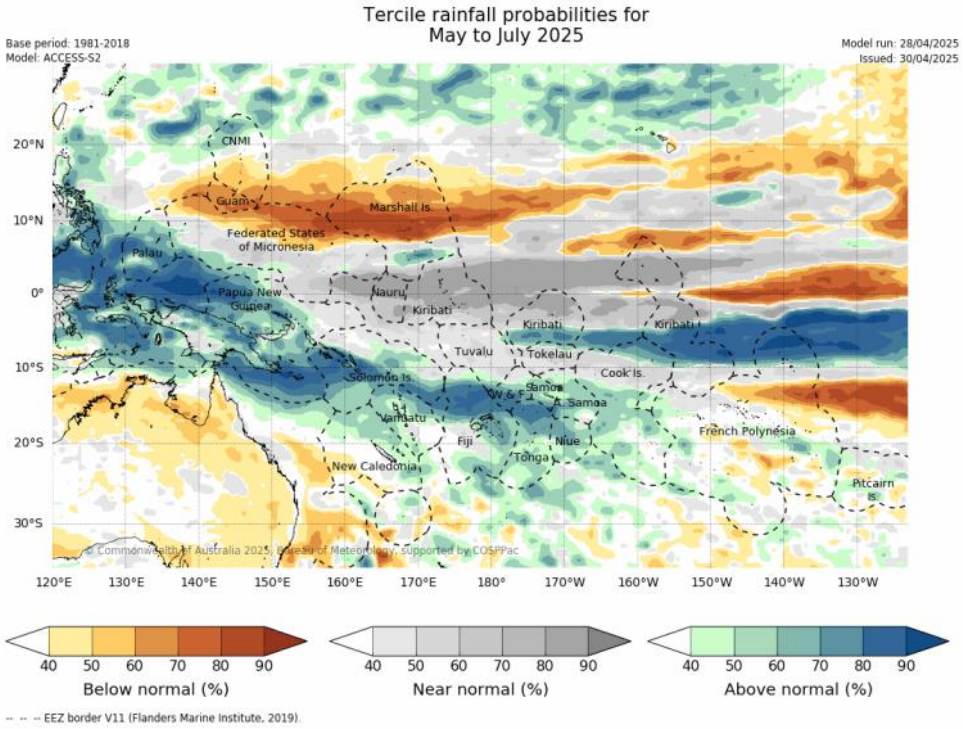


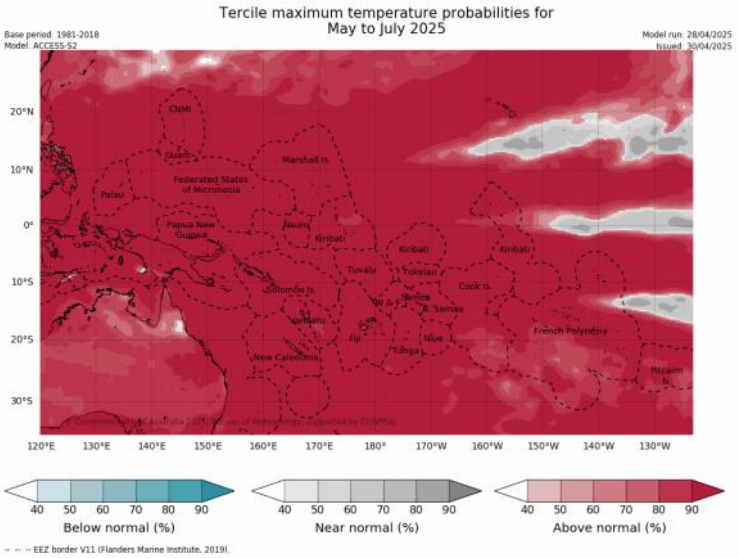


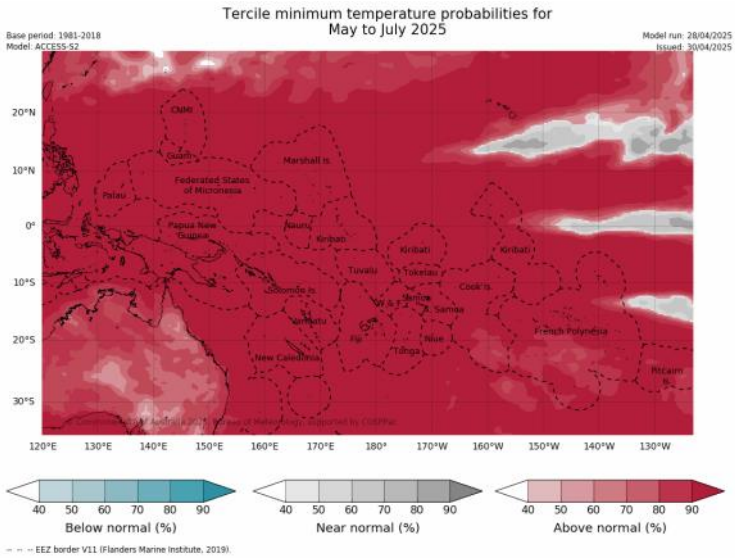
SEASONAL RAINFALL OUTLOOK

May—July 2025

Seasonal ACCESS-S maps



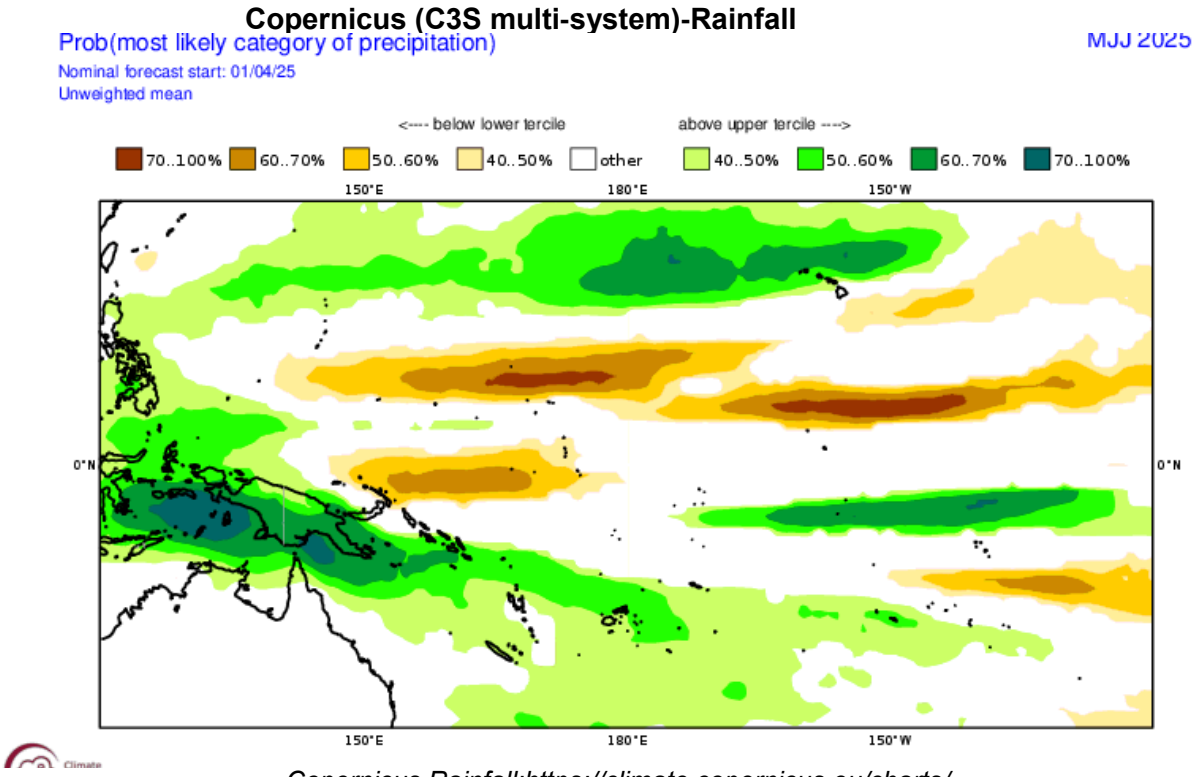




'About ACCESS-S http://access-s.clide.cloud/

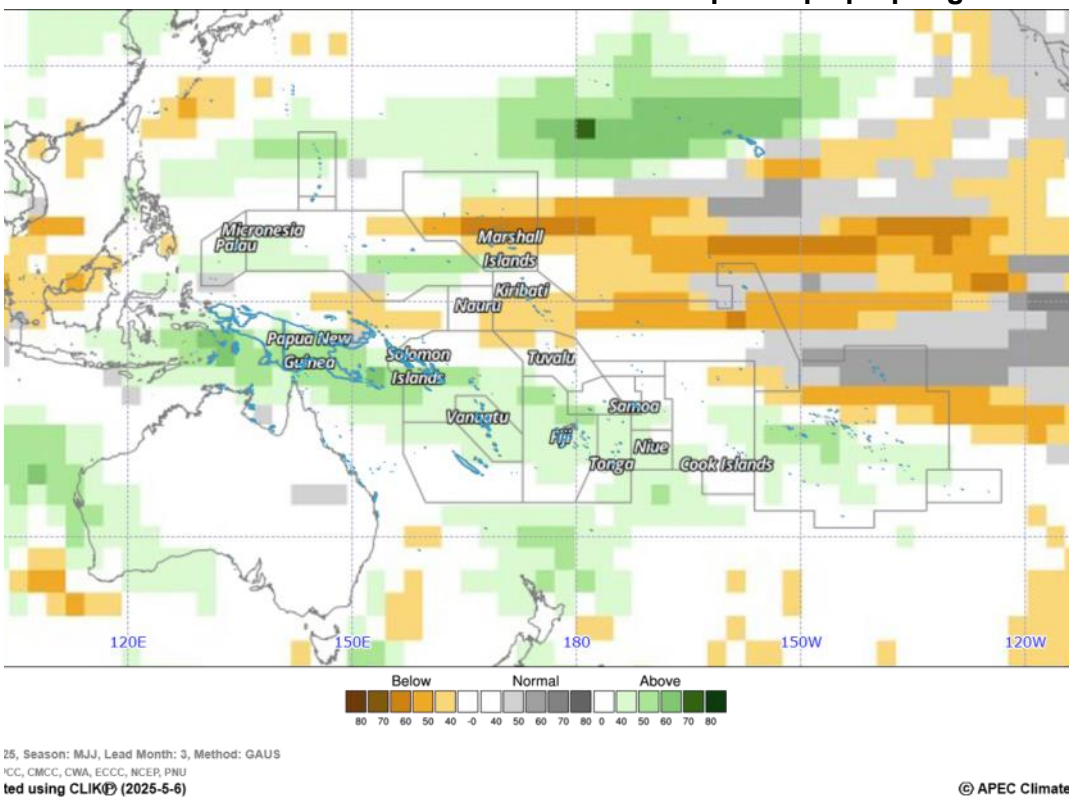
SEASONAL RAINFALL OUTLOOK

May—July 2025



Copernicus Rainfall:https://climate.copernicus.eu/charts/

APEC Climate Information Toolkit for the Pacific: http://clikp.sprep.org/



TROPICAL CYCLONE

2024/2025 Season

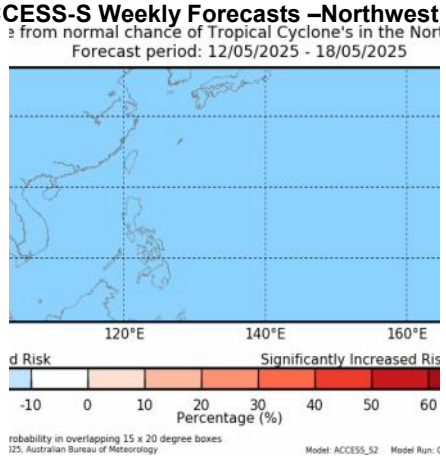
The northwest Pacific (WNP) tropical cyclone season is year-round, with most cyclones occurring between May and December. The 2024/25 Southwest Pacific tropical cyclone (TC) season has been remarkably inactive. There have been 11 disturbances overall, and five named storms to date (Alfred, Pita, Rae, Seru, Tam). Lower than normal TC activity in the central Pacific tends to be associated with La Niña conditions. Therefore, the 2024/25 TC season is consistent with this pattern.

In the WNP, the genesis and track of TCs show a relationship with the ENSO cycle: activity typically shifts eastward during El Niño and westward during La Niña. The outlooks currently favour a near-average TC season for the Western and Central North Pacific basins. In the southwest Pacific, the 2025-26 tropical cyclone season starts on 01st November 2025.

It's important to remember that history shows that tropical cyclones can happen outside the normal cyclone season, and it does not take a severe cyclone to produce severe impacts. Coastal and river flooding rainfall can occur with a distant, weak, or former cyclone, especially if the system is slow-moving. Communities should remain vigilant, and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

The weekly tropical cyclone forecasts from the ACCESS-S model shows some risks for Palau, and eastern FSM from 19 to 25 May.

ACCESS-S Weekly Forecasts –Northwest Pacific



ACCESS-S Weekly Forecasts –Southwest Pacific

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OUT OF SEASON

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are for November to April

Individual Model Links

UKMO Global long-range model probability maps: http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob

ECMWF Rain (Public charts) - Long range forecast: http://www.ecmwf.int/en/forecasts/charts/seasonal/rain-public-charts-long-range-forecast

POAMA Pacific Seasonal Prediction Portal: http://poama.bom.gov.au/experimental/pasap/index.shtml

APEC Climate Center (APCC): http://www.apcc21.org/eng/service/6mon/

OTHER INFORMATION

Southern Oscillation Index

The Southern Oscillation Index, or SOI, gives an indication of the development and intensity of El Niño and La Niña events across the Pacific Basin. The SOI is calculated using the difference in air pressure between Tahiti and Darwin. Sustained negative values of the SOI below −7 often indicate El Niño episodes. These negative values are usually accompanied by sustained warming of the central and/or eastern tropical Pacific Ocean, and a decrease in the strength of the Pacific Trade Winds. Sustained positive values of the SOI greater than +7 are typical of La Niña episodes. They are associated with stronger Pacific Trade Winds and sustained cooling of the central and eastern tropical Pacific Ocean. In contrast, ocean temperatures to the north of Australia usually become warmer than normal.

Multivariate ENSO Index (MEI)

The Climate Diagnostics Center Multivariate ENSO Index (MEI) is derived from a number of parameters typically associated with El Niño and La Niña. Sustained negative values indicate La Niña, and sustained positive values indicate El Niño.

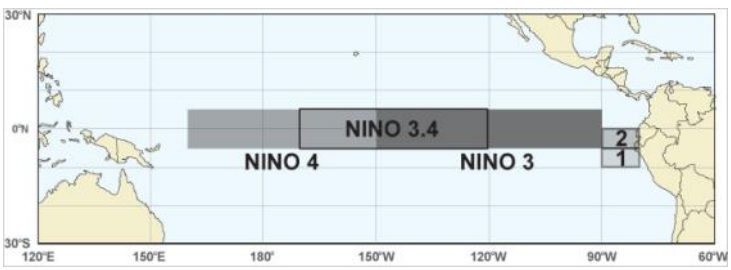
20 degrees Celsius Isotherm Depth

The 20°C Isotherm Depth is the depth at which the water temperature is 20°C. This measurement is important, as the 20°C isotherm usually occurs close to the thermocline, the region of most rapid change of temperature with depth, or the division between the mixed surface layer and deep ocean. A 20°C isotherm that is deeper than normal (positive anomaly) implies a greater heat content in the upper ocean, while a shallower 20°C isotherm (negative anomaly) implies a lower-than- normal heat content in the upper ocean.

Regions

SST measurements may refer to the NINO1, 2, 1+2, 3, 3.4 or 4 regions. These descriptions simply refer to the spatially averaged SST for the region described. The NINO regions (shown in the figure below) cover the following areas:

Region	Latitude	Longitude
NINO1	5-10°S	80-90°W
NINO2	0-5°S	80-90°W
NINO3	5°N to 5°S	150-90°W
NINO3.4	5°N to 5°S	120-170°W
NINO4	5°N to 5°S	160°E to 150°W



NOTE: NINO1+2 is the combined areas 1 and 2