Monthly Climate Bulletin

September 2024

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Photo Credit: Molly Powers (SPC) Samoa Tide Gauge

Sustainable, transformative, and resilient for a Blue Pacific SPREP PROE

Australian Government
Department of Foreign Affairs and Trade
Bureau of Meteorology

Australian Aid

Climate and Oceans Support Program in the Pacific

Pacific Community
Communauté du Pacifique

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Issued 16 October 2024

- The El Niño Southern Oscillation (ENSO) is neutral.
- The Madden-Julian Oscillation (MJO) is currently located in the Western Hemisphere with most models suggest the MJO will move eastwards towards the Indian Ocean and weaken in the coming days.
- In September, the Intertropical Convergence Zone (ITCZ) was active and north of the Date Line, and a well-defined South Pacific Convergence Zone (SPCZ) extended east-southeast from PNG to the northern Cook Islands in the southern hemisphere.
- Sea surface temperatures (SSTs) for September 2024 were above average across much of the western and eastern equatorial Pacific Ocean.
- The Coral bleaching Outlook to 20 October shows 'Alert Level 2' over eastern FSM, and southern RMI.
- For October to December 2024 the models agree that above normal rainfall is likely or very likely for Palau, most of FSM, central RMI, PNG, Solomon Islands, New Caledonia, Vanuatu, southern Fiji, southern Tonga, Niue, Wallis and Futuna, and the central to southern Cook Islands. The models agree that below normal rainfall is likely or very likely for southeastern FSM, far southern RMI, Nauru, most of Kiribati, most of Tuvalu, Tokelau, northern and southern French Polynesia, and Pitcairn Islands.
- The ACCESS-S weekly tropical cyclone outlook shows significantly increased risk over the Philippines, Palau, south China Sea region, Japan, and eastern Asia for the week from 12 to 18 October. There is also a slight to moderate increase risk over the same region from 19 to 25 October.

EL NIÑO–SOUTHERN OSCILLATION

ENSO and IOD remain neutral

Click link to access Climate Driver Update issued on 01 October 2024

The El Niño-Southern Oscillation (ENSO) is currently neutral.

Both Sea surface temperatures (SSTs) in the central equatorial Pacific Ocean and atmospheric patterns at ENSO-neutral levels. While some atmospheric indicators such as pressure, cloud and trade wind patterns over the Pacific have been more La Niña-like over the past few weeks, there has yet to be a consistent/sustained signal.

Of the 6 other climate models surveyed, 3 suggest SSTs in the tropical Pacific are likely to exceed the La Niña threshold (below -0.8 °C) from October, and another 3 models forecast SSTs to fall just short of the threshold from November. Should a La Niña develop in the coming months, it is forecast to be relatively weak (in terms of the strength of the SST anomaly) and short-lived, with all models indicating a return to neutral by February.

The Indian Ocean Dipole (IOD) is currently neutral, with the weekly IOD index of -0.39 °C (as of 29 September). Most models indicate that the IOD is likely to remain neutral, but weakly negative, for the rest of the year. An IOD event is unlikely.
Global sea surface temperatures (SSTs) remain at near-record levels, with temperatures since July falling just short of the record temperatures observed during 2023, yet well above all other years since observations began in 1854. The sustained nature of this significant global ocean heat suggests that climate patterns such as ENSO and IOD may not necessarily behave or evolve as they have in the past.

The Southern Annular Mode (SAM) is negative (as at 28 September). The SAM index is forecast to return to neutral levels during the coming week.

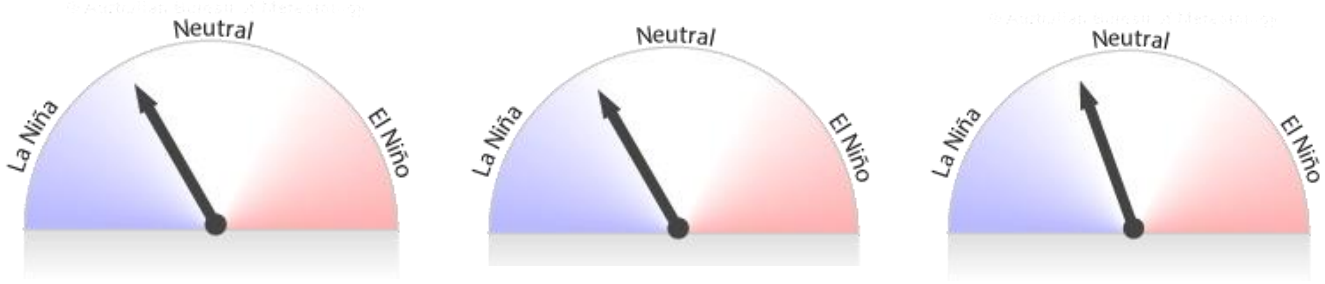
The 30-, 60- and 90-day Southern Oscillation Index (SOI) for the period ending 29 September were +0.4, +3.0 and -0.4 respectively.

EL NIÑO–SOUTHERN OSCILLATION

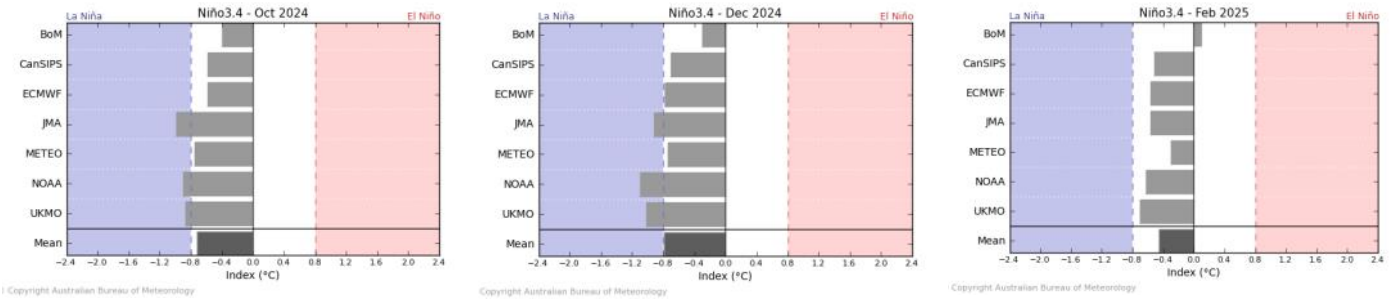
ENSO and IOD remain neutral

Click link to access Climate Driver Update issued on 01 October 2024

Bureau of Meteorology NINO3.4 ENSO Model Outlooks for October, December and February



Bureau of Meteorology NINO3.4 International Model Outlooks



Bureau of Meteorology summary of international model outlooks for NINO3.4: http://www.bom.gov.au/climate/model-summary/#tabs=Pacific-Ocean

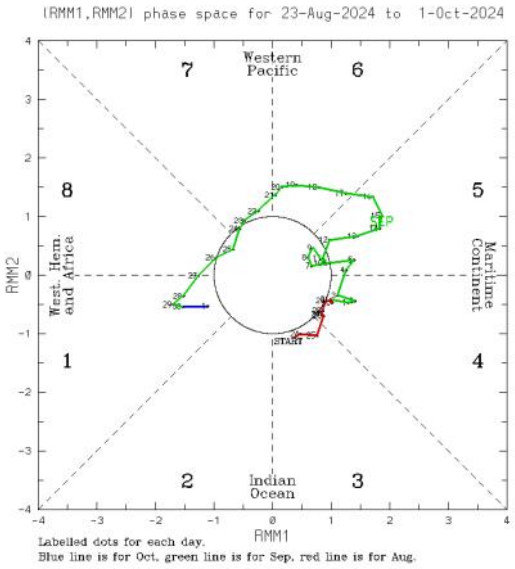
MADDEN–JULIAN OSCILLATION

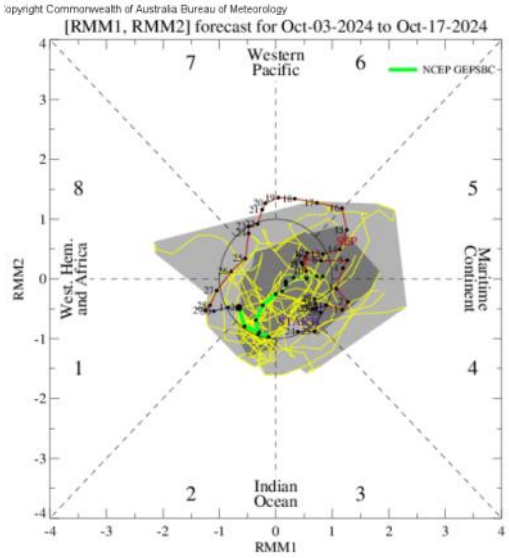
Click link to access *Tropical Climate Update* [Issued on Tuesday 01 October 2024]

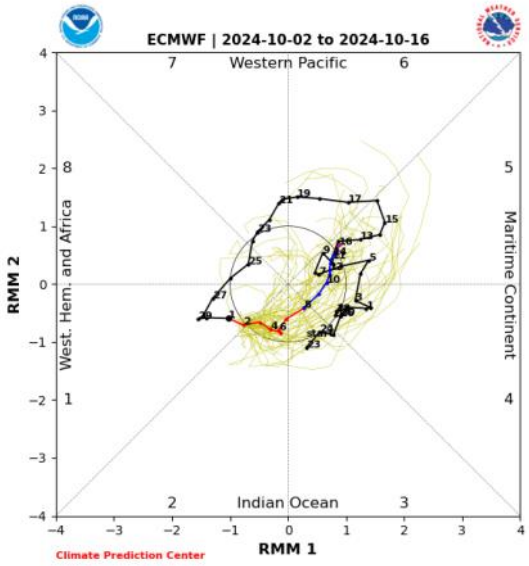
The Madden-Julian Oscillation (MJO) has been active over the Maritime continent and Western Pacific for the second and third week of September.

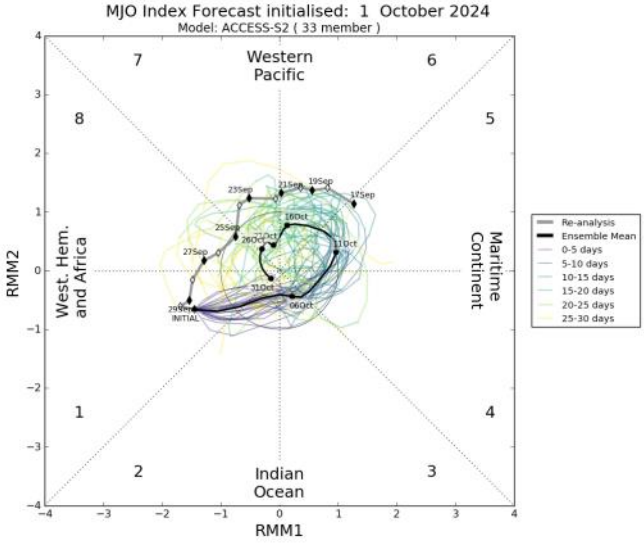
The MJO is currently located in the Western Hemisphere (as at 29 September). Most models suggest the MJO will move eastwards towards the Indian Ocean and weaken in the coming days and may reemerge in the Maritime Continent in mid-October.

This is an abbreviated version of the Tropical Climate Update. Click on the *Weekly Tropical Update* for more information .







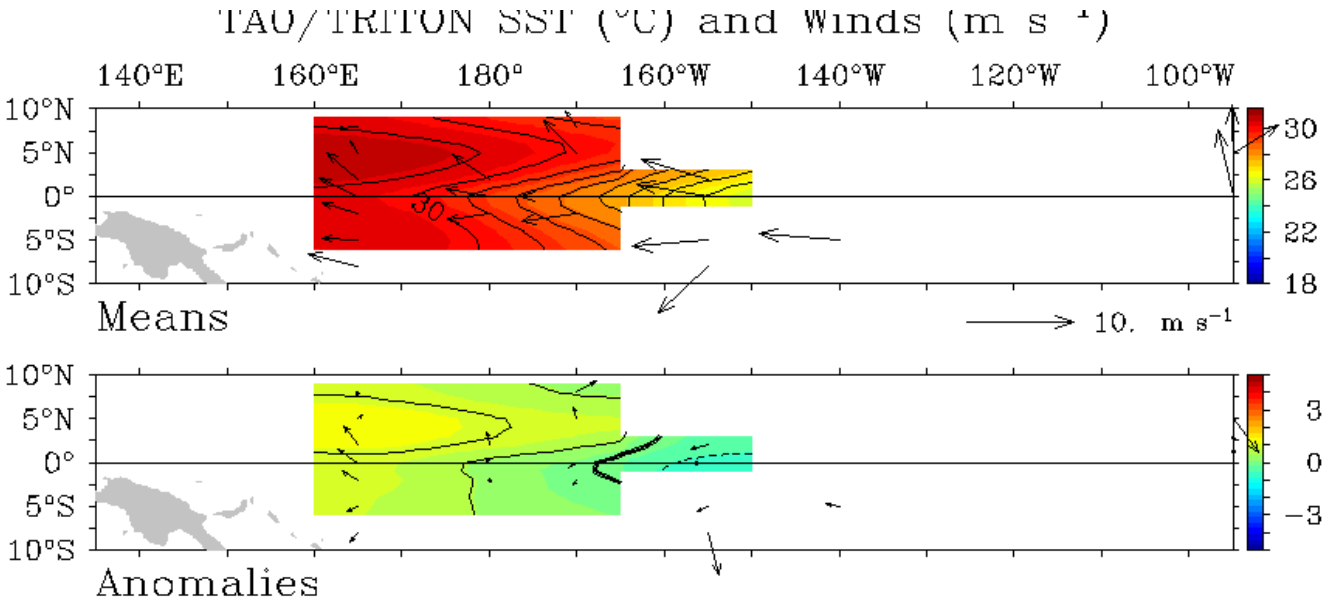


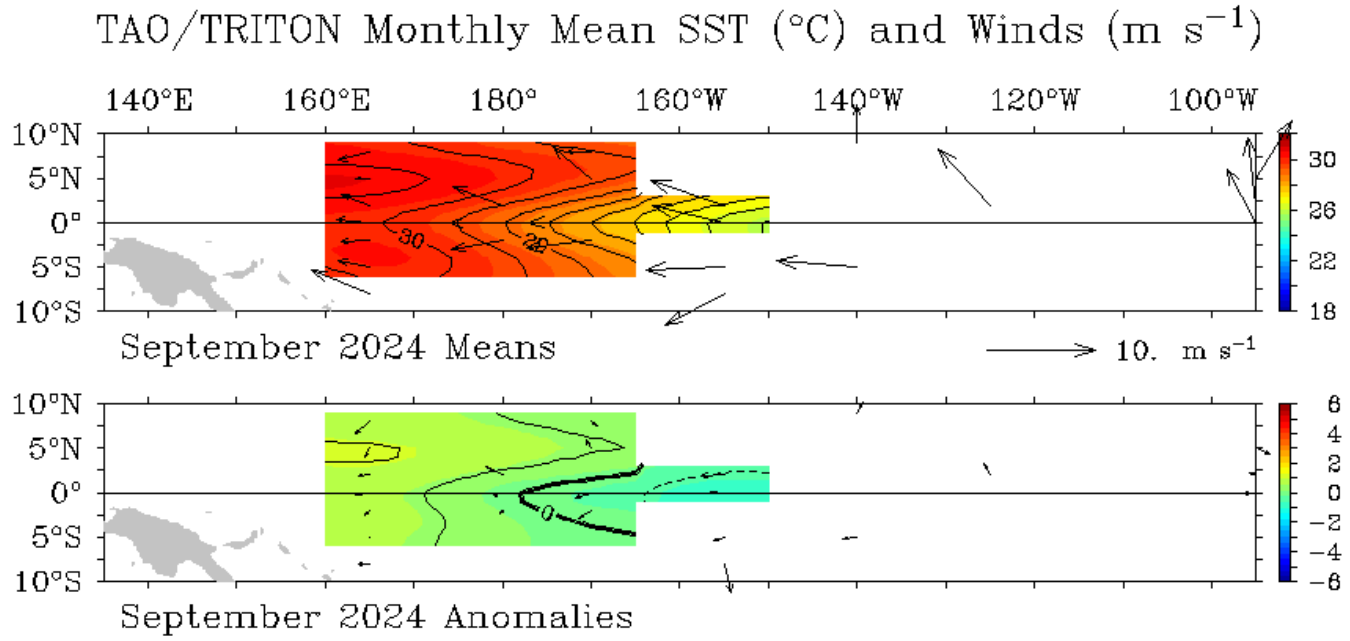
WIND

Click link to access Wind plots link

During September, the trade winds were generally close to normal over the equatorial Pacific. For the five days ending 2 October 2024, the trades were also stronger than normal west of the Date Line.

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

Oct 3 2024

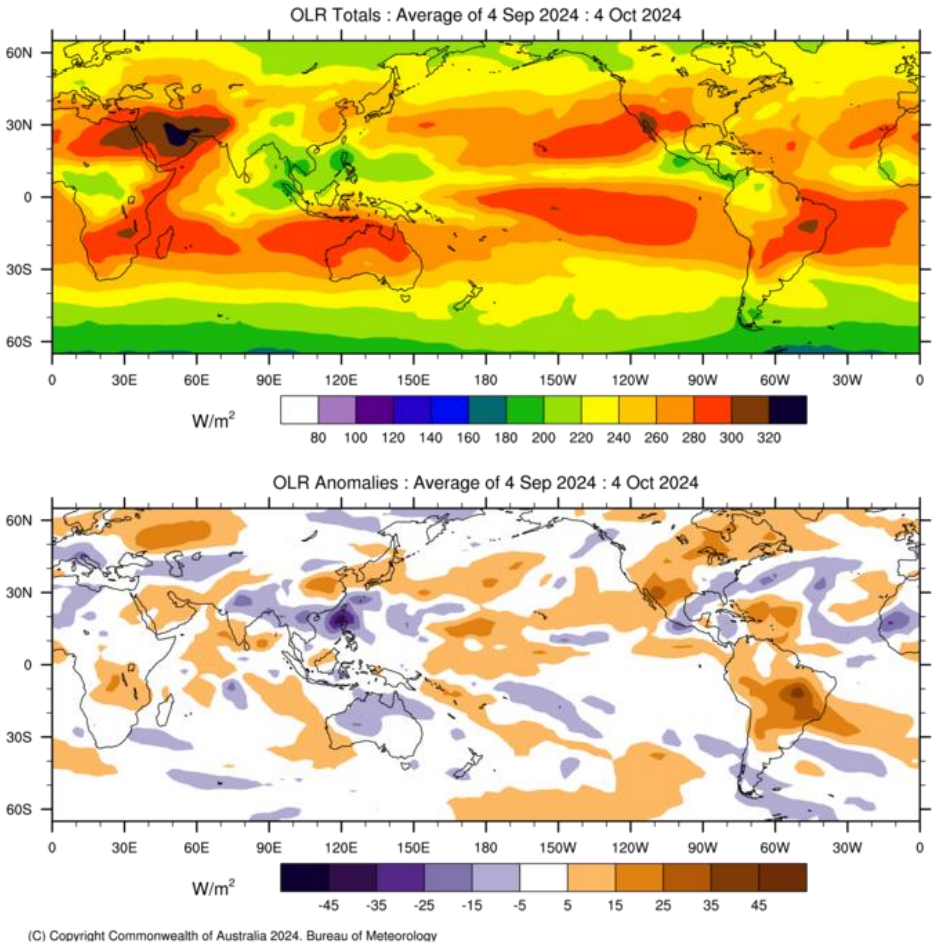
CLOUD AND RAINFALL

Click link to access OLR

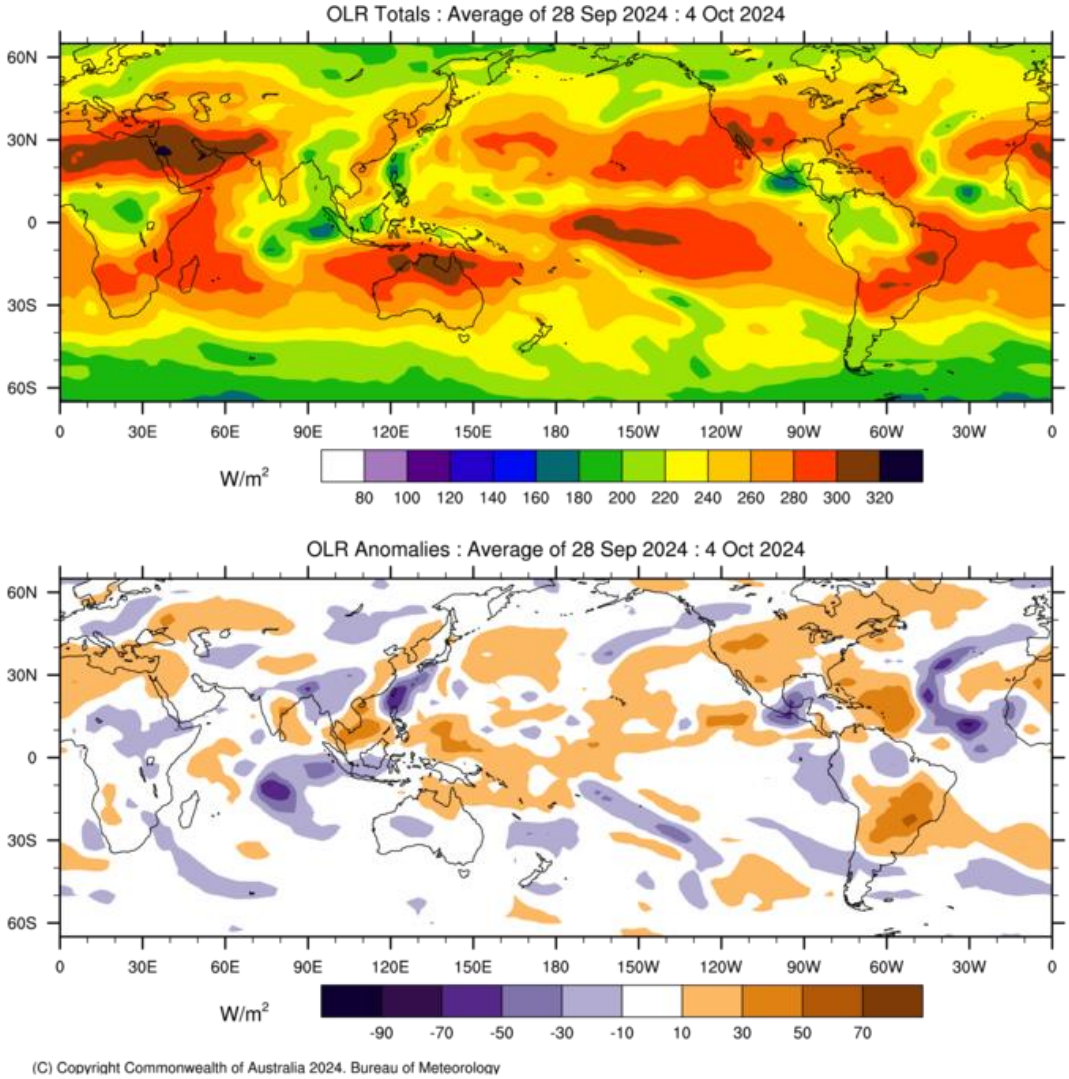
The September 30-day OLR anomaly map shows a region of negative OLR (increased convection) over American Samoa to southern Cook Islands, and French Polynesia. There is another area of increased convection between New Caledonia and New Zealand. Areas of anomalously high OLR (decreased convection) were evident over Palau, FSM, southern RMI, Nauru, and Kiribati in the northern hemisphere. Area of decreased convection were also observed over most of PNG, Solomon Islands, Vanuatu, Fiji, Wallis and Futuna, and Tuvalu in the southern hemisphere.

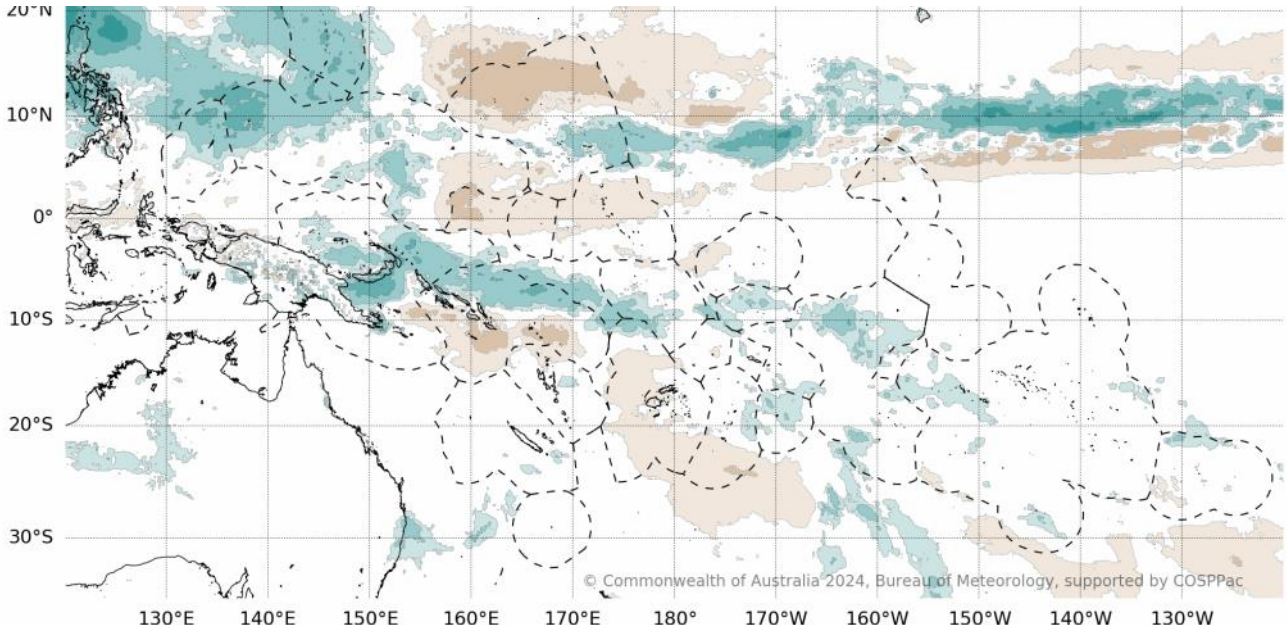
Note: Global maps of OLR below highlight regions experiencing increased or decreased cloudiness. The top panel is the total OLR in Watts per square metre (W/m^2) and the bottom panel is the anomaly (current minus the 1979-1998 climate average), in W/m^2. In the bottom panel, negative values (blue shading)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

OLR Total and Anomalies, 30 Day OLR

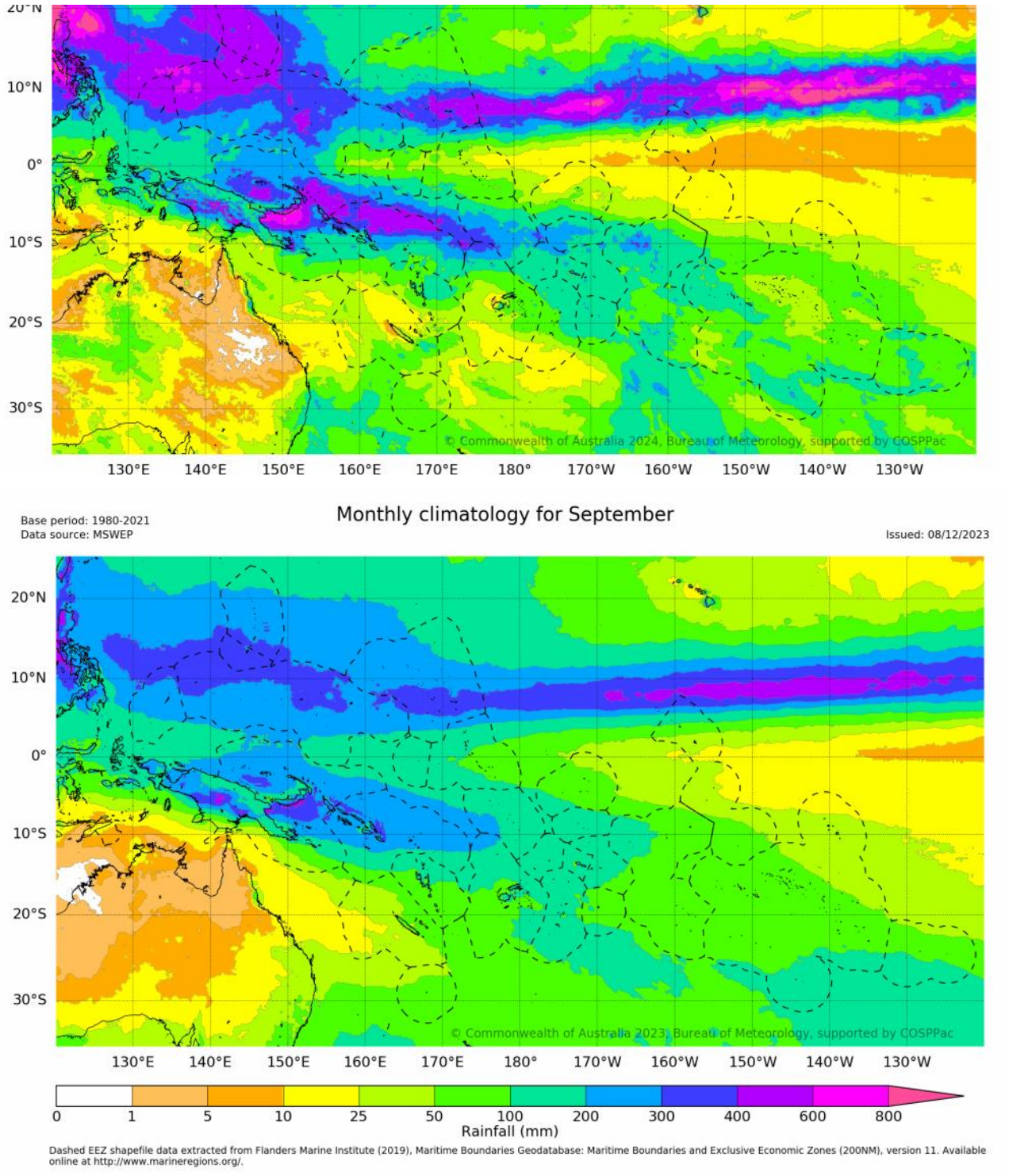


OLR Total and Anomalies, 7 Day OLR





30-Day Rainfall Accumulated



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

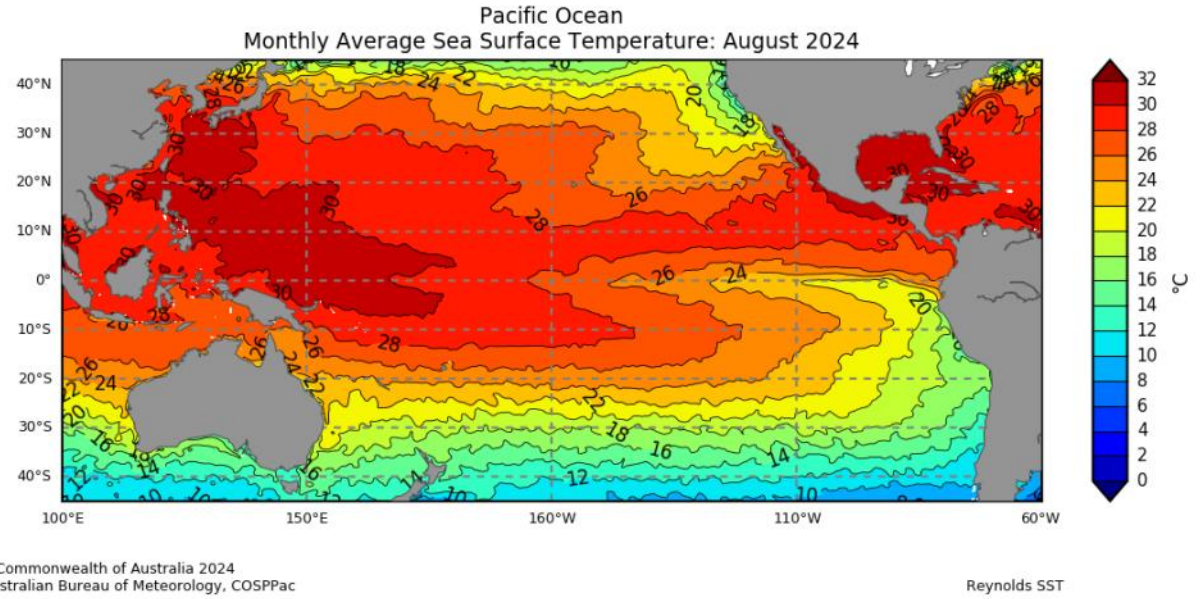
OCEAN CONDITIONS

SEA SURFACE TEMPERATURE

Click link to access Pacific Community COSPPac Ocean Portal

Sea surface temperatures (SSTs) for September 2024 were up to 1.2 °C warmer than average in the far western tropical and far eastern equatorial Pacific Ocean. The SSTs were also up to 1.2 °C cooler than average in the central and eastern equatorial Pacific and along parts of the South American coast.

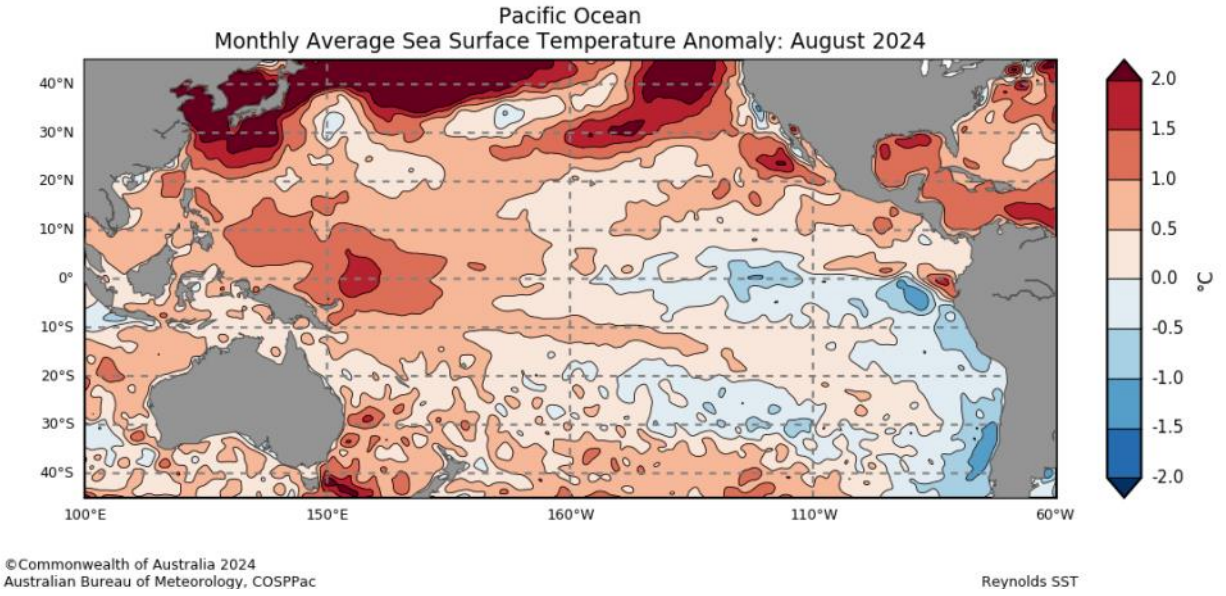
Highest-on-record August SSTs occurred in FSM, parts of Palau, northern PNG, southern RMI and western Nauru. The SSTs in decile 10 (very much above average) stretched east-northeastwards from Palau, FSM to Marshall Islands. Another band stretched east-southeastwards from PNG to northern French Polynesia. Above average (8-9) decile were observed for majority of the Pacific Island Countries, spanning east-south-eastwards from southern PNG, New Caledonia, Vanuatu, Fiji, Kiribati and northern Islands. Average SSTs (4-7) were observed in southern Fiji, most of Tonga, Wallis and Futuna, Samoa, American Samoa, Niue, central and southern Cook Islands, Kiribati (northern Line Islands) and northern French Polynesia. Patches of decile 2-3 (below average) were observed in southern Niue EEZ, Cook Islands, French Polynesia, and Pitcairn Islands.

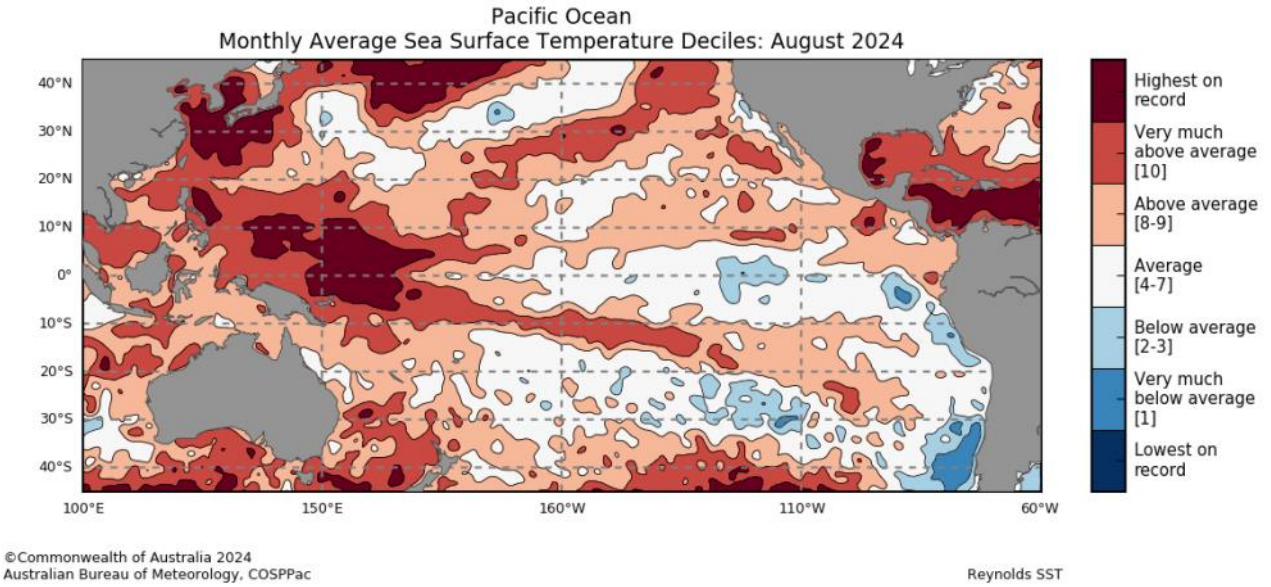


OCEAN CONDITIONS

Click link to access SEA SURFACE TEMPERATURE

Anomalous Sea Surface Temperature



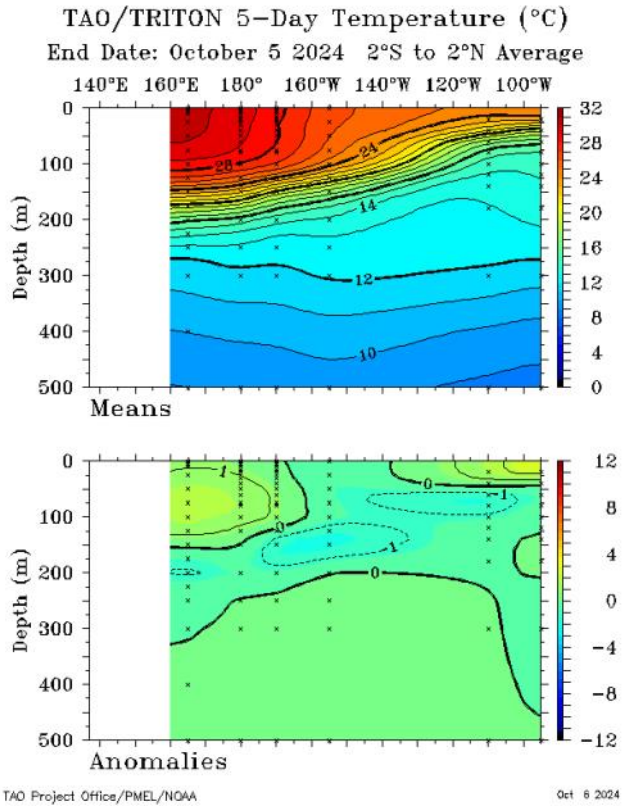


OCEAN CONDITIONS

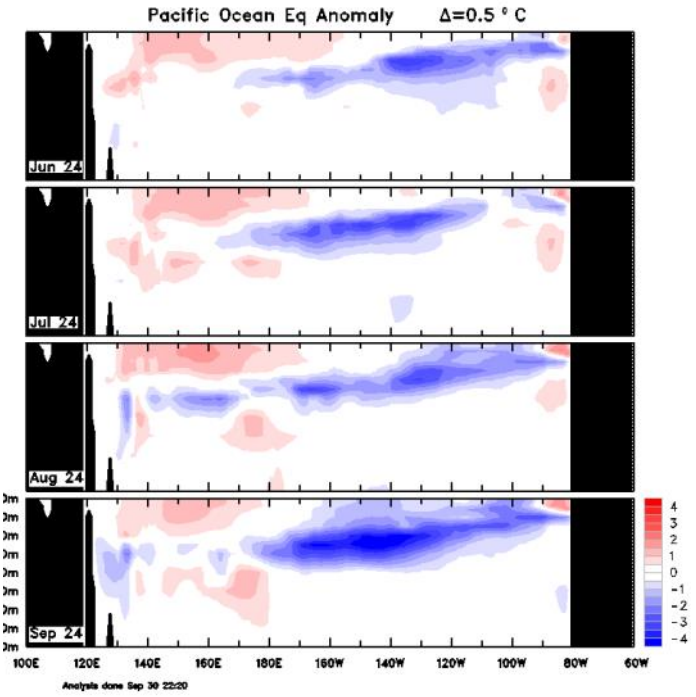
SUB SURFACE

The September equatorial Pacific sub-surface temperature anomalies for the 30 days ending 25 September 2024 shows cooler than average waters in the eastern half of the equatorial Pacific down to about 200 m depth; waters are more than 4 °C cooler than average in a small area around 100 to 150 m depth. There were warmer than average waters in the western half of the equatorial Pacific down to about 200 m depth, increasing to 300 m depth in the far west. Waters are 2 to 3 °C warmer than average in a couple of small pockets around 125 m depth.

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/

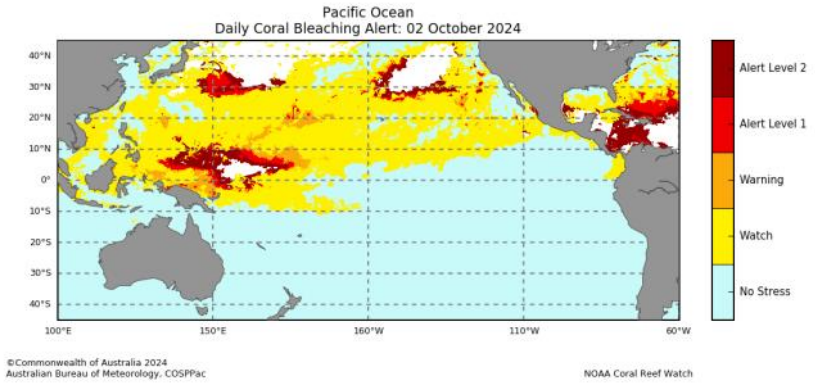
OCEAN CONDITIONS

CORAL BLEACHING

The daily Coral Bleaching Alert status for 02 October 2024 shows an area of 'Alert Level 2' over most parts of FSM, southern RMI, and northern most part of PNG, and Kiribati (Gilbert Islands). 'Alert Level 1' over parts of eastern Palau, southern RMI, northern PNG, and Kiribati (northern Gilbert islands). 'Warning' status over northern RMI, and most of northern PNG. 'Watch' or 'No stress' for the rest of the countries. The four-week Coral Bleaching Outlook to 20 October shows 'Alert Level 2' over eastern FSM, and southern RMI. 'Alert Level 1' rating over northern FSM, southern RMI, and northern PNG's EEZ. 'Warning' covers northern PNG, northern FSM, and southern RMI. 'Watch' or ' No Stress' over the rest of the countries.

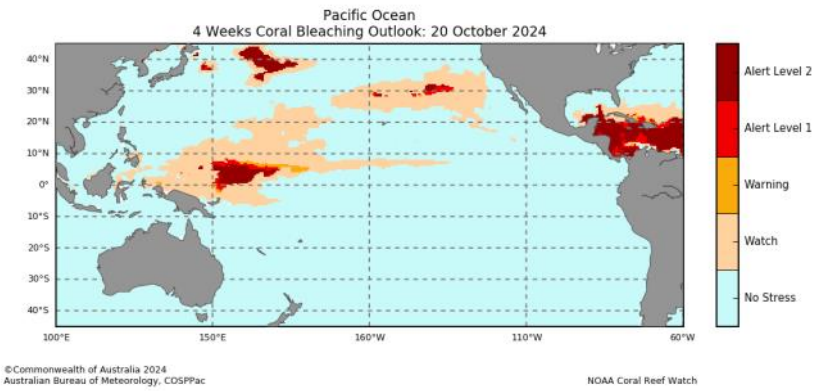
Daily Coral Bleaching Alert

(Source: Pacific Community COSPPac Ocean Porta Coral Bleaching)



4 Weeks Coral Bleaching Outlook

(Source: Pacific Community COSPPac Ocean Portal)



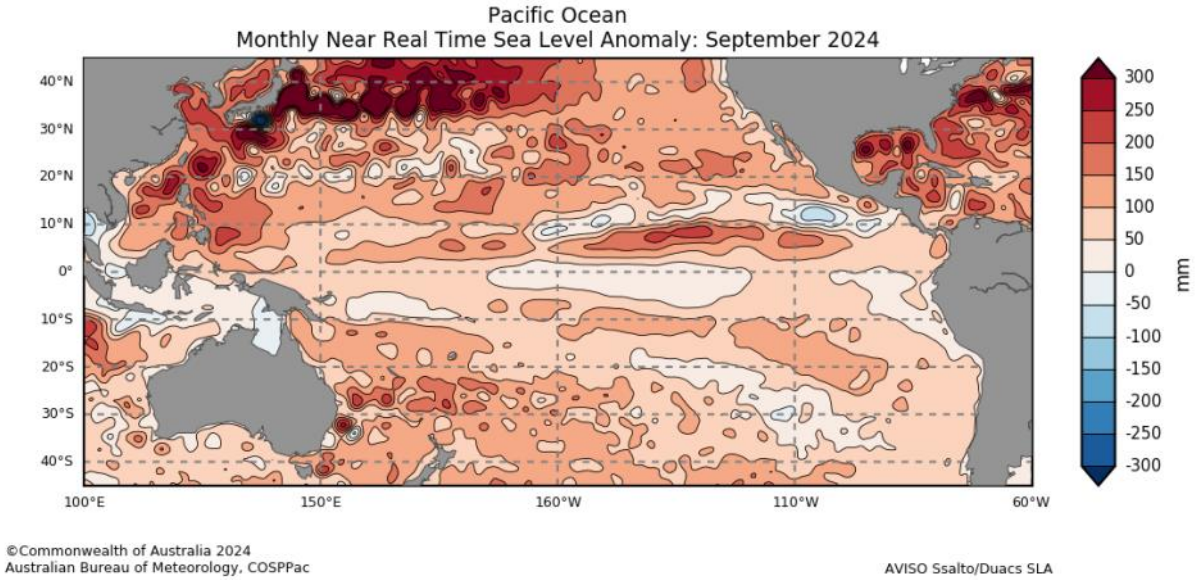
OCEAN CONDITIONS

OCEAN SURFACE CURRENTS AND SEA LEVEL

Sea levels observed in September were above normal over most COSPPac countries. Patches of anomalies from +200mm were observed over northern Palau, southern New Caledonia, southern Fiji, and southern Tonga. Anomalies of +100mm to +200mm were observed over most of Palau, most of FSM, northern and southern RMI, most of New Caledonia, most of Vanuatu, Fiji, Tonga, Niue, Kiribati (northern Gilbert, southern Phoenix, and northern and southern Line Is.,), western Wallis and Futuna, northern and southern Cook Islands, and southern French Polynesia. The rest of the region were observed with anomalies between +50 and +100mm.

Monthly Sea Level Anomalies

Source: Pacific Community COSPPac Ocean Portal

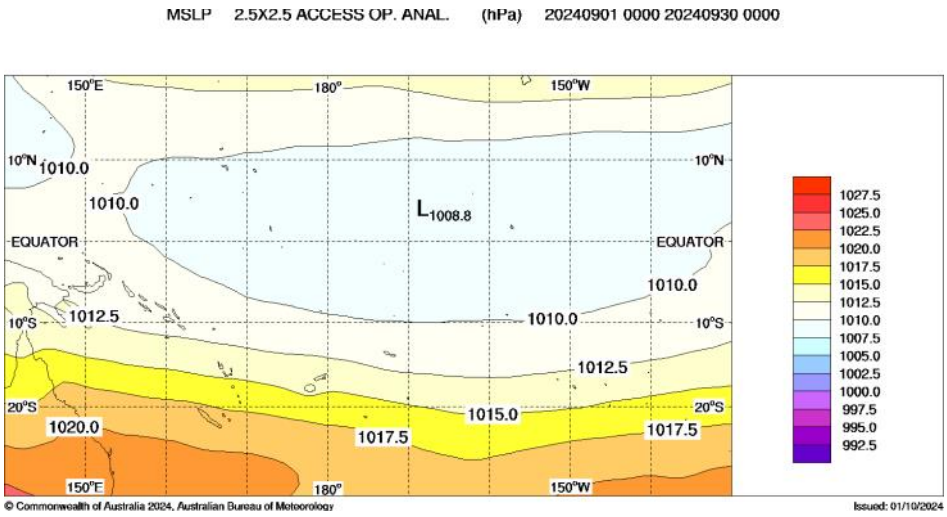


MEAN SEA LEVEL PRESSURE

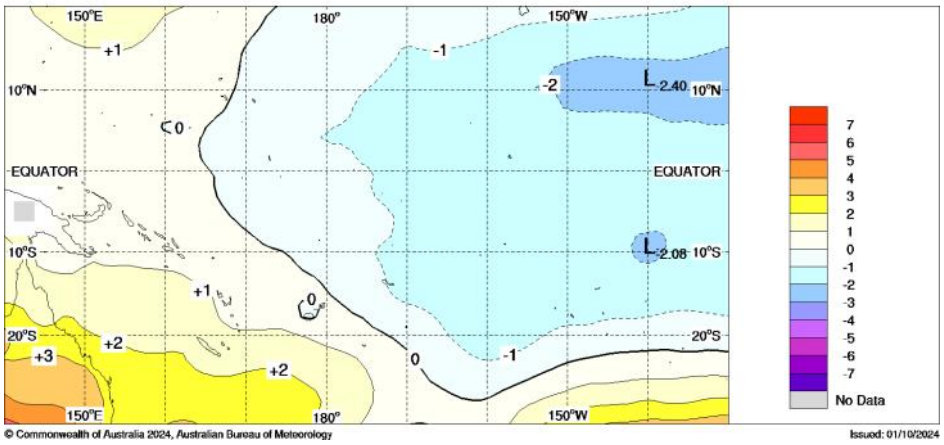
The September mean sea level pressure (MSLP) anomaly map displays positive anomalies of 1 hPa or greater over the southwest (Coral Sea region, southern Vanuatu. New Caledonia, and towards New Zealand) and south-central Pacific.

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

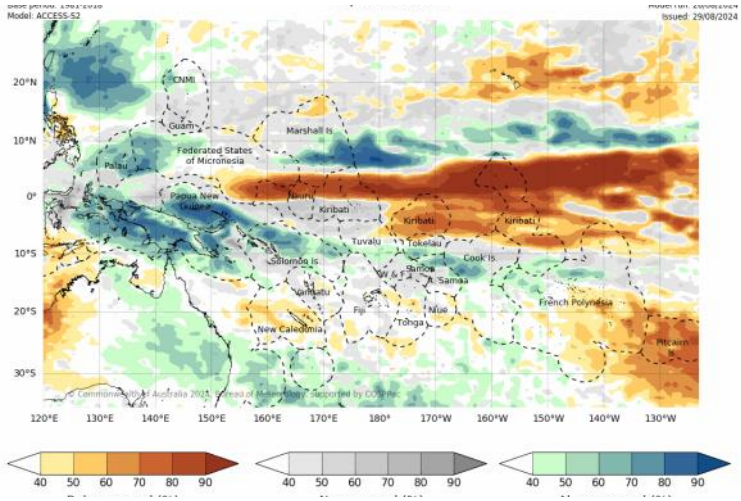
SEASONAL RAINFALL OUTLOOK

October—December 2024

The ACCESS-S model forecast for October 2024, shows above normal rainfall is likely or very likely for most of Palau, western FSM, southern CNMI, northern and southern RMI, and in a band stretching southeast from the PNG to central French Polynesia. Below normal rainfall is likely or very likely for southeast FSM, Nauru, Kiribati (most of Gilbert Is., Phoenix Is., and central and northern Line Is.), northern Tuvalu, far northern and southern Cook Islands, northern and central French Polynesia, and Pitcairn Islands. Patches of below normal rainfall is likely for northern CNMI, Tonga, and Niue

The ACCESS-S three-month rainfall outlook (October to December 2024) is very similar to the October outlook, but with a stronger and broader equatorial dry signal over southeast FSM, Nauru, and Kiribati extending to Tuvalu, Tokelau, northern Cook Islands, northern and southern French Polynesia, and Pitcairn Island. The above normal rainfall region is also more pronounced, extending over Palau, most of FSM, central RMI, PNG, Solomon Islands, New Caledonia, Vanuatu, southern Fiji, southern Tonga, Niue, Wallis and Futuna, and the central to southern Cook Islands. Patches of above normal rainfall is likely for Samoa, American Samoa and French Polynesia. .

Monthly ACCESS-S Maps



The Copernicus multi-model outlook for October to December 2024 is very similar to the ACCESS-S outlook.

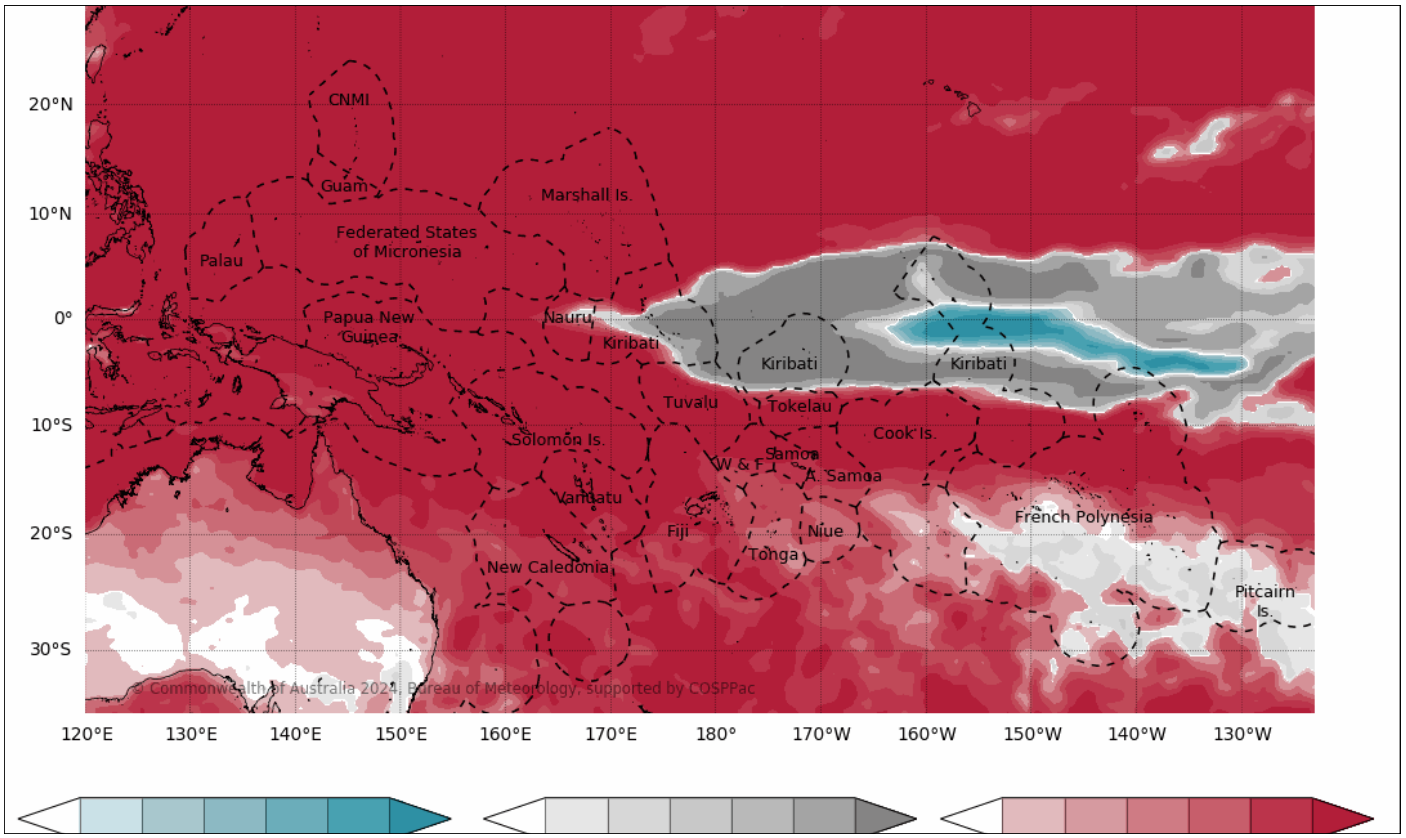
The APEC Climate Centre multi-model outlook (October to December 2024) is similar to the other two models.

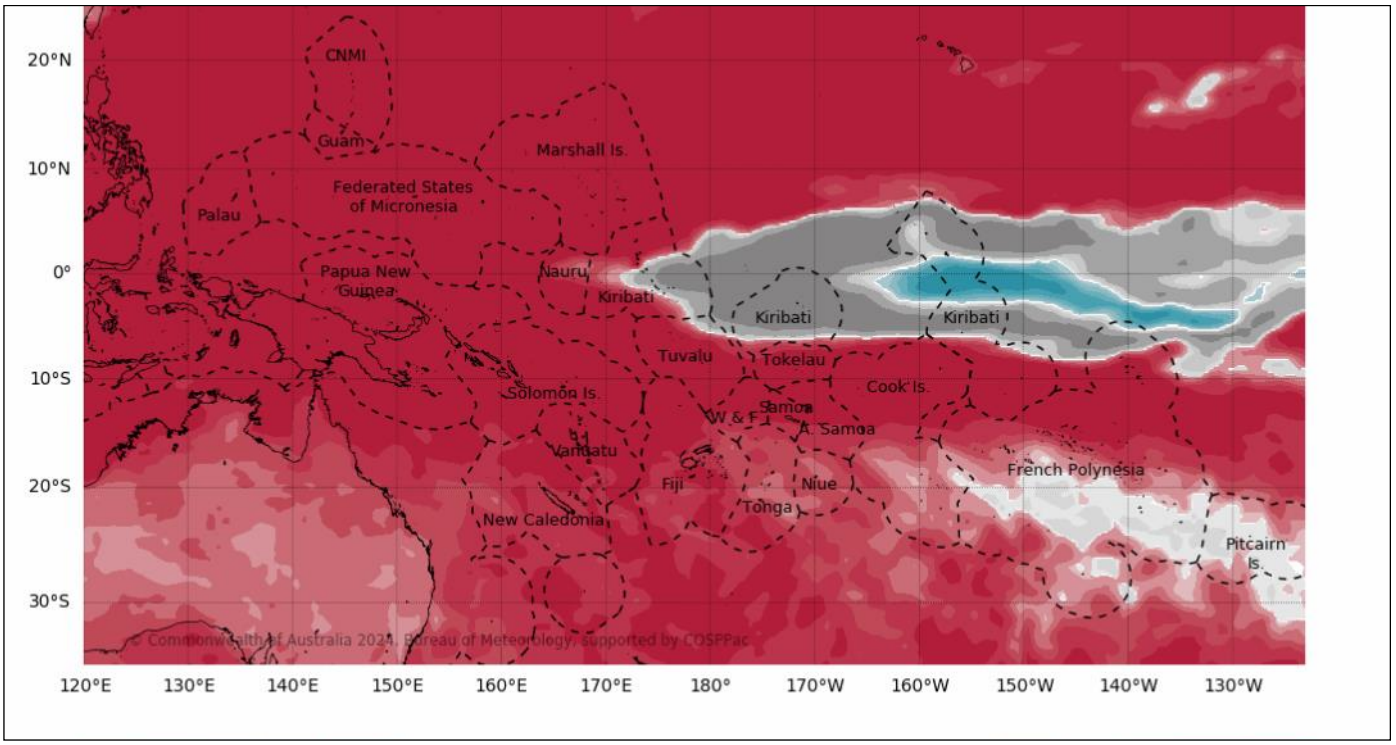
For October to December 2024 the models agree that above normal rainfall is likely or very likely for Palau, most of FSM, central RMI, PNG, Solomon Islands, New Caledonia, Vanuatu, southern Fiji, southern Tonga, Niue, Wallis and Futuna, and the central to southern Cook Islands. The models agree that below normal rainfall is likely or very likely for southeastern FSM, far southern RMI, Nauru, most of Kiribati, most of Tuvalu, Tokelau, northern and southern French Polynesia, and Pitcairn Islands.

SEASONAL TEMPERATURE OUTLOOK

October—December 2024

Monthly Tmax and Tmin ACCESS-S Maps

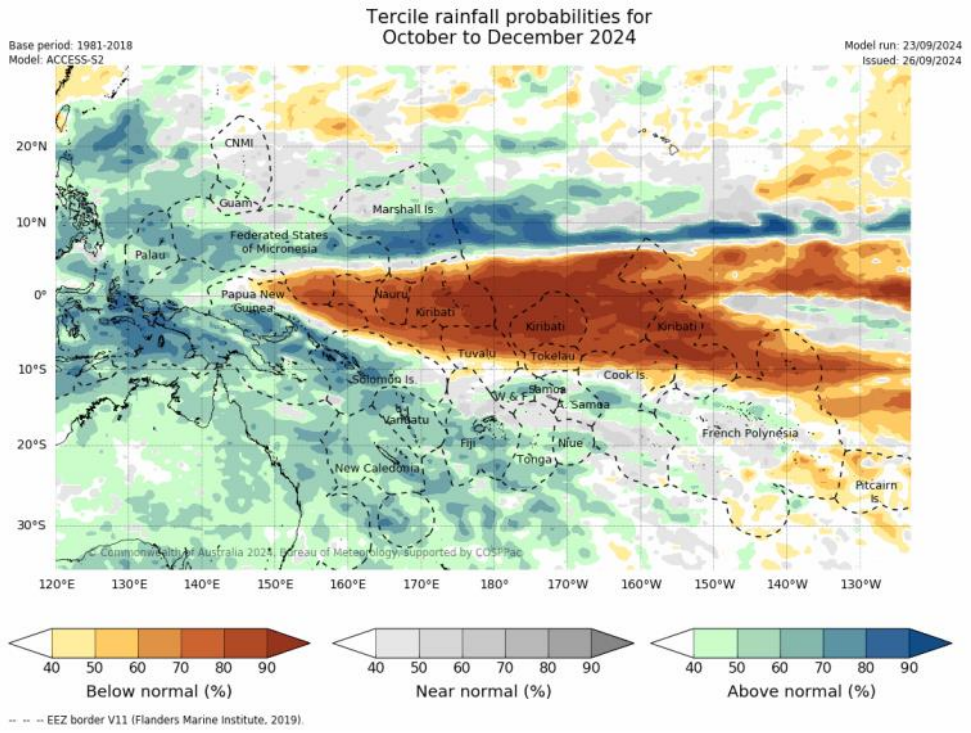


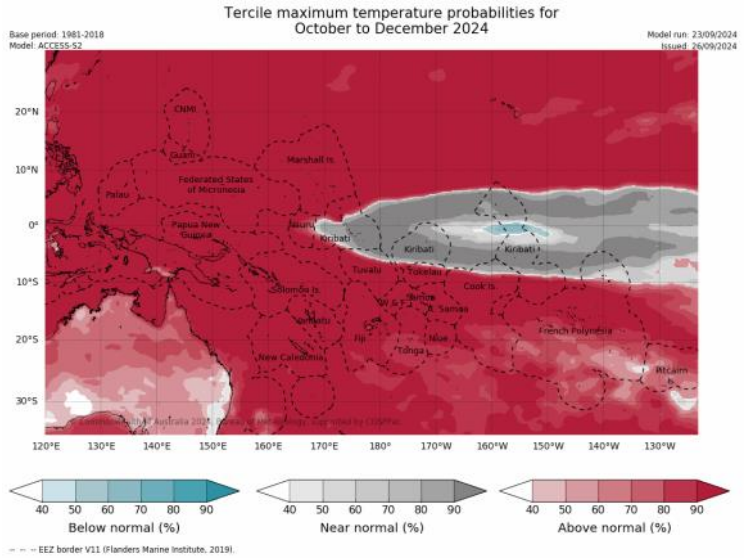


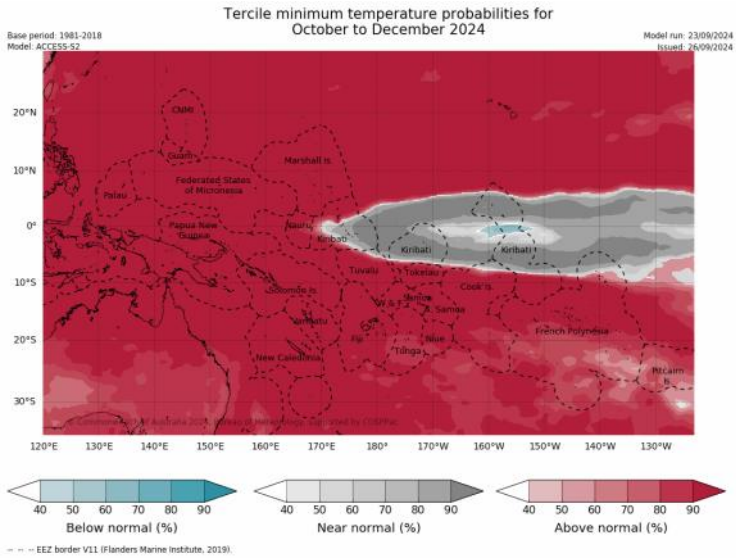
SEASONAL RAINFALL OUTLOOK

October—December 2024

Seasonal ACCESS-S maps



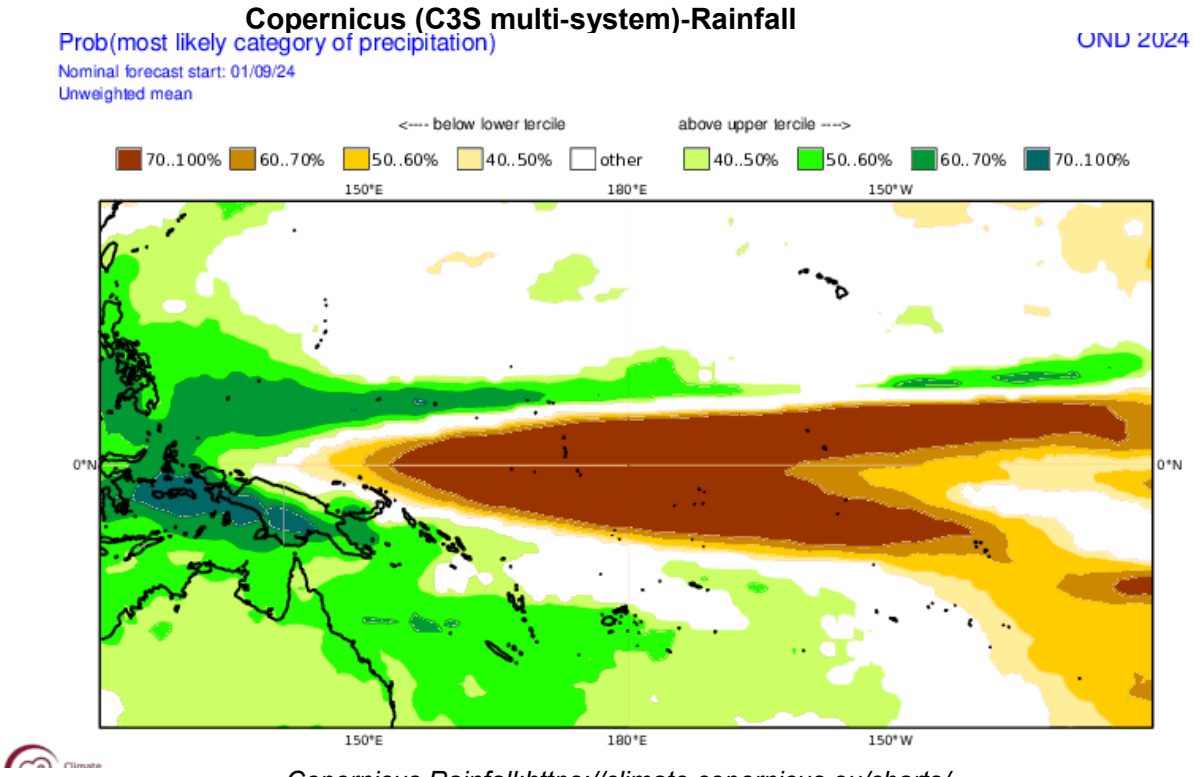




'About ACCESS-S http://access-s.clide.cloud/

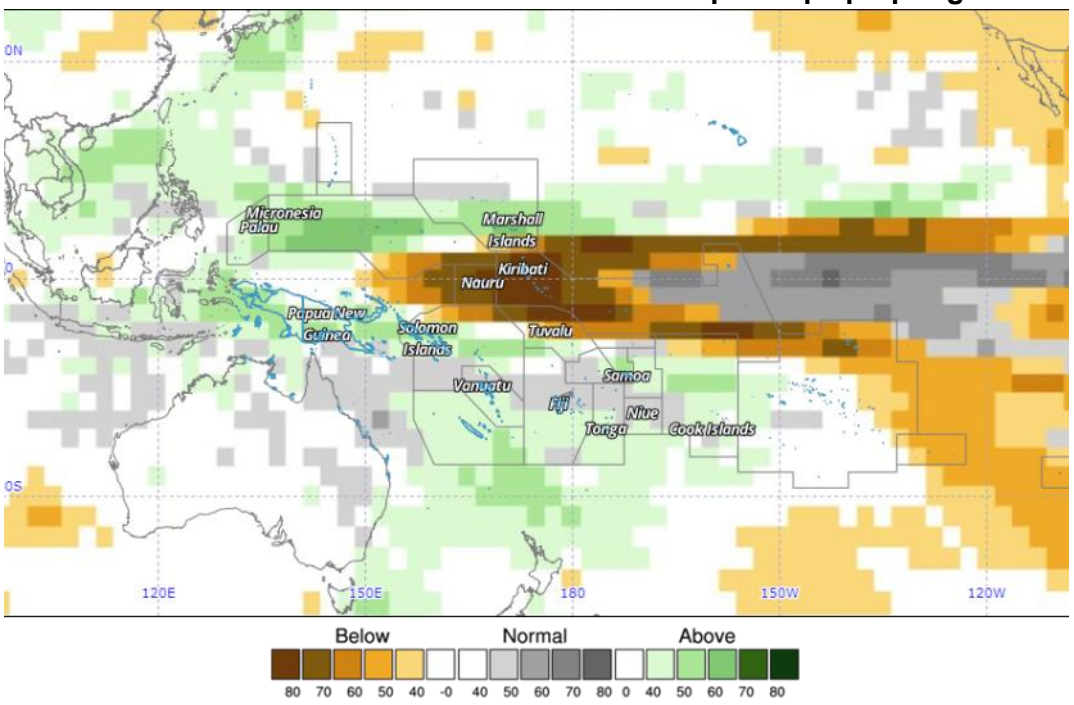
SEASONAL RAINFALL OUTLOOK

October—December 2024



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

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



Year: 2024, Season: OND, Lead Month: 3, Method: GAUS
Model: APCC, BOM, CMCC, CWB, MSC, NASA, NCEP, PNU
Generated using CLIK(P) (2024-10-7)

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TROPICAL CYCLONE

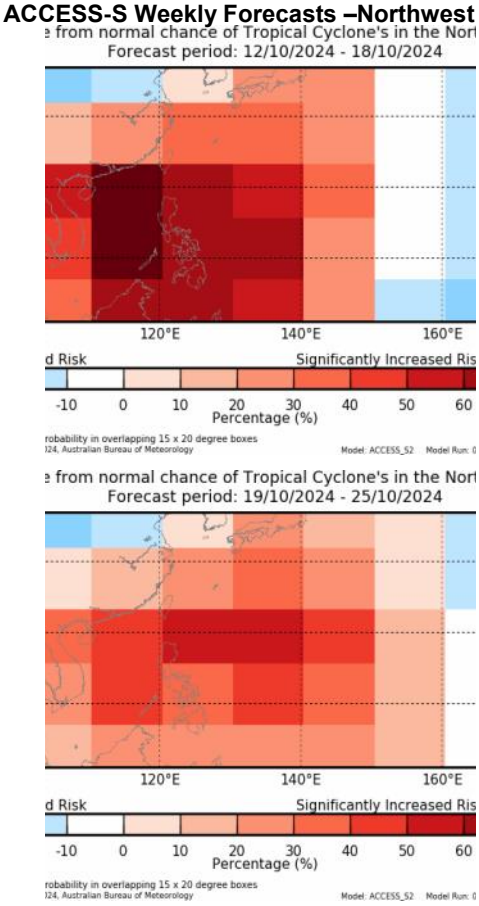
2023/2024 Season

The northwest Pacific tropical cyclone season is year-round, with most cyclones occurring between May and December. 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.

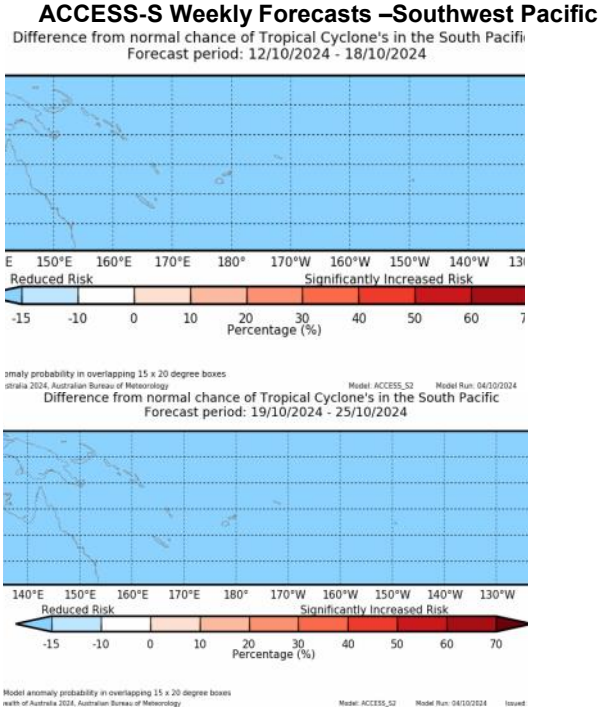
It's important to remember that history shows that tropical cyclones can happen outside the normal cyclone season, and it does not take a severe cyclone to produce severe impacts. Coastal and river flooding rainfall can occur with a distant, weak, or former cyclone, especially if the system is slow-moving. 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 significantly increased risk over the Philippines, Palau, south China Sea region, Japan, and eastern Asia for the week from 12 to 18 October. There is also a slight to moderate increase risk over the same region from 19 to 25 October.

ACCESS-S Weekly Forecasts –Northwest Pacific



ACCESS-S Weekly Forecasts –Southwest Pacific



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.

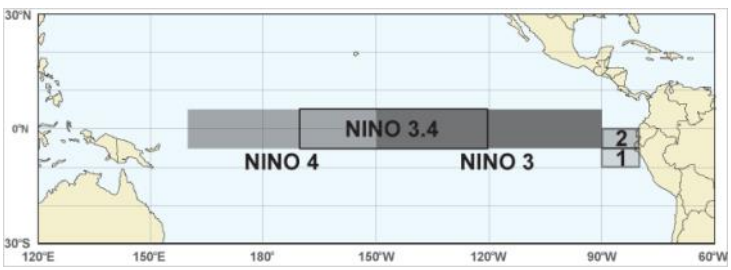
20 degrees Celsius Isotherm Depth

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