

Monthly Climate Bulletin

August 2022



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Photo Credit: Molly Powers (SPC) Samoa Tide Gauge



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- The Bureau's ENSO Outlook continues at La Niña indicating at least a 70% chance of La Niña reforming later this year. This is around triple the normal likelihood. La Niña events increase the chances of above-average rainfall for northern and eastern Australia and western Pacific during spring and summer.
- The negative Indian Ocean Dipole (IOD) event continues
- The Madden-Julian Oscillation (MJO) is currently indiscernible.
- The Intertropical Convergence Zone (ITCZ) was active in the western and eastern Equatorial Pacific and shifted north of its average August position, while the South Pacific Convergence Zone (SPCZ) was rather weak and shifted southwest over New Caledonia and New Zealand.
- The SSTs for August 2022 were slightly cooler than average along the equator between 160°E and 110°W, with SSTs generally close to average along the rest of the equator across the Pacific.
- Coral bleaching status for 2 September 2022 shows 'Alert Level 1' over parts of PNG island. Patches of 'Warning' for Palau and western FSM while 'No Stress or Watch' for the rest of CO-SPPac partner countries.
- For September-November 2022, the models agree on above normal rainfall being favoured for much of Palau, central RMI, most of PNG mainland, southern Solomon Islands, New Caledonia, Vanuatu, Fiji (excluding Rotuma), central and southern Tonga, Niue, southern Cook Islands and southern French Polynesia. The models also agree that below normal rainfall is likely or very likely for northern FSM, some of the PNG Islands, northern Solomon Islands, Nauru, western and central Kiribati, Tuvalu, Tokelau, northern Cook Islands, northern French Polynesia and Pitcairn Island.
- The ACCESS-S weekly tropical cyclone forecast model shows significant increased risk between 13 and 26 September for the northwest Pacific including the northern Philippines, the South China Sea region and south of Japan.



EL NIÑO–SOUTHERN OSCILLATION

La Niña ALERT continues

Click link to access [Climate Driver Update issued on 30 August 2022](#)

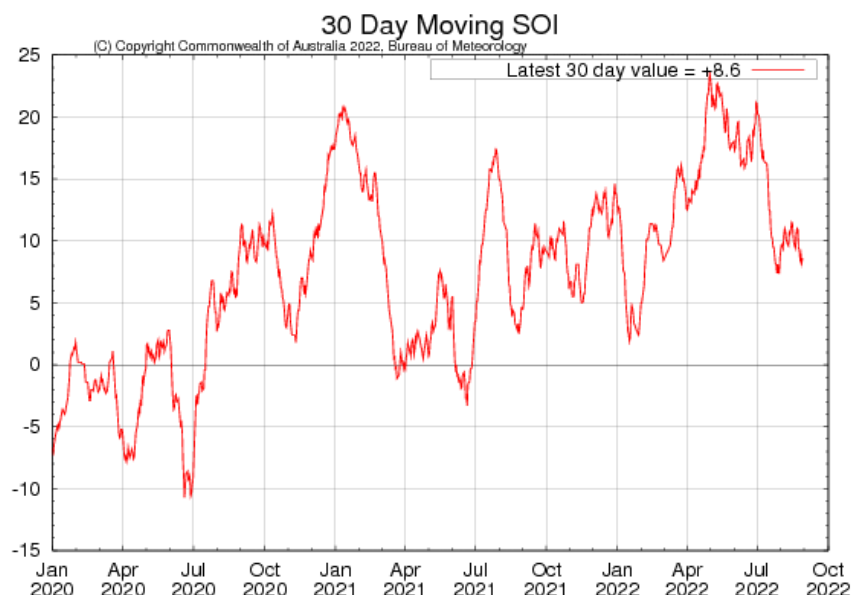
The Bureau's ENSO Outlook continues at La Niña indicating at least a 70% chance of La Niña reforming later this year. This is around triple the normal likelihood. La Niña events increase the chances of above-average rainfall for northern and eastern Australia and western Pacific during spring and summer.

Neutral but cooler than average sea surface temperatures (SSTs) persist in the central and eastern tropical Pacific Ocean. Some atmospheric indicators, such as the Southern Oscillation Index and cloudiness near the Date Line, show a La Niña-like signal. Four of seven climate models surveyed by the Bureau suggest La Niña may return by early-to-mid spring.

The negative Indian Ocean Dipole (IOD) event continues. The IOD index has satisfied negative IOD thresholds (i.e. at or below -0.4 °C) since June, with the latest weekly value being -0.8 °C. All surveyed climate models agree that negative IOD conditions are likely to continue into late spring. A negative IOD event is typically associated with above average spring rainfall for much of Australia.

The Southern Annular Mode (SAM) index is currently positive and is likely to be mostly positive for the coming three months. During the spring months, a positive SAM has a drying influence for western Tasmania, with a wetter influence for parts of eastern New South Wales and far eastern Victoria.

The 30-day Southern Oscillation Index (SOI) for the 30 days ending 28 August was $+8.2$. The 90-day SOI value was $+11.4$. Both the 30-day and 90-day SOI have fallen slightly over the past fortnight.



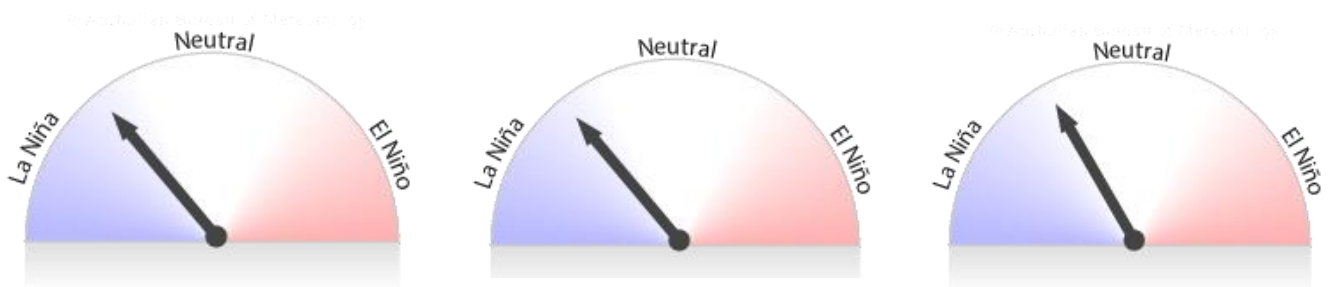


EL NIÑO–SOUTHERN OSCILLATION

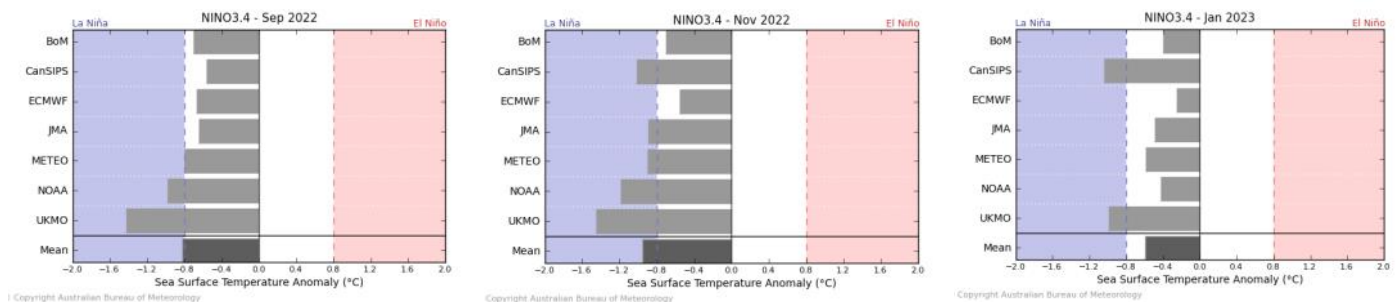
La Niña ALERT continues

Click link to access [Climate Driver Update issued on 30 August 2022](#)

Bureau of Meteorology NINO3.4 ENSO Model Outlooks for September, November and January



Bureau of Meteorology NINO3.4 International Model Outlooks



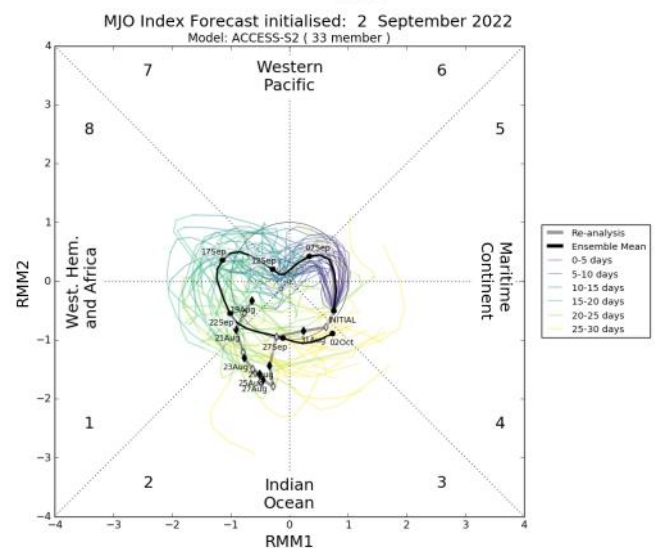
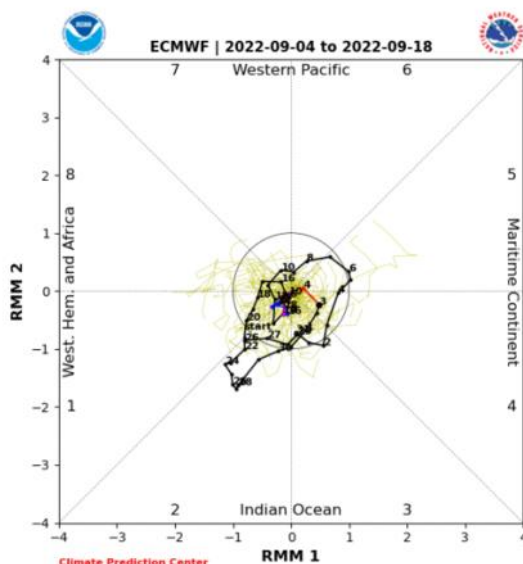
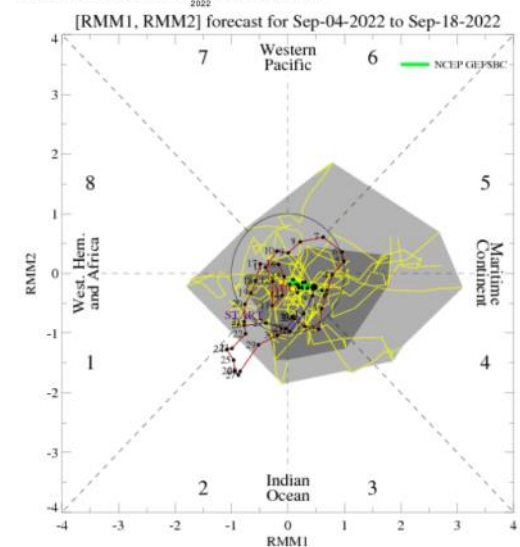
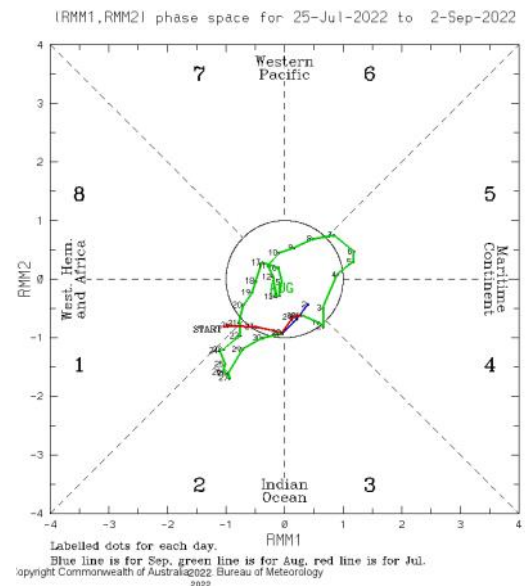
Bureau of Meteorology summary of international model outlooks for NINO3.4: <http://www.bom.gov.au/climate/model-summary/#tabs=Pacific-Ocean>

MADDEN–JULIAN OSCILLATION

Click link to access [Tropical Climate Update](#) [Issued on Tuesday 30 August 2022]

During the month of August, a weak pulse of Madden-Julian Oscillation (MJO) occurred during majority of the month with a moderate pulse during the fourth week affected the Indian Ocean. The Madden-Julian Oscillation (MJO) is currently moderately strong in the western Indian Ocean. Most models suggest the MJO is likely to become weak in the coming days. A weak MJO is unlikely to have much impact on Australian climate.

This is an abbreviated version of the Tropical Climate Update. Click on the [Weekly Tropical Update](#) for more information.



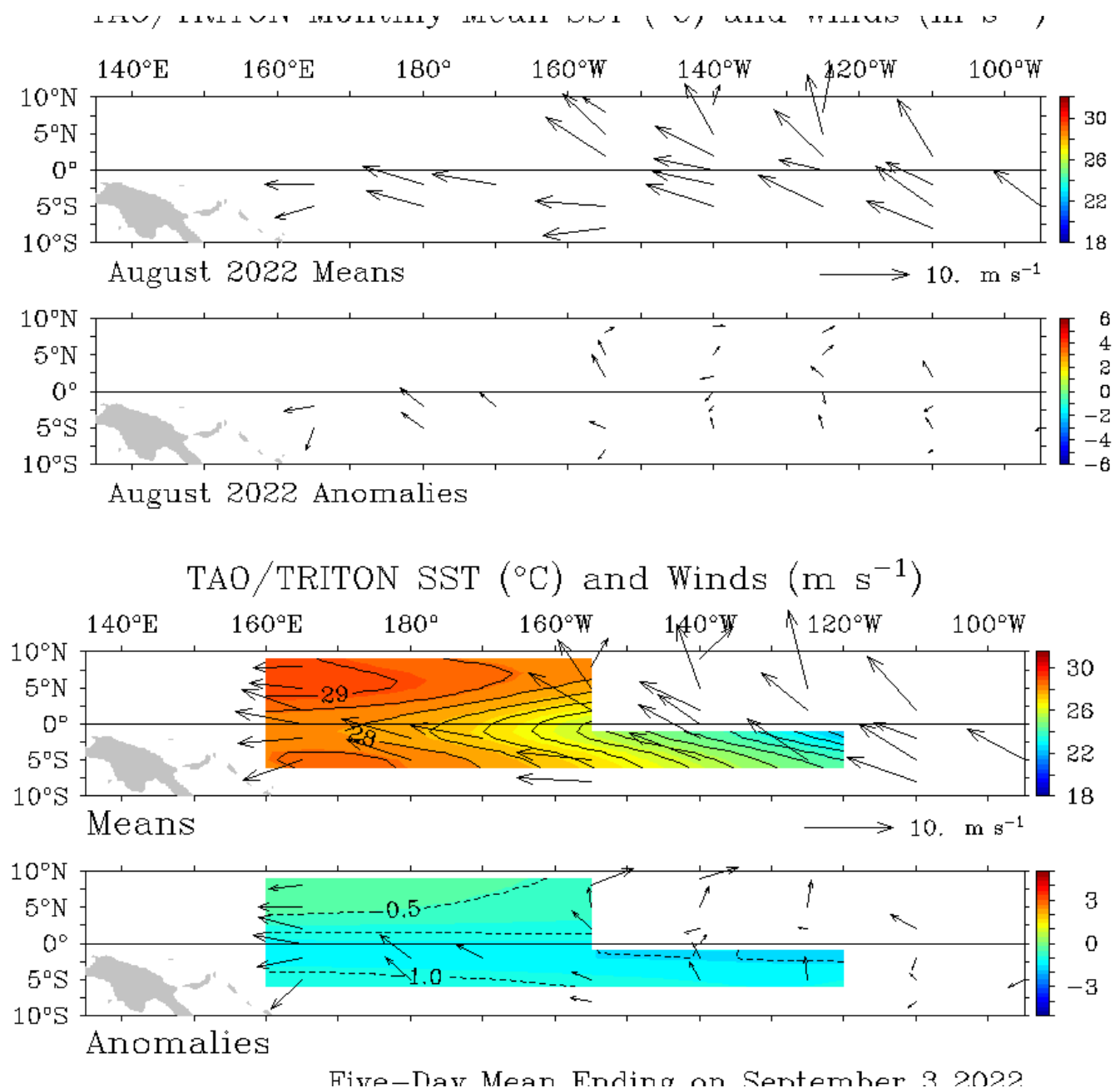
WIND



Click link to access [Wind plots link](#)

The trade winds in August were stronger over the equatorial Pacific, especially west of the Date Line.

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



CLOUD AND RAINFALL

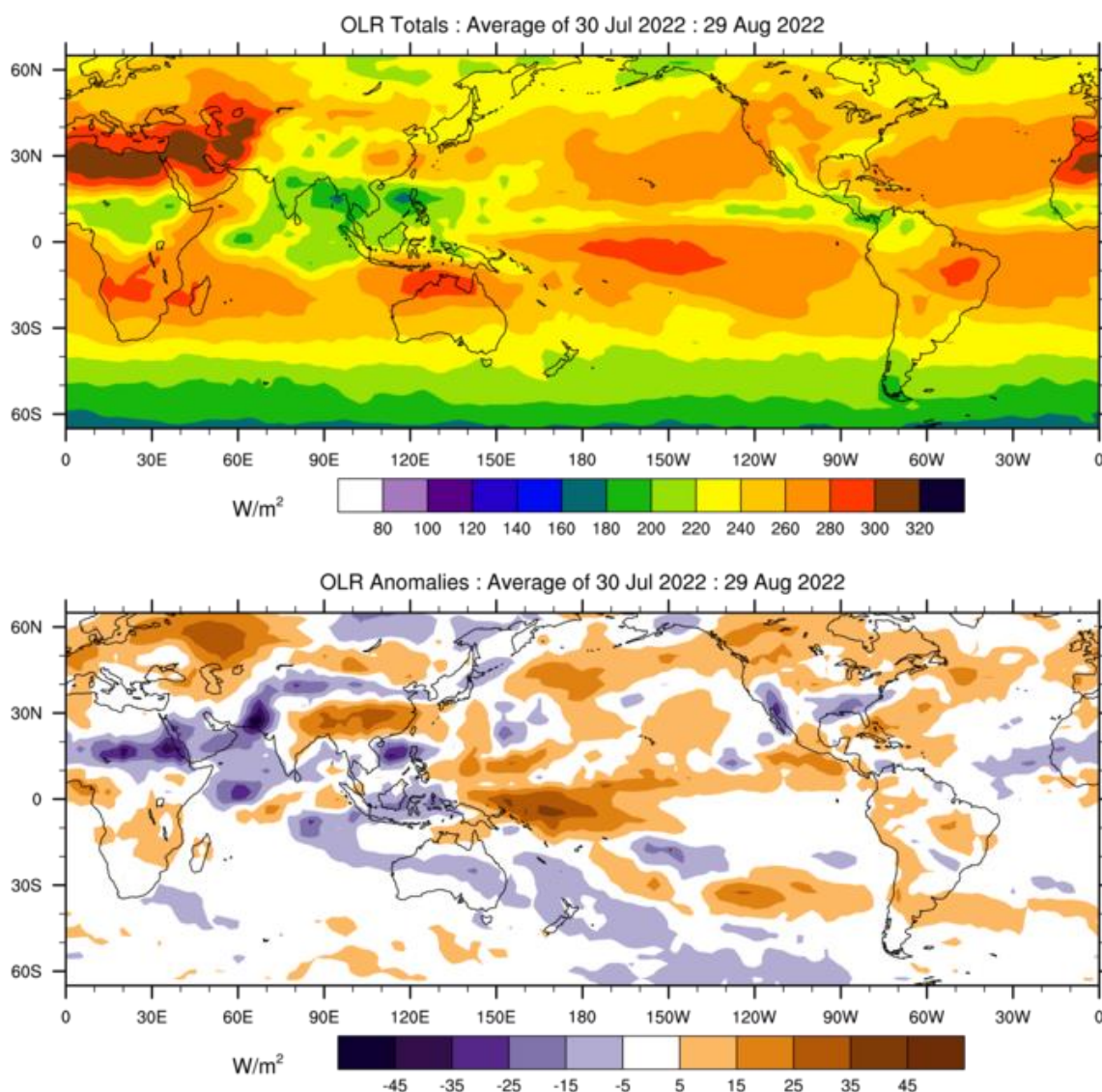
Click link to access [OLR](#)



The August 30-day OLR total and anomaly maps suggest the Intertropical Convergence Zone (ITCZ) was active in the western and eastern Equatorial Pacific and shifted north of its average August position, while the South Pacific Convergence Zone (SPCZ) was rather weak and shifted southwest over New Caledonia and New Zealand.

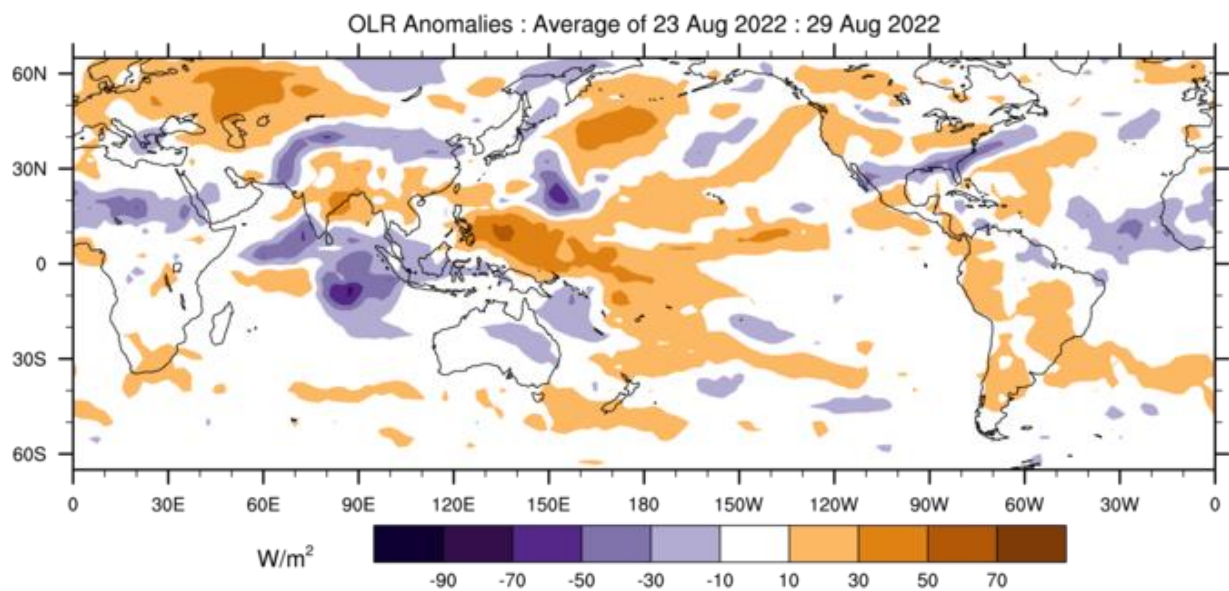
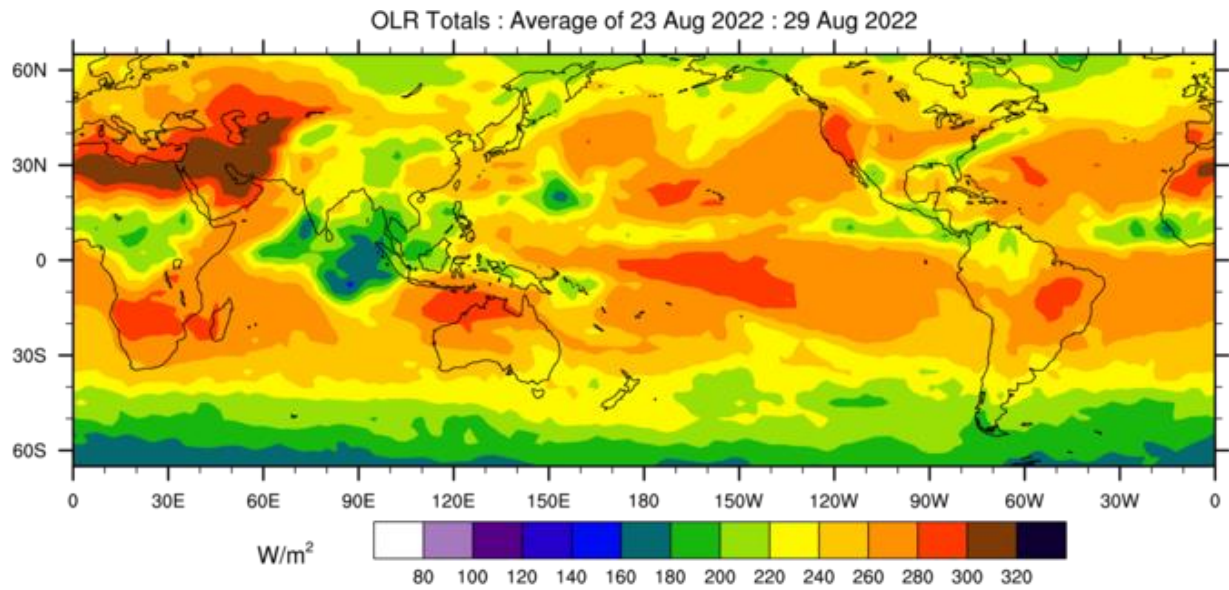
Note: Global maps of OLR below highlight regions experiencing increased or decreased cloudiness. The top panel is the total OLR in Watts per square metre (W/m^2) and the bottom panel is the anomaly (current minus the 1979-1998 climate average), in W/m^2 . In the bottom panel, negative values (blue shading)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

OLR Total and Anomalies, 30 Day OLR

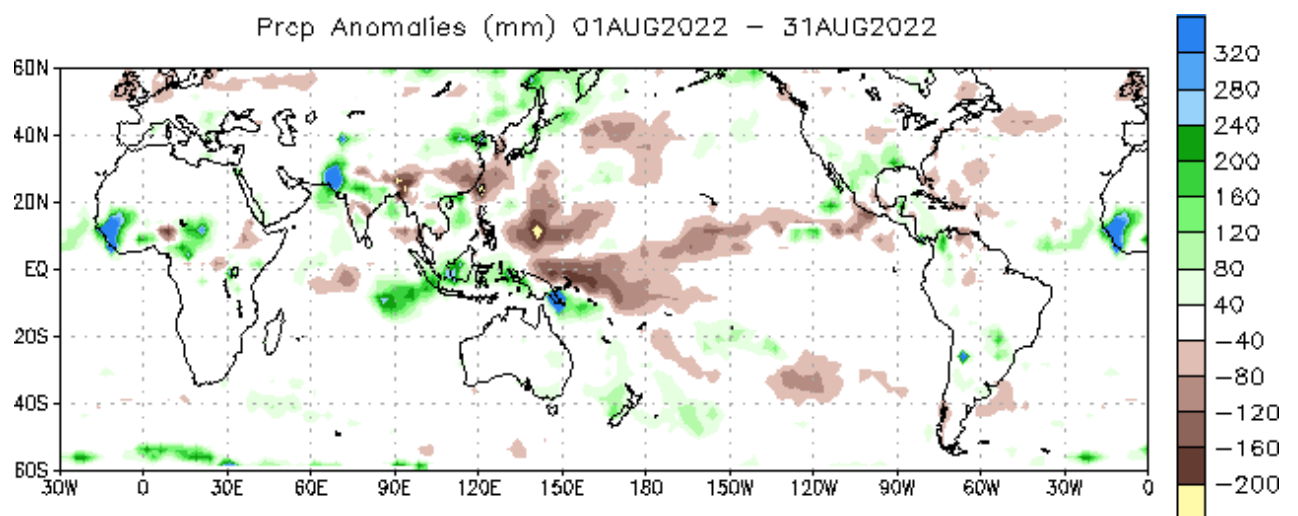


(C) Copyright Commonwealth of Australia 2022. Bureau of Meteorology

OLR Total and Anomalies, 7 Day OLR

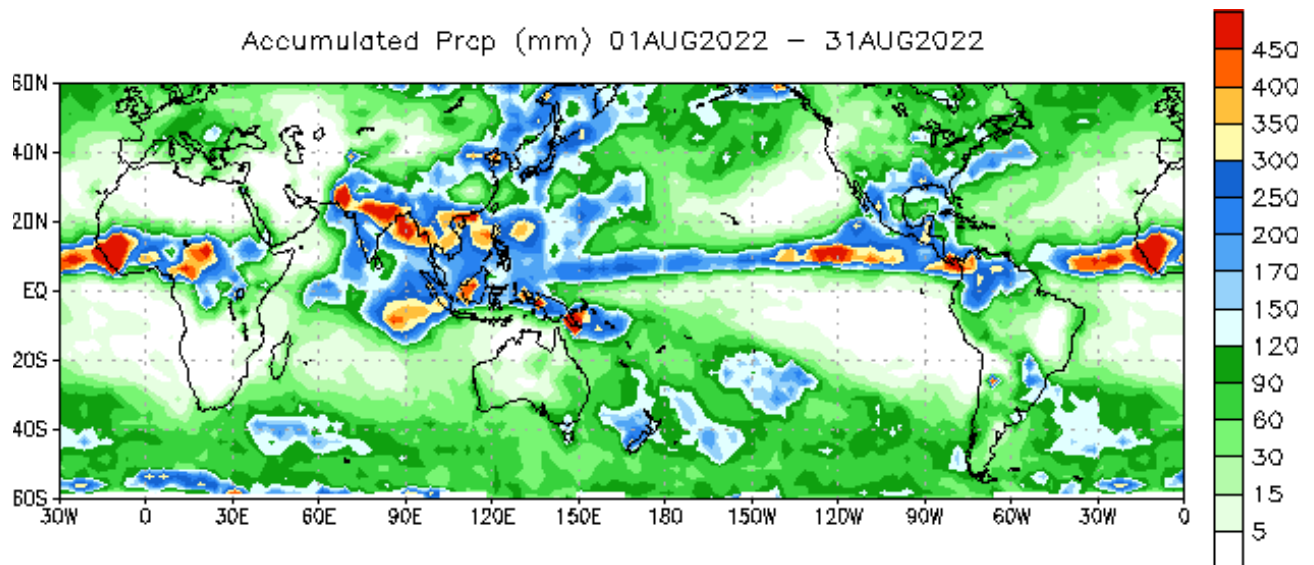


(C) Copyright Commonwealth of Australia 2022. Bureau of Meteorology

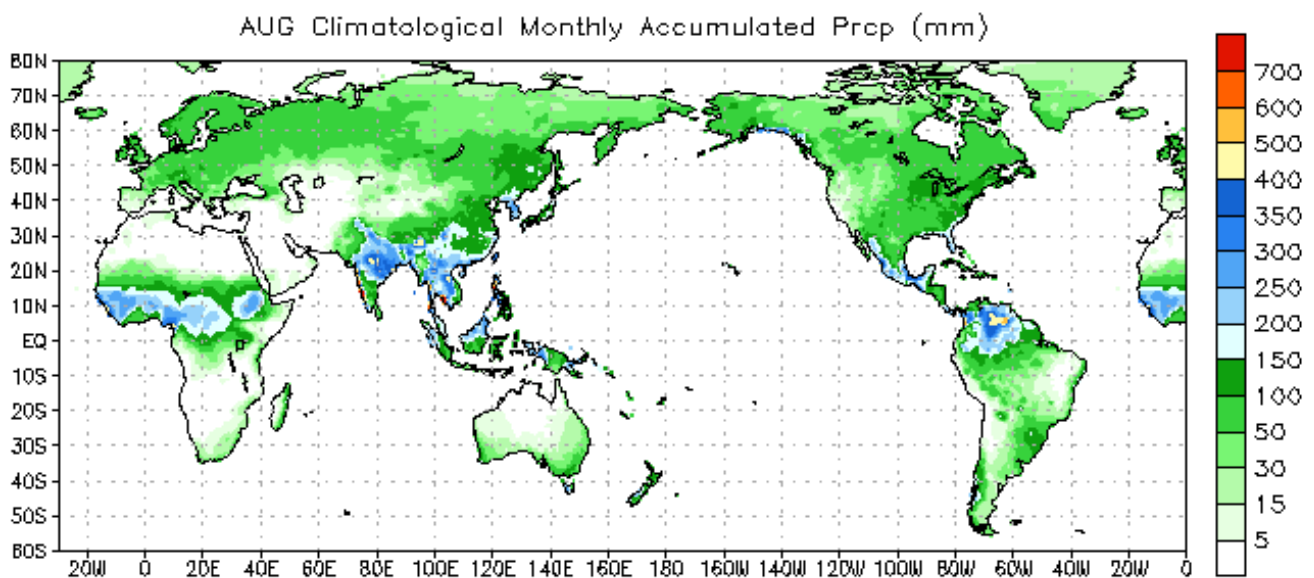


Data Source: NCEP CMAP Precipitation
Climatology (1991–2020)

30-Day Rainfall Accumulated



Data Source: NCEP CMAP Precipitation



Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1979–1995)

NOAA Climate Prediction Centre - NCEP CMAP precipitation:

https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/Global-Monsoon.shtml

OCEAN CONDITIONS

SEA SURFACE TEMPERATURE

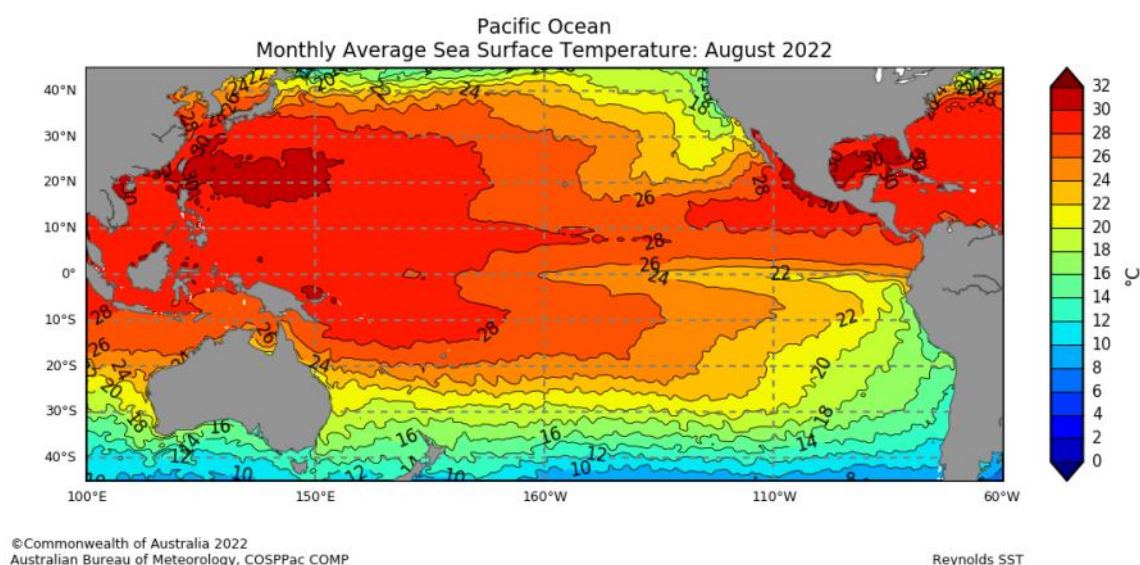


Click link to access [Pacific Community COSPPac Ocean Portal](#)

The SSTs for August 2022 were slightly cooler than average along the equator between 160°E and 110°W, with SSTs generally close to average along the rest of the equator across the Pacific. SSTs were also slightly cooler than average over much of the tropical central and eastern Pacific south of the equator. Warm SST anomalies were present over much of the Maritime Continent. Warm anomalies exist across most COSPPac countries except for Nauru, RMI, Tuvalu, northern Cook Islands and French Polynesia. Compared to July, cool anomalies have strengthened over the central equatorial Pacific, but the extended of the cool anomalies reduced in the west.

The highest on record deciles for August, occurred in most of Papua New Guinea, southern Solomon Islands, northern New Caledonia, Vanuatu, southern Fiji, parts of Tonga and Niue. Regions of very much above average (deciles 10) SSTs spanned across parts of Palau, northern PNG, northern Solomon Islands, northern Fiji, most of Tonga, patches in Niue, southern Cook Islands, French Polynesia and Pitcairn Island. Regions of above average (deciles 8-9) SST for August occurred across majority of the COSPPac countries from Palau, western FSM to Pitcairn Island. In contrast, average (4-7) SSTs were observed in central FSM, central RMI, far northern PNG, southern Tuvalu, Samoa, central Cook Islands and central French Polynesia. Below average (deciles 2-3) to very much below average (decile 1) occurred over eastern FSM, southern RMI, Nauru, Kiribati, northern Tuvalu, Tokelau, northern Cook Islands and central and northern French Polynesia. The lowest on record SSTs were observed over parts of central and eastern Kiribati and central French Polynesia.

Mean Sea Surface Temperature

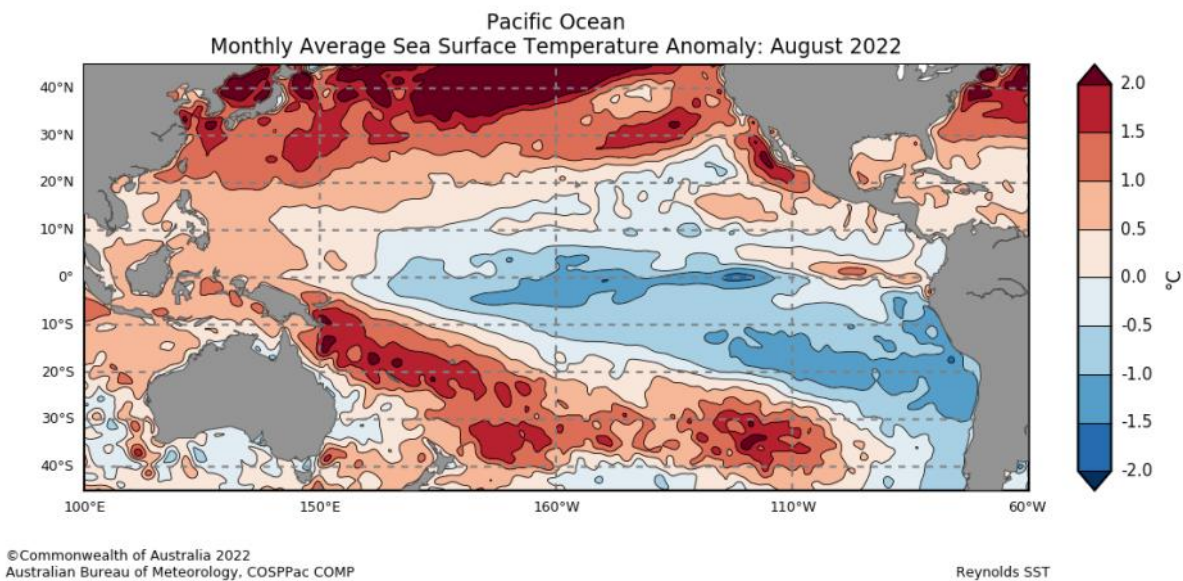


OCEAN CONDITIONS

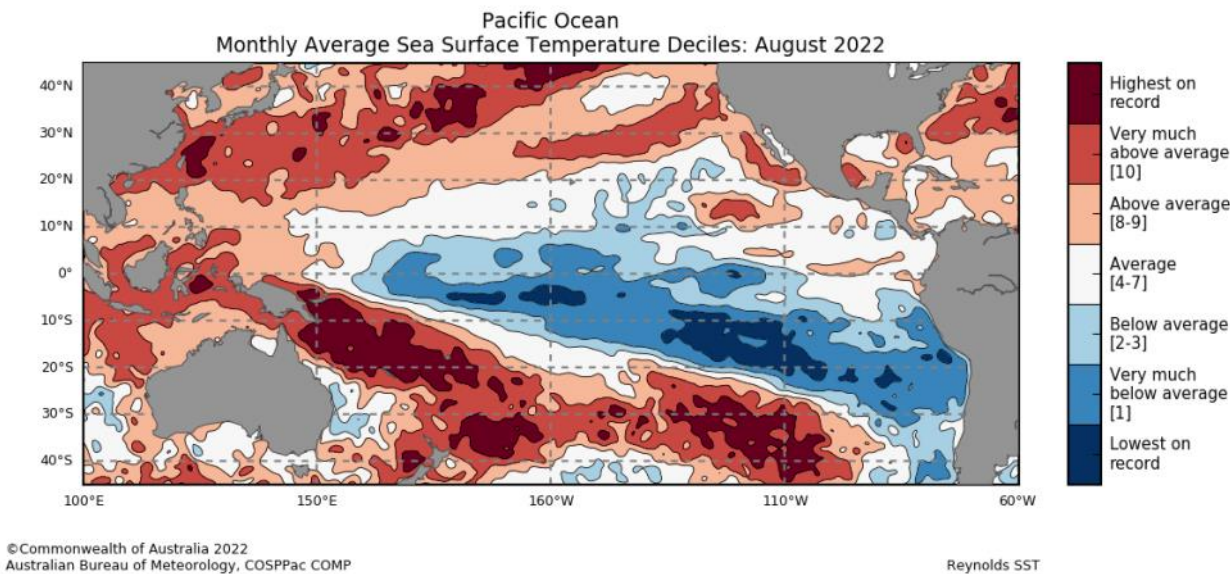
Click link to access [SEA SURFACE TEMPERATURE](#)



Anomalous Sea Surface Temperature



Sea Surface Temperatures Deciles



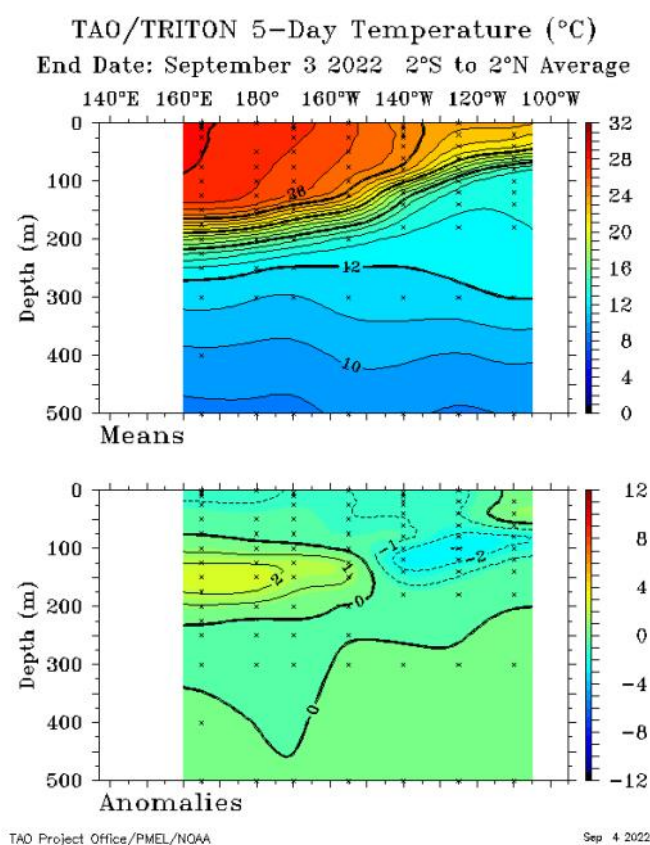
OCEAN CONDITIONS

SUB SURFACE

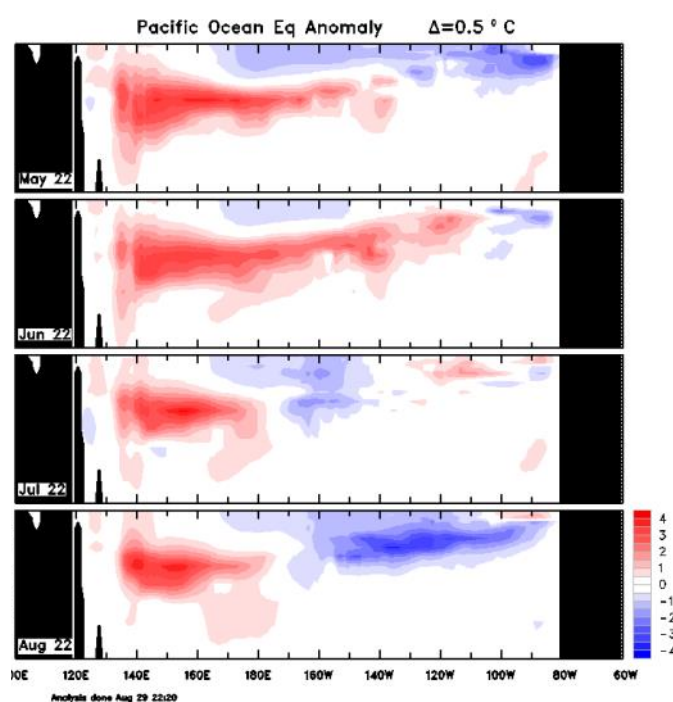


The four-month sequence of equatorial Pacific sub-surface temperature anomalies (to August 2022) shows cool anomalies are present across the top 150 m of the central to eastern equatorial Pacific. Warm anomalies persist between 100 m and 250 m depth west of the International Date Line, remaining similar in strength but decreasing slightly in eastward extent compared to July. Cool anomalies have increased in the central to eastern equatorial Pacific sub-surface month-on-month across winter.

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

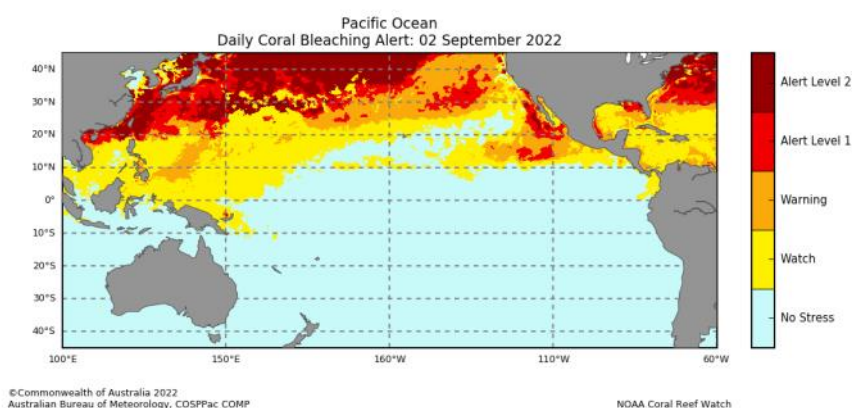
CORAL BLEACHING



The daily Coral Bleaching Alert for 02nd September 2022 shows 'Alert Level 1' over parts of PNG island. Patches of 'Warning' for Palau and western FSM while 'No Stress or Watch' for the rest of COSPPac partner countries. The four weeks Coral Bleaching Outlook to 25th September shows 'Alert Level 1' for northern Palau and part of northern PNG. 'Warning' alert for Palau, western FSM and northern PNG. 'No Stress or Watch' for the rest of COSPPac partner countries.

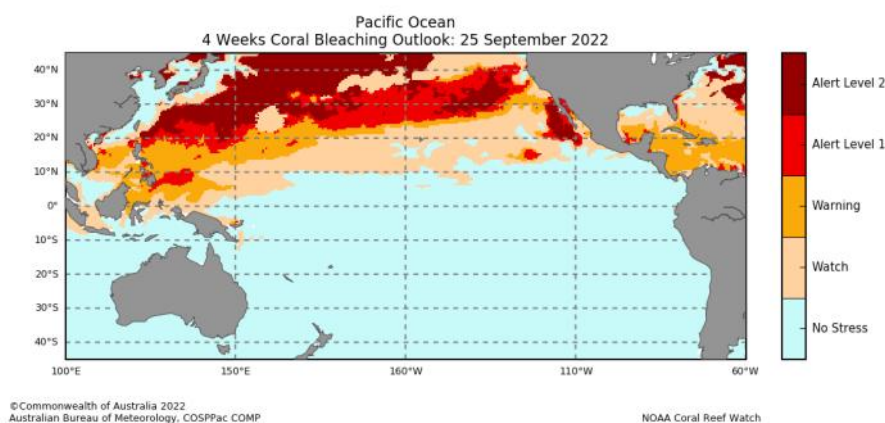
Daily Coral Bleaching Alert

(Source: [Pacific Community COSPPac Ocean Portal Coral Bleaching](#))



4 Weeks Coral Bleaching Outlook

(Source: [Pacific Community COSPPac Ocean Portal](#))



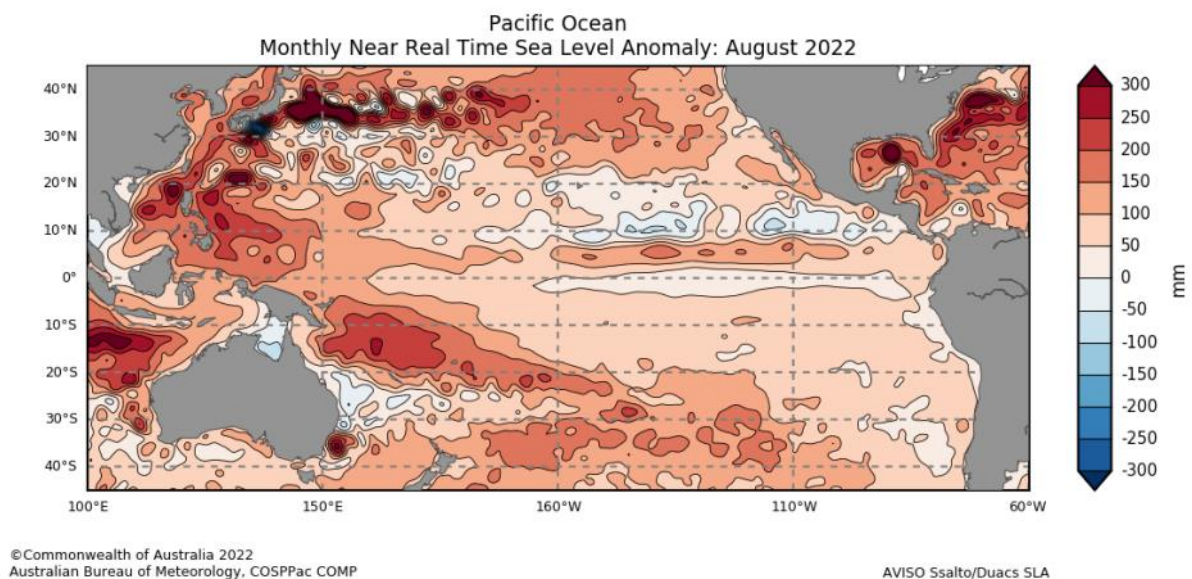
OCEAN CONDITIONS

OCEAN SURFACE CURRENTS AND SEA LEVEL

Sea level was above normal for most of the COSPPac countries. Patches of the highest anomalies above 300mm were observed in northern New Caledonia and Coral Sea region. Patches of anomalies of 200-300mm were observed part of Palau, western FSM, southeastern PNG, Solomon Islands, Vanuatu, parts of Fiji, Tonga, Niue and southern Cook Islands. Sea level of 100mm to 200mm were also observed for FSM, southern RMI, most of PNG, Solomon Islands, Patches of New Caledonia, Vanuatu, Fiji, Tuvalu, Tonga, Samoa, Niue, southern Cook Islands and French Polynesia. Anomalies of 50-100mm observed at most of COSPPac countries. Near normal to below normal sea levels were observed over parts of eastern Australia, southern New Caledonia and southern Tonga.

Monthly Sea Level Anomalies

Source: [Pacific Community COSPPac Ocean Portal](#)

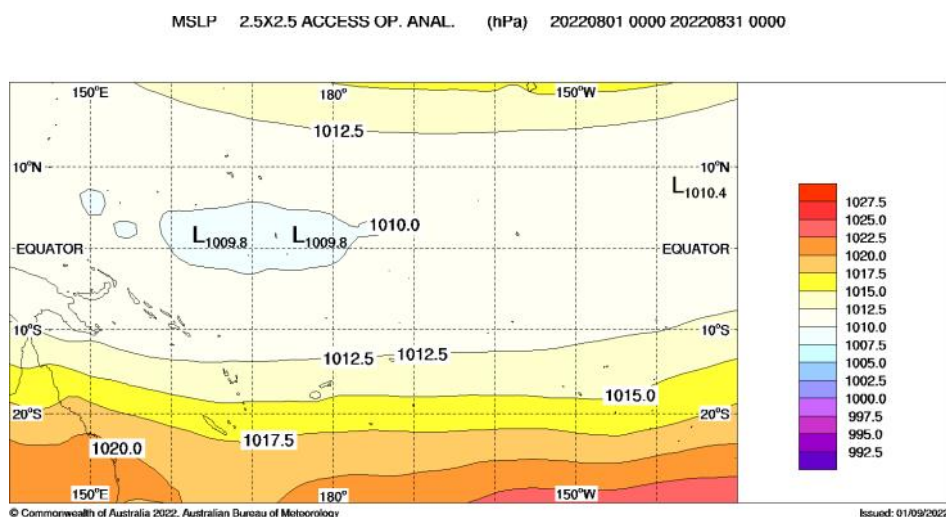


MEAN SEA LEVEL PRESSURE

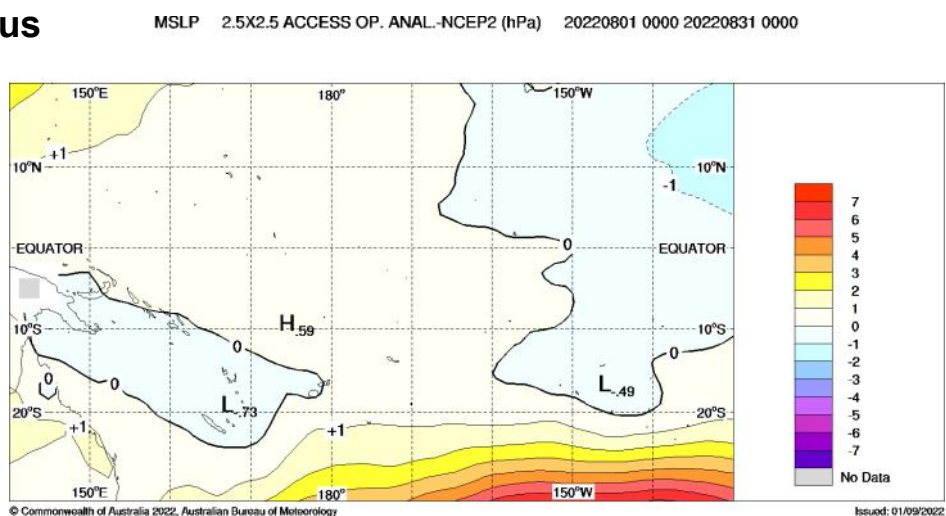
The August mean sea level pressure (MSLP) anomaly map shows mostly positive anomalies of +1 or greater over south Fiji and Tonga and further south, and north Pacific over Guam and CNMI.

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

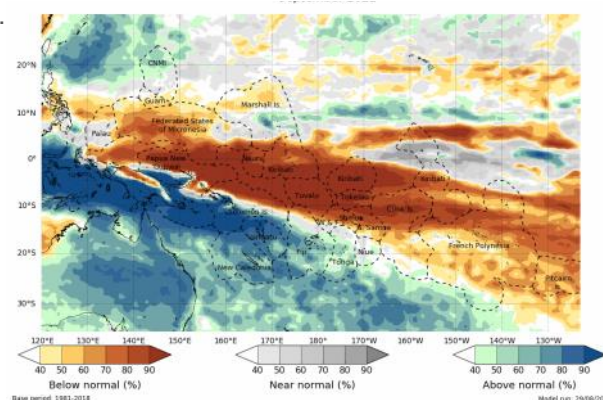
September—November 2022



The ACCESS-S model forecast for September 2022, favours below normal rainfall for FSM, northern PNG plus Momase region and some of the PNG Islands, northern and southern RMI, northern Solomon Islands, Nauru, most of Kiribati, Tuvalu, Tokelau, Samoa, American Samoa, and most of both the Cook Islands and northern and central French Polynesia. Above normal rainfall is likely or very likely for CNMI, central RMI, most of PNG, most of the Solomon Islands, New Caledonia, Vanuatu, Fiji, and central and southern Tonga.

The three-month rainfall outlook (September–November 2022) favours below normal rainfall for most of FSM, southern RMI, northern PNG including some of the Islands, northern Solomon Islands, Nauru, Kiribati, Tuvalu, Tokelau, northern Samoa (excluding the main islands), American Samoa, northern Cook Islands, northern French Polynesia and Pitcairn Island. The models show an increased chance of above normal rainfall for Palau, central RMI, most of PNG (excluding Momase), most of the Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, southern Cook Islands and southern French Polynesia. Above normal maximum and minimum temperatures are very likely for most COSPPac countries, except for countries east of 154°E, namely far southeastern FSM, northeast PNG, Nauru, central and southern RMI, Kiribati, central and northern Tuvalu, Tokelau, northern Cook Islands, northern and central French Polynesia, where near-normal to below normal temperatures are favoured.

Monthly [ACCESS-S](#) Maps



The Copernicus multi-model outlook for September–November 2022 favours below normal rainfall for PNG Islands, most of Solomon Islands, Nauru, western and central Kiribati, Tuvalu, Tokelau, Wallis and Futuna, Samoa, American Samoa, northern and central Cook Islands, French Polynesia and Pitcairn Island. Above normal rainfall is likely or very likely for Palau, central Marshall Islands, western and southern PNG, New Caledonia, Vanuatu, Fiji, central and southern Tonga, and Niue.

The APEC Climate Centre multi-model for September–November 2022 favours below normal rainfall for northern FSM, northwest RMI, PNG Islands, western and northern Solomon Islands, Nauru, Kiribati, Tuvalu, Tokelau, Samoa, northern Cook Islands, northern French Polynesia and Pitcairn Island. Above normal rainfall is likely or very likely for Palau, southern RMI, PNG mainland and Milne Bay region, southern Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, southern Cook Islands and southwest French Polynesia.

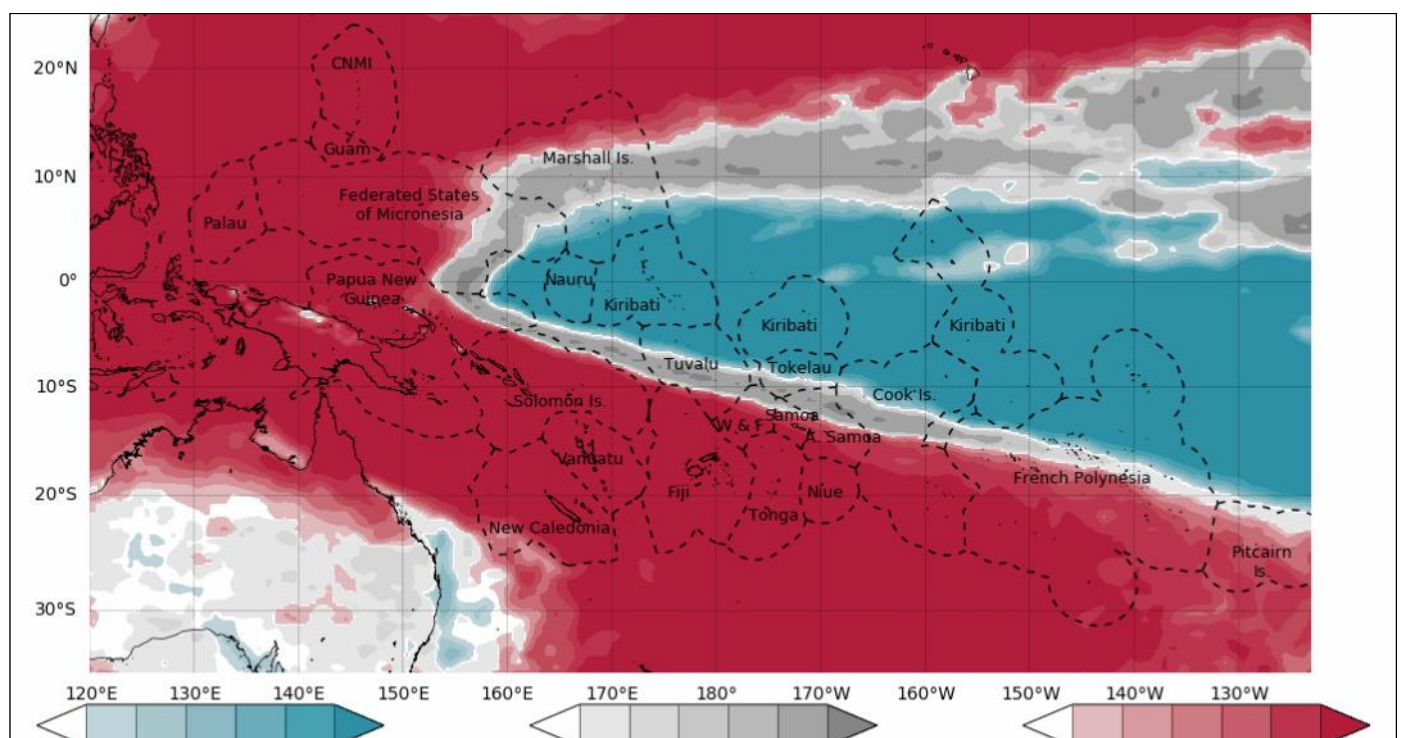
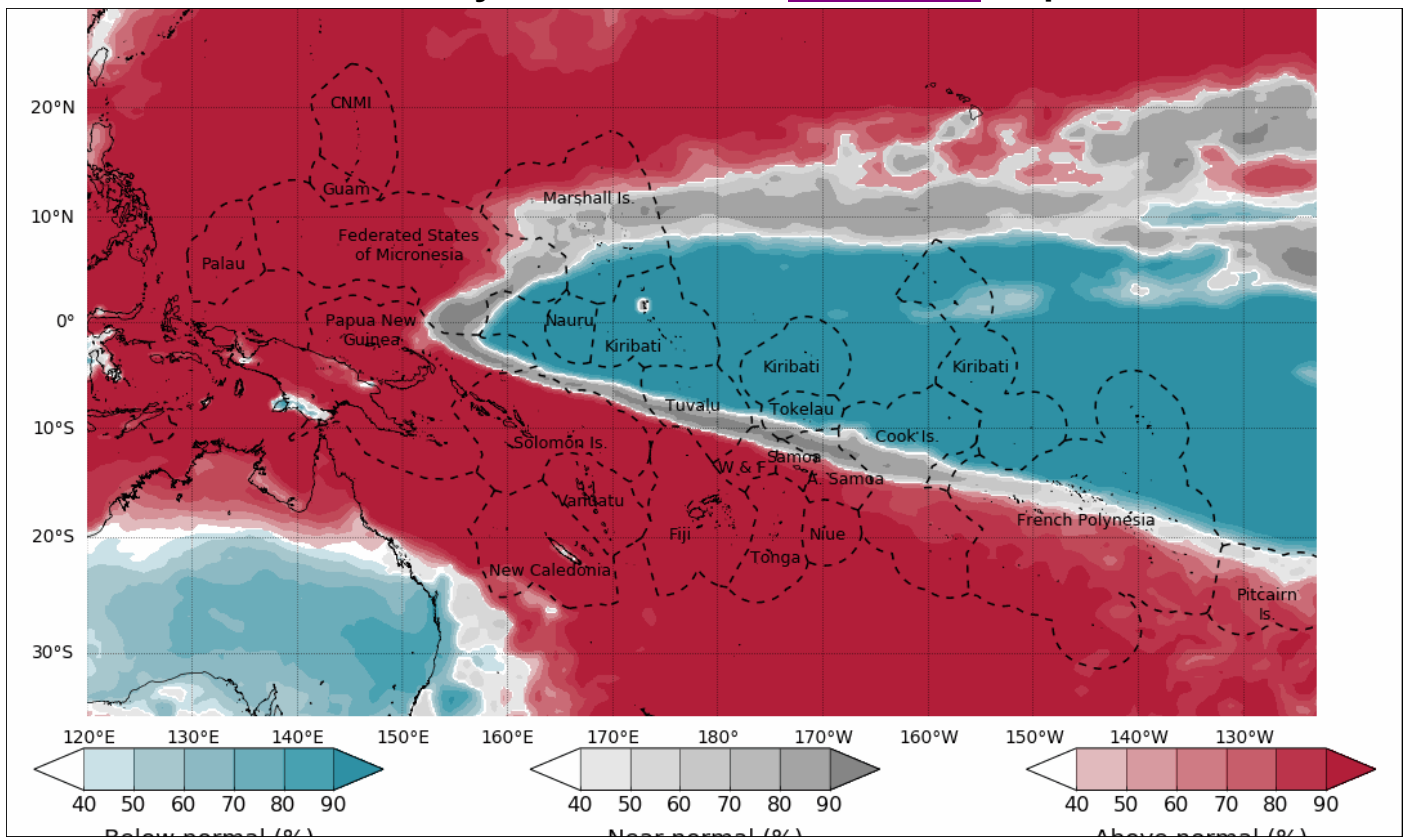
For September–November 2022, the models agree on above normal rainfall being favoured for much of Palau, central RMI, most of PNG mainland, southern Solomon Islands, New Caledonia, Vanuatu, Fiji (excluding Rotuma), central and southern Tonga, Niue, southern Cook Islands, and southern French Polynesia. The models also agree that below normal rainfall is likely or very likely for northern FSM, some of the PNG Islands, northern Solomon Islands, Nauru, western and central Kiribati, Tuvalu, Tokelau, northern Cook Islands, northern French Polynesia and Pitcairn Island.

SEASONAL TEMPERATURE OUTLOOK

September—November 2022



Monthly Tmax and Tmin **ACCESS-S** Maps



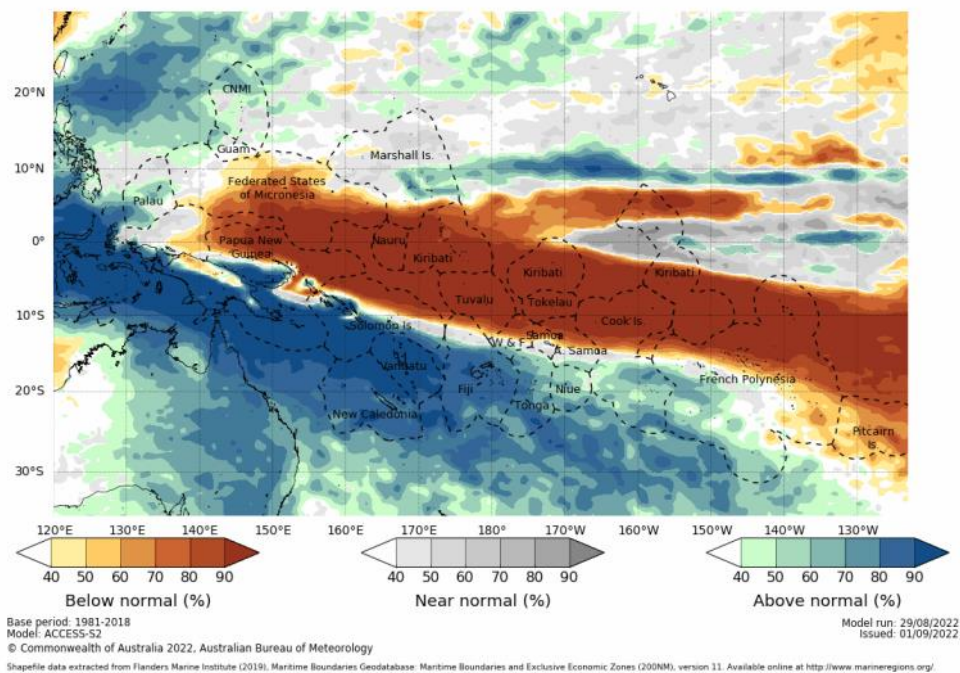
SEASONAL RAINFALL OUTLOOK

September—November 2022

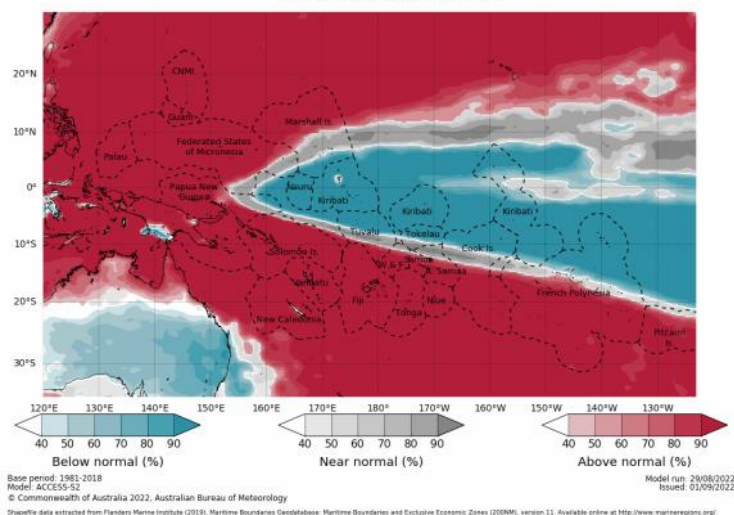


Seasonal ACCESS-S maps

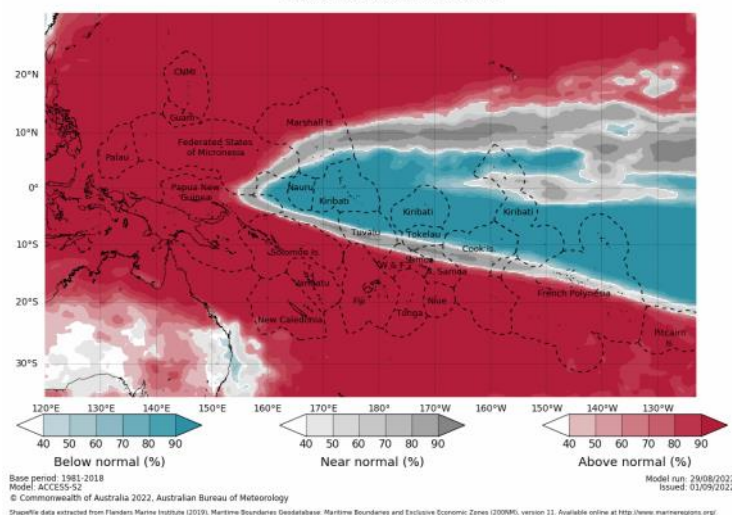
Tercile rainfall probabilities for
September to November 2022



Tercile maximum temperature probabilities for
September to November 2022



Tercile minimum temperature probabilities for
September to November 2022



'About ACCESS-S <http://access-s.climatecloud/>

SEASONAL RAINFALL OUTLOOK

September—November 2022



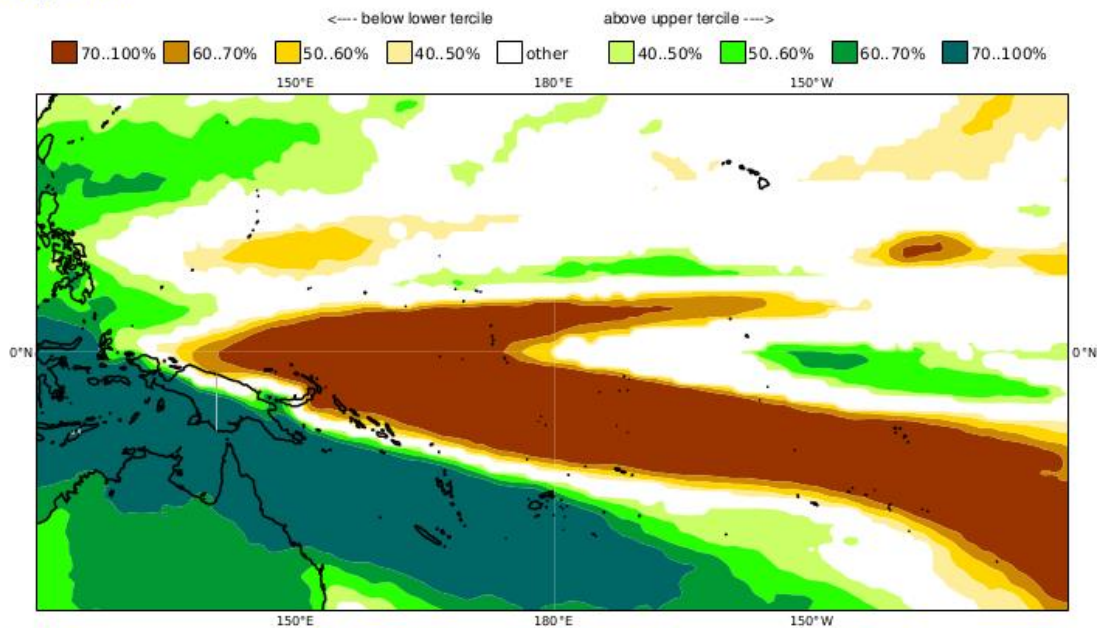
Copernicus (C3S multi-system)-Rainfall

Prob(most likely category of precipitation)

Nominal forecast start: 01/08/22

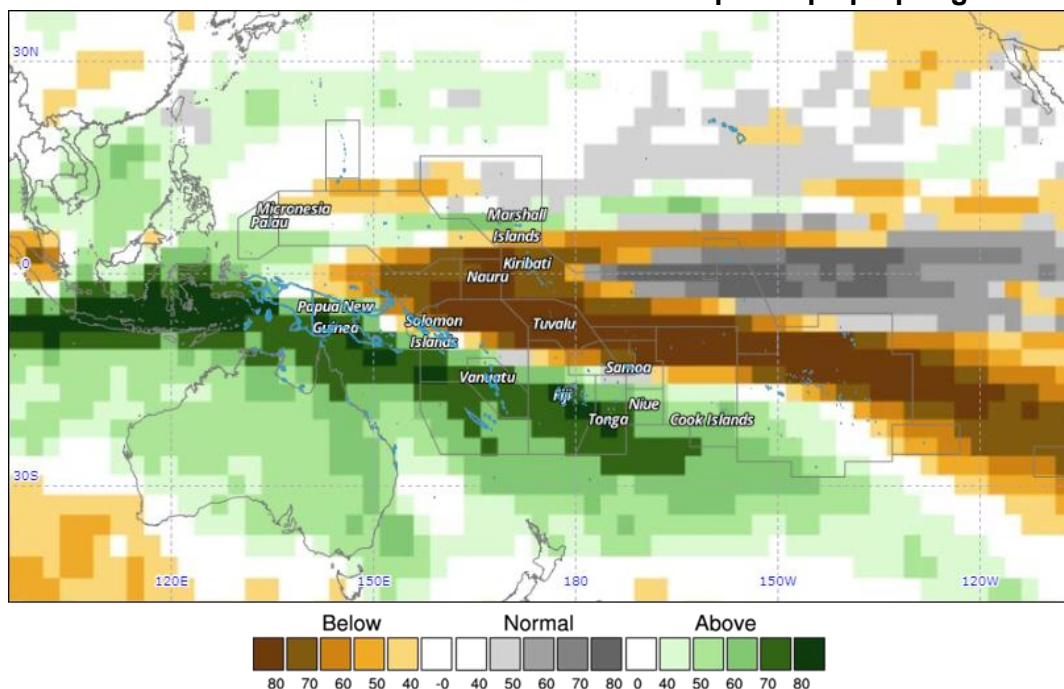
Unweighted mean

SON 2022



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

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



Year: 2022, Season: SON, Lead Month: 3, Method: GAUS

Model: APCC, BOM, CMCC, CWB, MSC, NASA, NCEP, PNU

Generated using CLIK® (2022-9-5)

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TROPICAL CYCLONE

2021/2022 Season



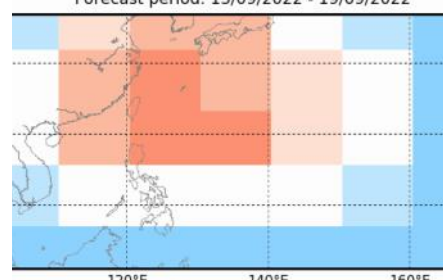
The southwest Pacific, 2021-22 tropical cyclone season ended on 30th April 2022. Seven named TCs (Ruby, Seth, Cody, Dovi, Tiffany, Eva and Fili) formed from east of the longitude of the tip of Cape York, Australia. Two cyclones reached category three status, including Dovi and Coby. TC activity in the Western North Pacific occurs year-around, and with the resurgence of at least a borderline La Niña conditions, a preliminary cyclone outlook for the northwest Pacific is for near-average seasonal activity.

It's important to remember that 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. Communities should remain vigilant, and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

The weekly tropical cyclone forecast from the ACCESS-S model shows significant increased risk between 13 and 26 September for the northwest Pacific including the northern Philippines, the South China Sea region and south of Japan.

ACCESS-S Weekly Forecasts –Northwest Pacific

a from normal chance of Tropical Cyclone's in the North Pacific
Forecast period: 13/09/2022 - 19/09/2022

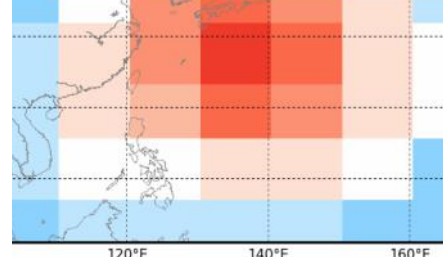


Model: ACCESS_S2 Model Run: 05/09/2022

robability in overlapping 15 x 20 degree boxes

122, Australian Bureau of Meteorology

a from normal chance of Tropical Cyclone's in the North Pacific
Forecast period: 20/09/2022 - 26/09/2022



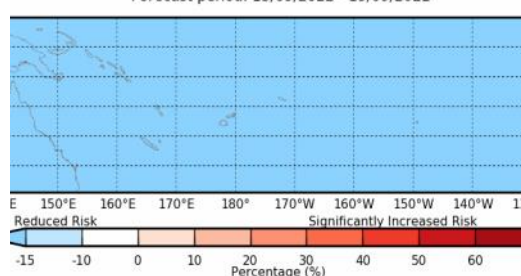
Model: ACCESS_S2 Model Run: 05/09/2022

robability in overlapping 15 x 20 degree boxes

122, Australian Bureau of Meteorology

ACCESS-S Weekly Forecasts –Southwest Pacific

Difference from normal chance of Tropical Cyclone's in the South Pacific
Forecast period: 13/09/2022 - 19/09/2022

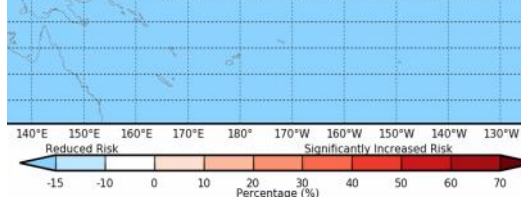


Model: ACCESS_S2 Model Run: 05/09/2022

robability in overlapping 15 x 20 degree boxes

122, Australian Bureau of Meteorology

a from normal chance of Tropical Cyclone's in the South Pacific
Forecast period: 20/09/2022 - 26/09/2022



Model: ACCESS_S2 Model Run: 05/09/2022

robability in overlapping 15 x 20 degree boxes

122, Australian Bureau of Meteorology

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/ps/japcc030703.jsp>

NASA GMAO GEOS-5: <http://gmao.gsfc.nasa.gov/research/ocean/>

NOAA CFSv2: <http://www.cpc.ncep.noaa.gov/products/CFSv2/CFSv2seasonal.shtml>

IRI for Climate and Society: <http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/>

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.

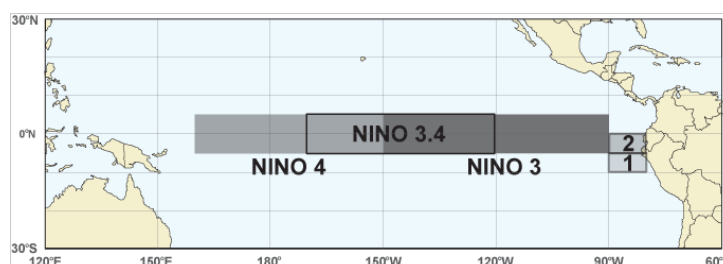
20 degrees Celsius Isotherm Depth

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