

Monthly Climate Bulletin

October 2020

ISSN: 2617-3565

Photo Credit: S. Chape (Savaii, Samoa Blowholes)





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SUMMARY

Issued 06 November 2020

- La Niña continues in the tropical Pacific. Australian and international climate models suggest it is likely to continue at least into February 2021.
- The Intertropical Convergence Zone (ITCZ) was shifted to the north, while the South Pacific Convergence Zone (SPCZ) was more active east of Fiji.
- A weakening pulse of the Madden-Julian Oscillation (MJO) is currently located over the tropical central Pacific Ocean with most climate models suggest it will weaken in strength while moving eastwards towards the tropical Americas in the coming week.
- Sea level in October was higher than normal for most countries in the region, with positive anomalies (15-25cm) situated around Palau, FSM, RMI, and the far north of eastern Kiribati, while smaller patches of +15 to +20cm anomalies occurred around the northern PNG, Solomon Islands, Vanuatu, Fiji and Tonga. Sea level in the central to eastern equatorial Pacific was lower in October than September.
- Coral Bleaching Alert is on Alert Level 2 in the western and central part of FSM while areas of Alert Level 1 exist around FSM and eastern Palau. The Coral Bleaching Outlook shows the region of Alert Level 2 remaining similar over FSM, with Alert 1 expanding in Palau, the northern PNG coast and parts of the far northwest Solomon Islands. The rest of northern PNG, the Solomon Islands, central and southern RMI, Tuvalu, northern Fiji and Samoa are on Warning and Watch alert, while remaining south-west Pacific countries are rated as 'no stress'.
- For November 2020 to January 2021, the dynamical models (as well as SCOPIC) agree on above normal rainfall for Palau, southern Marshall Islands, most parts of PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Samoa, Niue, southern Cook Islands and southern French Polynesia. The models also agree on below normal rainfall for northern Marshall Islands, northern PNG, Nauru, Kiribati, Tuvalu, northern Cook Islands and central and northern French Polynesia.

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EL NIÑO–SOUTHERN OSCILLATION

La Niña likely to continue until at least the end of summer 2020-21

Click link to access [Climate Driver Update issued on 27 October 2020](#)

La Niña continues in the tropical Pacific. Australian and international climate models suggest it is likely to continue at least into February 2021.

Central and eastern tropical Pacific Ocean sea surface temperatures remain at La Niña levels, as do most atmospheric indicators, including trade winds and cloudiness. The Southern Oscillation Index (SOI) has moved back into neutral values, most likely due to the influence of a passing MJO event. The SOI is expected to return to La Niña levels in the coming weeks.

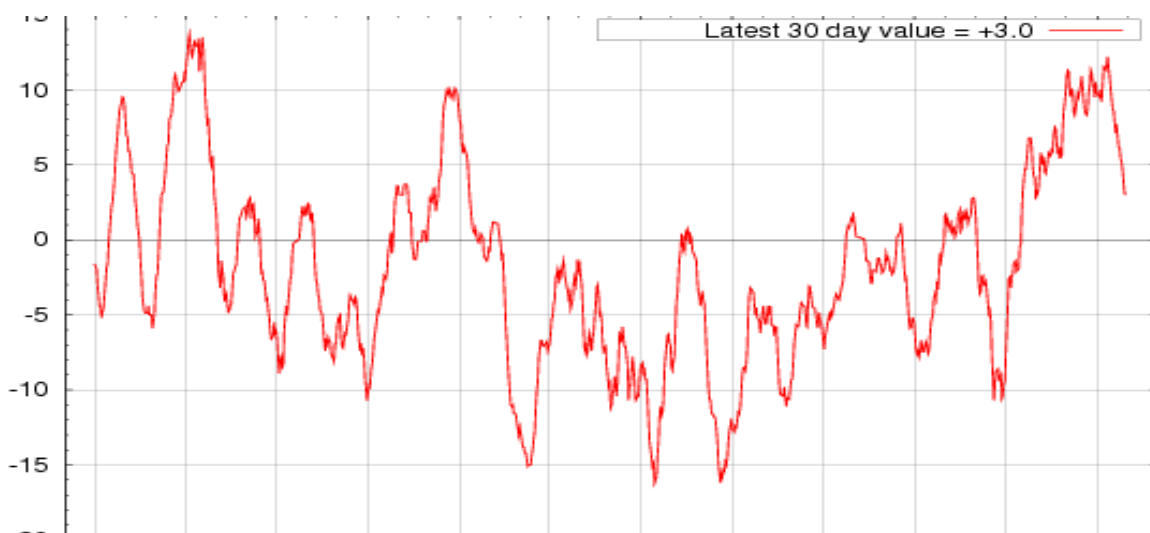
La Niña typically increases the chance of above average rainfall across much of western Pacific countries during summer. Current climate outlooks indicate rainfall during November 2020 to January 2021 is likely to be above average for off-equatorial Western Pacific countries from Palau east to central RMI and from central and southern Papua New Guinea southeast through the Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, southern Cook Islands to the Tubai Islands in French Polynesia.

Most models suggest La Niña will peak in December, with around half the models anticipating a strong event. While there is some possibility that the peak strength could reach levels similar to 2010-12 there are some differences. La Niña became established much earlier in 2010, was long lived (over two years), and impacts were enhanced by a negative Indian Ocean Dipole and warm ocean temperatures around Australia.

In contrast, the Indian Ocean Dipole (IOD) is currently neutral, and most models suggest it will remain neutral for the rest of 2020.

The Madden-Julian Oscillation (MJO) is currently in the western Pacific and is expected to remain moderately strong as it moves across the Pacific basin, then decrease in strength as it approaches Africa.

The 30-day Southern-Oscillation Index (SOI) for the 30 days ending 25 October was +5.4. The 90-day value is also above La Niña threshold at +7.4.



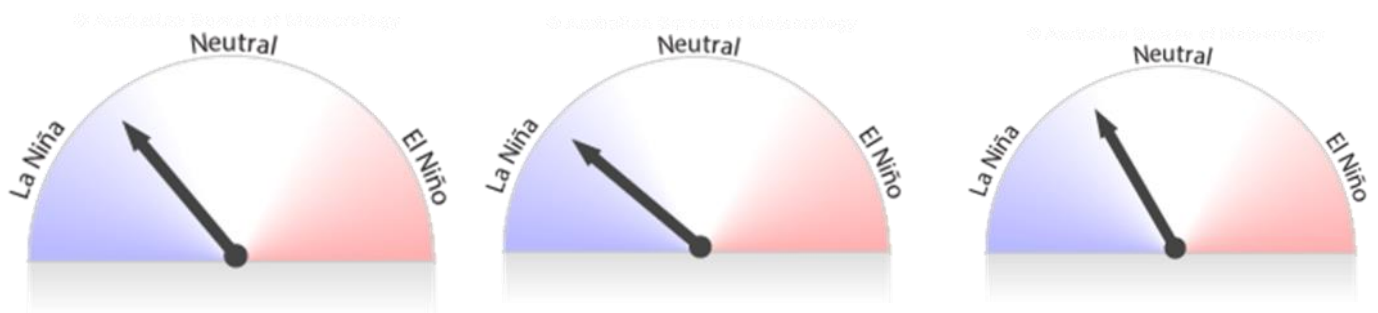


EL NIÑO–SOUTHERN OSCILLATION

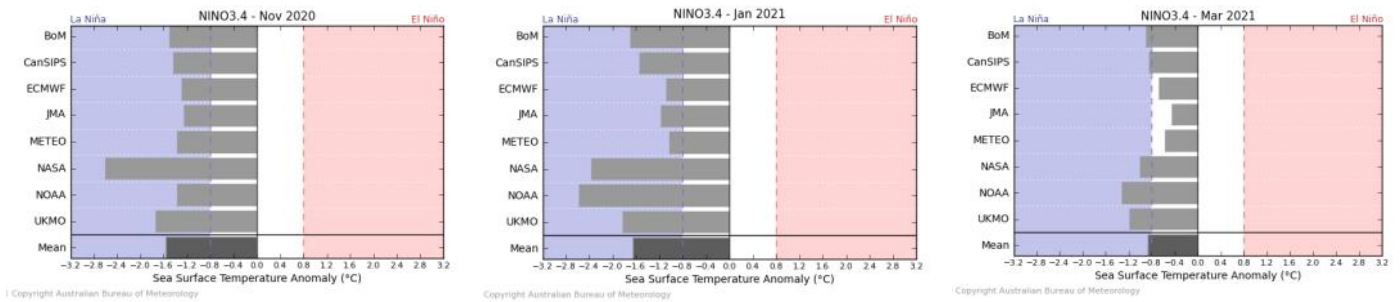
La Niña likely to continue until at least the end of summer 2020-21

Click link to access [Climate Driver Update issued on 27 October 2020](#)

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



Bureau of Meteorology NINO3.4 International Model Outlooks



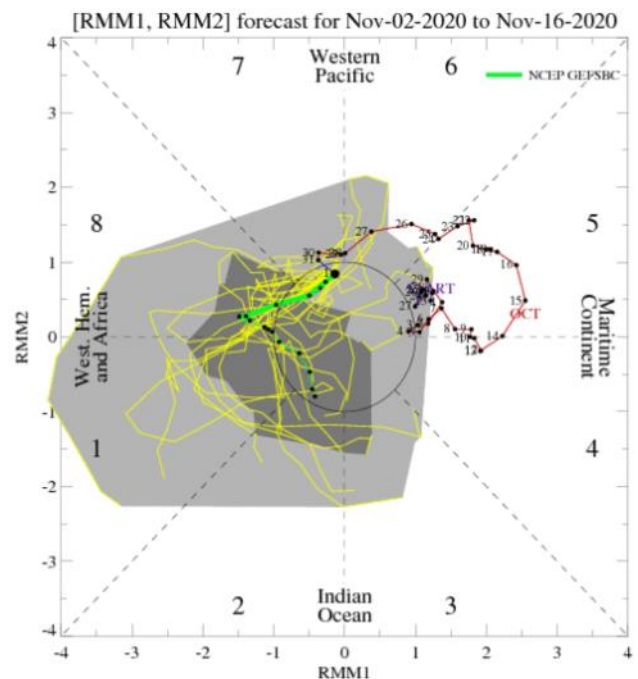
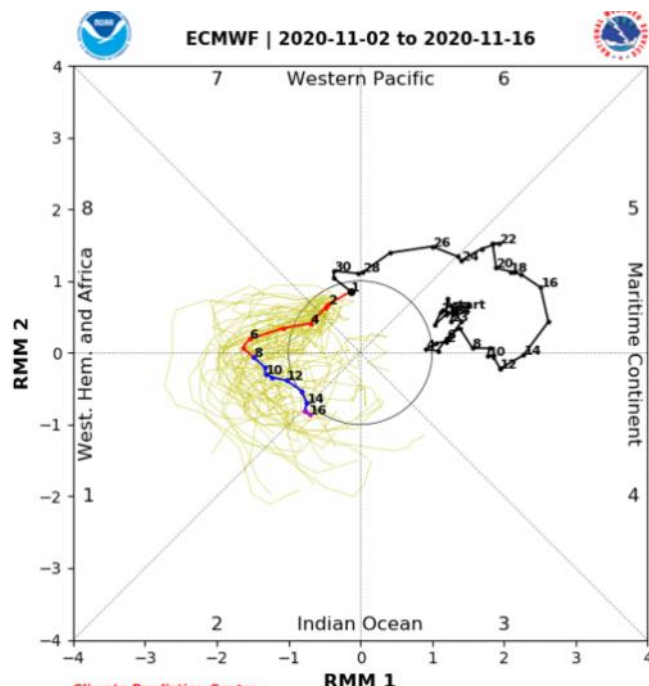
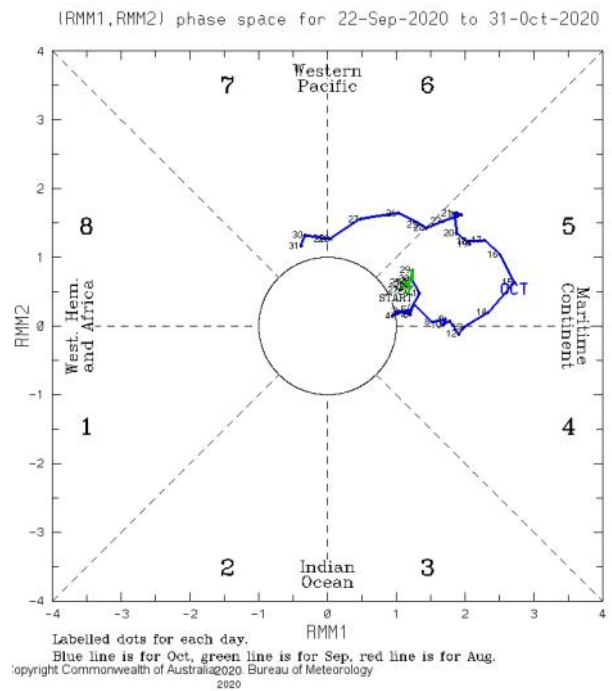
Bureau of Meteorology summary of international model outlooks for NINO3.4: <http://www.bom.gov.au/climate/model-summary/#tabs=Pacific-Ocean>

MADDEN–JULIAN OSCILLATION

Click link to access [Weekly Tropical Note](#) [Issued on Tuesday 03 November 2020]

A weakening pulse of the Madden-Julian Oscillation (MJO) is currently located over the tropical central Pacific Ocean, east of the Date Line. This pulse is moderately strong but most climate models suggest it will weaken in strength while moving eastwards towards the tropical Americas in the coming week. An MJO pulse in the central Pacific region would typically enhance rainfall across parts of western Pacific at this time of the year. The influence of the MJO on western Pacific countries reduces considerably as it moves further east towards the Americas.

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



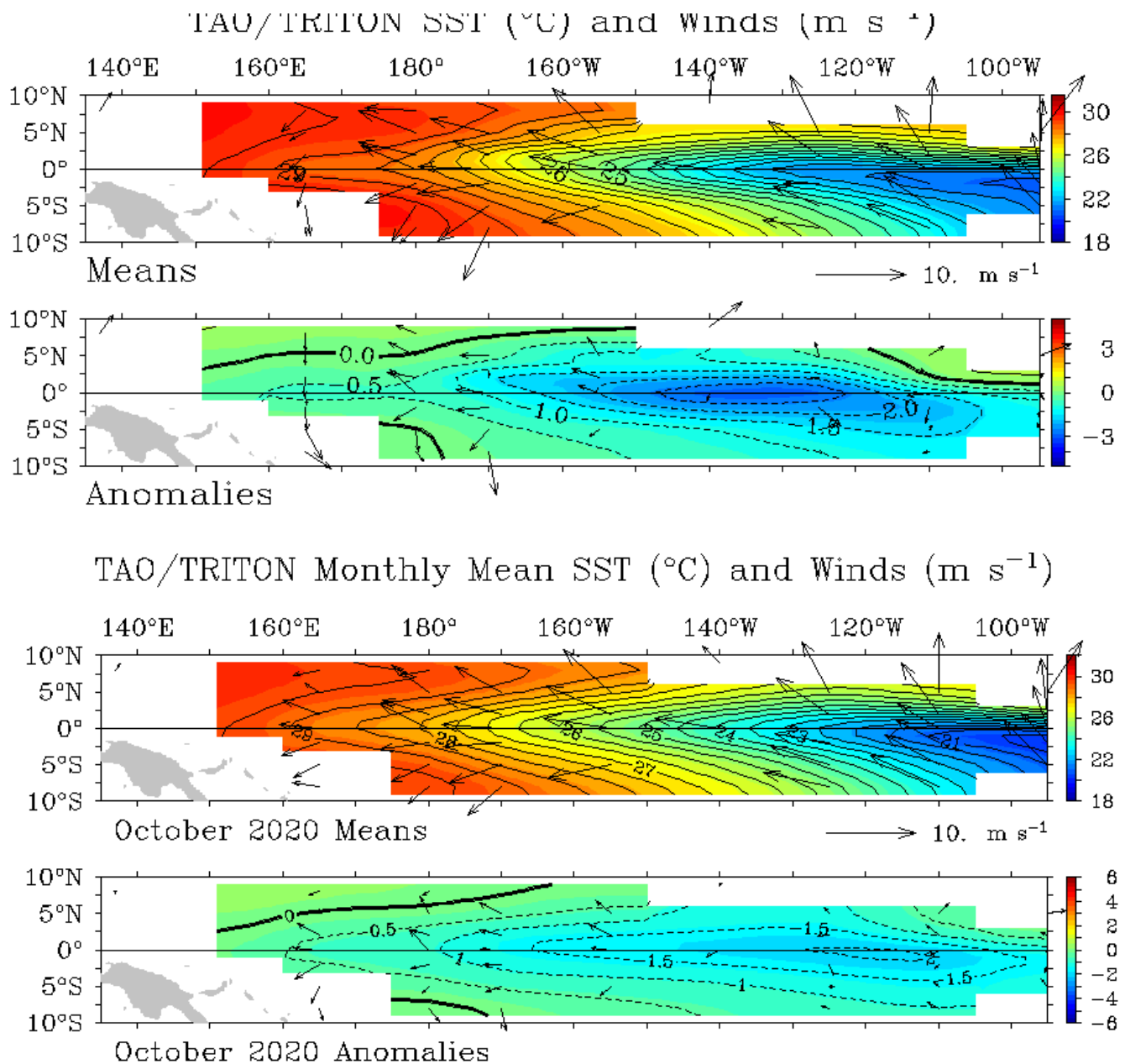


WIND

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

The equatorial trade winds in the 5-day snapshot ending 01 November shows strengthened trade winds across the western to central equatorial Pacific and near-normal trade winds further east. For October, the TAO/TRITON data show slightly enhanced trade winds across the central and western equatorial Pacific

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

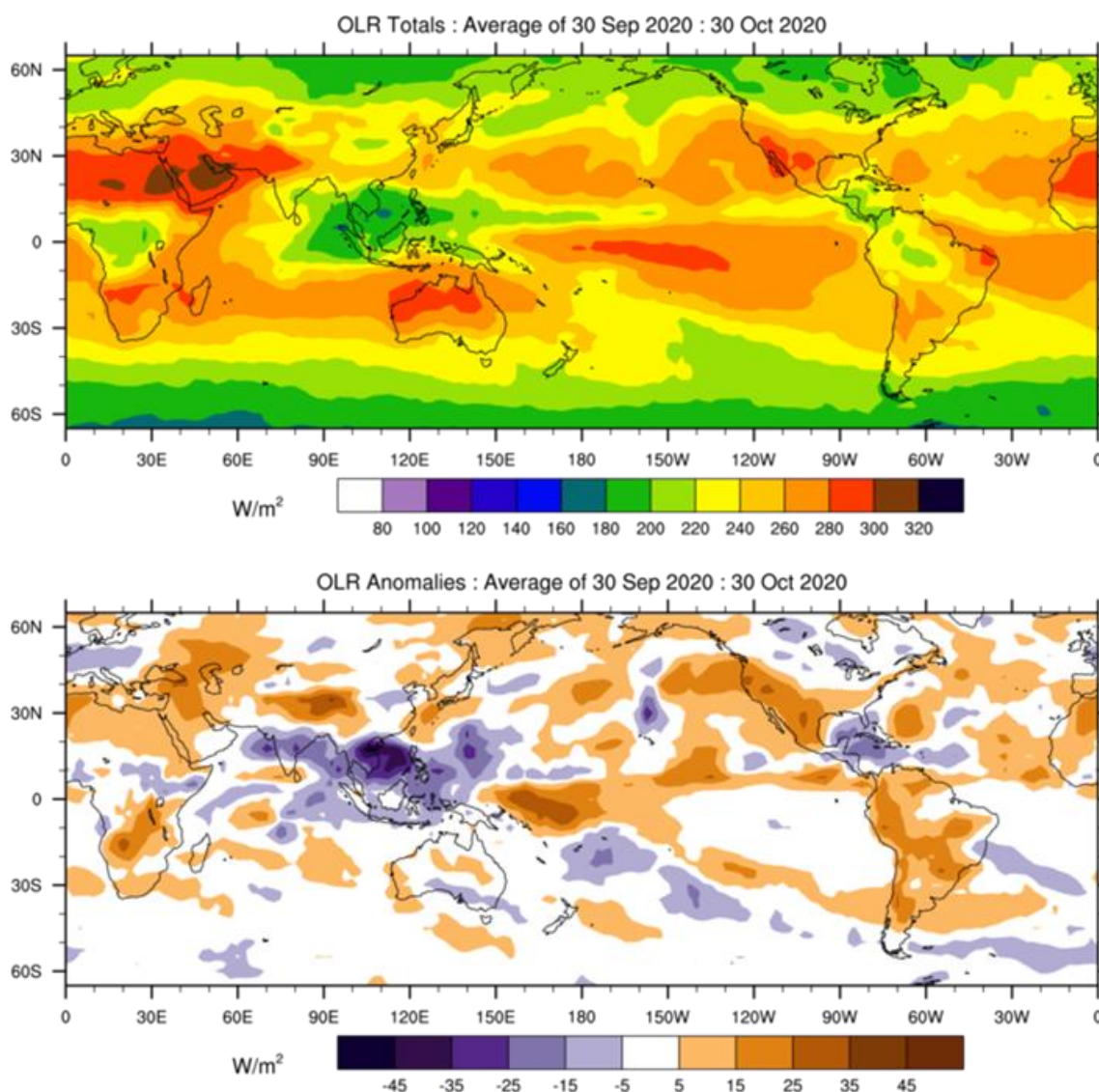
Click link to access [OLR](#)



The October 30-day OLR total and anomaly maps suggest the Intertropical Convergence Zone (ITCZ) was stronger than normal and shifted north in the western Pacific. However, the South Pacific Convergence Zone (SPCZ) was not active over PNG and Solomon Islands, while a portion of the SPCZ was active over Fiji, Tonga, Samoa, Niue and southern Cook Islands which may result in higher rainfall over these countries.

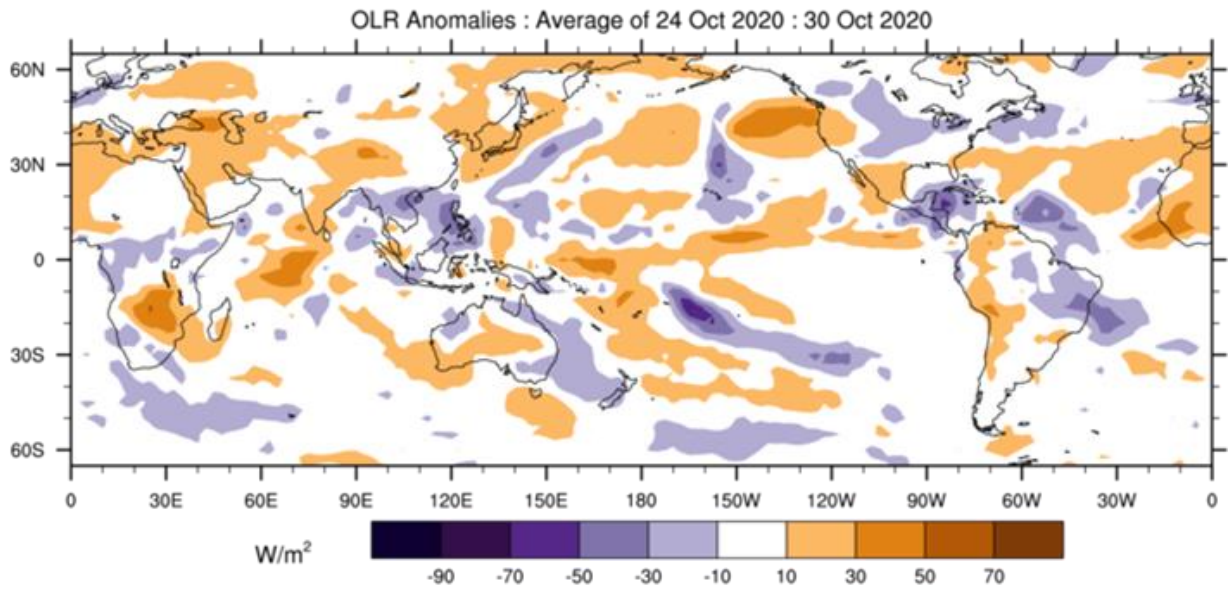
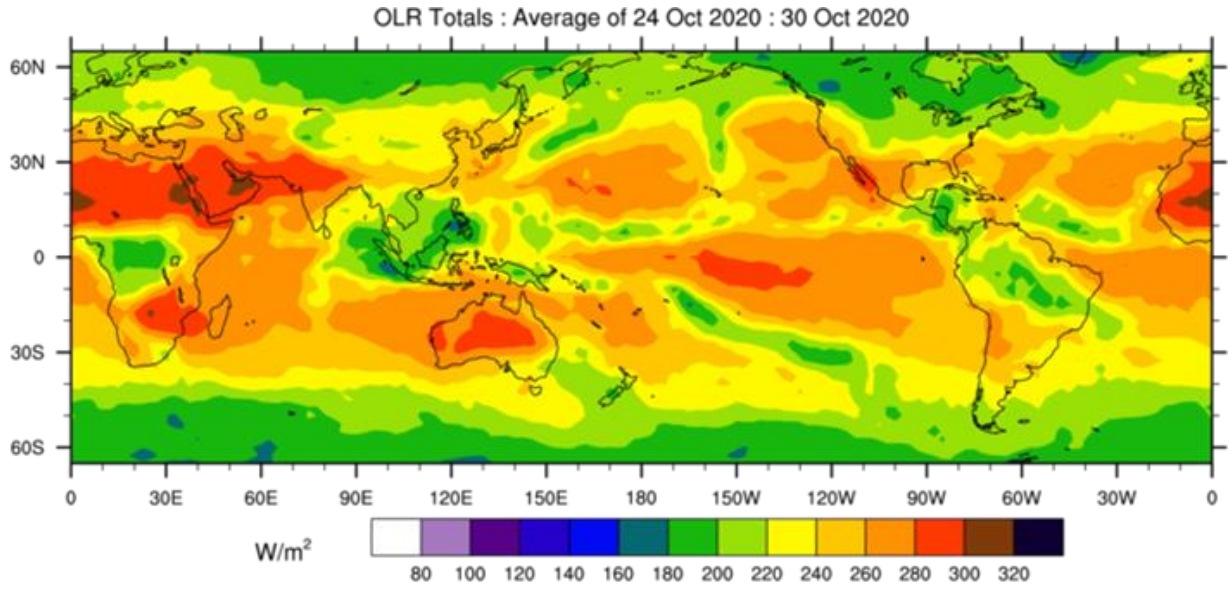
Note: Global maps of OLR below highlight regions experiencing increased or decreased cloudiness. The top panel is the total OLR in Watts per square metre (W/m^2) and the bottom panel is the anomaly (current minus the 1979-1998 climate average), in W/m^2 . In the bottom panel, negative values (blue shading)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

OLR Total and Anomalies, 30 Day OLR

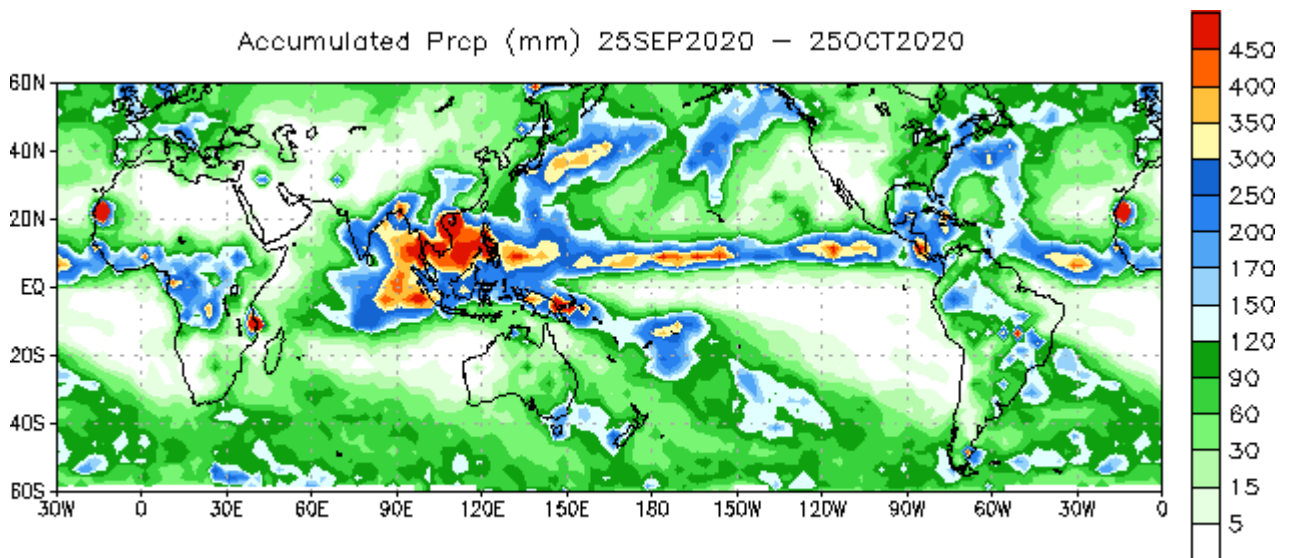


(C) Copyright Commonwealth of Australia 2020. Bureau of Meteorology

OLR Total and Anomalies, 7 Day OLR

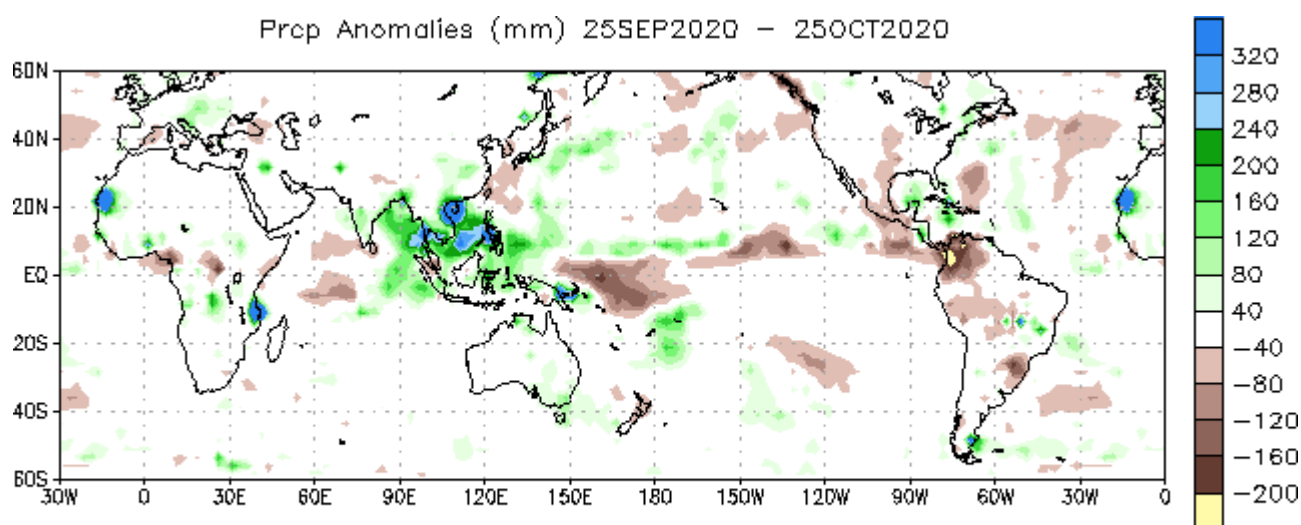


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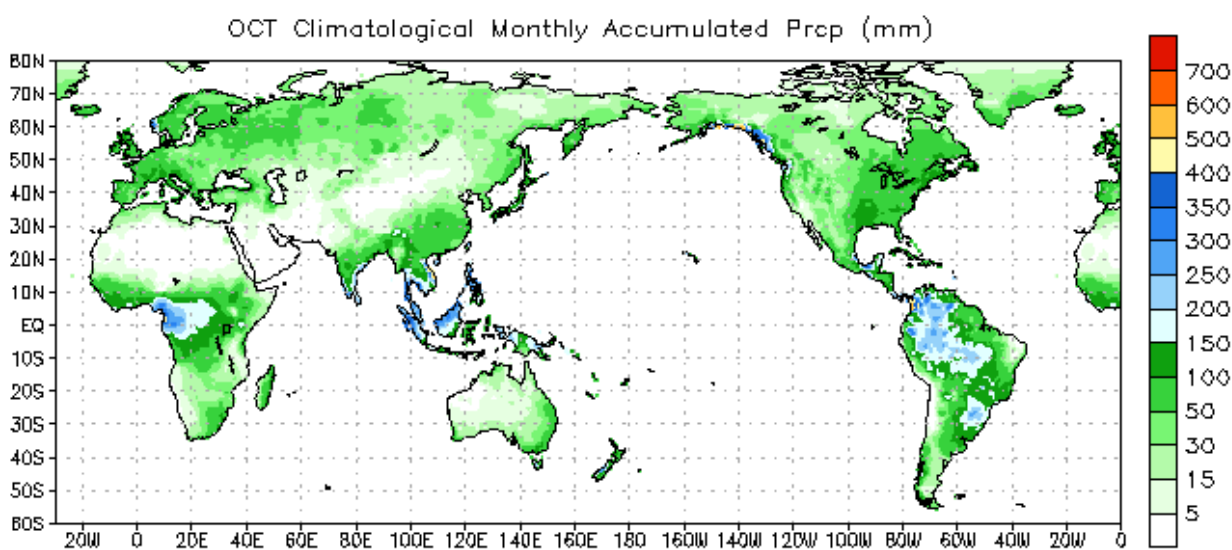


Data Source: NCEP CMAP Precipitation

30-Day Rainfall Anomalies



Data Source: NCEP CMAP Precipitation
Climatology (1979–1995)



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

NOAA Climate Prediction Centre - NCEP CMAP precipitation:

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

OCEAN CONDITIONS

SEA SURFACE TEMPERATURE

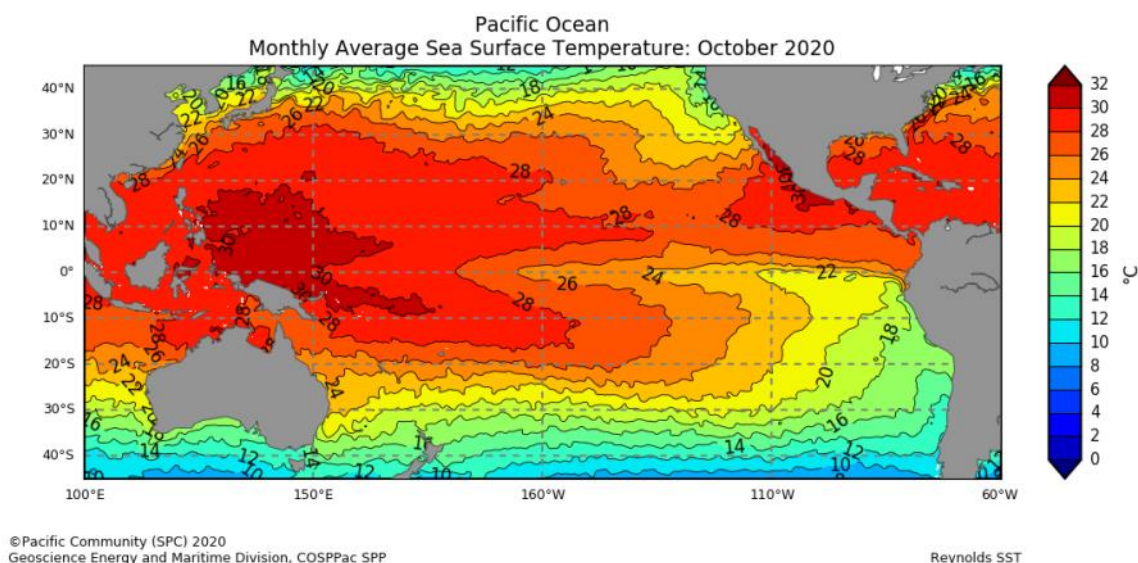


Click link to access [Pacific Community COSPPac Ocean Portal](#)

Sea surface temperatures (SSTs) for October show a cooling trend in the central and western tropical Pacific Ocean compared with September, consistent with the evolving La Niña. Cool SST anomalies were observed near the equator from 170°E eastwards to South America. Cool anomalies also covered most of the southern tropics east of about 130°W, but in the northern hemisphere they only reached about 10° north. In COSPPac countries, the Line Islands of the Kiribati group experienced the strongest negative anomalies of about 1.5 degree. Nauru and parts of PNG, New Caledonia, Fiji, Tonga, Niue, Cook Islands and northern French Polynesia also experienced below average ocean temperatures.

SSTs were 0.5 to 1.5 degrees above normal across remaining COSPPac countries, especially in the north-western Pacific around Palau, FSM, northern PNG, Solomon Islands, Vanuatu, Fiji and French Polynesia. In terms of the deciles, regions of Highest-on-Record for October occurred in much of Palau, FSM, and in parts of PNG, Solomon Islands, Vanuatu, northern Fiji, Samoa, Cook Islands and French Polynesia EEZs. Regions of above average to very much above average (deciles 8-10) SSTs also spanned across the same countries, as well as RMI, south and central Tuvalu, Tonga and Niue. In contrast, below average (decile 2-3) SSTs were observed in Nauru and Kiribati, particularly the east where a small region of decile 1 to lowest on record was analysed. Deciles 2 and 3 also occurred in the north of the Cook Islands EEZ.

Mean Sea Surface Temperature

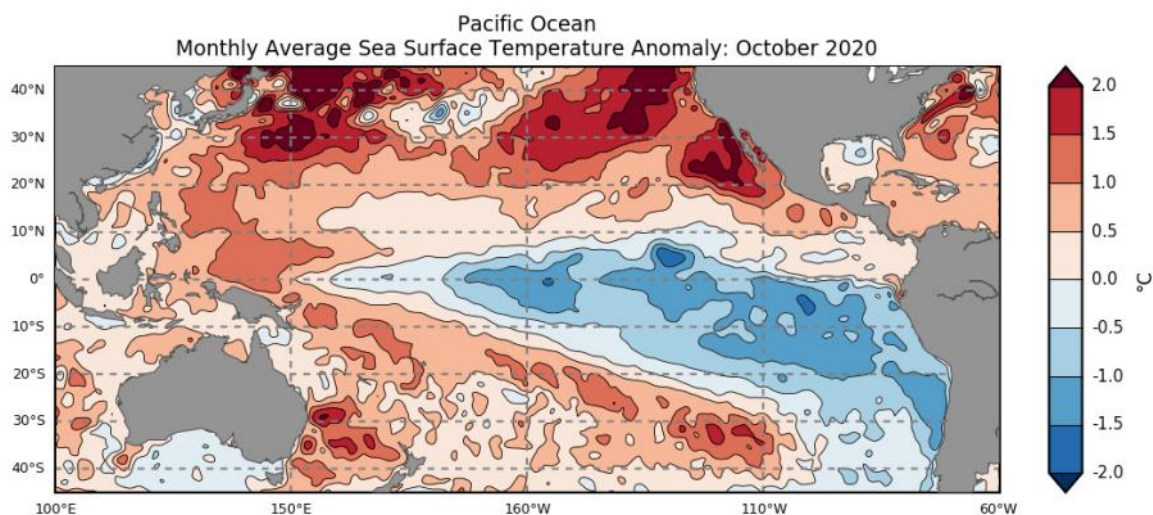


OCEAN CONDITIONS

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



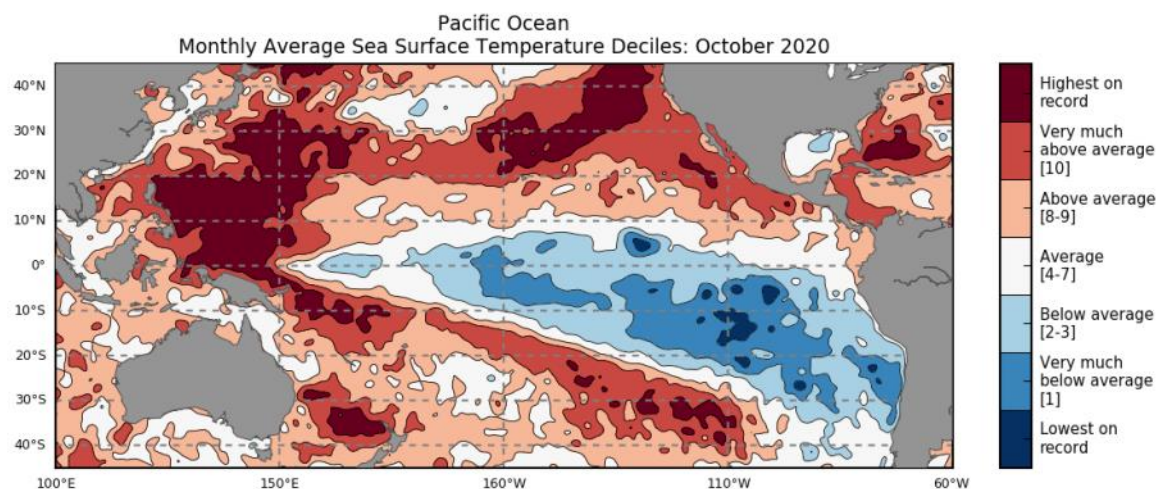
Anomalous Sea Surface Temperature



©Pacific Community (SPC) 2020
Geoscience Energy and Maritime Division, COSPPac SPP

Reynolds SST

Sea Surface Temperatures Deciles



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Geoscience Energy and Maritime Division, COSPPac SPP

Reynolds SST

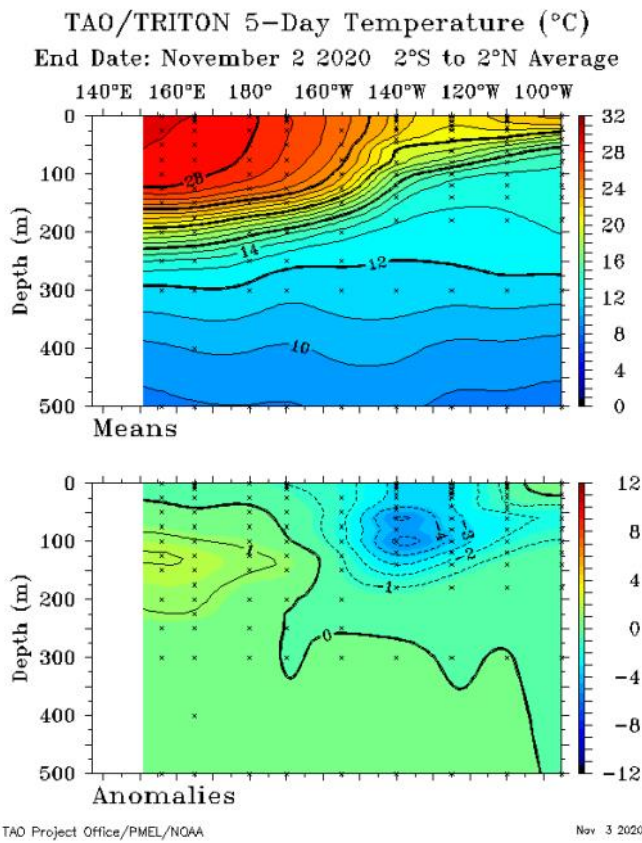
OCEAN CONDITIONS

SUB SURFACE

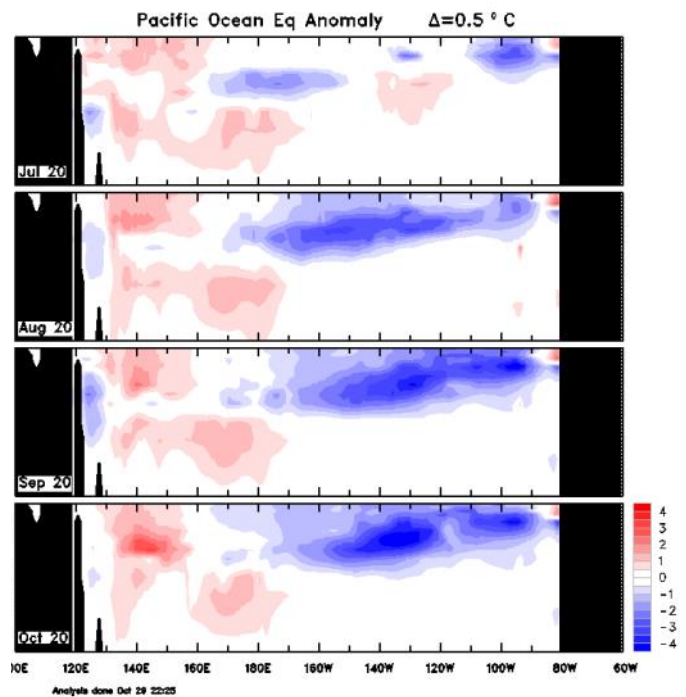


The Bureau of Meteorology's four-month sequence of equatorial sub-surface temperature anomalies to (29 October), shows cool anomalies extending across the top 200 m of the sub-surface of the equatorial Pacific from around the Date Line eastward across the basin. The strength and extent of cool anomalies have increased month-on-month since July. Weak warm anomalies persist across large parts of the column depth in the far western equatorial Pacific.

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

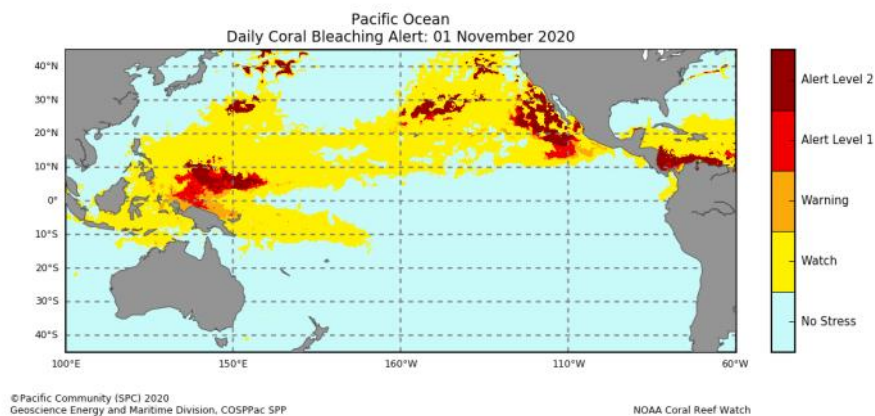
CORAL BLEACHING



The daily Coral Bleaching Alert for 01 November 2020 shows Alert Level 2 in the western and central part of FSM while areas of Alert Level 1 exist around FSM and eastern Palau. Parts of Palau and northern PNG are on Warning while other parts of PNG, RMI, Solomon Islands, Nauru, Tuvalu, parts of Kiribati and Tokelau are on Watch. The remainder of Pacific Island countries are in 'no stress'. The four weeks Coral Bleaching Outlook to 22 November shows the region of Alert Level 2 remaining similar over FSM, with Alert 1 expanding in Palau, the northern PNG coast and parts of the far northwest Solomon Islands. The rest of northern PNG, the Solomon Islands, central and southern RMI, Tuvalu, northern Fiji and Samoa are on Warning and Watch alert, while remaining south-west Pacific countries are rated as 'no stress'.

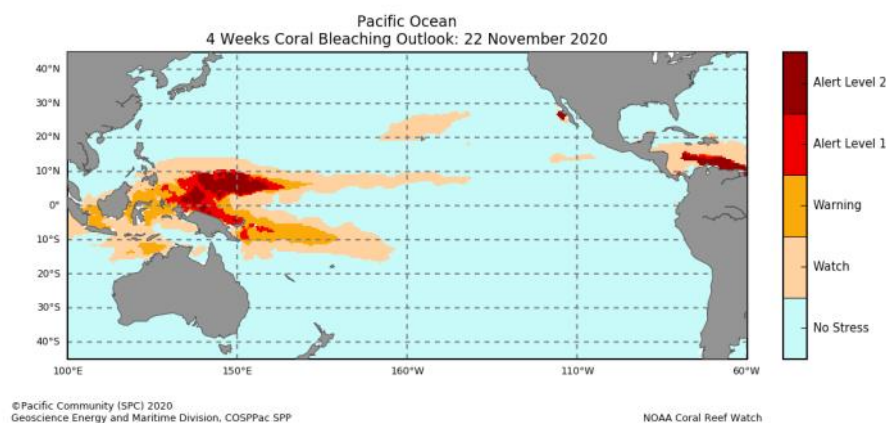
Daily Coral Bleaching Alert

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



4-Weeks Coral Bleaching Outlook

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



OCEAN CONDITIONS

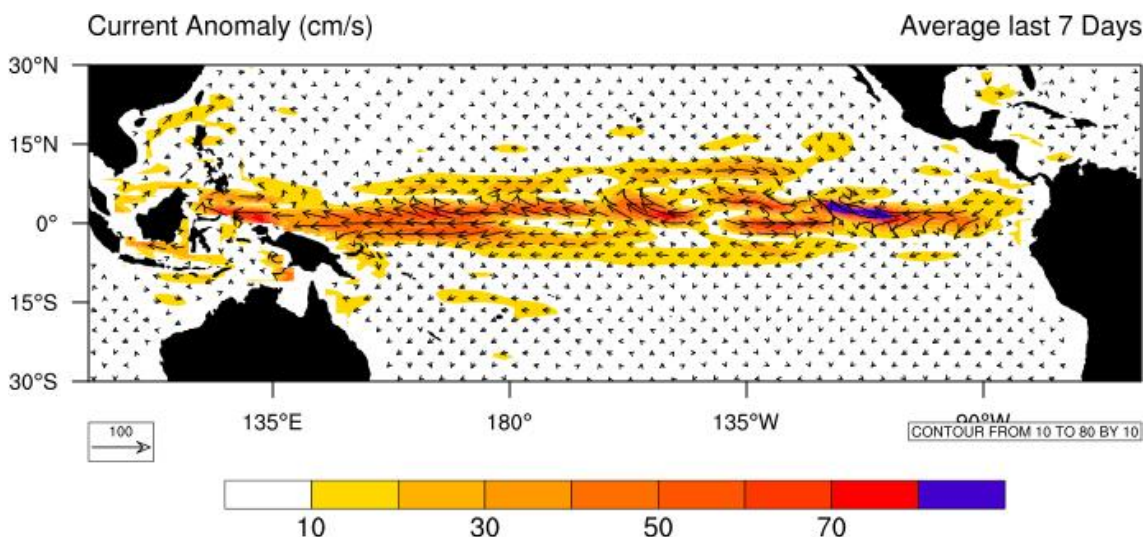
OCEAN SURFACE CURRENTS AND SEA LEVEL



The most recent 7-day ocean surface currents plot shows a stronger-than-normal westward-flowing Equatorial Current in the equatorial Pacific, with clear divergence along the equator, especially east of about 140° W. The plot also shows an anomalous eddy field exists between 145°W and 135°W.

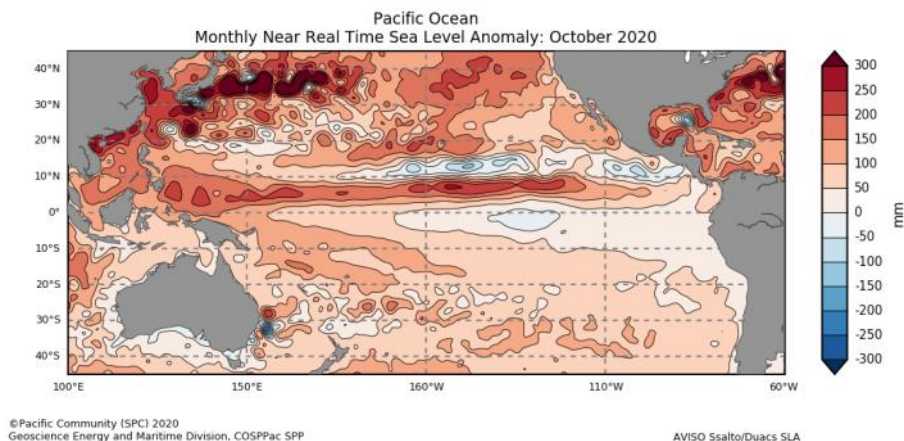
Sea level in October was higher than normal for most countries in the region, with positive anomalies (15-25cm) situated around Palau, FSM, RMI, and the far north of eastern Kiribati, while smaller patches of +15 to +20cm anomalies occurred around the northern PNG, Solomon Islands, Vanuatu, Fiji and Tonga. Sea level in the central to eastern equatorial Pacific was lower in October than September. Continued development of the La Niña should see a further fall in equatorial sea-level anomalies.

Ocean Surface Current (Last 7-Days)



Monthly Sea Level Anomalies

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

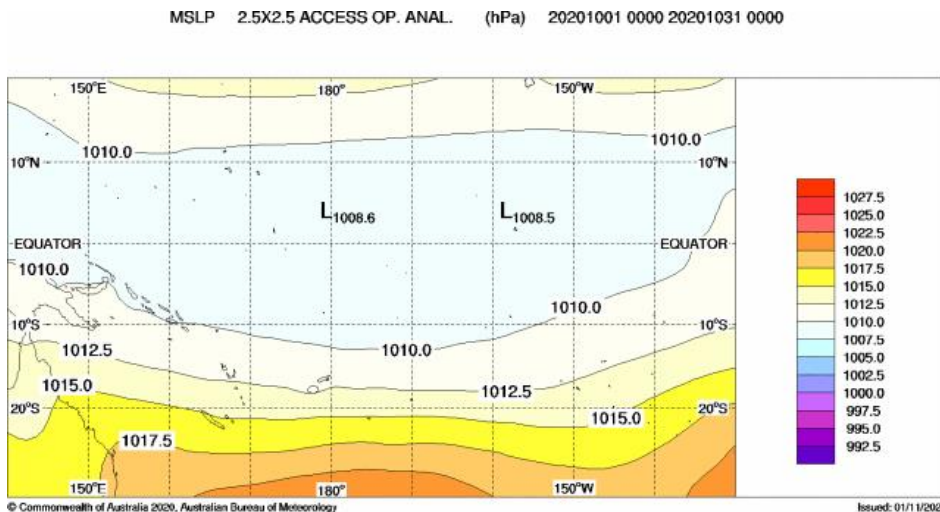


MEAN SEA LEVEL PRESSURE

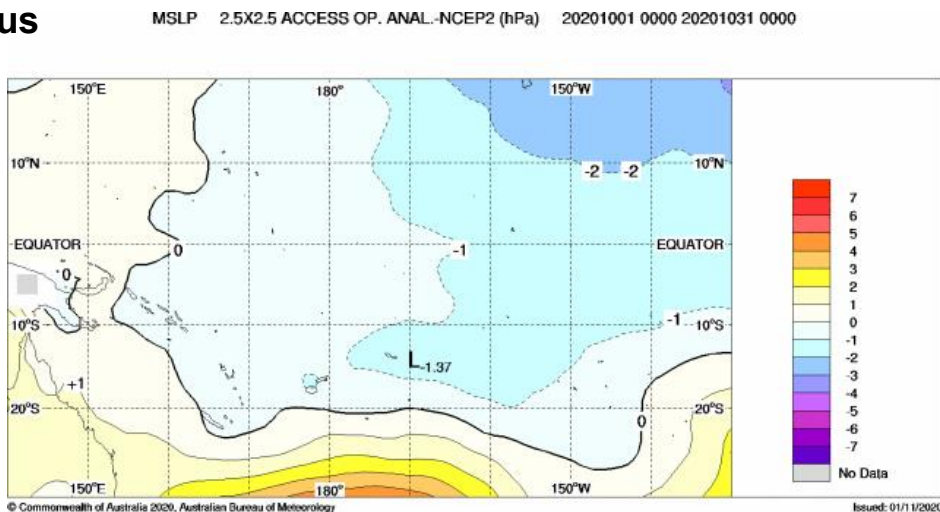
The October mean sea level pressure (MSLP) anomaly map shows negative anomalies east of about 180° in the tropical Pacific. Positive anomalies were present in the southern sub-tropical Pacific south of 20°S.

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>

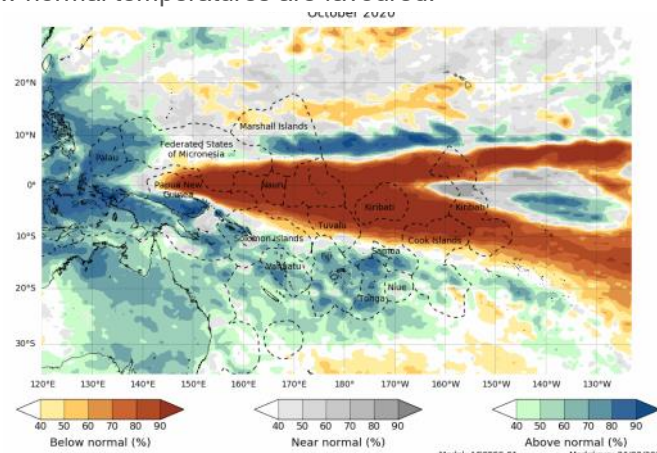
SEASONAL RAINFALL OUTLOOK

November 2020—January 2021



For November, the ACCESS-S model strongly favours below normal rainfall in a large wedge centred on the equator, affecting Nauru, Kiribati, north and central Tuvalu, Tokelau, the northern Cook Islands and parts of central and northern French Polynesia, while also extending as far west as the northernmost part of PNG. A small region more weakly favouring below normal rainfall is evident in the northwestern Marshall Islands. Above normal rainfall is favoured in a boomerang-shaped zone wrapping around the below normal wedge. Countries affected include Palau, FSM, central Marshall Islands, most parts of PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Samoa, Niue and southern Cook Islands. The three-month outlook (November-January) is similar outlook to that for November, except for above normal rainfall extending over the southern half of RMI and below normal rainfall extending to the New Guinea Islands and Samoa. The overall pattern is typical of La Niña. Above normal maximum and minimum temperatures are favoured for all COSPPac countries, except for areas close to the equator east of 155°E, namely the far southern Marshall Islands, Nauru, Kiribati, northern Tuvalu, Tokelau, northern Cook Islands and northern and central French Polynesia where near-normal to below normal temperatures are favoured.

Monthly ACCESS-S Maps



The Copernicus multi-model outlook for November to January favours below normal rainfall for the northern Momase and New Guinea Islands region of PNG, Nauru, Kiribati, northern and central Tuvalu, Tokelau, northern Cook Islands and northern and central French Polynesia. Above normal rainfall is favoured for Palau, parts of PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, southern Tuvalu, Tonga, Samoa, Niue and southern Cook Islands.

The SCOPIC statistical model for November to January favours below normal rainfall for Kiribati, northern Tuvalu and northern Cook Islands. Above normal rainfall is favoured for Palau, FSM, southern Marshall Islands, the southern region of PNG, Solomon Islands, Vanuatu, Fiji, southern Tuvalu, Tonga, Samoa, Niue and southern Cook Islands.

The APEC Climate Centre multi-model for November to January favours below normal rainfall for eastern FSM, northern and far southern Marshall Islands, the northern Momase and New Guinea Islands regions of PNG, Nauru, northern and central Tuvalu, Kiribati, Tokelau, northern Cook Islands and northern and eastern French Polynesia. Above normal rainfall is favoured for Palau, western and central FSM, parts of PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Samoa, Niue, central and southern Cook Islands and parts of southern French Polynesia.

For November 2020 to January 2021, the dynamical models (as well as SCOPIC) agree on above normal rainfall for Palau, southern Marshall Islands, areas in the Highlands and Southern Regions of PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga, Niue, southern Cook Islands and southern French Polynesia. The models also agree on below normal rainfall for northern Marshall Islands, the New Guinea Islands, Nauru, Kiribati, northern and central Tuvalu, northern Cook Islands and central and northern French Polynesia.

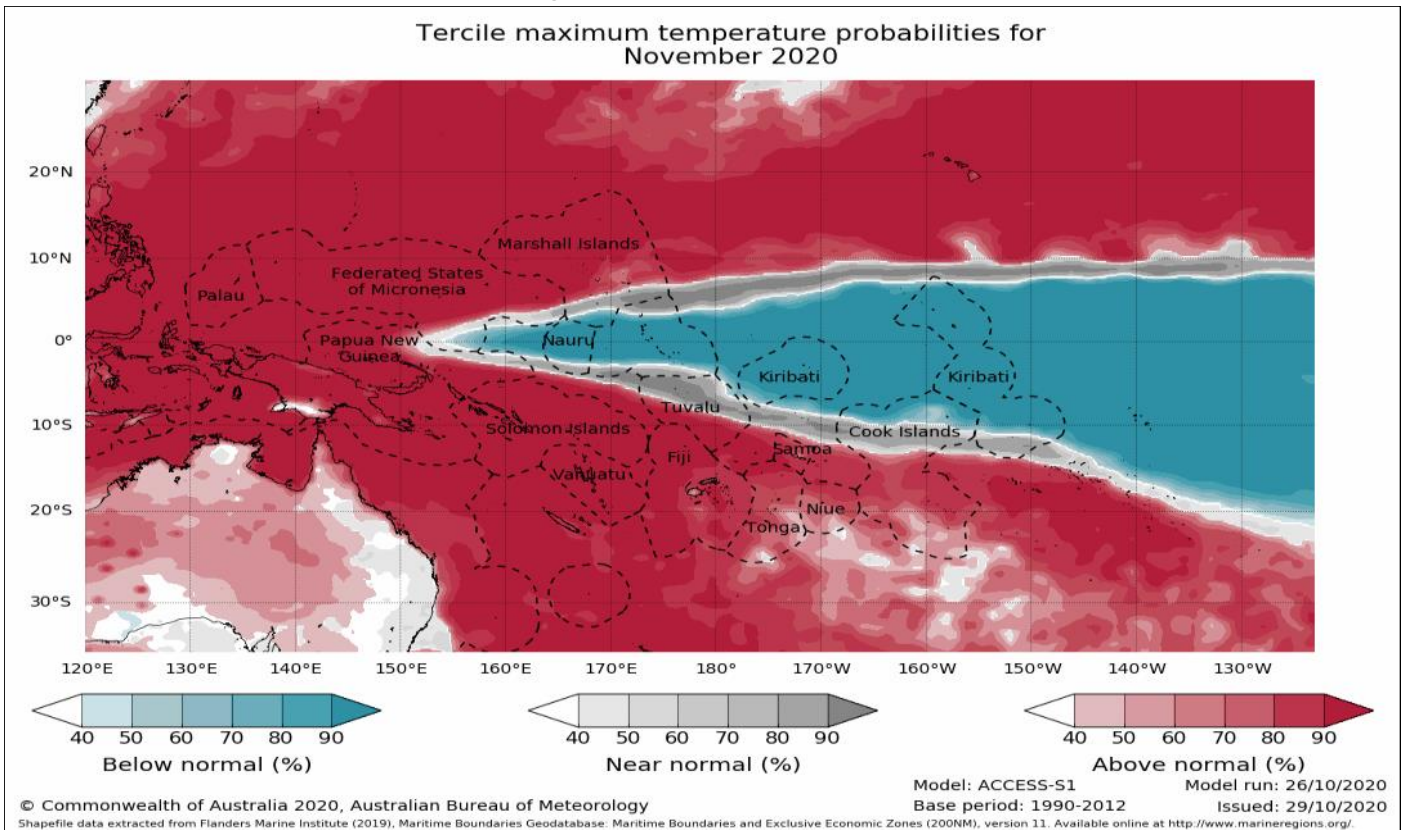
SEASONAL TEMPERATURE OUTLOOK

November 2020—January 2021

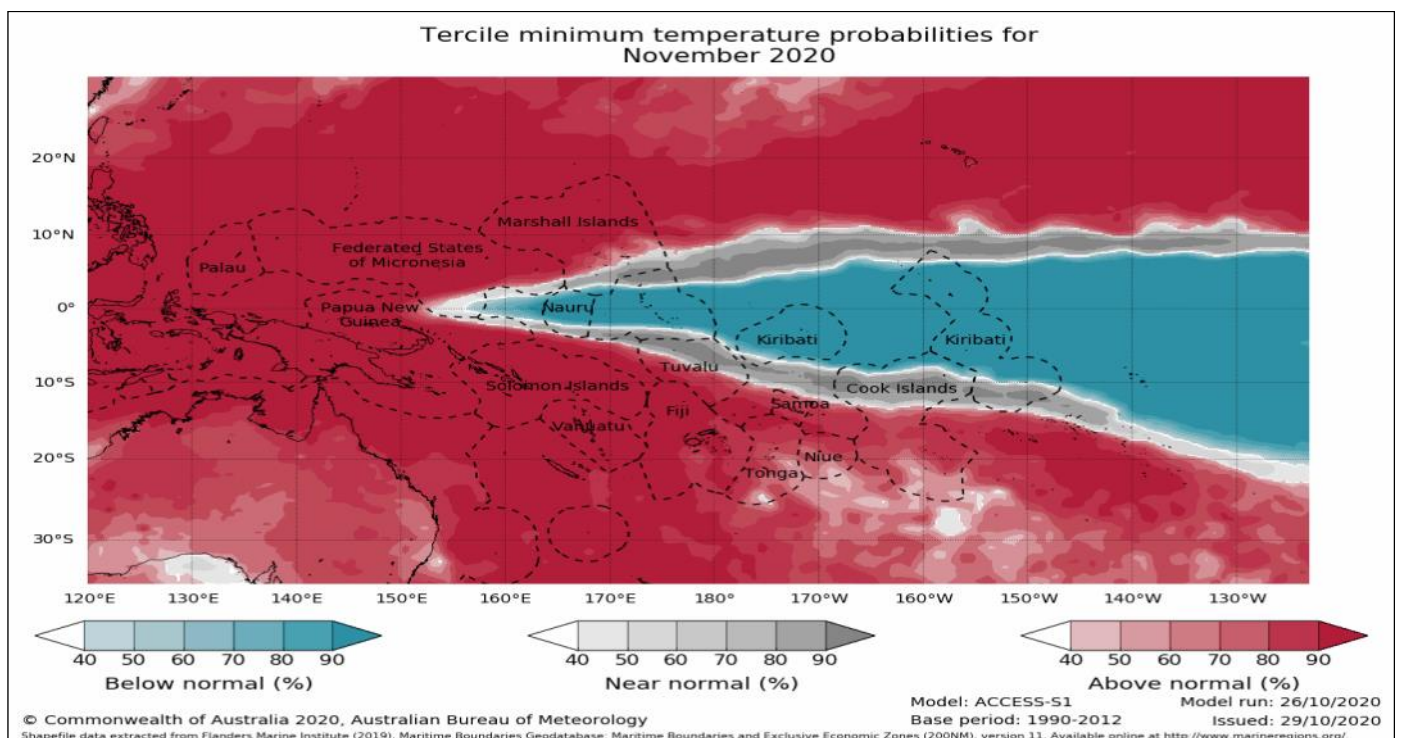


Monthly **ACCESS-S** Maps

Tercile maximum temperature probabilities for November 2020



Tercile minimum temperature probabilities for November 2020



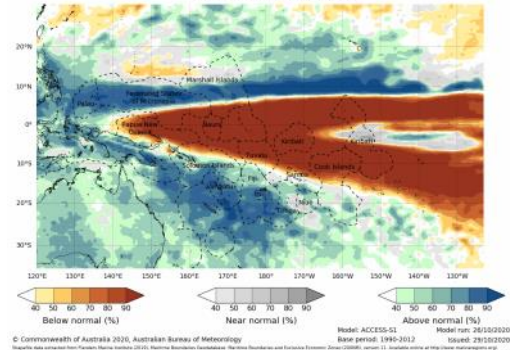
SEASONAL RAINFALL OUTLOOK

November 2020—January 2021

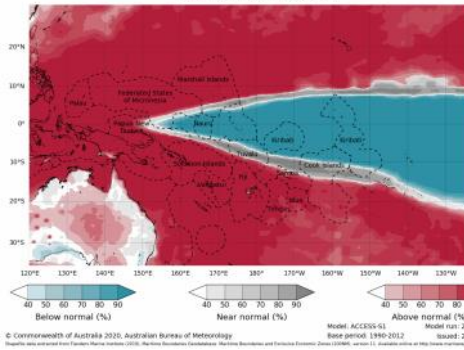


Seasonal ACCESS-S maps

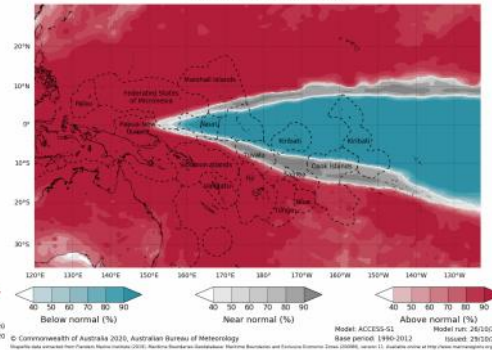
Tercile rainfall probabilities for November 2020 to January 2021



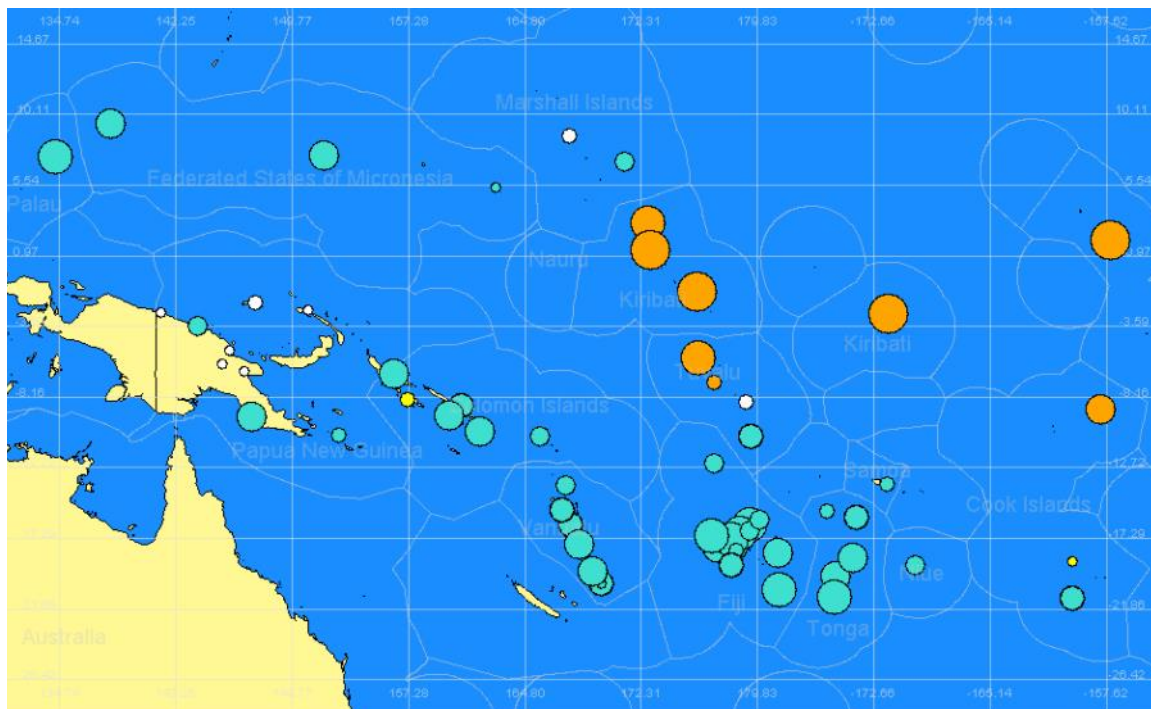
Tercile maximum temperature probabilities for November 2020 to January 2021



Tercile minimum temperature probabilities for November 2020 to January 2021



SCOPIC



Legend Bias towards below-normal rainfall Bias towards normal rainfall Bias towards above-normal rainfall No bias in forecast (Cimatology)

Larger "bubbles" represent higher forecast skill (based on LEPS scores)

'About SCOPIC' www.pacificmet.net/project/climate-and-ocean-support-program-pacific-cosppac

SEASONAL RAINFALL OUTLOOK

November 2020—January 2021



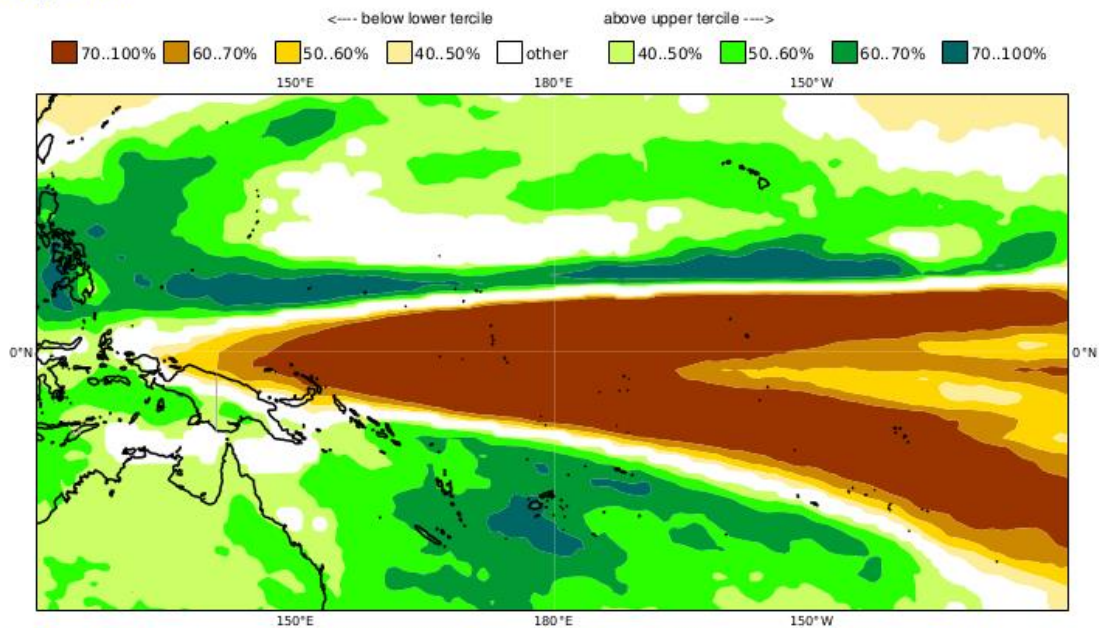
Copernicus (C3S multi-system)-Rainfall

Prob(most likely category of precipitation)

NDJ 2020/21

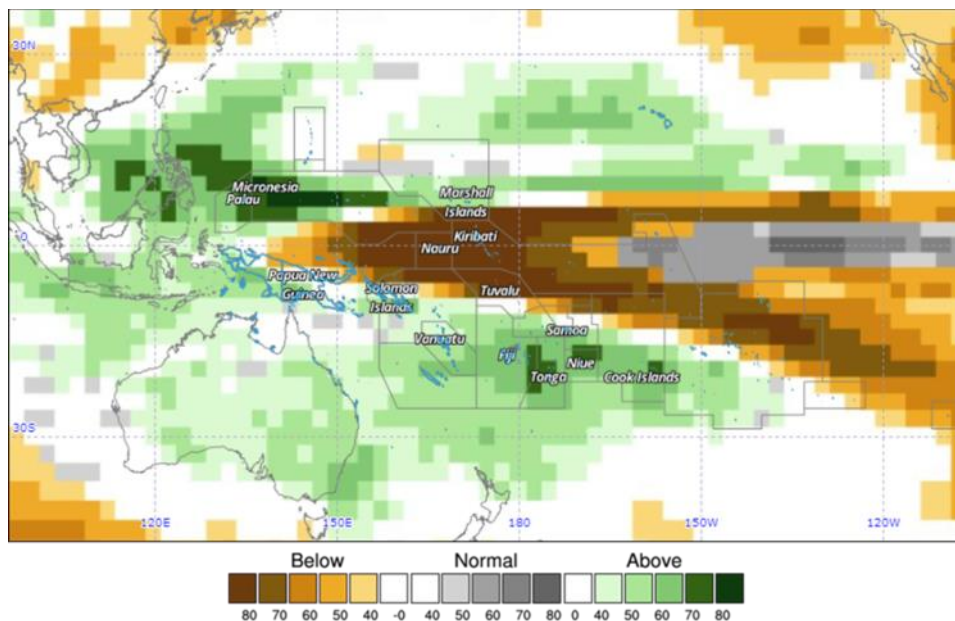
Nominal forecast start: 01/10/20

Unweighted mean



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

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



Year: 2020, Season: NDJ, Lead Month: 3, Method: GAUS

Model: APCC, MSC, NASA, NCEP, PNU, POAMA

Generated using CLIK® (2020-11-3)

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TROPICAL CYCLONE

2020/2021 Season



Tropical cyclone (TC) activity is expected to be near normal or slightly below normal in the Southwest Pacific. There is the potential for elevated levels of tropical cyclone activity as near New Caledonia, the Coral Sea, and northern Tasman Sea. The presence of warmer than normal ocean temperatures in the western part of the region may contribute to the potential for enhanced cyclone activity, along with the aforementioned displacement of the SPCZ. Some island groups in the eastern part of the region may experience reduced activity because of this displacement. The long-term average is nine cyclones (east of the tip of Cape York). There is the potential for elevated levels of tropical cyclone activity in the western part of the basin, such as near New Caledonia, the Coral Sea, and northern Tasman Sea. Typhoon activity is expected to be normal or below normal through December in the western North Pacific, although there is an elevated risk for development into early November. The above statement comes from the 2020 October Pacific Climate Outlook Forum (PICOF-7) regional statement. Weekly tropical cyclone forecast from ACCESS-S model show no cyclone risk for the southwest Pacific while some risk for northwest Pacific until 21 November 2020.

The tropical cyclone season outlook for 2020-21 is available via: <http://www.bom.gov.au/climate/cyclones/south-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/ps/japcc030703.jsp>

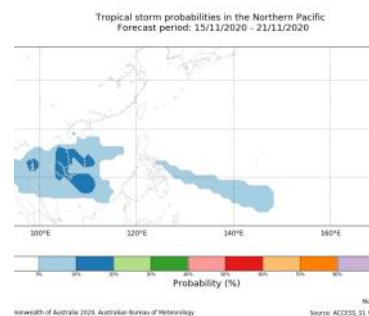
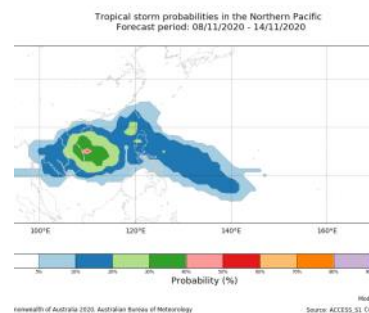
NASA GMAO GEOS-5: <http://gmao.gsfc.nasa.gov/research/ocean/>

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

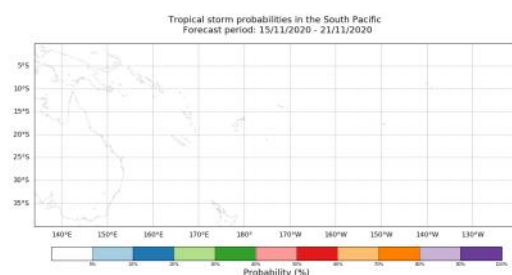
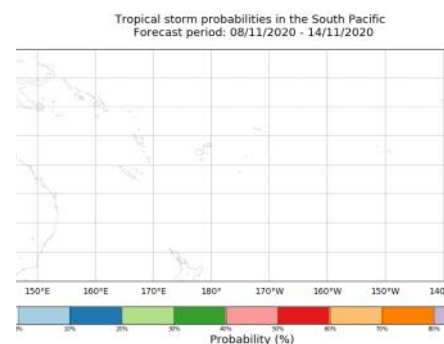
IRI for Climate and Society: <http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/>

The tropical cyclone season outlook for 2020-21 is available via: <http://www.bom.gov.au/climate/cyclones/south-pacific/>

ACCESS-S Weekly Forecasts –Northwest Pacific



ACCESS-S Weekly Forecasts –Southwest Pacific



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.

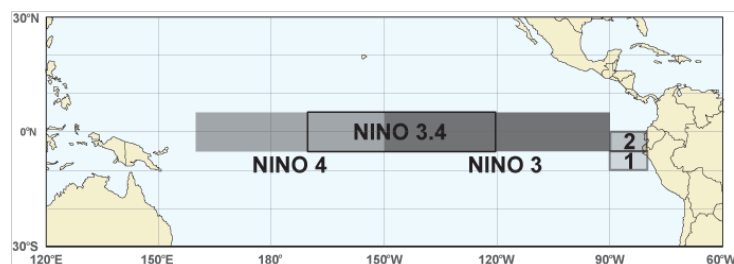
20 degrees Celsius Isotherm Depth

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 deeper than normal 20°C isotherm (positive anomaly) implies a greater heat content in the upper ocean, whilst 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