



Climate and Oceans Support  
Program in the Pacific



# Monthly Climate Bulletin

October 2018



# Summary

## Issued 05 October 2018

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- The Bureau's ENSO Outlook remains at El Niño ALERT, indicating there is approximately a 70% chance of El Niño occurring in 2018, around triple the normal likelihood. In the Indian Ocean there are signs that a positive Indian Ocean Dipole (IOD) is underway.
- A weak phase of the Madden Julian Oscillation (MJO) over the western Pacific in recent days. Most international models forecast the MJO to be active for the coming week and track eastwards over American and African longitudes and towards the maritime continent. Stronger than usual westerly winds have also developed over the tropical Pacific Ocean, something that could potentially assist El Niño development.
- For the month of October, the OLR and TRMM anomaly maps suggest ITCZ was weaker than normal west of about 160°W, especially close to the equator between about 150°E and the Date Line. Over the central to eastern Pacific the ITCZ was shifted slightly southward towards the equator. The SPCZ was enhanced and a little southwest of normal between Vanuatu, Samoa, the southern Cook Islands and the far southeast of French Polynesia. It was weaker than normal west of Vanuatu.
- Models outlooks for November 2018 to January 2019 indicate below normal rainfall for Palau, FSM, north and southeast Papua New Guinea, Solomon Islands, Vanuatu, Fiji, south Tuvalu, Tonga, Samoa, Niue and southern Cook Islands. Above normal rainfall is favoured for north Tuvalu, Kiribati and northern Cook Islands. Models are less emphatic elsewhere.
- Above average tropical cyclone activity is expected in the western north Pacific in 2018. Three or four tropical cyclones of tropical storm intensity or higher are likely to pass nearby Guam, the Commonwealth of the Northern Mariana Islands (CNMI), Yap or Palau by the end of this year. In the southwest Pacific, regional-scale tropical cyclone outlooks for the upcoming November 2018 to April 2019 season favour near average (7-11) numbers of tropical cyclones, following the very early TC Liua that formed in September. Tropical cyclone activity is expected to be lower than normal around the northern and eastern Coral Sea margin and elevated east of the International Date Line. For the week 8-14 or even up to 21 November 2018 the chances of tropical cyclone occurrence for the Pacific region is low. The Vanuatu, New Caledonia and Fiji region continue to remain active for this week.

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Climate Bulletin

ISSN: 2617-2557

Published by the Secretariat of the Pacific Regional Environment Programme (SPREP)

PO Box 240, Apia, Samoa • Ph: +685 21929 •  
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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

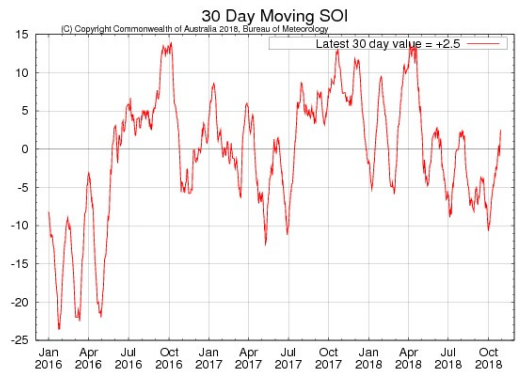
www.sprep.org



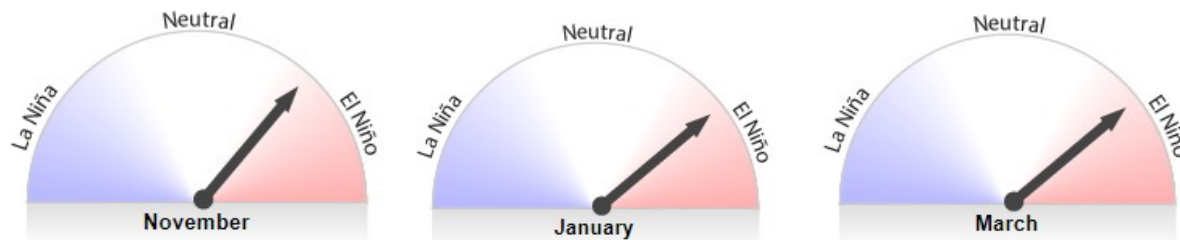
# El Niño–Southern Oscillation

## **El Niño WATCH continues- ENSO Wrap-Up issued on 23 October 2018**

The Bureau's ENSO Outlook remains at El Niño ALERT, indicating there is approximately a 70% chance of El Niño occurring in 2018 around triple the normal likelihood. In the Indian Ocean there are signs that a positive Indian Ocean Dipole (IOD) is underway. An El Niño and a positive IOD increase the likelihood of a dry and warm end to the year across most of Australia. They also raise the risk of heatwaves and bushfire weather in the south, while there are typically fewer tropical cyclones in the Australian region. The surface of the tropical Pacific has warmed over the past month due to weakening of the trade winds. Sub-surface waters also remain warmer than average, increasing the potential for further warming at the surface. However, atmospheric indicators in the tropical Pacific such as the Southern Oscillation Index (SOI), cloudiness and trade winds, are yet to indicate that the ocean and atmosphere have coupled and hence are reinforcing each other. A positive feedback between the ocean and atmosphere is what defines and sustains an El Niño event. International climate models suggest further warming of the tropical Pacific Ocean is likely, increasing the chance of coupling occurring in the coming months. Six of eight models predict El Niño thresholds will be met or exceeded in November. The IOD index has exceeded the positive threshold (+0.4 °C) for five of the last six weeks. If these values persist for another fortnight, 2018 will be considered a positive IOD year. Model outlooks suggest the positive IOD event will decay during November. The IOD is linked with drier weather in southern and central Australia during spring, but typically has little influence on Australian climate from December to April. The approximate 30-day and 90-day Southern-Oscillation Index (SOI) values to 21 October are -2 and -4 respectively.



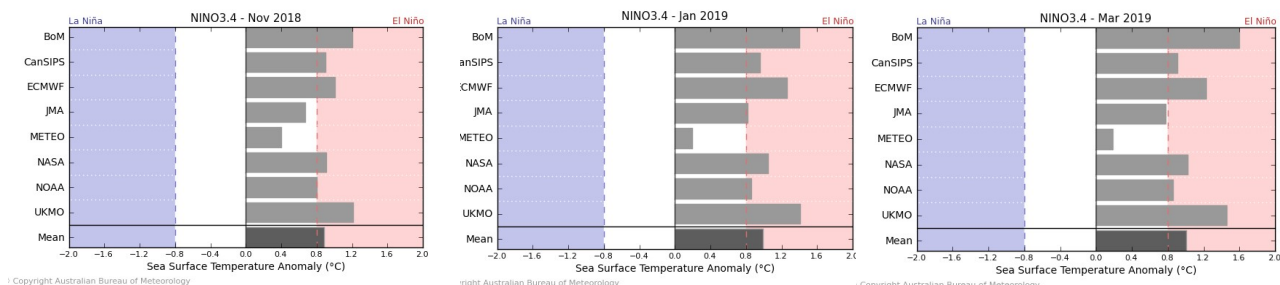
## **Bureau of Meteorology NINO3.4 ENSO Model Outlooks for October, December and February**



Average of international model outlooks for NINO3.4 for the months r, March, May and July <http://www.bom.gov.au/climate/model->

## **Bureau of Meteorology NINO3.4 International Model Outlooks**

Bureau of Meteorology ENSO Wrap-Up: <http://>



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

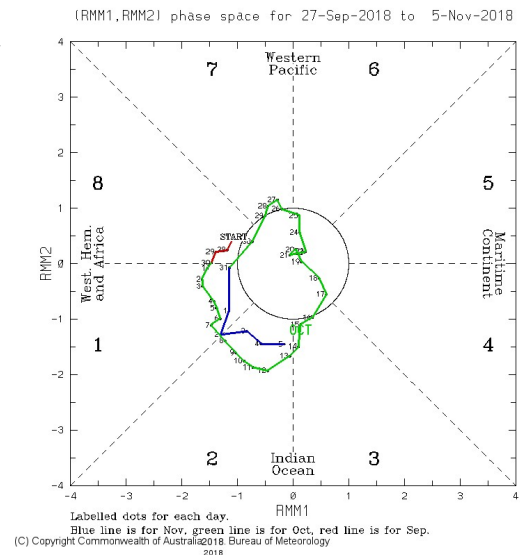
**Weekly Tropical Note**  
**[Issued on Tuesday 30 October 2018]**

A weak phase of the Madden Julian Oscillation (MJO) over the western Pacific in recent days. Most international models forecast the MJO to be active for the coming week and track eastwards over American and African longitudes and towards the maritime continent. Stronger than usual westerly winds have also developed over the tropical Pacific Ocean, something that could potentially assist El Niño development.

This is an abbreviated version of the Weekly Tropical Note. Click on the link below for the full version.

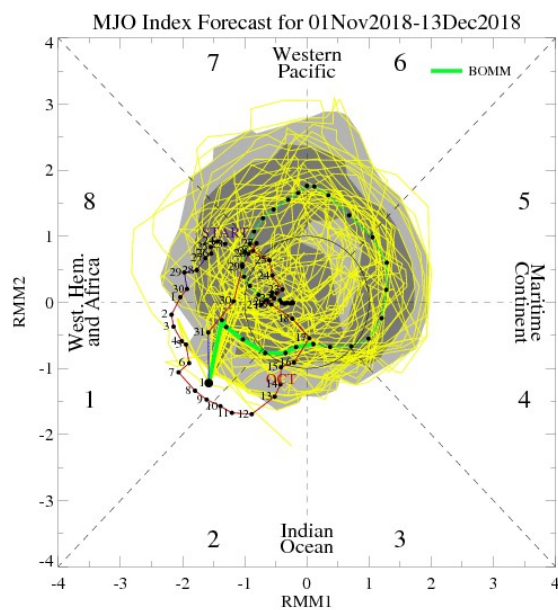
Bureau of Meteorology Weekly Tropical Climate Note Page:  
<http://www.bom.gov.au/climate/tropical-note/>

**40-Day MJO Phase Plot**

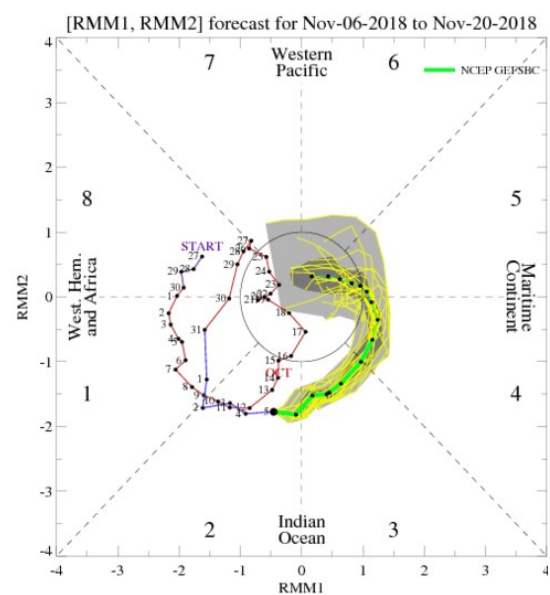


Bureau of Meteorology MJO Page:  
<http://www.bom.gov.au/climate/mjo/>

**MJO Phase Forecasts**



Bureau of Meteorology MJO Forecast: <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/bomm.shtml>



NOAA MJO Model Forecasts: [http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/clivar\\_wh.shtml](http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/clivar_wh.shtml)

NOAA MJO Page: <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjo.shtml>

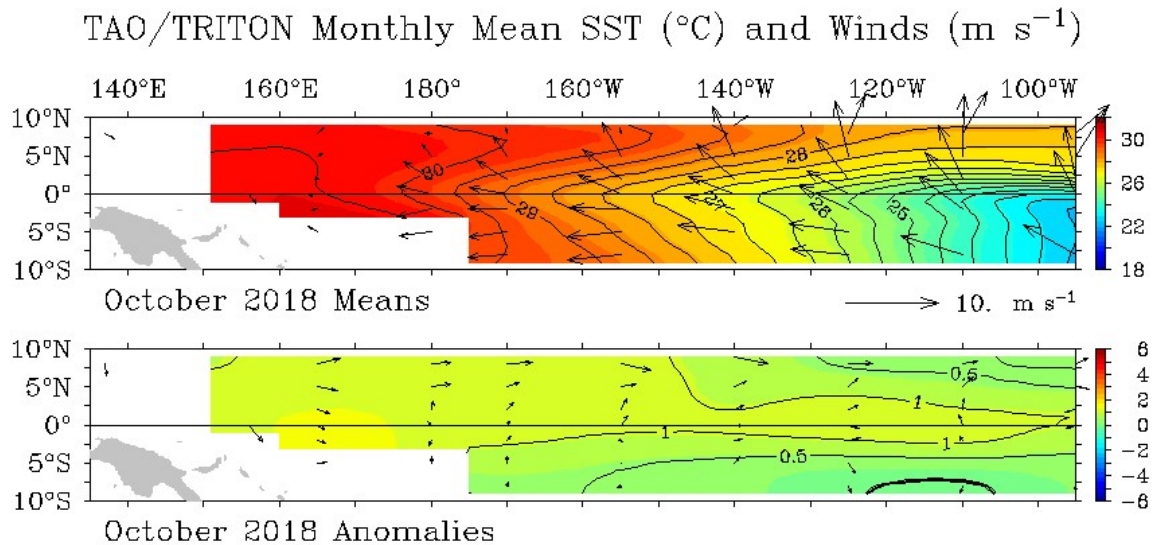


# Wind

The equatorial trade winds were somewhat weaker than average across the tropical Pacific in October. Trade winds for the five days ending 05 November were near average across the tropical Pacific. This again suggests that the atmosphere and ocean have yet to start reinforcing each other, which is required for an El Niño event to become firmly established.

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 of the trade winds across much of the tropical Pacific, or even a reversal of the trade winds.

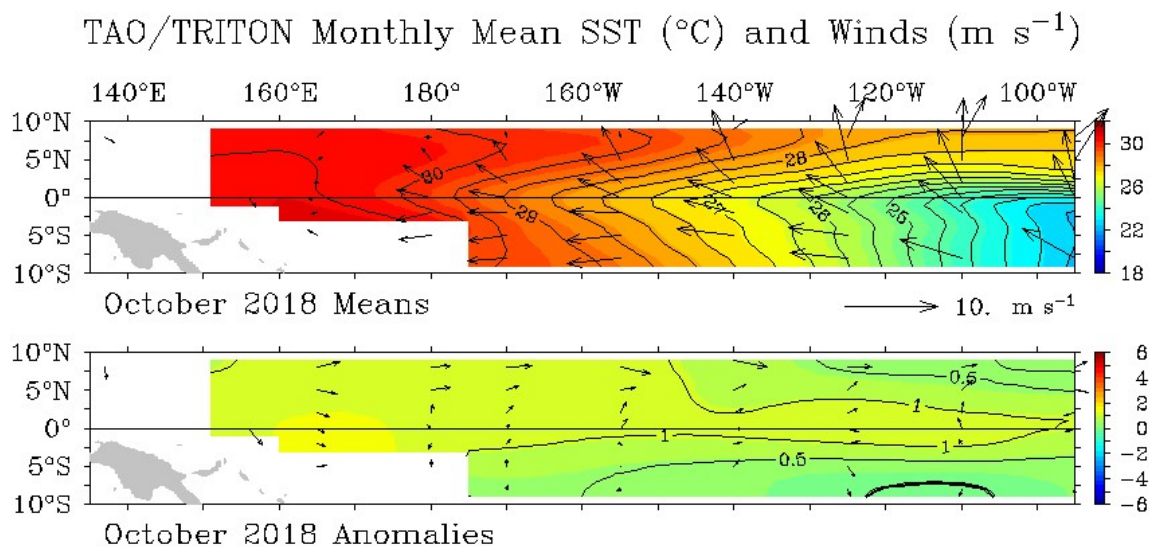
## Five-Day Mean SST/Wind Map



TAD Project Office/PMEL/NOAA

Nov 6 2018

## Latest Monthly SST/Wind Map



TAD Project Office/PMEL/NOAA

Nov 6 2018

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

7-Day ACCESS Model South West Pacific Wind Forecasts: <http://www.bom.gov.au/australia/charts/viewer/index.shtml?type=windbarb&level=10m&tz=AEDT&area=SWP&model=G&chartSubmit=Refresh+View>

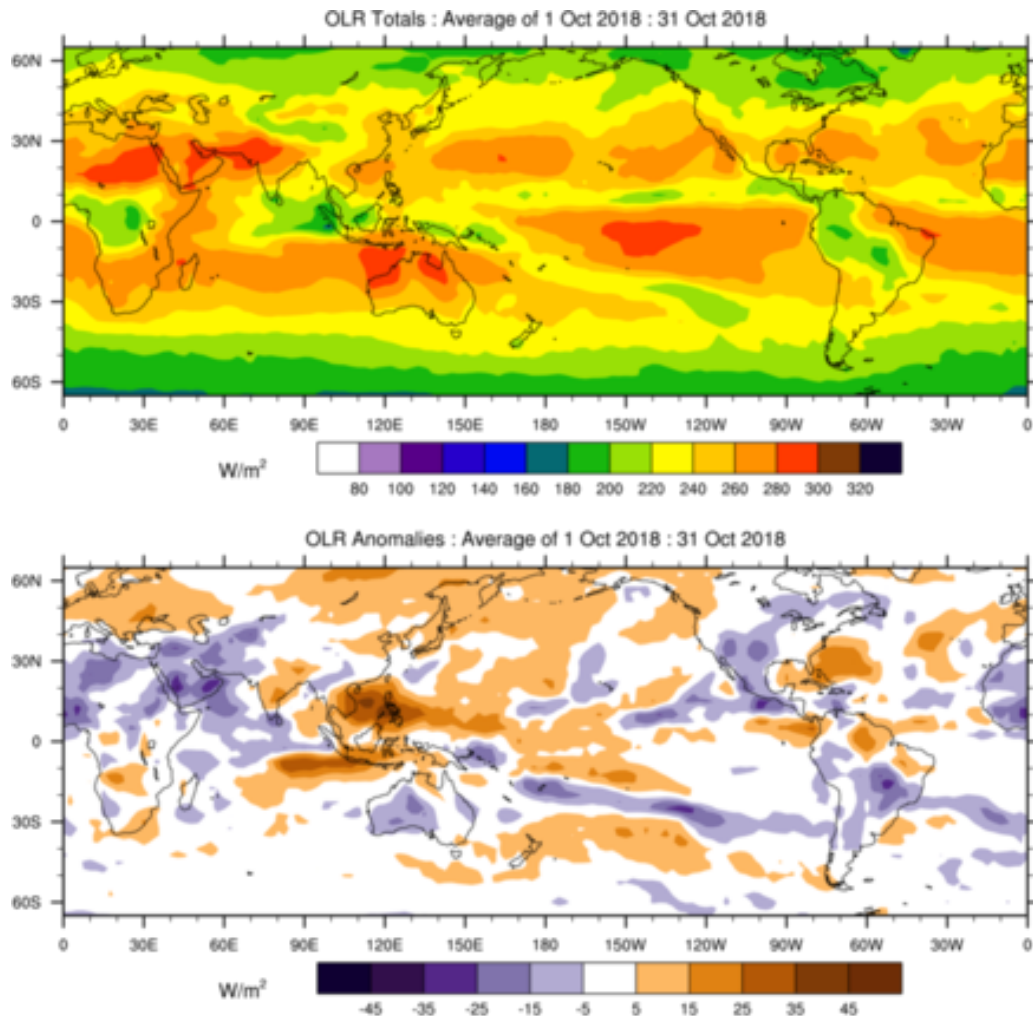


## Cloud and Rainfall

For the 30-days ending 30 October, the OLR and TRMM anomaly maps suggest ITCZ was weaker than normal west of about 160°W, especially close to the equator between about 150°E and the Date Line. Over the central to eastern Pacific the ITCZ was shifted slightly southward towards the equator. The SPCZ was enhanced and a little southwest of normal between Vanuatu, Samoa, the southern Cook Islands and the far southeast of French Polynesia. It was weaker than normal west of Vanuatu.

Note: Global maps of outgoing longwave radiation (OLR) highlight regions experiencing enhanced or reduced 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 Totals and Anomalies, 30 Day OLR

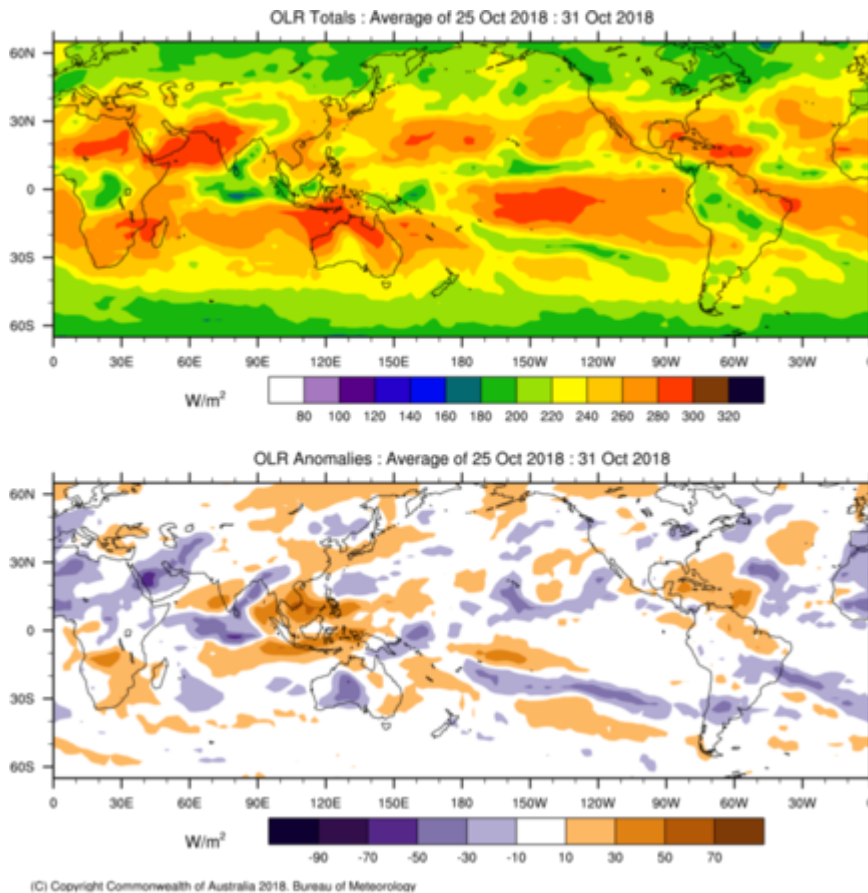


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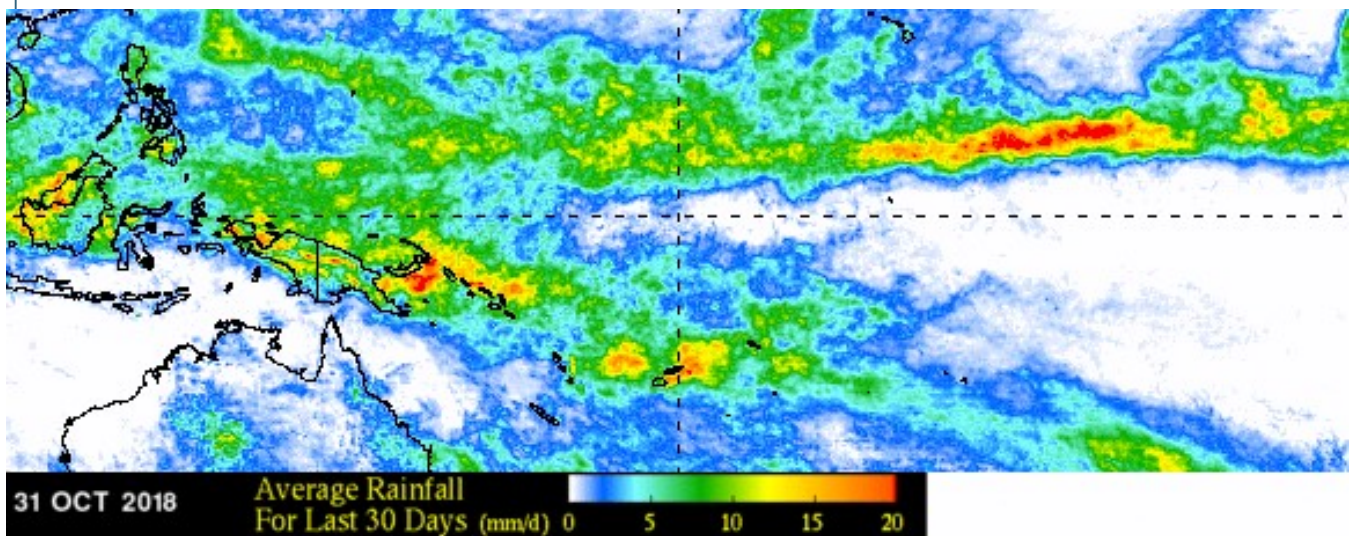
# Cloud and Rainfall

## OLR Totals and Anomalies, 7 Day OLR



Bureau of Meteorology MJO - Cloudiness: <http://www.bom.gov.au/climate/mjo/#tabs=Cloudiness>

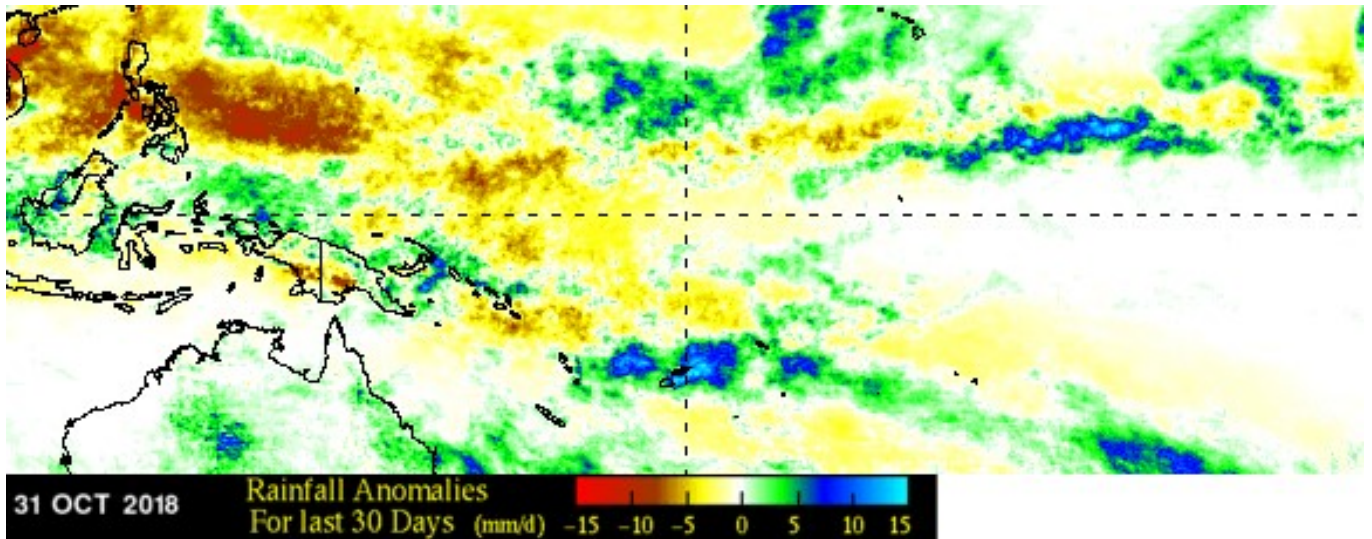
## NASA Tropical Rainfall Measuring Mission (TRMM) 30-Day Rainfall Averages



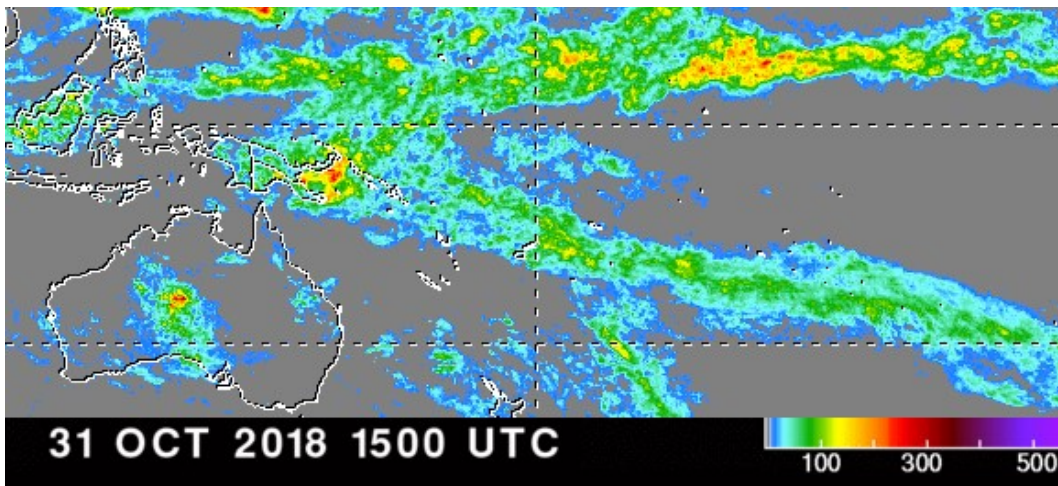


# Cloud and Rainfall

**30-Day Rainfall Anomalies**

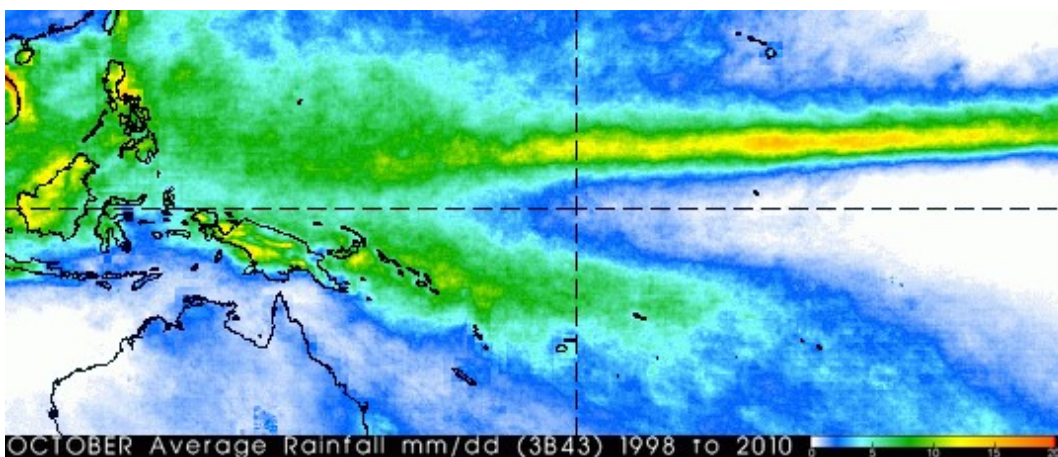


**7-Day Rainfall Accumulation**



NASA TRMM:  
<http://trmm.gsfc.nasa.gov/>

**Current Month Rainfall Climatology**







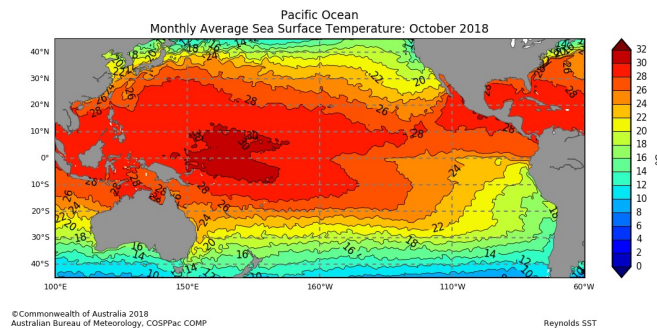
# Oceanic Conditions - Sea Surface Temperature

Sea surface temperature (SST) anomalies for October show SSTs were warmer than average across much of the equatorial Pacific Ocean, with a few patches of anomalies in the +1.5 to +2.0°C range. In comparison with the month of September, SST anomalies for October indicate warming of most the near equatorial Pacific from around 150°E to the central American coast and adjacent areas of the north Pacific. With BoM ENSO status as at El Niño Alert (70% possibility of El Niño developing in the upcoming months), monitoring of SST and dissemination of information to respective stakeholders in countries would be of importance. Regions experiencing a steady rise of SST anomaly could start to witness impacts on marine ecosystem and resources. The October values of the NINO indices were: NINO3 +0.8 °C, NINO 3.4 +0.7 °C, and NINO4 +0.9 °C.

The SST decile map for October shows a large region of deciles 4 to 7 in the south tropical Pacific from central regions to the South American coast, with an area of 2 to 3. Surrounding this was a boomerang shape of deciles 8 to 9 and above extending well into both hemispheres. Affecting parts of Federated States of Micronesia, Marshall Islands, Nauru, Kiribati, Tuvalu, Solomon Islands, parts of Vanuatu, Fiji and Samoa was a large region of decile 10 to highest on record.

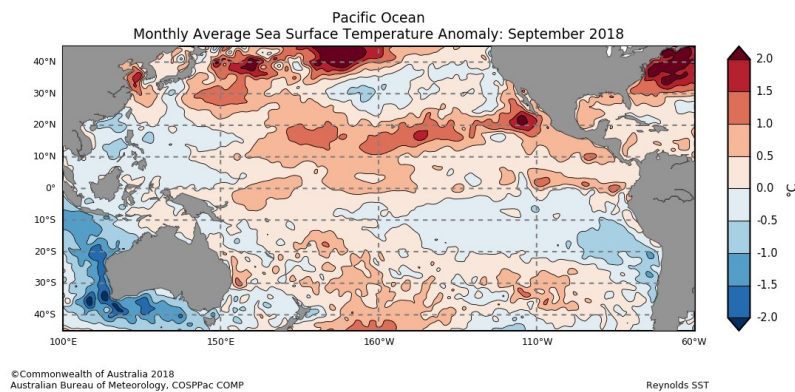
## Mean SST

Bureau of Meteorology COSPPac  
 Ocean  
 Portal:  
<http://cosppac.bom.gov.au/>



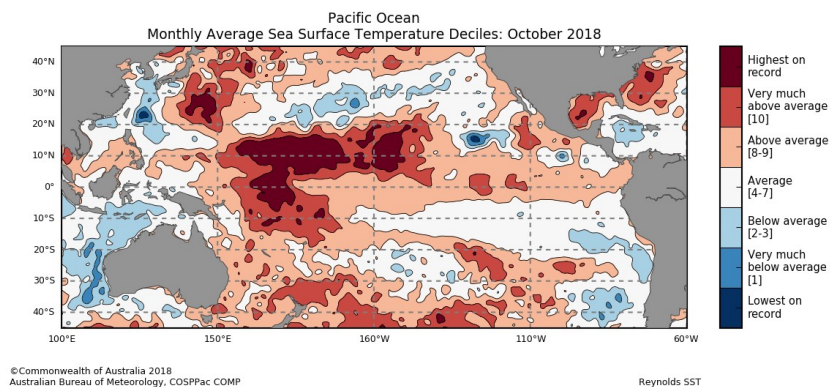
## Anomalous SST

Bureau of Meteorology CO-  
 SPPac Ocean  
 Portal:



## SST Deciles

Bureau of Meteorology CO-  
 SPPac Ocean Portal:  
<http://cosppac.bom.gov.au/>

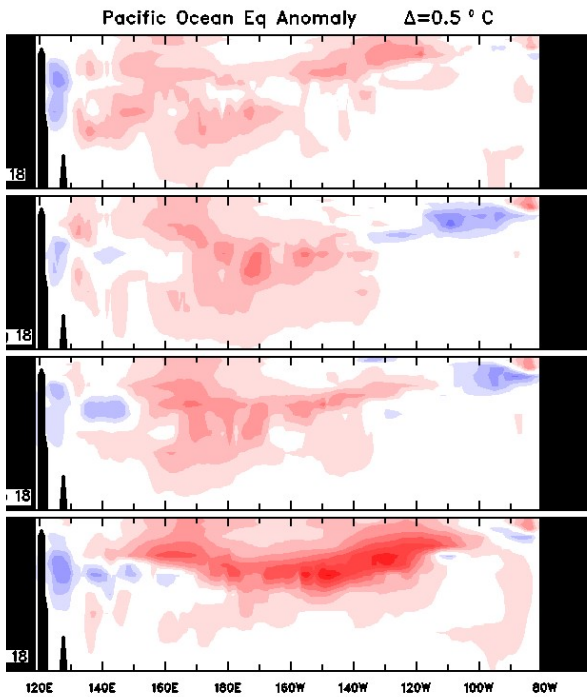




## Oceanic Conditions - Sub Surface

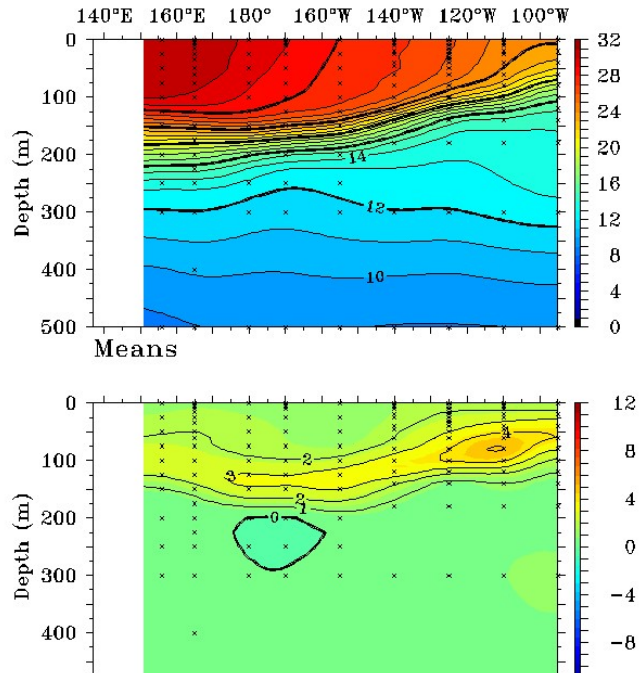
The four-month sequence of sub-surface temperature anomalies (to October) shows warm anomalies in the sub-surface have increased significantly compared to the preceding months. A large pool of warmer than average water extends across the sub-surface of the equatorial Pacific, between about 150°E to about 100°W. Parts of this region are more than 3 degrees warmer than average

### Sub-surface Temperature



Analysis done Oct 29 22:30

Bureau of Meteorology Sea Temperature Analysis (monthly anomalies):  
<http://www.bom.gov.au/mine/sst.shtml>



TAO/TRITON Data Display (weekly means and anomalies):  
<http://www.pmel.noaa.gov/tao/jsdisplay/>

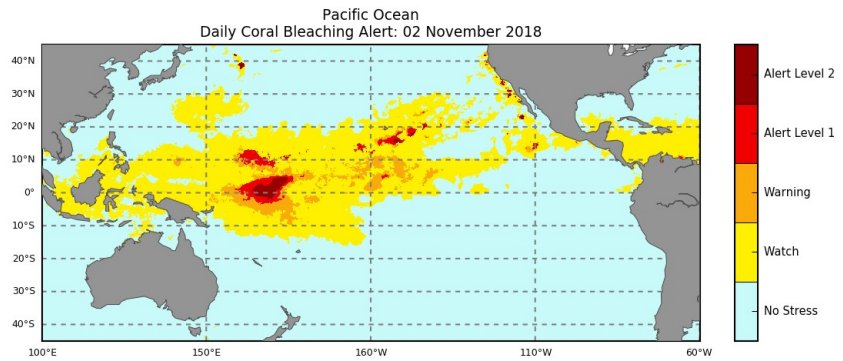


# Oceanic Conditions - Coral Bleaching

The Daily Coral Bleaching Alert for 2 November 2018 shows Alert levels 1 and 2 few countries in the western tropical Pacific especially Nauru, Kiribati and RMI. These coincide with the very high SSTs on the decile map. The four week coral Bleaching outlook from 4 November shows watch level and higher between 10°N and 10°S from 150°E to 160°W, with countries such as Nauru, Marshall Islands and Kiribati reaching Alert levels 1 and 2.

## Daily Coral Bleaching Alert

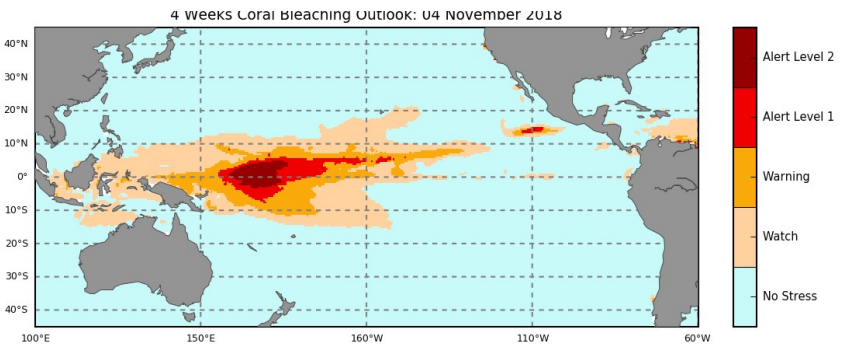
About Coral Bleaching:  
<http://www.bom.gov.au/cosppac/apps/portal/help/>



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 Australian Bureau of Meteorology, COSPPac COMP  
 NOAA Coral Reef Watch

## 4-Weeks Coral Bleaching Outlook

Bureau of Meteorology  
 COSPPac  
 Ocean Portal:  
<http://www.bom.gov.au/>



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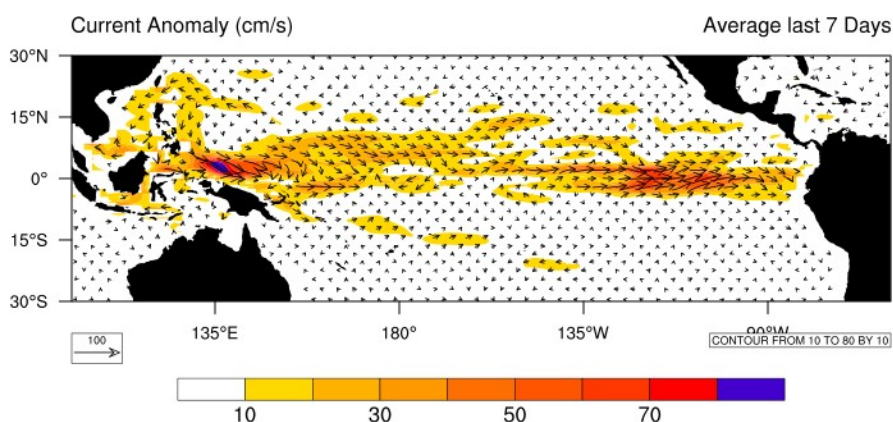
# Oceanic Conditions - Ocean Surface Currents and Sea Level

The most recent seven day ocean surface currents anomaly plot shows eastward flowing anomalies near the equator an enhanced Equatorial Countercurrent west of the Date Line, and even more strongly between 135°W and South America. These indicate a weakening of the Equatorial Current (which flows to the west), an observation which is consistent with a developing El Niño.

Sea level in October was generally above normal in most COSPPac partner countries, with highest anomalies in Kiribati, Nauru and the southern Marshall Islands. In contrast, the northern parts of FSM and RMI experienced slightly below normal sea level.

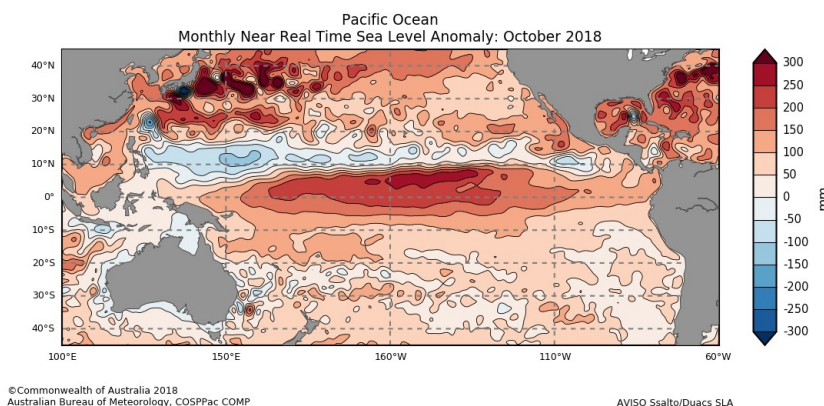
### Ocean Surface Currents (Last 7-Days)

Bureau of Meteorology POAMA



### Monthly Sea Level Anomalies

Bureau of Meteorology  
 COSPPac Ocean Portal:  
<http://cosppac.bom.gov.au/>



### Pacific Sea Level Monitoring Information

Sea level data products, including tide prediction calendars and archives of quality-controlled weather and ocean measurements, are available from the Pacific Sea Level Monitoring page at: <http://www.bom.gov.au/pacific/projects/pslm/>

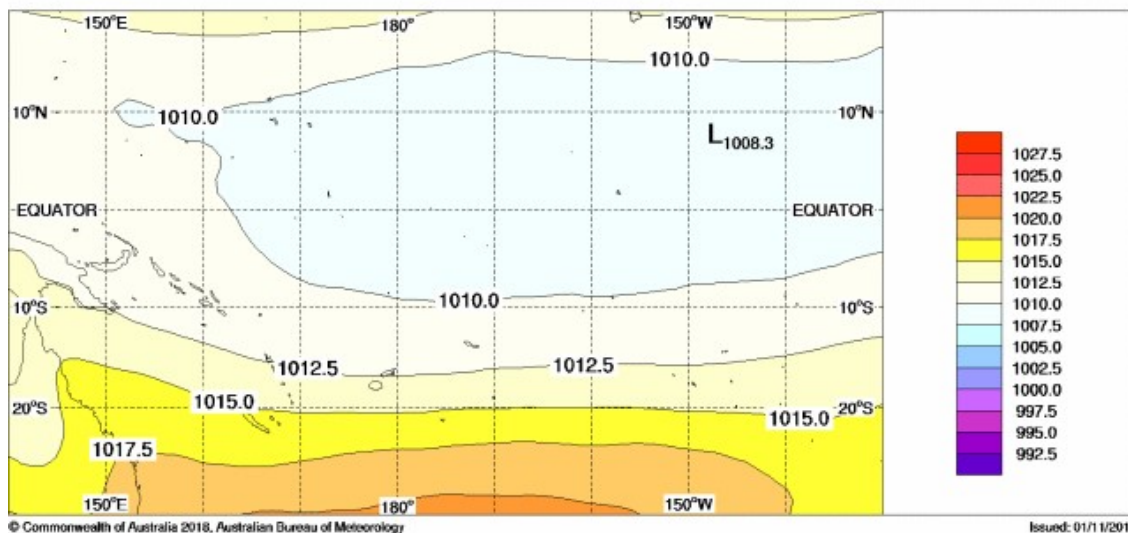


# Mean Sea Level Pressure (MSLP)

The October mean sea level pressure (MSLP) anomaly map show positive anomalies greater than 1hPa around the Coral Sea, western Solomon Islands and further west. The MSLP was mainly close to average over remaining COSPPac countries, the exceptions being the Kiribati Islands where MSLP was between 1 and 2 hPa below average.

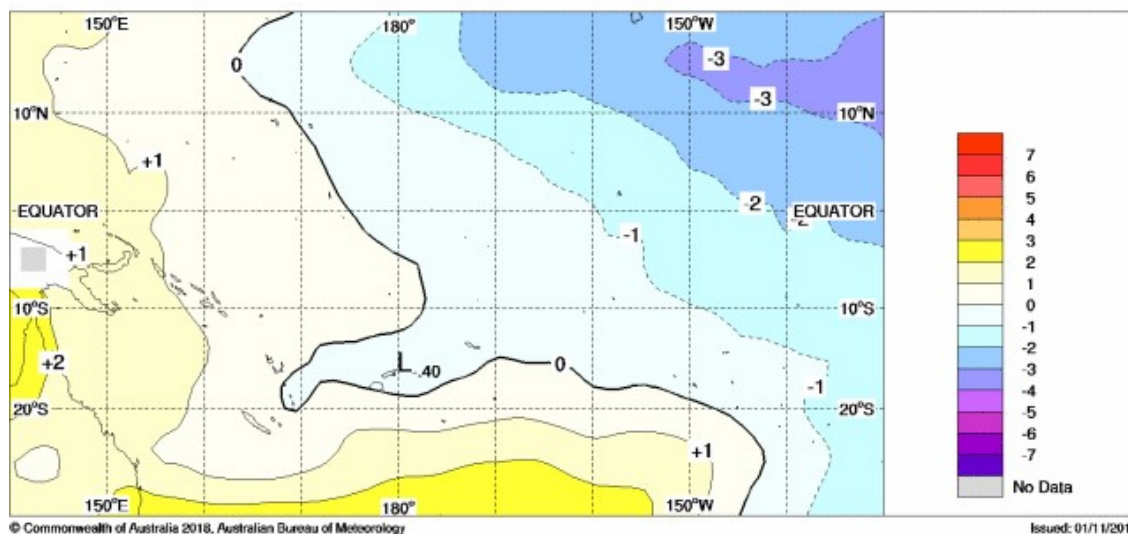
## Mean

MSLP 2.5X2.5 ACCESS OP. ANAL. (hPa) 20181001 0000 20181031 0000



## Anomalous [with respect to a 1979-2000 mean]

MSLP 2.5X2.5 ACCESS OP. ANAL.-NCEP2 (hPa) 20181001 0000 20181031 0000

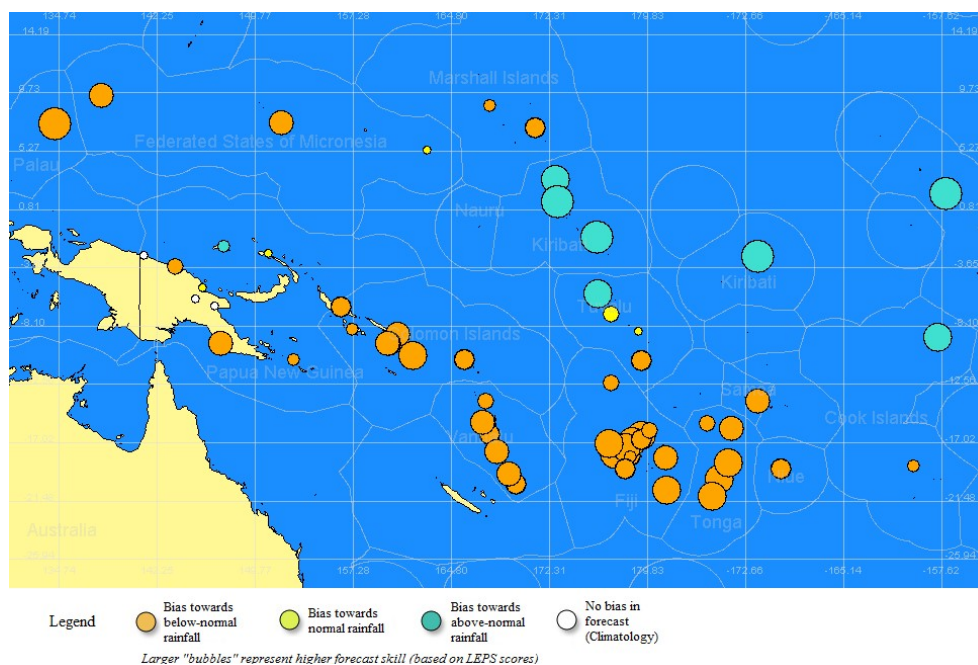




## Seasonal Rainfall Outlooks Nov 18 to Jan 19

All the selected models indicate below normal rainfall for Palau, FSM, north and southeast Papua New Guinea, Solomon Islands, Vanuatu, Fiji, south Tuvalu, Tonga, Samoa, Niue and southern Cook Islands. Above normal rainfall is favoured for north Tuvalu, Kiribati and northern Cook Islands. Models are less emphatic elsewhere.

### SCOPIC v4

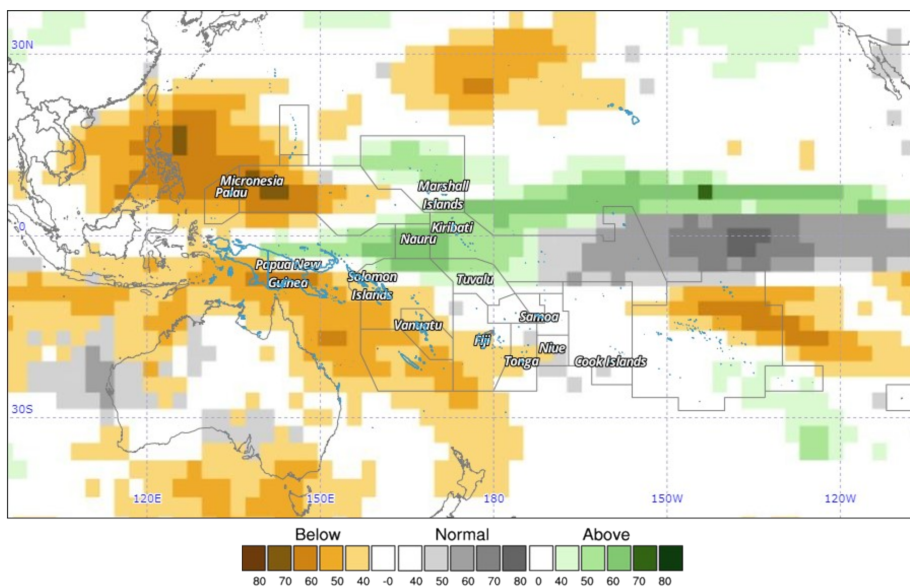


'About SCOPIC' <http://cosppac.bom.gov.au/products-and-services/seasonal-climate-outlooks-in-pacific-island-countries>  
 COSPPac Online Climate Outlook Forum: <http://www.bom.gov.au/cosppac/comp/ocof/index.shtml>



# Seasonal Rainfall Outlooks Nov 18 to Jan 19

## APEC multi-model outlook



Year: 2018, Season: NDJ, Lead Month: 3, Method: GAUS  
 Model: APCC, CWB, MSC, NASA, NCEP, PNU, POAMA  
 Generated using CLIK© (2018-11-2)

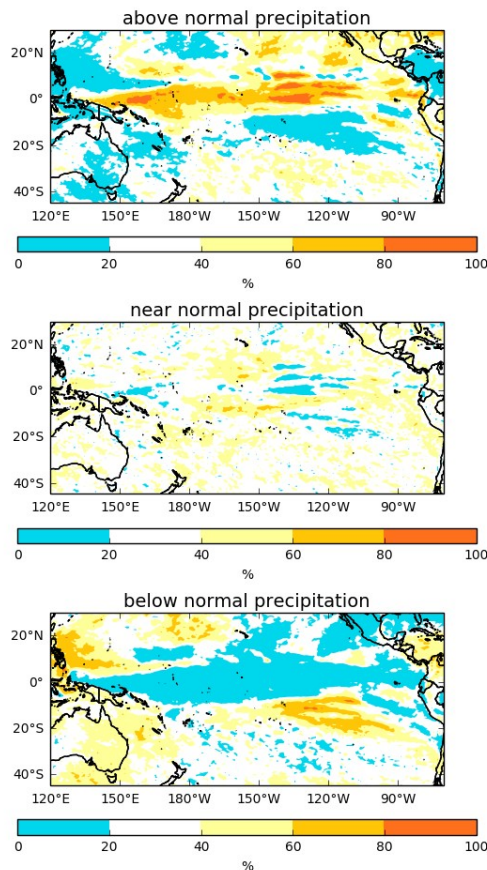
© APEC Climate Center

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

robability of tercile categories Nov/Dec/Jan Issued October 201

## UKMO Pacific region tercile categories

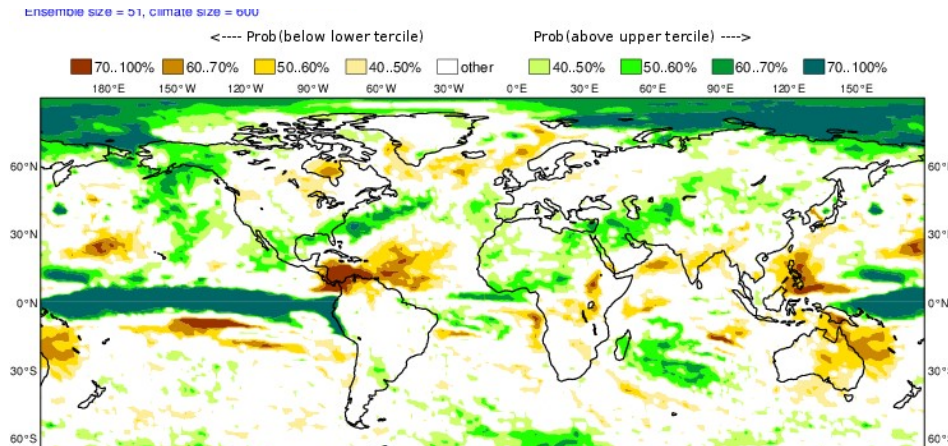
<http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob>





# Seasonal Rainfall Outlooks Nov 18 to Jan 19

## ECMWF Tropics tercile summary



<http://www.ecmwf.int/en/forecasts/charts/catalogue/>

## 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/>





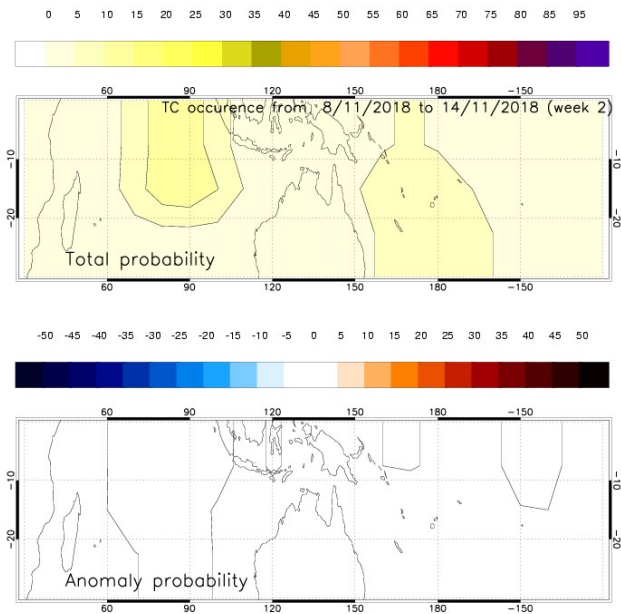
# Cyclones and Other Information

## Tropical Cyclone Information

Above average tropical cyclone activity is expected in the western North Pacific in 2018. Three or four tropical cyclones of tropical storm intensity or higher are likely to pass nearby Guam, the Commonwealth of the Northern Mariana Islands (CNMI), Yap or Palau by the end of this year. In the Southwest Pacific, regional-scale tropical cyclone outlooks for the upcoming November 2018 to April 2019 season favour near average (7-11) numbers of tropical cyclones, following the very early TC Lina that formed in September. Tropical cyclone activity is expected to be lower than normal around the northern and eastern Coral Sea margin and elevated east of the International Date Line. For the week 8-14 or even up to 21 November 2018 the chances of tropical cyclone occurrence for the Pacific region is low. The Vanuatu, New Caledonia and Fiji region continue to remain active for this week.

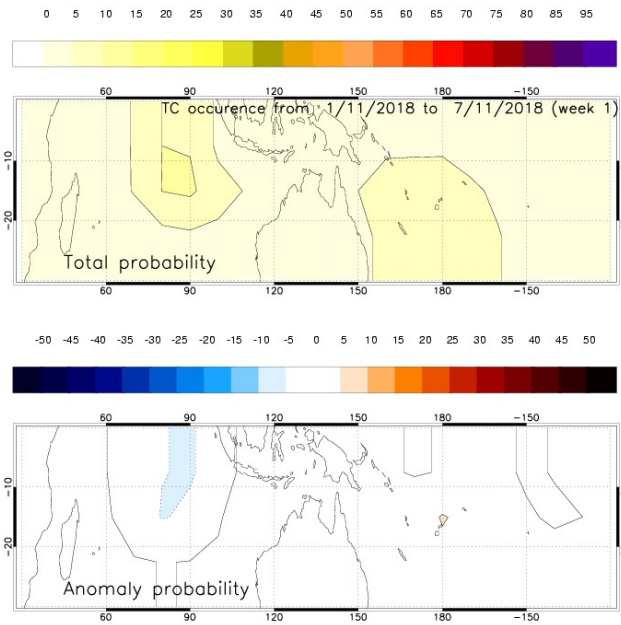
*MeteoFrance Tropical Cyclone Weekly Forecast:*  
<http://www.meteo.nc/nouvelle-caledonie/cyclone/coin-des-experts>

### Week 2

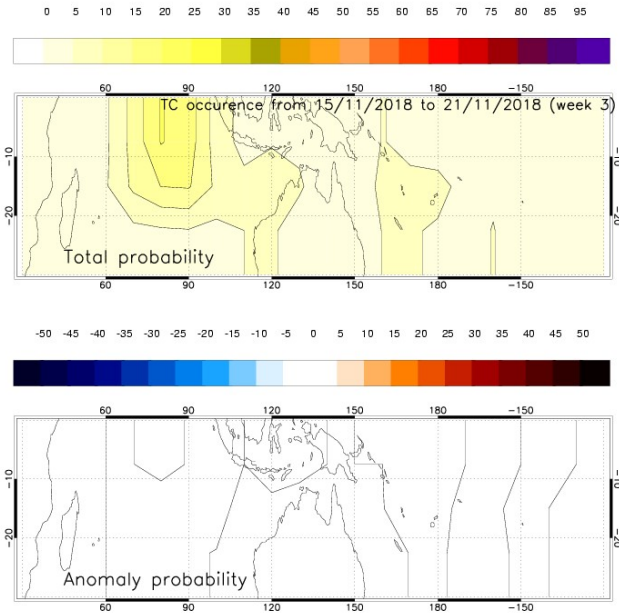


## Meteo France Tropical Cyclone Weekly Fore-

### Week 1



### Week 3



*Bureau of Meteorology Tropical Cyclone Climatologies:* <http://www.bom.gov.au/cyclone/climatology/index.shtml>

*PACCSAP Tropical Cyclone Data Portal:* <http://www.bom.gov.au/cyclone/history/tracks/>

*Fiji Meteorological Service Tropical Cyclone Warnings:* <http://www.met.gov.fj/>

*Japan Meteorological Agency Tropical Cyclone Information Page:* <http://www.jma.go.jp/en/typh/>

*Bureau of Meteorology Current Tropical Cyclone Page:* <http://www.bom.gov.au/cyclone/index.html>

*United States Joint Typhoon Warning Center Tropical Cyclone Warnings and Information:* <http://www.usno.navy.mil/JTWC/>

*New Zealand Meteorological Service Weather Warning:* <http://www.metservice.com/warnings/home>



## Other Information

### Further 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. <http://www.bom.gov.au/climate/glossary/soi.shtml>

#### 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. <http://www.esrl.noaa.gov/psd/enso/mei/index.html>

#### 20 degrees Celsius Isotherm Depth

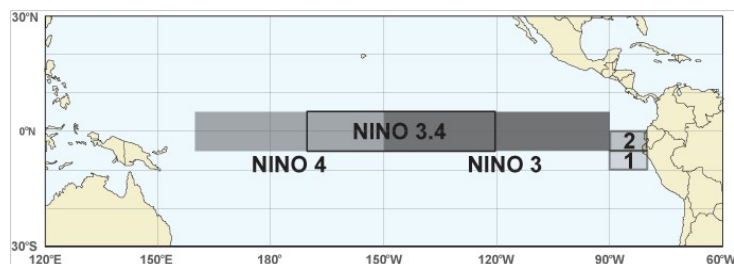
The 20°C Isotherm Depth is the depth at which the water temperature is 20°C. This measurement is important, as the 20°C isotherm usually occurs close to the thermocline, the region of most rapid change of temperature with depth, or the division between the mixed surface layer and deep ocean. A deeper 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. [http://www.pmel.noaa.gov/tao/jsdisplay/plots/gif/](http://www.pmel.noaa.gov/tao/jsdisplay/plots/gif/uwnd_sst_iso20_anom_nocap.gif)

[uwnd\\_sst\\_iso20\\_anom\\_nocap.gif](http://www.pmel.noaa.gov/tao/jsdisplay/plots/gif/uwnd_sst_iso20_anom_nocap.gif)

#### 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