

# Seventh Pacific Islands Climate Outlook Forum

May-October 2020 summary and November 2020-April 2021 climate and tropical cyclone outlook | 26 October 2020

## Outlook for November 2020 to April 2021

- The El Niño-Southern Oscillation (ENSO) is currently in its cold phase, La Niña, which is predicted to continue through at least early 2021 after a peak during December 2020.
- There is a possibility that this La Niña event could become strong, similar to 2010-11.
- Tropical cyclone 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 in the western part of the basin.
- 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.
- With La Niña conditions in place, there is a strong consensus across prediction systems for precipitation and temperature outlooks.
- Rainfall is favoured to be above normal for many Pacific Islands, except for islands along and near the equatorial Pacific.
- Temperatures (air and sea) are favoured to be above normal for many Pacific Islands, except for those in the equatorial central Pacific.
- Ocean heat stress is favoured to be elevated across a large portion of the equatorial West Pacific, particularly near Papua New Guinea (PNG), the western Solomon Islands, the Federated States of Micronesia (FSM), and the Republic of the Marshall Islands (RMI).
- Coral bleaching alerts and warnings are in place in the western North Pacific, including PNG, the Solomon Islands, and parts of FSM.
- Sea levels are favoured to be above normal from PNG to the Pitcairn Islands, including many island groups in between. The largest anomalies are predicted between Tuvalu and the Solomon Islands. Sea levels are also favoured to be above normal from the RMI to Palau in the North Pacific. These countries need to be aware of the potential for coastal flooding especially during King tides and the passage of a tropical disturbance (e.g. cyclone)
- The potential for landslides and river flashing is higher than normal this coming wet season in the south Pacific, especially when a tropical disturbance follows a prolonged period of wetter than normal conditions.

## Climate since May 2020

- The ENSO state has transitioned to La Niña since the last PICOF held in April 2020.
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- Significant rainfall deficiencies occurred across the equatorial Pacific from north of New Guinea through Nauru, Tuvalu, and Kiribati, the central Cook Islands, a majority of French Polynesia, the Pitcairn Islands, most of FSM, Guam, and the northern and southernmost RMI.
- Wetter than normal conditions extended from eastern PNG to Niue, including New Caledonia, Vanuatu, Fiji, Tonga, Wallis & Futuna, Samoa, American Samoa, and the southernmost Cook Islands.
- Air temperatures were warmer than normal across many Pacific Islands, from New Guinea southeast to Samoa. Cooler than normal temperatures occurred east of the Line Islands of Kiribati.
- Coral bleaching occurred in parts of the western equatorial Pacific, including Palau.
- Sea levels were higher than normal across much of the tropical Pacific, particularly for Samoa, Tuvalu, and the Solomon Islands during August.

## Review of May to October 2020 climate

ENSO neutral conditions transitioned to La Niña over the past six months, with monthly SST anomalies in the central and eastern equatorial Pacific now approaching  $-1.0^{\circ}\text{C}$ .

Sub-surface ocean temperatures decreased notably in the central and eastern equatorial Pacific while a warm pool of water developed in the west (to the north of PNG). This is well aligned with oceanic La Niña conditions.

The Southern Oscillation Index (SOI) has been positive since July 2020 and was near the La Niña threshold during August and September. Persistent positive values of the SOI are indicative of La Niña's influence on atmospheric patterns. Patterns of enhanced trade winds and below normal cloudiness along the equator were also consistent with La Niña.

The South Pacific Convergence Zone (SPCZ) became displaced to the southwest, a common occurrence during La Niña.

The Indian Ocean Dipole (IOD), an ocean-atmosphere seesaw that impacts sea surface temperatures, rainfall, and wind, has largely been neutral over the last six months. SSTs in the tropical and sub-tropical Indian Ocean have been above normal.

These climate drivers have contributed to significant rainfall deficits for some of the region and wetter than normal conditions in many others.

**Recent drier areas include:** equatorial Pacific from north of New Guinea through Nauru, Tuvalu, and Kiribati, the central Cook Islands, a majority of French Polynesia, the Pitcairn Islands, most of FSM, Guam, and the northern and southernmost RMI.

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**Recent wetter areas include:** eastern PNG to Niue, including New Caledonia, Vanuatu, Fiji, Tonga, Wallis & Futuna, Samoa, American Samoa, and the southernmost Cook Islands.

Air temperatures were warmer than normal across many Pacific Islands, from New Guinea southeast to Samoa. Cooler than normal temperatures occurred east of the Line Islands of Kiribati, extending eastward toward South America.

This pattern was consistent with ocean surface temperatures as well as air temperature predictions provided during PICO-6. Pacific air temperatures tend to be strongly associated with the temperature of the surrounding ocean. Rainfall predictions from May to July 2020 were partly consistent with PICO-6 outlooks. Nauru and Saipan received below normal rainfall as predicted but Niue and American Samoa experienced wetter conditions than forecast.

Coral bleaching occurred in parts of the western equatorial Pacific, including Palau. Coral bleaching alert level 1 conditions were in place for the western Pacific until September when alert level 2 conditions began for western FSM. The remainder of countries were on warning, watch, or no stress.

Sea levels were higher than normal (1.5-3.0 cm) across much of the tropical Pacific with 25 cm above normal heights observed in Palau and FSM during July. Sea levels were elevated for Samoa, Tuvalu, and the Solomon Islands during August.

In the western North Pacific, a near normal amount of tropical cyclones (called typhoons) occurred (14 total through mid-October), but accumulated cyclone energy was notably less than normal. In the eastern North Pacific, 13 tropical cyclones (called hurricanes) occurred through mid-October.

Looking further back, the last Southwest Pacific tropical cyclone season (November 2019-April 2020) produced a near normal amount of activity with eight cyclones. Four cyclones reached severe category three or higher status. The long-term average number of cyclones for the Southwest Pacific is nine (east of the tip of Cape York).

## **Typhoon and tropical cyclone outlook**

According to regional-scale outlooks, tropical cyclone activity is expected to be near normal or slightly below normal in the Southwest Pacific. 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.

This year's outlook is based on the expectation for La Niña conditions, possibly strong, continuing through much of the season. 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

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island groups in the eastern part of the region may experience reduced activity because of this displacement.

New Caledonia and Vanuatu typically experience the greatest activity, with an average of two or three named cyclones passing close to land each year.

Typhoon activity in the western North Pacific is expected to be normal or below normal through December, however the next several weeks (into early November) have an elevated risk for typhoon development.

All communities should remain vigilant and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

## **November 2020 to April 2021 outlook**

La Niña conditions are predicted to peak in December 2020 and will most likely continue through February-April 2021. The presence of moderate to possibly strong La Niña conditions is expected to elevate the predictive ability of the dynamical model guidance.

Around half of the leading ENSO models favour a strong La Niña event similar to 2010-11.

Warmer than normal SSTs are expected to continue across much of the tropical Southwest and North Pacific, encompassing cooler than normal equatorial SSTs in a horseshoe-like pattern.

With La Niña conditions in place, there is a strong consensus across prediction systems for precipitation and temperature outlooks.

SST patterns are likely to result in warmer than normal air temperatures for many island groups aside from Nauru, southern RMI, Kiribati, Tuvalu, Tokelau, the northern Cook Islands, and the Marquesas.

Widespread above normal rainfall will be possible in the off-equatorial Western Pacific, 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.

Near the equator, the potential for abnormal dryness and drought may be elevated. This includes northern Papua New Guinea, southern FSM, southern RMI, Nauru, Tuvalu, Kiribati, Tokelau, the northern Cook Islands, the Marquesas, the Tuamotu Archipelago, and the Pitcairn Islands. The guidance is unclear for French Polynesia (Société).

The Madden-Julian Oscillation (MJO), or a pulse of rain and thunderstorms that moves from west to east across the global tropics every one to two months, is expected to weaken before reaching the Pacific basin in November. Therefore, chances for tropical cyclone development in the Southwest Pacific may be marginal to start the season.

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There is an indication that MJO activity may be more common over the Indian Ocean rather than the Pacific through the season, which could influence longer periods of marginal risk for cyclone development in the Southwest Pacific.

Ocean heat stress is favoured to be elevated across a large portion of the equatorial West Pacific, particularly near PNG, the western Solomon Islands, the Federated States of Micronesia (FSM), and the Republic of the Marshall Islands (RMI).

Coral bleaching alerts and warnings are in place in the western North Pacific, including PNG, Solomon Islands, and parts of FSM. The rest of the region is experiencing minimal stress, however other localised contributors can lead to coral bleaching.

Sea levels are favoured to be above normal from PNG to the Pitcairn Islands, including many island groups in between. The largest anomalies are predicted between Tuvalu and the Solomon Islands. Sea levels are also favoured to be above normal from RMI to Palau in the western North Pacific.

With elevated sea levels due to La Niña, there is greater potential for coastal inundation especially for low lying atolls.

With respect to the potential for coastal flooding, please keep up with alerts from your local meteorological office. The risk for flooding will be elevated during the highest (king) tides, particularly if a cyclone is nearby. For more information on when king tides will occur, click [here](#).

In the North Pacific, 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.

## **Linking science to the Pacific fisheries and marine sector**

Research indicates ENSO impacts recruitment and spatial distribution of tuna fisheries, particularly skipjack and albacore. Expansion and contraction of the western Pacific warm pool correlates well with movements in purse seine fisheries.

La Nina could impact spatial distribution of pelagic fisheries, catchability, and recruitment with La Nina favoring South Pacific Albacore. Shoaling of thermocline and increased equatorial upwelling will increase biological productivity in the western central equatorial Pacific. Coral bleaching could affect coastal fisheries in areas of ocean heat stress in the western North Pacific, including PNG, the Solomon Islands, and parts of FSM.

A number of NMHSs are regularly producing ocean and climate bulletins that are used by the fisheries and ocean sector to reduce risk. For example, tide calendars and information on SSTs are used to assess algae risk and track oceanic fisheries movement; coral bleaching alerts are used by the tourism industry for business planning.

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Climate change projections are important for fisheries management, future planning, and to help inform adaptation protocols. It is recommended that active localised management be developed to reduce long term impacts of climate change on coastal fisheries and marine resources. Gaps remain in contextualizing regional data in a national context, linking data to policy making, and reaching the last mile.

## Recommendations from PICOF-7 virtual session (October 2020)

Regional Climate Forums such as the PICOF are important mechanisms for sharing information, best practices, and lessons learnt on climate prediction and its likely implications on the most pertinent socio-economic sectors. This should continue and be linked to the functions of the [Pacific Islands Regional Climate Centre Network](#) (PI-RCC Network).

Close working relationships between Pacific NMHSs are critical to effective warning of climate hazards leading to early preparedness. All countries throughout the region should continue to strengthen these relationships, as well as with other sectors through such mechanisms as one-on-one discussions, cluster group meetings, and national climate outlook forums.

In addition to the production of national seasonal climate outlooks which are well communicated to sectors, there is a need for simplified products and messaging especially for rural and remote communities. Sectoral impacts are most often related to drier or wetter than normal conditions. NMHSs should continue to develop climate products tailored for national sectors, relevant to their needs, and incorporating where possible traditional knowledge elements.

Climate and tropical cyclone outlooks for the whole Pacific region should continue to be well communicated to all NMHSs in the region prior to general release, to ensure consistent responses are provided to local media enquiries.

## Further Information

The PICS Panel has been coordinating the Pacific Islands Climate Outlook Forum (PICOF) since 2015 in collaboration with SPREP, WMO with the support of other international and regional partners. PICOF is a platform to discuss the seasonal outlook (cyclone, precipitation, temperature and oceanic conditions) and state of ENSO, capacity build and enable knowledge exchange between National Meteorological and Hydrological Services (NMHSs) and strengthen relationships between NMHSs and stakeholders. PICOF occurs twice a year, a physical session, when possible, in October focusing on November to April season and a virtual session in April to produce a seasonal outlook for May to October season.

This statement was produced during the seventh virtual session of Pacific Islands Climate Outlook Forum (PICOF-7) held on 22-23 October 2020. The forum had a specific focus on the

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overview of regional climate of May to October 2020, November 2020 to April 2021 rainfall and temperature outlooks and the North Pacific tropical cyclone outlook to December 2020.

PICOF-7 was attended by members from American Samoa, Australia, Fiji, French Polynesia, Indonesia, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, South Korea, Tokelau, Tonga, Tuvalu, United States of America, and Vanuatu. Secretariat of the Pacific Regional Environment Programme (SPREP), World Meteorological Organisation (WMO), Pacific Community (SPC), International Federation of Red Cross and Red Crescent Societies (IFRC), Australian Bureau of Meteorology (BoM), United States National Oceanic and Atmospheric Administration (NOAA), University of Hawaii, Météo-France, New Zealand National Institute of Water and Atmospheric Research (NIWA), Fiji Meteorological Service, Asia-Pacific Economic Cooperation (APEC) Climate Center (APCC) and The Commonwealth Scientific and Industrial Research organisation (CSIRO) provided technical support.

This statement is consistent with the Nuku'alofa Ministerial Declaration for Sustainable Weather and Climate Services for the Resilient Pacific, which recognises the importance of Meteorological and Hydrological Services in support of relevant national needs, including protection of life and property, sustainable development and safeguarding the environment. The same noted that weather and climate services are not an option but are a responsibility and a basic human right.

Map of the Pacific Islands region including those countries and territories involved in PICOF-7.



Source: <https://www.infoplease.com/atlas/pacific-islands>