



## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

This statement was produced by the [WMO RA-V Pacific Regional Climate Centre Network](#) following the 11<sup>th</sup> Pacific Islands Climate Outlook Forum (PICO-11) held on 25 October 2022, for use by National Meteorological and Hydrological Services (NMHSs) in the Pacific Islands. For more information, please see the [background section](#) and/or contact your local meteorological office.

[Key messages](#)   [Climate in review](#)   [ENSO](#)   [Rainfall](#)   [Air temperature & wind](#)   [Sea level](#)   [Tropical cyclones](#)

### Key messages – November 2022 to April 2023

- Climate model outlooks favour La Niña conditions in the tropical Pacific Ocean from November to February. Between February and April, La Niña will most likely transition to ENSO-neutral, with the second most likely outcome being a continuation of La Niña.
- Drier than normal conditions are favoured for island groups near and west of the Date Line that are located close to the equator. Drier than normal conditions are forecast to extend northeast and southeast from the Date Line towards the sub-tropics, especially in the Southern Hemisphere. Dry conditions in the northern hemisphere seem to zonally span (along the latitude 5° N) in the northeast direction
- Wetter than normal conditions are favoured for islands located between Palau and the central Marshall Islands in the North Pacific and from southeast Papua New Guinea (PNG) to the southernmost French Polynesian islands.
- Sea surface temperatures (SSTs) are favoured to be above normal in the western Pacific and Coral Sea. Below normal SSTs are favoured near the equator typical of La Niña. This is reflected in the air temperature outlook.
- The risk for coral bleaching is enhanced in the tropical west Pacific.
- Sea level is favoured to be notably higher than normal for most of the countries in the region. Communities are encouraged to note periods of higher-than-normal tides, especially when a tropical cyclone (TC) is in the vicinity.
- There is an enhanced risk for TC activity in the western tropical Pacific. In the central part of the region, TC risks are generally near normal to below normal.
- It does not take a severe TC to produce severe impacts. Coastal and river flooding rainfall can occur with a distant, weak, or former TC. Communities should remain vigilant and follow forecast information provided by their NMHS.

### Climate in review – May to October 2022

- As of October 2022, the [Pacific Regional Climate Centre ENSO tracker](#) ([click here](#)) indicated a La Niña event (APCC, BoM, NIWA, and NOAA). The tropical ocean and atmosphere are consistent with La Niña conditions.
- Drier than normal conditions affected parts of many island groups along the equator. In northern Papua New Guinea and PNG Islands, northern Solomon Islands, Nauru, Kiribati, Tuvalu, Wallis and Futuna, Tokelau, the northern Cook Islands and northern French Polynesia, rainfall deficits were severe to extreme.
- Wetter than normal conditions extended from southern Papua New Guinea to New Caledonia and Vanuatu; parts of Fiji and the Tuamotu Archipelago in the South Pacific and eastern Federated States of Micronesia (FSM) and southern Marshall Islands in the North Pacific also experienced wetter than normal conditions.



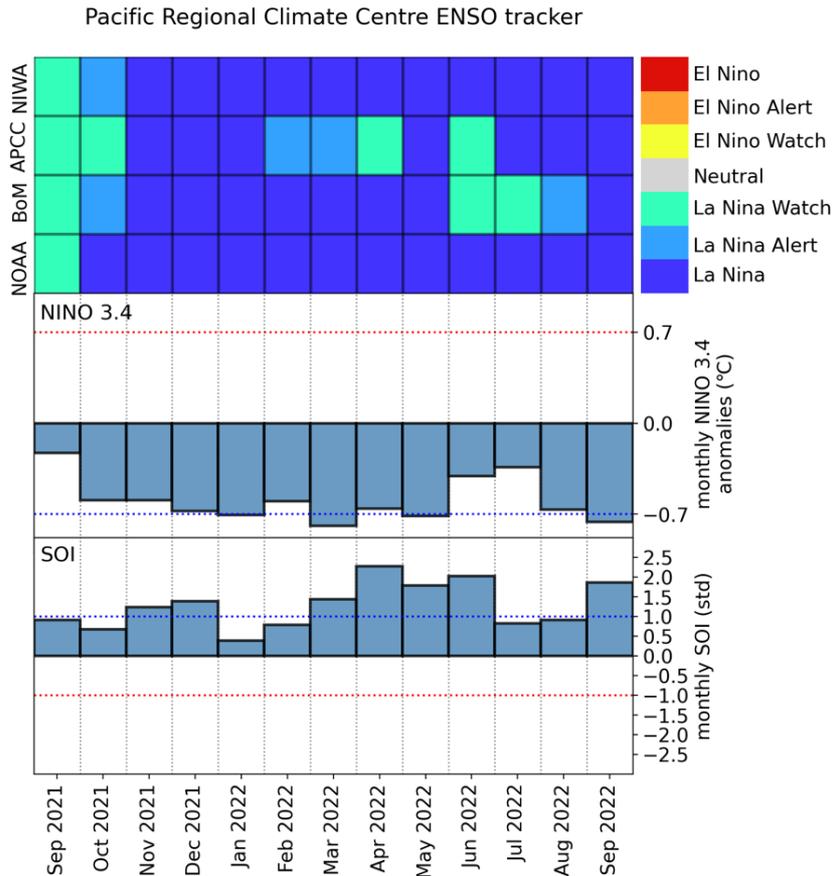
## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

- Sea level was higher than normal for most of the countries in the region, especially in the central and west from near Fiji to eastern Papua New Guinea.
- As of mid-October, there had been 24 TCs in the western North Pacific, with four of those reaching typhoon (super typhoon) intensity.

### Climate outlook – November 2022 to April 2023

#### El Niño Southern Oscillation (ENSO) & [Pacific RCC ENSO Tracker](#)

- Most climate model outlooks favour La Niña conditions in the tropical Pacific Ocean through to February 2023.
- ENSO-neutral conditions are likely to return around March 2023, although continued La Niña conditions are possible.
- Although there is strong model agreement for La Niña to continue until February 2023, the forecast evolution and strength differs, with dynamical models favoring an earlier transition to ENSO-neutral conditions.
- This is a “triple dip” La Niña event, following on from the last two La Niña events in 2020 and 2021. The oceanic imprint of the current event is a bit stronger than the last two years.

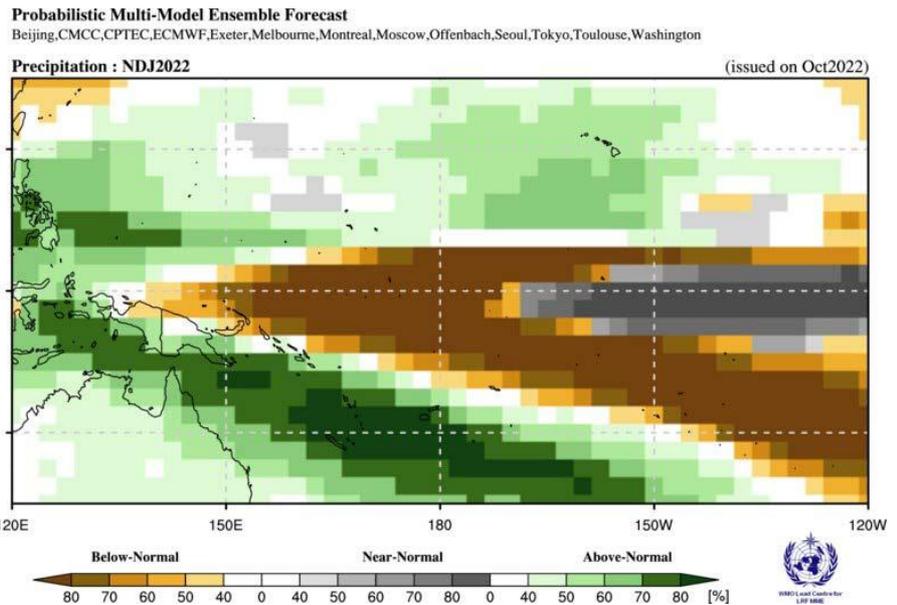




## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

### Rainfall

- Drier than normal conditions are favoured for island groups east of 150°E that are located close to and south of the equator including PNG islands, Nauru, Kiribati, Tuvalu, Samoa, the Cook Islands and French Polynesia for November 2022 – January 2023.
- Wetter than normal conditions are forecast in the tropical Northern Hemisphere, including Palau, the Federated States of Micronesia and the Marshall Islands.
- Wetter than normal conditions are also forecast from southeast Papua New Guinea (PNG) to the southernmost French Polynesian islands, including New Caledonia, Vanuatu and Fiji.
- The February-April 2023 rainfall outlook has minor differences to November-January. The chances for drier than normal conditions ease east of the Date Line and along the equator in the North Pacific, while the chances of wetter than normal conditions ease in the southwest and south central South Pacific. This is consistent with the onset of ENSO-neutral conditions.
- PICO-11 included a review of long-term rainfall trends. Due to large annual-decadal variability, there has been no significant trend in annual total and extreme rainfall at most tropical locations over last 70 years. Significant drying trends exist in Hawai'i and in the South Pacific subtropics (south of 30°S).
- The Interdecadal Pacific Oscillation (IPO) is a measure of decadal variability in the Pacific. Phases can last 20 to 30 years. Positive and negative phases affect the strength and frequency of El Niño and La Niña. The current IPO phase is negative. During negative phases the SPCZ is displaced further southwest during La Niña, rainfall is generally lower than normal northeast of the SPCZ and in the central equatorial Pacific (Northern Cook Is., Tokelau, Kiribati and Tuvalu). Rainfall is higher than normal southwest of the SPCZ (Solomon Is., Vanuatu, Fiji, Tonga).
- In the future short-term rainfall projections (2021-30) will be strongly affected by natural variability.
- Longer-term projections indicate an increase in annual total rainfall near the equator, but the direction of change is uncertain outside the equator. A warmer atmosphere will cause an increase in heavy daily rainfall and flash flooding.

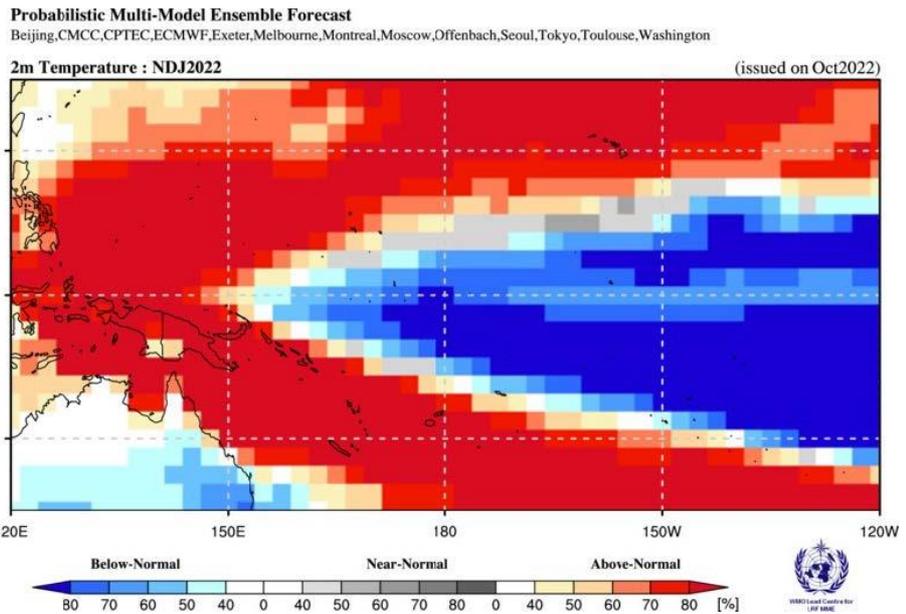




# 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

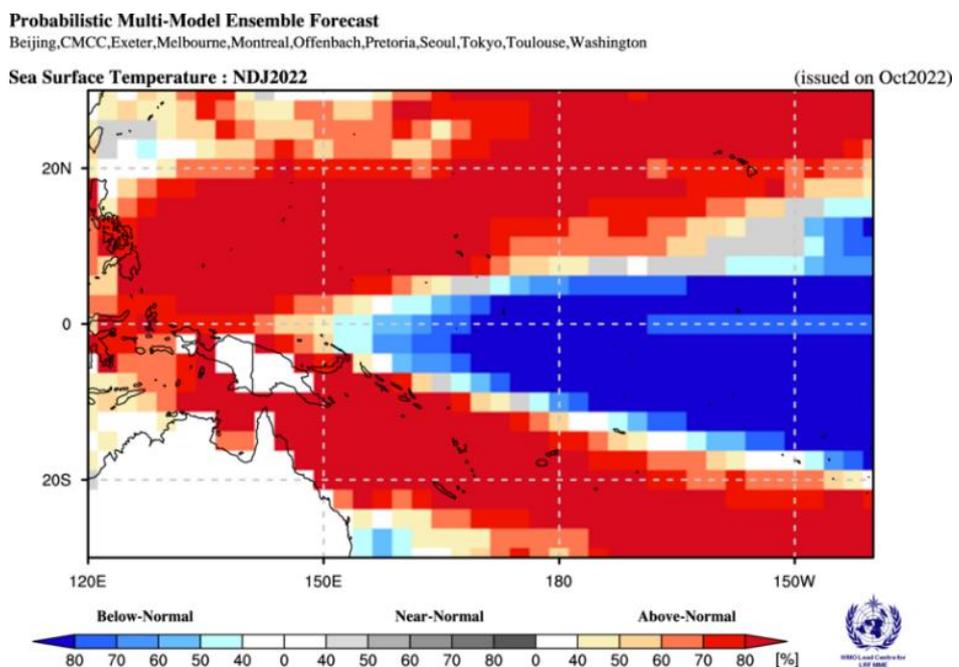
## Air temperature & wind

- Warmer than normal air temperatures are favoured for many island groups, particularly in the western equatorial Pacific, extending northeast and southeast towards the sub-tropics during November 2022-January 2023.
- Cooler than normal air temperatures are more likely in the tropical Pacific east of the Date Line.
- The air temperature outlook pattern for February-April 2023 shows areas of cooler than normal temperatures contracting both east and south. This is consistent with the onset of ENSO-neutral conditions.
- Wind outlooks show a stronger-than-normal easterly air flow along the equator over with an enhanced flow of warm, moist air into the Northern and Southern Hemispheres in the western Pacific.



## Sea level, ocean surface temperature & coral bleaching

- SSTs are favoured to be above normal in the western equatorial Pacific and Coral Sea extending northeast and southeast towards the sub-tropics.
- SSTs are favoured to be and below normal near and south of the equator east of the Date Line.
- Above-average sea level anomalies during the next six months are likely to occur in parts of the southwest tropical Pacific, which includes the regions around the Solomon Islands, Fiji and Tonga (>20 cm above normal).





## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

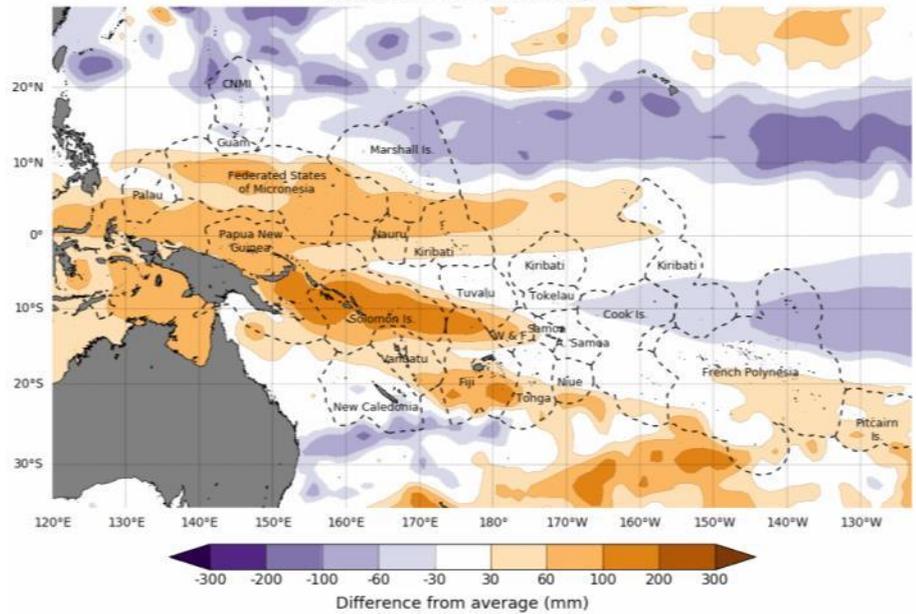
- In the Northern Hemisphere, continued above-normal sea levels (>10cm) are likely between the equator and 10°N, which includes Palau and the Federated States of Micronesia.

The SST convergence zone that forms the boundary of the western warm pool is an important feature for tuna fisheries, with the area of skipjack abundance highly correlated within this region. The convergence zone is favoured to sit further west compared to average in the tropical Pacific, and extend further southward and northward in the far western Pacific.

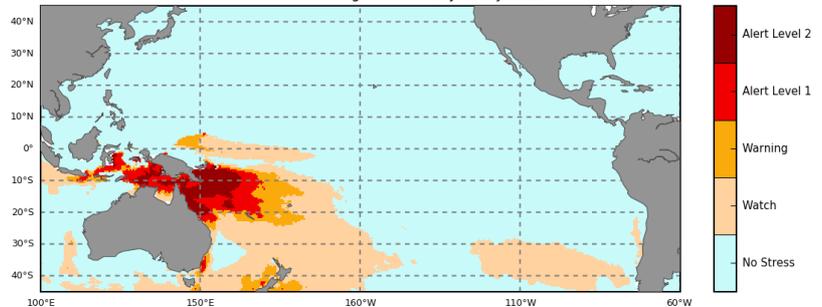
- The coral bleaching outlook favours coral bleaching in the tropical west Pacific both north and south of the equator. Coral bleaching Watch and Warning levels are favoured in almost all countries in the region west of the dateline and along a band that stretches across much of the northern tropical Pacific. Alert Level 1 and 2 are favoured in the vicinity of east Papua New Guinea, the Solomon Islands, and portions of the Marshall Islands.

- PICO-11 included a review of long-term SST patterns.
- Warmer sea surface temperatures in the future will increase the frequency and intensity of marine heat waves. The rate of change depends on future greenhouse gas concentrations.

Difference from average sea surface height forecast for December 2022 to February 2023



Pacific Ocean  
12 Weeks Coral Bleaching Outlook: 15 January 2023



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NOAA Coral Reef Watch



## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

### Tropical cyclones

- Compared to this time last year, SSTs are warmer across the Southwest Pacific, particularly in the Coral Sea region.
- The South Pacific Convergence Zone (SPCZ) tends to be displaced to the southwest during La Niña events and this behaviour has already been observed during October.
- With this mind, The Australian Bureau of Meteorology (BoM) and New Zealand National Institute of Water and Atmospheric Research (NIWA) agree on an enhanced risk for tropical cyclone (TC) activity in the western Pacific.
- In the central and eastern part of the region, TC risks are near normal to below normal.
- NIWA expects at least three severe TCs reaching Category 3 or higher might occur anywhere across the region, so all communities should remain prepared.
- Both outlooks consider relationships between ENSO indicators and TCs numbers. BoM reports a high level of accuracy in the western part of the region.
- TC activity across the western North Pacific is closely related to the current ENSO pattern. While TC numbers show little fluctuation from year-to-year, the genesis location and track of TCs show a dramatic relationship with the ENSO cycle. TC activity shifts eastward during an El Niño; and shifts westward during a La Niña.
- As of mid-October, seasonal activity has been below normal, with 18 named storms, in the western North Pacific. Five of those storms have reached major hurricane status.
- La Niña conditions will likely result in a westward shift of tropical cyclone activity for the remainder of 2022.
- It does not take a severe TC to produce severe impacts. Flooding rainfall can occur with a weaker or former TC especially when high river flows are already present. All communities should remain vigilant, monitor tide predictions and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

### PICOF-10 outlook review

- Dynamical and statistical model rainfall forecasts have been consistent within the western Pacific for nearly all regions since PICOF-8. The model forecasts assessed at PICOF-10 verified well ('were correct'), owing in part to higher model skill when an El Niño or La Niña event is occurring.

### Background

This statement has been crafted using the [WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble](#). Where an element forecast is not available (e.g., for TCs or coral bleaching), outlooks are obtained from [Pacific RCC Network Node for LRF](#).

**These outlook statements are for use by National Meteorological and Hydrological Services (NMHSs). They do not constitute an official outlook for any nation. For more information, please contact your local meteorological office.**

The [Pacific Islands Climate Services Panel](#) and [Pacific Regional Climate Centre \(RCC\) Network Node for Long Range Forecasting](#), in collaboration with the World Meteorological Organisation (WMO), have been coordinating PICOF since 2015. PICOF is a platform used to assess the skill of past climate outlook and discuss the seasonal climate outlooks (ENSO, tropical cyclones, precipitation, temperature, and oceanic conditions), capacity build, and



## 11<sup>th</sup> Pacific Islands Climate Outlook Forum Statement

enable knowledge exchange between NMHSs and strengthen relationships between NMHSs and stakeholders. PICOFF also includes a summary of climate projections for the coming decades, based on greenhouse gas emission scenarios.

PICOFF is an important mechanism for sharing climate and ocean information, best practices, and lessons learnt on climate and ocean prediction and its likely implications on sectors where productivity is heavily dependent on the state of climate. PICOFF is held twice a year: an in-person session, when possible, in October, focusing on November to April and a virtual session in April, focusing on May to October.

PICOFF-11 was attended virtually by members from American Samoa, Australia, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Micronesia, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, South Korea, Switzerland, Timor-Leste, Tokelau, Tonga, Tuvalu, United States of America, and Vanuatu. Representatives from the following organisations also participated: Secretariat of the Pacific Regional Environment Programme (SPREP), World Meteorological Organisation (WMO), Pacific Community (SPC), Australian Bureau of Meteorology (BoM), Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), United States National Oceanic and Atmospheric Administration (NOAA), Météo-France, New Zealand National Institute of Water and Atmospheric Research (NIWA), and the Asia-Pacific Economic Cooperation (APEC) Climate Center (APCC).

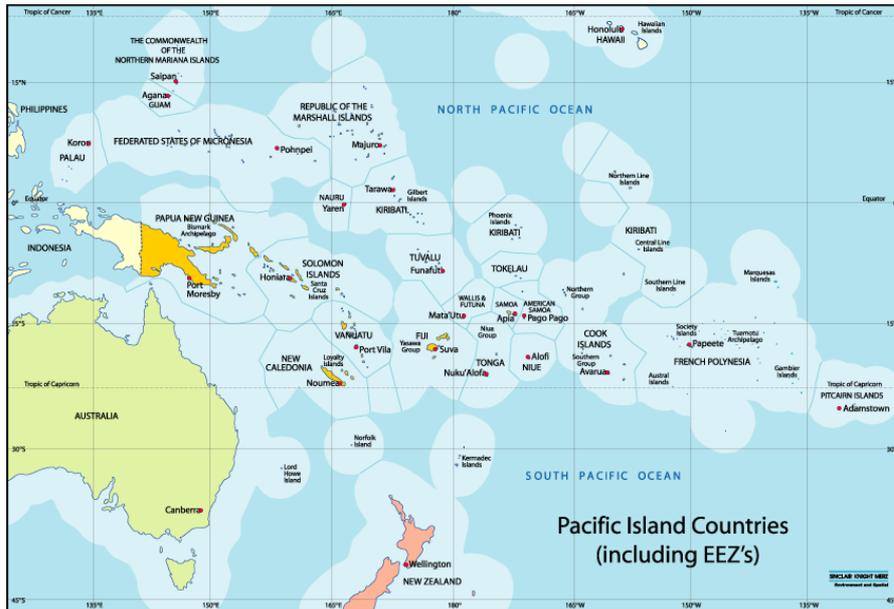
Close working relationships between Pacific rim and Pacific Island NMHSs, regional organisations, and WMO are critical to effective warning of climate hazards leading to early preparedness. Further enhancement of these relationships is essential, as well as relationships between NMHSs, their primary stakeholders, and the community. These can be frequent meetings such as one-on-one discussions, cluster group meetings, and national climate outlook forums.

In addition to the production of national seasonal climate outlooks, there is a need for simplified products and messaging especially for rural and remote communities. Sectoral impacts are most often related to prolonged 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.

This statement is consistent with the Nuku'alofa Ministerial Declaration and Honiara Ministerial Statement for Sustainable Weather, Water, Ocean 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.



Figures & supporting information



Map of the Pacific Islands region, including countries and territories involved in PICOF. [Source](#).

Important links



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