13th Pacific Islands Climate Outlook Forum Statement

This statement was produced by the WMO RA-V Pacific Regional Climate Centre Network following the 13th Pacific Islands Climate Outlook Forum (PICOF-13) held on 23-24 October 2023, 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 2023 to April 2024

- El Niño is expected to continue through at least March 2024, peaking in December 2023 or January 2024, likely as a strong event.
- Because of differences in the ocean-atmosphere system, climatic and oceanic impacts from the 2023-24 El Niño event are unlikely to match those of the 2015-16 and 1997-98 very strong El Niño events.
- Below normal rainfall is favoured for much of the off-equatorial North and South Pacific, between southern PNG and southern French Polynesia, and between Palau and the northern Marshall Islands.
- Above normal rainfall is indicated along the equator, extending from eastern Papua New Guinea to the Line Islands of Kiribati, including Nauru, Tokelau, and Tuvalu.
- Warmer than average sea surface temperatures are favoured in most of the region, except in New Caledonia, Vanuatu, Fiji, and Niue, where near average conditions are favoured. This is reflected in the air temperature outlook.
- Slightly higher than normal sea levels are predicted near the equator; this may lead to a risk for coastal inundation, particularly about Kiribati during the highest tides.
- The risk for coral bleaching is enhanced in the central equatorial to the eastern part of the region.
- Tropical cyclone (TC) season runs from November-April in the South Pacific, but the first one formed in late October (named Lola), impacting the region around the Solomon Islands and Vanuatu as a severe TC.
- In the South Pacific, there's normal-to-enhanced risk for TC activity in the eastern part of the basin; normal-to-reduced TC activity is forecast in the western part of the basin. Several severe TCs are possible anywhere in the basin.
- It does not take a severe TC to produce severe impacts. Coastal and river flooding can occur with a distant, weak, or former TC. Communities should remain vigilant and follow forecast information provided by their NMHS.
- The agriculture and fisheries sectors, as well as all climate-sensitive sectors, should be aware of the impact that El Niño will have on the region, elaborated in the sector focus section.

Climate in review – May to October 2023

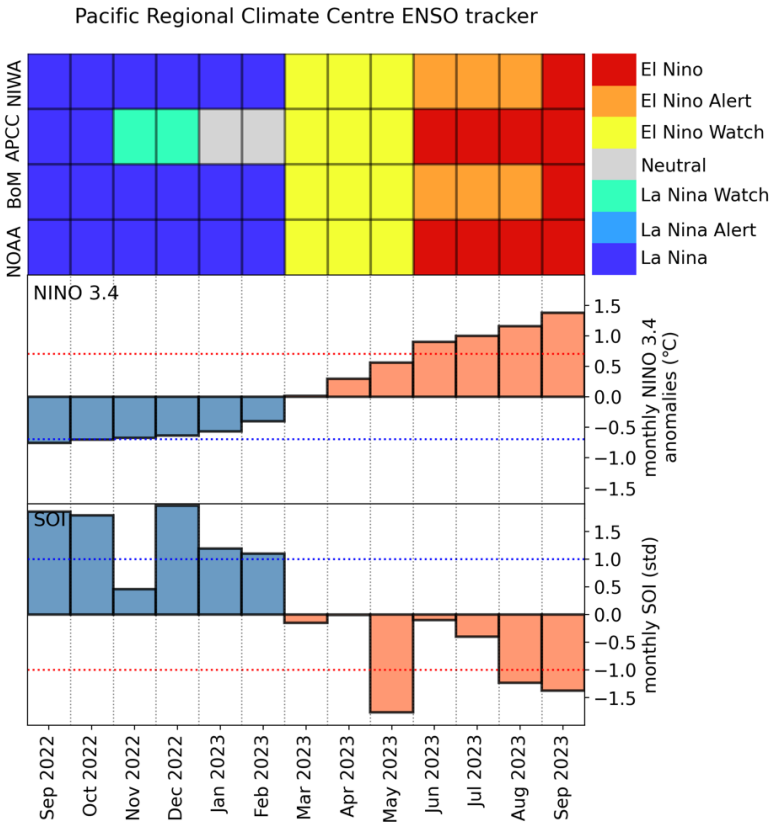
- As of October 2023, the **Pacific Regional Climate Centre ENSO tracker** (click here) indicated an El Niño event (APCC, BoM, NIWA, and NOAA).
- The tropical ocean and atmosphere are "coupled", meaning that patterns in the ocean and atmosphere are connected and influencing the climate in the region.

- Middle and upper atmospheric winds during mid-2023 were unlike those that occurred during the historical El Niño events of 2015 and 1997, showing that no two El Niño events are exactly alike, especially in the context of a changing climate.
- After being displaced south-west of its typical position earlier in 2023, the South Pacific Convergence Zone was located near its climatological location as of mid-October.
- From May to October 2023, rainfall was near normal or above normal across many island groups, except in a band along the equator from Tuvalu to Marquesas, including Tokelau, the northern Cook Islands, and parts of Kiribati. Rainfall was very high across parts of Micronesia.
- The heavy rainfall led to flooding and adversely affected several island groups, including Palau, Federated States of Micronesia (FSM), Papua New Guinea (PNG), Solomon Islands, Vanuatu, Fiji, New Caledonia, Samoa, Cook Islands, Tonga, and Tokelau, as reported by national met services.
- Air temperatures were generally above average across the region from May-October 2023, except in a small area from Fiji to near Niue and New Caledonia.
- Sea level was higher than normal for most of the countries in the region, especially in the Coral Sea and in the Line Islands of Kiribati (more than 20 cm above normal).
- Notably, the first TC of the South Pacific season (Lola) formed earlier-than-normal, on 22 October, in the eastern Solomon Islands. Lola intensified into a severe TC on 23 October, tracking toward northern Vanuatu.
- As of 20 October, there had been 16 TCs in the western North Pacific, with three bringing direct impacts to the U.S.-Affiliated Pacific Islands.
- Review of PICOF-12 statement: predictions from PICOF-12 were generally accurate, especially for air temperature (above average predicted and verified) and ENSO state (El Niño conditions were expected to develop). However, while rainfall predictions were generally accurate along the equator and in the western part of the region, predictions were not as good in the south and east. Model skill for rainfall is historically lower in the south-east part of the region.

Climate outlook – November 2023 to April 2024

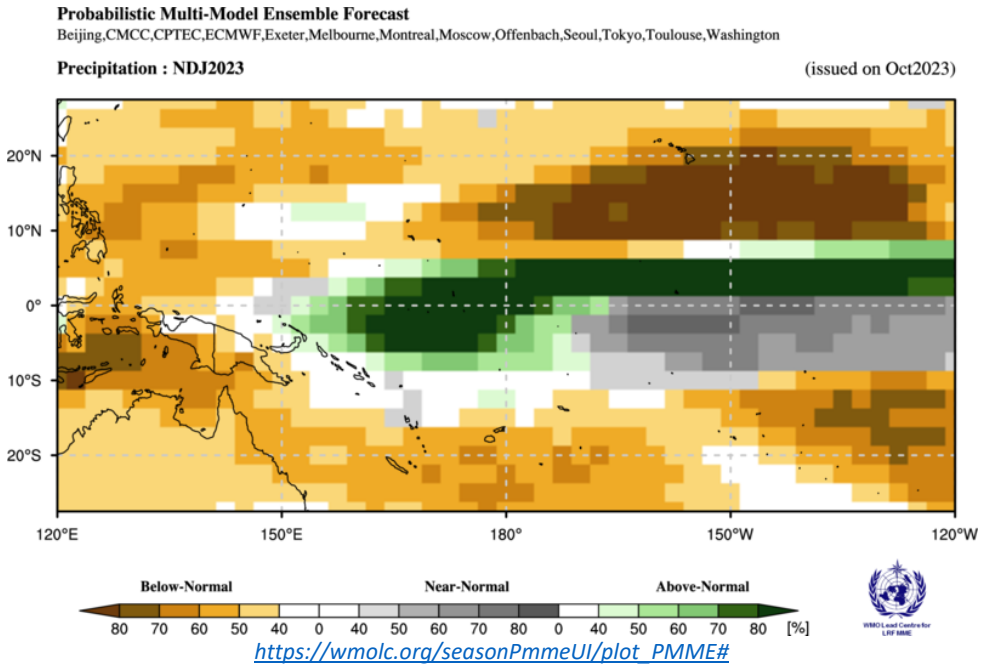
El Niño Southern Oscillation (ENSO) & Pacific RCC ENSO Tracker

- El Niño is expected to continue and peak in December 2023 or January 2024, likely as a strong event. There is strong multi-model agreement for this to occur.
- The 2023 El Niño event is showing distinct oceanic and atmospheric differences from past strong El Niño events like 2015-16 and 1997-98. Because of this, the climatic patterns of 2023-24 probably won't match those years.
- El Niño's oceanic intensity is forecast to gradually wane during the first half of 2024, but atmospheric influences may linger into the middle part of the year.



Rainfall

- Because of the active El Niño event, there is good agreement between Pacific Regional Climate Centre models for most of the Pacific region over the next six months. Peak model skill in the region can coincide with strong El Niño episodes.
- Below normal rainfall (brown shading) is favoured for much of the off-equatorial North and South Pacific, between southern PNG and southern French Polynesia, and between Palau and the northern Marshall Islands.

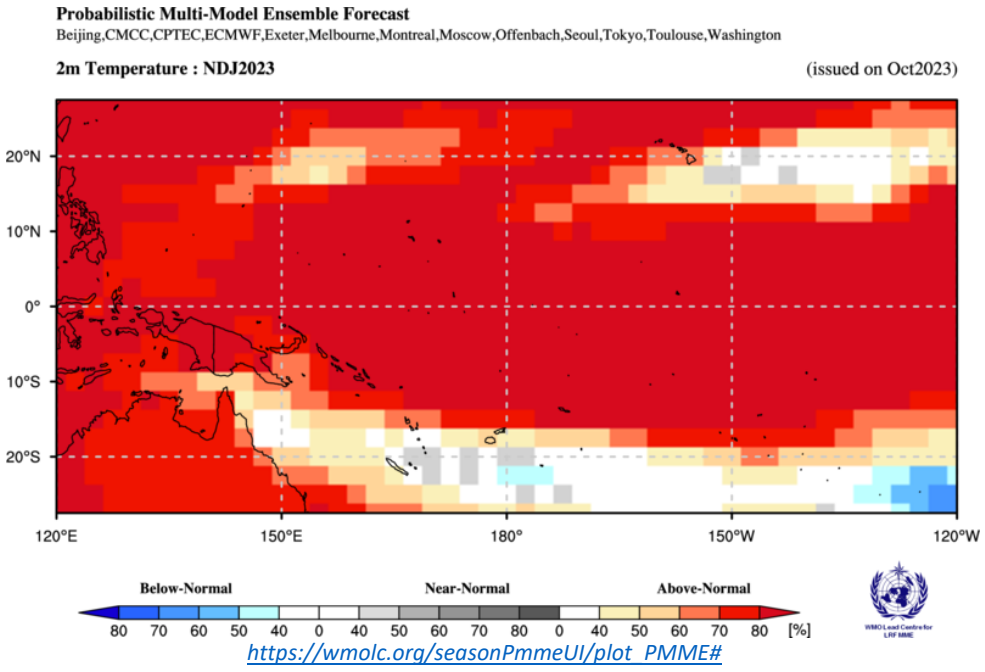


https://wmolc.org/seasonPmmeUI/plot_PMME#

- Above normal rainfall (green shading) is indicated along the equator, extending from eastern Papua New Guinea to the Line Islands of Kiribati, including Nauru, Tokelau, and Tuvalu.
- Near normal rainfall (grey shading) is shown for northern Vanuatu and the Northern Cook Islands.
- There is no clear signal (white shading) for parts of northern Papua New Guinea, Solomon Islands, and near Guam.
- The February-April 2024 rainfall outlook has minor differences to November 2023-January 2024. The chance for above normal rainfall increases along the equator and in Papua New Guinea and the Solomon Islands, while below normal rainfall remains most likely both north and south of the equator. There remains a corridor of lower confidence in rainfall predictions between the areas of above and below normal rainfall.
- The WMO global annual to decadal climate update covering 2023-2027 indicates above normal rainfall near the equator and below normal rainfall in the off-equatorial South Pacific, but skill is low and rainfall patterns will be strongly affected by natural variability. For more information: https://hadleyserver.metoffice.gov.uk/wmolc/

Air temperature & wind

- Consistent with an El Niño event, above normal air temperatures are favoured for most countries except the northmost islands around the northern Marianas and near New Caledonia, southern Vanuatu, eastern Fiji, Tonga, Niue, and south-east French Polynesia.
- The air temperature outlook for February-April 2024 is similar to November 2023-January 2024, but the odds for above normal temperatures increase between New Caledonia and Fiji.



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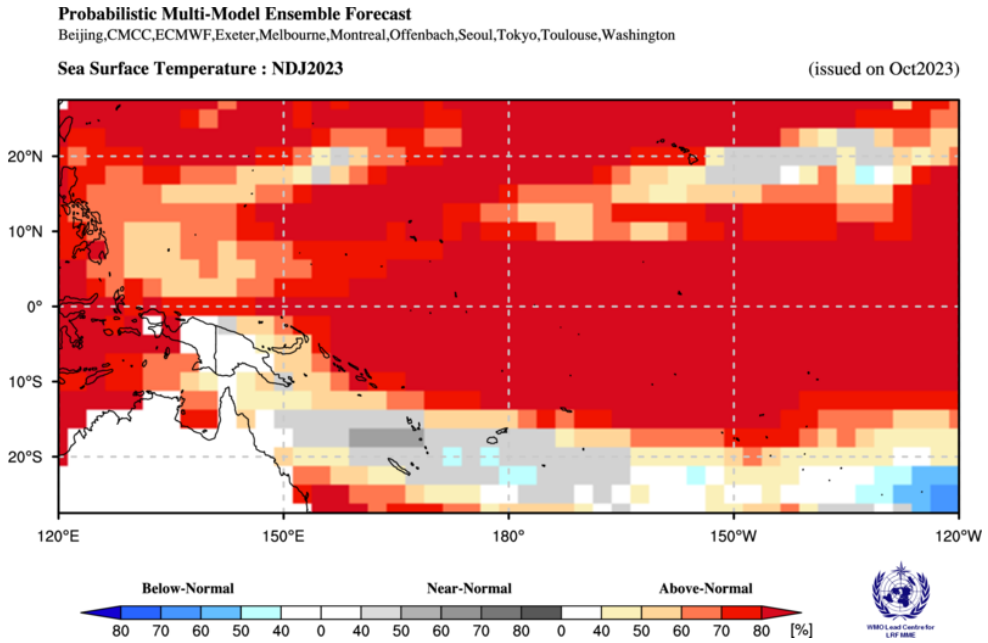
- Wind outlooks indicate a higher frequency of southerly quarter air flows over the South Pacific, which may occasionally bring cooler air temperatures to countries located closer to the sub-tropics.

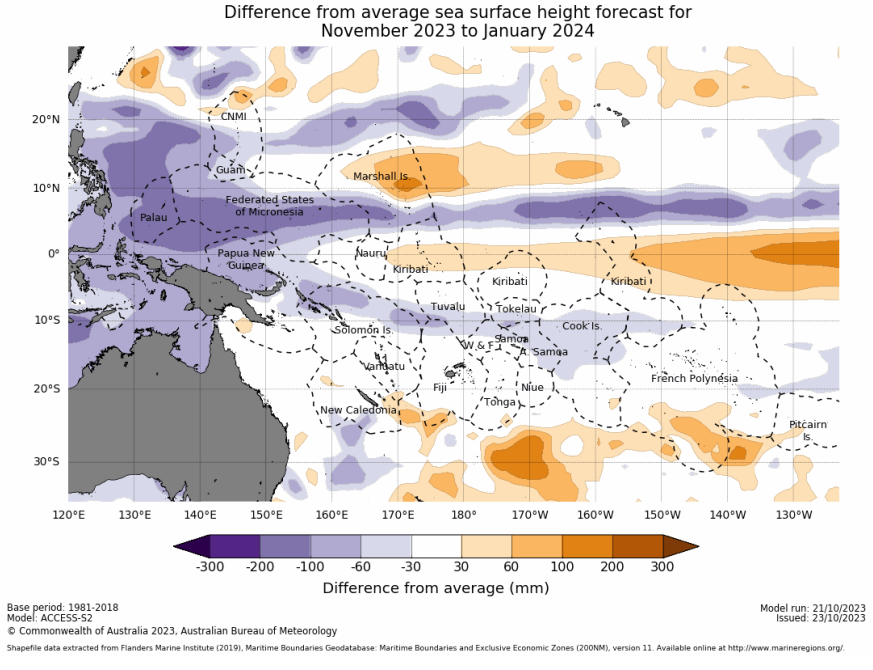
Ocean surface temperature, sea level & coral bleaching

- Warmer than average SSTs are favoured in most of the region, except in New Caledonia, Vanuatu, Fiji, and Niue, where near average conditions are favoured.
- Slightly higher than normal sea levels are predicted along the equator; this may lead to a risk for coastal inundation about Kiribati, especially during the highest tides.
- Lower than normal sea levels are forecast in the western part of the region, near Palau, FSM, Marshall Islands, PNG, and Solomon Islands – the combination of lower sea levels and warm seas may lead to coral bleaching.



https://wmolc.org/seasonPmmeUI/plot_PMME#

- Coral bleaching may also occur in Tokelau, Tuvalu, Kiribati, Northern Cook Islands, and Marshall Islands. While ocean heat stress is the major factor causing coral bleaching, other localised environmental stressors could also lead to coral bleaching.



- The SST convergence zone that forms the boundary of the western Pacific warm pool is an important feature for tuna fisheries, with a high correlation to skipjack abundance. This feature is predicted to be expanded north and east of what is typical in the seasons ahead.
- PICOF-13 also included a review of historical trends and long-term predictions of sea level. Stemming from rising air and sea temperatures, sea level has risen 10-15 cm in the western part of the Pacific and 5-10 cm in central areas since 1993.
- Sea level is forecast to continue to rise through 2050, but the long-term increase and severity will be influenced by the emissions pathway.

http://access-s.clide.cloud/files/regional/pacific/seasonal/forecast/

- Rising sea levels will see minor flood frequency continue to increase across the region.

Tropical cyclones

- TC season runs from November-April in the South Pacific, but the first one formed in late October (Lola), impacting the region around the Solomon Islands and Vanuatu as a severe TC.
- The Australian Bureau of Meteorology (BoM), the National Institute of Water and Atmospheric Research (NIWA New Zealand), and the Regional Specialised Meteorological Centre in Nadi agree on an normal-to-enhanced risk for TC activity in the eastern part of the basin and normal-to-reduced TC activity in the western part of the basin – linked to the established El Niño event. Outlook confidence is low to very low from a BoM perspective.
- NIWA indicates that 4-8 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. TC numbers show little fluctuation from year-to-year, regardless of the ENSO pattern. However, 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 20 October, seasonal activity has been below normal, with 16 named storms in the western North Pacific. Three storms have directly affected the U.S.-Affiliated Pacific Islands.
- Despite the relatively slow season so far, El Niño conditions may prolong TC activity in the western North Pacific and increase the risk for the U.S.-Affiliated Pacific Islands.
- 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-13 also included a review of historical trends and long-term predictions of TC activity. A statistically significant trend toward fewer TCs and severe TCs in the Pacific (about one fewer per decade).
- There has been a strong increase in the percentage of cyclonic systems in the South Pacific sub-tropics
- Climate change is projected to lead to: fewer TCs in the South Pacific, elevated storm surge risk, and the TC risk shifting poleward.

Sector focus: agriculture and fisheries

- The second day of PICOF-13 included an interactive session during which the national meteorological services collaborated with sectorial representatives in agriculture and fisheries. Sessions included a group exercise on identifying potential climatic and oceanic impacts from the 2023-24 El Niño event using past El Niño experiences as a guide. Additional group work identified regional and national agriculture and fisheries product and information needs from national meteorological services. Key messages from the day included:
    - The agriculture and fisheries sectors are particularly vulnerable to the impacts of the ENSO and a changing climate. Examples include the effect of marine heatwaves on fisheries and the impact of extreme temperature and humidity on crops.

- These sectors are considering weather and climate information, but access can be affected by cost, internet connectivity, and the ability to find the information.
- A need for tailored products and services, particularly based on thresholds, has been stressed.
- The agriculture and fisheries sectors discussed experiences and impacts during past El Niño episodes, including impacts related to crop yield and food availability, an increase in costs, water availability (for livestock and irrigation), fish migration patterns, coral bleaching, fish mortality and algal blooms due to marine heatwaves, reduced sea level (and access to marine food resources), vulnerability to pests and diseases, soil and coastal erosion, damage and recovery from TCs, seaweed and pearl farms, saltwater intrusion and groundwater quality degradation, forest fires, social conflicts around food availability, and human health and wellbeing.
- Most meteorological services in the region make monthly-to-seasonal climate bulletins available online. The sectors mostly confirmed that while this information is useful, some of it could be improved to more directly meet their needs. Suggested improvements included the way in which the information is delivered (e.g., an app, over the radio, or on social media), an inclusion of impact statements (e.g., what does a forecast of elevated sea levels mean?), and the frequency of delivery (e.g., from monthly to weekly), the incorporation of hydrological information and pest and disease information where possible.
- Discussions around how the sectors would apply the existing bulletin content in their operations also took place. The need to provide training on how to interpret the bulletins was noted, but ideally, information in the bulletins would be easy to understand and translated into local languages. Visuals may have a higher impact than text-based information.
- It is recommended that the agriculture and fisheries sectors, as well as all climate-sensitive sectors, engage with their national meteorological service for guidance around the 2023-24 El Niño.
- This sector day satisfied the PICOF-13 aim to strengthen the collaboration between national meteorological services and the agriculture and fisheries sectors as well as regional organisations, including through the use of User Interface Platforms (UIPs).

Vanuatu tailored system of agricultural climate services

- The third day of PICOF-13 featured presentations and discussions from some members of the Vanuatu Climate Information Services for Resilient Development Project (Van-KIRAP). Van-KIRAP intends to build technical capacities in Vanuatu to harness, manage, and disseminate tailored climate services across five key sectors: tourism, agriculture, infrastructure, water, and fisheries.
- The Asia-Pacific Economic Cooperation (APEC) Climate Centre (APCC) presented on tailored System of Climate Services for Agriculture (OSCAR). OSCAR is a collaboration between APCC, the Vanuatu Meteorology and Geo-Hazards Department (VMGD), and the Vanuatu Department of Agriculture, enabling access to tailored weather and climate information and agrometeorological guidance, particularly for farmers. OSCAR provides farmers the ability to make data-driven decisions around their crops.
- OSCAR can be accessed online: https://oscar.gov.vu/mobile/mobile.do.

- VMGD and the Vanuatu Department of Agriculture presented on their experiences throughout the project and noted an enhancement of information around the management of weather-related risk, crop selection and productivity, timing of planting, harvest date, the optimisation of irrigation, and water management.
- Another element of Van-KIRAP includes a climate futures portal, which includes sectoral case studies on how crop production may be affected by future climate conditions, interactive maps, and climate summaries.
- Community climate centres have been developed in provincial Vanuatu so that weather, climate, and related agricultural guidance from Van-KIRAP can reach "the last mile", but dissemination of such information remains a work-in-progress.
- The project serves as an example as to how climate services can be enhanced through integration with sectoral data and direct, national-level collaboration.

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 discuss the seasonal outlook (ENSO, TCs, precipitation, temperature, and oceanic conditions) for the upcoming seasons, capacity build, and enable knowledge exchange between NMHSs and strengthen relationships between NMHSs and stakeholders.

PICOF 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. PICOF 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.

PICOF-13 was attended virtually by members from Fiji, Guam, Tonga, Tuvalu, BoM, CSIRO, Federation University Australia, Met Office Hadley Centre, NOAA, SPREP, UKMO, and UNEP. The countries attended in person includes Australia, Cook Islands, Fiji, French Polynesia, Kiribati, Marshall Islands, Micronesia (Chuuk and Pohnpei), Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, South Korea, Tokelau, Tonga, Tuvalu, United Kingdom, 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), Pacific Farmers Organisation (PIFON), Nature's Way Cooperative (NWC), United States National Oceanic and Atmospheric

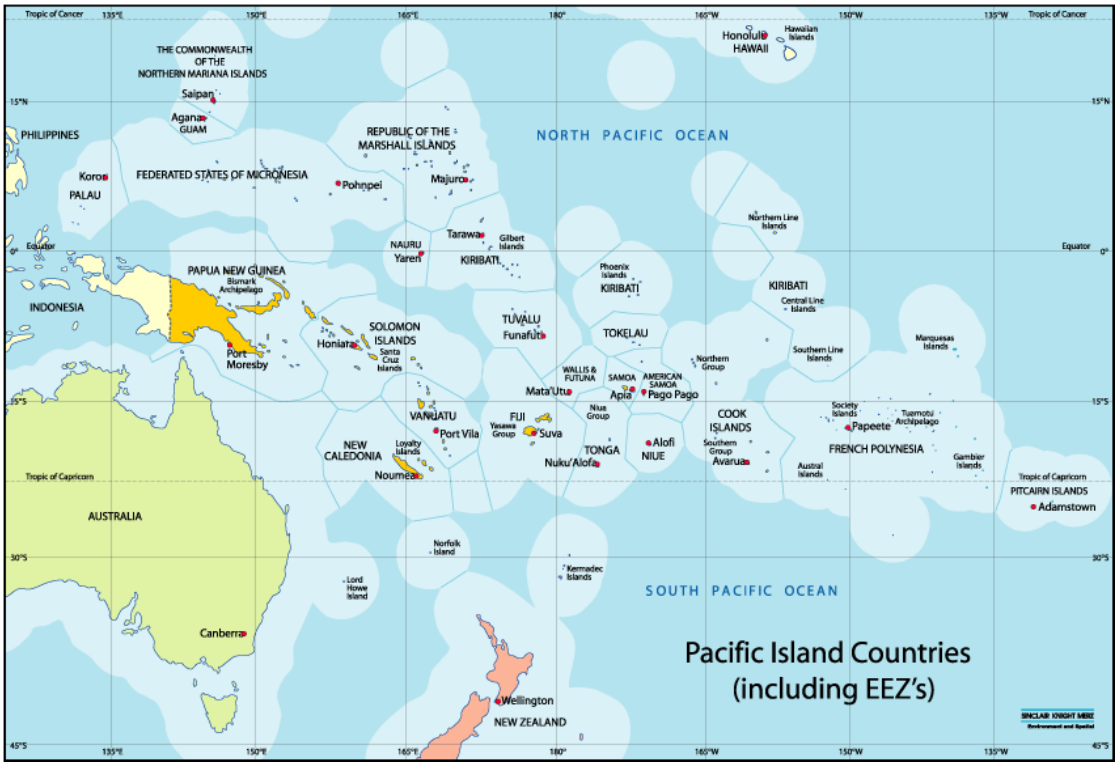
Administration (NOAA), Météo-France, New Zealand National Institute of Water and Atmospheric Research (NIWA), and the Asia-Pacific Economic Cooperation (APEC) Climate Centre (APCC).

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

https://twitter.com/pacific_rcc

https://www.facebook.com/PacificRegionalClimateCentre/

https://www.pacificmet.net/rcc