

# Eleventh Pacific Islands Climate Outlook Forum (PICOF-11)

25 October 2022



Hosted virtually by the Secretariat of the Pacific Regional Environment Programme, Pacific Met Desk Partnership and World Meteorological Organisation

25 October, 2022

## Introduction

Regional Climate Outlook Forums have been held annually in the Pacific since 2015, and biannually since 2020, allowing dialogue and learning between the providers and users of climate information. Pacific Islands Climate Outlook Forums (PICOFO) are organized by the Pacific Meteorological Council's (PMC) Pacific Islands Climate Services Panel (PICS Panel), its secretariat SPREP and the WMO and supported by various international and regional organisations.

The October PICOFO 11, was held virtually attended by 94 participants and was organised around the following objective: *To discuss and produce objective, user-relevant regional climate and ocean outlook guidance in real time to support Pacific Island Countries and Territories (PICTs) NMHSs produce national climate and oceans climate information for their national stakeholders, with the ultimate aim to reduce climate-related risks and support sustainable development for the coming season in sectors of critical socioeconomic significance.*

A PICOFO 11 Regional Statement summarising climate and ocean conditions over the past months, tropical cyclone (TC) and seasonal outlook November 2022 - April 2023 was produced as an output of PICOFO 11. These products will provide guidance to National Meteorological and Hydrological Services (NMHS) to develop their specific country outlook for this season.

This report offers a short summary of material presented during the virtual meeting, the key discussion points, and any Meeting recommendations and action points.

## **Agenda Item 1: Opening & setting the scene**

### **The Meeting: (opening statements/remarks summary)**

- Arieta Baleisolomone from the Fiji Met Service opened with a prayer
- Opening remarks were given by Tagaloa Cooper, SPREP and Henry Taiki, WMO.
- Acknowledged participants including PICS Panel members, WMO, and representatives of Pacific meteorological services and applauded the success of the previous 6 virtual PICOFs.
- Acknowledged the impacts felt across the Pacific associated with the La Niña events over the past few years, emphasizing the importance of current, available, and usable information for addressing these impacts, right down to the last mile.
- Emphasised the importance of the Pacific Climate Change Monitor and Climate Change in the Pacific to providing long term climate trends to inform preparations for COP27, and the efforts of the PICS Panel and the RCC.
- Welcomed participants on behalf of the WMO and acknowledged the partnership of the WMO with SPREP to supporting the needs of the Pacific with climate information.
- Overviewed the agenda of the upcoming meeting, in particular reviewing the PICOF10 statement and the outlook for the coming season.
- Noted the WMO state of climate reports, including the report for the South West Pacific, emphasising the importance of the information coming from the countries for the development of these reports.

### **The Meeting: (objectives)**

- Simon McGree, representative of the node on Long Range Forecasting from the RCC overviewed the objectives of the meeting:
- To discuss and produce objective, user-relevant regional climate and ocean outlook guidance in real time. Support member NMHSs produce national climate and oceans climate information for their national stakeholders, with the ultimate aim to reduce climate-related risks and support sustainable development for the coming season in sectors of critical socioeconomic significance

## **Agenda Item 2: ENSO update and outlook**

John Marra from NOAA presented a review of the last season's outlook and the outlook for the upcoming season, with contributions from other members.

### **The Meeting:**

- Noted that a La Niña advisory remains in effect and is likely to remain until at least February 2023 (75% chance). Return to ENSO neutral is likely by February to April 2023.
- Noted that below-average SSTs continued across the central and eastern equatorial Pacific Ocean during September 2022 and for the last couple months, negative subsurface

temperature anomalies remained mostly unchanged, reflecting the persistence of below-average temperatures across the eastern Pacific Ocean.

- Negative subsurface temperatures anomalies remained mostly unchanged, reflecting the persistence of below-average temperatures across the eastern Pacific.
- During September, convection remained suppressed over the western and central Pacific and enhanced over Indonesia. Low-level easterly wind anomalies and upper-level westerly wind anomalies prevailed over most of the equatorial Pacific
- Summarized that the most likely scenario is that the La Niña continues for the remainder of 2022 becoming the first 'triple dip' La Niña event of the 21st Century and the third such event since the 1950s

### Discussion:

- NOAA asked whether other providers agree with the summary that the transition to neutral is likely during Feb-April 2023.
- APCC noted that their analysis generally agrees with the overview given by NOAA
- NIWA noted that the latest suite of guidance indicates higher chance of La Niña extending into the FMA period, also noting that some models are indicating return to La Niña following this, although a quadruple dip would be unprecedented
- University of Hawaii noted that looking at the forecast from the previous two years, this year is indicating more uncertainty, however, neutral conditions from the beginning of next year are most likely
- FMS asked whether there is any scientific explanation of the early termination of this La Niña event. NOAA responded that climatologically, this is not an early termination, as unlike El Nino, the events don't trail out. NIWA added that in the subsurface there is warm water at depth, so if we get a wind burst we might release some of the warmth moving the conditions away from La Niña, however, agreed that the predictions are tracking close to climatology. BoM agreed with the previous comments.
- PNG noted that the past few months have been very dry over much of the country, asking for clarification on what the chances are that conditions will swing to El Niño rather than neutral. NOAA responded that it is probably unlikely that El Niño phase will occur rather than neutral, although the predictions for that period are over the spring predictability barrier. BoM responded that we will probably be La Niña like enough to still experience elevated rainfall despite probability of returning to neutral, so NMSs should still be mindful of flood risk.

## **Agenda Item 3: Looking back - review and evaluation of May-October 2022 - climate outlook.**

### **i. Atmosphere**

#### **The Meeting:**

Tile Tofaeono of SPREP presented on the Atmosphere overview for May to October 2022, with contributions from other members:

- Reviewed the statement issued in April 2022 based on the WMO MME, covering predicted rainfall and temperature and Southern Oscillation Index (SOI)
- Presentation will include all materials from individual partners APCC, BoM and NIWA for information
- Climate models indicate a continuation of La Niña with drier than normal conditions favoured for equatorial Pacific, wetter than normal conditions for RMI, southern PNG to southern Cook Islands, cooler than normal conditions along the equator and the off equatorial South Pacific and warmer than normal conditions for regions extending northeast and southeast towards the subtropics.
- The precipitation outlook for MJJ 22 showed expected dry conditions across the central equatorial Pacific and expected wetter than normal conditions elsewhere. Over ASO 22 the anomalies retracted but remained in a similar pattern.
- Noted high chance of dry anomalies in PNG highlands over MJJ and ASO 22 as noted by PNG
- Noted temperature outlook for above normal temperatures indicated cool anomalies across the central equatorial Pacific and warm anomalies elsewhere.
- Noted flooding experienced in Vanuatu, water distribution required in Kiribati and drought situation in PNG
- Noted that the PICOFF statement presented in April 2022 was generally consistent with actual conditions

### **ii. Ocean**

#### **The Meeting:**

Ben Noll from NIWA presented the review and evaluation of the May - October 2022 Ocean Outlook.

- Reviewed the April 2022 PICOFF-10 Prediction Statement highlighting that the continued influence of La Niña was well predicted. The slight easing of event during June-July was well predicted, however, the intensification during Aug-Sept was not. Coral Bleaching and sea level outlooks were generally good and consistent with La Niña like conditions.

- Noted that higher than normal sea levels were observed in many of the locations for which this was predicted
- Noted that model skill tends to be higher when we have an active ENSO phase, and thus, the forecasts for the April PICOV were skillful.
- Noted that we saw some of the highest SST on record around Vanuatu, Solomons and PNG.
- Noted that the eastern equatorial Pacific is significantly cooler than normal at present.
- Conditions in the current year are notably cooler than at the same time of year during the past two years. This is likely to influence rainfall and TC activity.
- Marine heatwaves are active in the western Pacific which can influence TC activity
- Noted that the thermocline in the eastern Pacific resides near the surface, and sea level is elevated across most of the region, up to 10 to 20cm above average around the Solomon Islands, New Caledonia, Fiji. relative to the past two years, sea levels have been generally higher in 2022, and this has implications for storm surge associated with TC and storms.
- Noted that a coral bleaching watch is in place in the west, and is associated with the marine heatwave. A bleaching event is current in Palau.
- Noted that a significant ocean swell event occurred in July 2022, affecting Cook Islands but also Samoa, American Samoa, Niue and Hawaii. Flooding and damage occurred in coastal areas, for example, debris on the runway in Pago Pago Airport.

## Discussion

- No questions

### iii. Tropical cyclones (Southwest Pacific)

#### The Meeting:

- NOAA WFO Guam presented the TC situation for the NWS Pacific Region for the US affiliated Pacific Islands.
- Noted the influence of ENSO status on location of TC activity, emphasising that the La Niña has led to low TC activity in the region. The predicted busier last quarter of 2022 was updated based on the continuation of the La Niña. Typhoon Malakas passed through Yap state in April 22 and was the only significant system to affect islands in the region during the season. However, Tropical Storm Megi dropped a lot of rainfall over the Philippines due to slow moving nature, leading to flooding. Super Typhoon Noru was the last system to affect the region, although there is another month to go.

## Discussion

- Meteo France asked whether skill scores are available for the predictions and whether seasonal forecasts for TC activity over a large area are valuable information for the general public, or whether it's more useful for forecasters. NOAA responded that releases to the media are coupled with disclaimers that the outlooks are not for TCs making landfall. However, in El Niño phases, the seasonal forecasts are an added prompt to do due diligence regarding preparedness. Weak developing systems can be as impactful as severe TCs due to rainfall. The outlook in the current form (as a region) is a developing product with the CPC and this will require looking at the skill and accuracy.
- FMS asked about the value add of the seasonal outlook for TCs prior to TC season and whether regional providers can share insight regarding value adding of their products. NOAA WFO Guam responded that the communications to media emphasise to not prepare based on the outlook but rather that you should always be prepared. If a busy season is expected this aids preparedness so seasonal outlooks are used as a communication tool. NIWA responded that some parties in NZ are interested for example, the NZ Defense Force, however, for the general public, the largest value of the outlook is a reminder that the TC season is coming up.

## Agenda Item 4: Looking back long term: Status of key variables

### The Meeting:

- BoM overviewed the status of long-term trends in rainfall. BoM emphasised that Pacific rainfall is highly variable and influenced by ENSO and the position and strength of the ITCZ, SPCZ and West Pacific Monsoon. Extreme weather events are also important to Pacific rainfall.
- Rainfall has wide ranging impacts on humans and ecosystems across the Pacific Islands. Rainfall supplies drinking water on low-lying atolls, replenishes freshwater lens and provides water for agriculture. Changes in rainfall can disrupt these and other natural processes. Heavy or extreme rainfall can increase or enhance crop damage, soil erosion and floods, reduce quality of drinking water.
- Noted that a mixed pattern of positive and negative changes in annual total rainfall is evident across the Pacific, and most trends are not statistically significant. In the Hawaiian region and south Pacific subtropics, drying trends are evident. From a seasonal perspective, drying trends in Hawaii are strongest in DJF and in JJA in FSM and RMI. Subtropical drying trends are most significant over July-August in the west and Sep-Nov in the east. Most locations show little change in max 1 day rainfall, noting that very few stations exist in the central equatorial Pacific so some trends could be concealed.
- Noted that there is little change in annual consecutive dry days in most locations over the past 70 years. Drying trends exist in Hawai'i and in the South Pacific subtropics. Consistent with climate change projections.

- Little change in annual and seasonal maximum 1-day rainfall at most locations over the last 70 years.
- The annual consecutive dry days (CDD) index represents change in the longest number of days in year where rainfall is less than 1 mm (0.04 inches). Positive values represent longer periods of low rainfall in recent years. Negative values represent shorter periods of low rainfall in recent years. There has been little change in annual CDD at most locations over the last 70 years.
- Noted that the positive and negative phases of the Interdecadal Pacific Oscillation influence the strength and frequency of El Niño and La Niña events. Currently, we are in a negative phase since 1999 displacing the SPCZ further southwest during La Niña, rainfall tends to be more 'La Niña like'. Considering the IPO phase is currently strongly negative, it is no surprise we have experienced 3 La Niña events in a row
- The University of Hawaii presented the status of long term trends in ocean temperature. Trends over 1982 to 2020 show warming in most locations other than in proximity to the Marquesas where cooling is evident. Regionally averaged SSTs generally follow the global trends
- Noted that marine heatwaves (defined as times when SST exceed the 90th percentile for that point in time for 5 or more consecutive days), have increased in number and the past 10 years the trend is accelerating. Severity may have shifted north and duration has increased.

## Discussion

- Meteo France asked what the main drivers of marine heatwaves are in the Pacific other than ENSO. Also, are there co-occurrences between atmospheric and marine heatwaves. NOAA responded that they observed broken temperature records in Hawaii associated with the marine heatwave. BoM responded that the marine heatwave in NZ during the summer of 2017/18 led to the warmest January on record. Regarding drivers, NOAA response that it is a growing area of research, particularly the influence of the IPO

## Agenda Item 5: Looking Forward - Seasonal and Intra-seasonal Pacific guidance for 22/23

Daeun Jeong of APCC, Alex Peltier of Meteo France, and Marcus Aydlett of NOAA presented the guidance for the upcoming season for atmosphere, ocean and tropical cyclones respectively



## **i. Atmosphere**

### **The Meeting:**

- Noted that during NDJ 2022, dry conditions are expected for the Islands along the equator and for the central and eastern off-equatorial South Pacific, wet conditions (>70%) for southern Melanesia and normal conditions for the eastern equatorial Pacific.. -
- During FMA 2023, the probabilities are expected to weaken, whereas the chances for near normal conditions are expected to be enhanced.
- Noted that other models reviewed are generally consistent with the WMO MME with some small variety
- During NDJ 2022, cooler than normal conditions are expected along the equator near and east of the Dateline and for the central and eastern off-equatorial South Pacific, and warmer than normal conditions for region extending northeast and southeast towards the subtropics.
- During FMA 2023, the probability for below normal temperatures is expected to decrease, whereas the chances (>80%) for above normal conditions are expected to persist for southern Melanesia.
- Noted that other models are generally in agreement with the WMO MME
- Mean sea level pressure shows a typical La Niña pattern expected with pressure higher than normal conditions for the east of the dateline and with lower than normal pressure conditions in Melanesia

## **ii. Ocean**

### **The Meeting:**

Judith Giblin of SPC presented on the outlook for Ocean temperature, Coral Bleaching and Sea level with contributions from its members:

- Noted that warmer than normal SSTs are expected for most countries in the west, including COSPPac partner countries in the south. Cooler than normal SSTs are expected along the equator towards the east.
- Sea level is favoured to be higher than normal for most countries and coral Bleaching on alert levels for PNG, FSM, Palau. Coral bleaching can also be caused by factors other than SST ie, salinity changes, intense light, freshwater inflows. Bleaching limits fishing in the region. American Samoa example showing healthy corals in 2014 to dead corals in 2015.
- Highest tides is noted for Funafuti (Tuvalu) and Pohnpei (FSM) for the November - December 2022 period. For the January - March 2023 period, highest tides are noted for FSM, PNG, RMI and Tuvalu.

- The Fisheries convergence zone is likely to sit further west compared to average in the tropical Pacific, and extend further southward and northward in the far western Pacific

## Discussion

- Samoa Met Service requested clarification on the model bias for the MME precipitation outlook and value added of this for Samoa. It was noted that in 2021, for Samoa it was biased towards wet and yet the country has been in meteorological drought for much of 2022. Ben of NIWA noted to review the individual members in terms of assessing how many are predicting the similar outcome for Samoa and conduct a comparative analysis to establish a baseline. The information from the individual members can be accessed via the WMO LRF MME website.

### **iii. Tropical Cyclones (Northern Hemisphere (West Pacific) and American Samoa**

#### The Meeting:

- An established La Niña in the tropical Pacific Ocean has influenced the Northwest Pacific and South Pacific tropical cyclone outlook.
- BoM overviewed SW Pacific TC outlooks provided by regional providers. An above-average number of tropical cyclones is likely (65% likelihood) in the western South Pacific region this season, with model accuracy historically being moderate. A close-to-average to below-average number of tropical cyclones is expected for the eastern South Pacific, but model accuracy is historically very low for this region.
- According to NIWA's analog method seasonal outlook, elevated activity is likely in areas around the Coral Sea, especially Vanuatu and New Caledonia. Reduced TC activity is expected east of the International Date Line
- Near normal or below normal TC activity is expected for Fiji, Tuvalu, and the southern Cook Islands. Below normal TC activity is forecast for Tuvalu and most other islands near or to the east of the International Date Line.
- At least three severe TCs reaching Category 3 or higher might occur anywhere across the region, so all communities should remain prepared.
- The ECMWF outlook predicts enhanced numbers of TC in the western Pacific and reduced numbers in the eastern Pacific
- The RSMC Nadi TC outlook anticipates a total of 5-7 TCs in the region over the season
- Noted that BoM provides multi-week TC outlooks and the 'difference from normal' option is most useful. Meteo-France and ECMWF also provide multi-week outlooks. The Copernicus flood system seasonal basin outlook provides flood outlooks for the larger

Pacific countries. For Vanuatu, New Caledonia and Fiji there is a 50-75% chance of high river flows. Therefore, there is high potential for river floods over the coming months.

- It does not take a severe TC to produce severe impacts. Flooding rainfall can occur with a weaker or former TC especially when high flows are present due to recent wetter than normal conditions. All communities should remain vigilant, monitor tide predictions and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

### Discussion

- FMS asked about the predicted reduced risk for Tonga provided by NIWA and RSMC's outlooks as this was somewhat different to the ECMWF outlook. BoM clarified that the ECMWF outlook indicated near normal activity. However, the ECMWF map is difficult to interpret with accuracy.

## Agenda Item 6: Looking forward long term

### The Meeting:

- Noted that the direction and magnitude of climate projections are affected by Green House Gas concentration pathways and regional climate responses.
- Climate variability remains the strongest influencer on rainfall. We have observed mixed trends in rainfall.
- Noted that rainfall projections are indicating that along the equator, increasing trends are expected associated with increasing temperature, but trends are less directional outside of that region. The changes closer to the equator are strongest
- Noted that averaged over the South Pacific Ocean, the projected SST warming is: 0.4°C by 2021-2040, 0.6°C by 2041- 2060, and 0.7°C by 2081-2100, relative to 1995-2014, for a low concentration pathway (SSP1-2.6) and 0.4°C by 2021-2040, 1.0°C by 2041- 2060, and 2.4°C by 2081-2100, relative to 1995-2014, for a high concentration pathway (SSP5-8.5)
- Increased observed trends in marine heatwaves are a consequence of increased SST. For a low concentration pathway (SSP1-2.6), the number of "Moderate" marine heat waves increases from recent (1995–2014) values of 10–50 days/year to over 100 days/year by 2050, with over 200 days/year nearer the equator. For a high concentration pathway (SSP5-8.5), the number of "Moderate" marine heat waves increases to 100-200 days/year by 2050, with over 300 days/year nearer the equator.
- Before 2040, there are small differences between low and high concentration pathways but big differences after 2050 for select countries including Fiji, Samoa and Palau.
- Future greenhouse gas concentrations will heavily influence what happens after mid-century

## Discussion

- Meteo France asked whether there is a plan to do downscaled projections for the Pacific. CSIRO responded that downscaling is important for simulating TCs and tropical depressions in particular, and they will follow up and get back to Meteo France.
- SPREP asked what the latest is regarding the new project for projections for the Pacific for the French Territories. Meteo France responded that they are undertaking this work for the whole Pacific under CLIMSA and in a few months they will be able to discuss outcomes.
- SPREP asked whether maps from various providers can be Pacific centred because global maps are difficult to interpret from the Pacific. BoM responded that when accessing content from the WMO lead centre you can specify the area of interest. There is not a lot of detail for specific countries but you can zoom down to the Pacific. APCC responded that it is possible to select the domain using their products. NIWA responded that it would be helpful to add a domain for the Western Pacific because presently they have to select an arbitrary region.
- 

## Agenda Item 7: Closing

- The PICS Panel Vice Chair summarized the discussions during the meeting

## Annex 1: Agenda

### 11<sup>th</sup> session of the Pacific Islands Climate Outlook Forum (PICOF-11)

*Virtual Meeting 25 October 2022*

*12:00-16:30 WST (23:00-03:30 UTC)*

<p>[Lead agency for the session presented in bold]</p> <p>Chair: PICS panel co-chairs</p>		
12:00-12:30  (Samoa local time)	Registration and communications testing  Meeting procedures	SPREP to coordinate and provide all supporting details and documents prior.
12:30-13:00	<p><b>Session 1: Opening and Setting the scene.</b></p> <ul style="list-style-type: none"><li>▪ Opening prayer (Ms Arieta Baleisolomone)</li><li>· Opening remarks (Ms Tagaloa Cooper - SPREP)</li><li>· Opening remarks (Mr Henry Taiki - WMO)</li><li>· Meeting objectives (Node for LRF representative)</li><li>▪ Group photo</li></ul>	
13:00-13:20	<p><b>Session 2: ENSO Update and Outlook.</b></p> <p>ENSO status and outlook, and introduction to ENSO tracker: NIWA, BoM, Meteo-France, NOAA, University of Hawaii, APCC, SPREP and SPC (15 minutes)</p> <p>Including</p>	All PICOF are joint presentations. A representative from the agency in bold print will deliver the presentation with support/input from the

	<p>highlights from Global Seasonal Climate Update (GSCU)</p> <ul style="list-style-type: none"> <li>· Agenda 2 discussion (5 minutes)</li> </ul>	remaining agencies referenced.
13:20-14:15	<p><b>Session 3: Looking Back - Review and Evaluation of May-October 2022 Climate outlook.</b></p> <p><b>i. Atmosphere</b></p> <p>Overview of May to October 2022 state of the climate, plus evaluation of the last PICOF outlook: NOAA, University of Hawaii, BoM, SPC, SPREP, and NIWA (15 minutes).</p> <p><b>ii. Ocean</b></p> <p>Overview of May to October 2022 state of the ocean, plus evaluation of the last PICOF outlook: NOAA, University of Hawaii, BoM, SPC, SPREP, NIWA (15 minutes).</p> <p><b>iii. Tropical cyclones</b></p> <p>Overview of the TCs over last six months: NOAA, University of Hawaii, BoM, SPC, SPREP, and NIWA (15 minutes).</p> <p>Agenda 3 discussion (10 minutes)</p>	
14:15-14:45	<p><b>Session 4: Looking Back Long-Term: Status of key variables</b></p> <p>A brief examination of long-term trends for variables of interest to Pacific communities: In October 2022, these will be rainfall and sea surface temperature: NOAA, University of Hawaii, BoM, SPC, SPREP, and NIWA (20 minutes).</p>	Tropical cyclones and sea level at PICOF-10

	Agenda 4 discussion (10 minutes)	
14:45-14:55	<b>10-min break</b>	
14:55:15:55	<p><b>Session 5: Looking Forward - Seasonal and Intra-seasonal Pacific guidance for 2022/23.</b></p> <p><b>i. Atmosphere</b></p> <p>PICOF outlook and RCC Node for LRF individual model/MME guidance and skill comparison: NIWA, BoM, Meteo-France, NOAA, University of Hawaii, APCC, SPREP, and SPC (15 minutes).</p> <p><b>ii. Ocean</b></p> <p>PICOF outlook and RCC Node for LRF individual model/MME guidance and skill comparison: NIWA, BoM, Meteo-France, NOAA, University of Hawaii, APCC, SPREP, and SPC (15 minutes).</p> <p><b>iii. Tropical cyclones</b></p> <p>PICOF outlook and RCC Node for LRF individual model/MME guidance and skill comparison: NIWA, BoM, Meteo-France, NOAA, University of Hawaii, APCC, SPREP, and SPC (15 minutes)</p> <p>Agenda 5 discussion (15 minutes)</p>	
15:55-16:25	<p><b>Session 6: Looking Forward Long-Term</b></p> <p>A brief review of long-term climate change projections for variables of interest to Pacific communities: In October 2022, these will be rainfall and sea surface temperature: CSIRO, UGCRP, BoM and SPREP (20 minutes).</p>	

	Agenda 6 discussion (10 minutes)	
16:25-16:30	<p><b>Session 7: Closing</b></p> <p>Chair: Summary of proceedings, feedback from participants</p> <p>Next steps: production of PICO 11 Report, PICO Statement, reminder of production deadlines.</p>	



## Annex 2: Participant list

Given First Name	Family Name/Last Name	Gender	Job Designation	Organization	Country	Email
Tile	Tofaeono	Male	CLIPSCo	SPREP	Samoa	tilet@sprep.org
Arieta	Baleisolomone	Female	Climate Officer	Fiji Met Service	Fiji	arieta.daphne@met.gov.fj
Ben	Noll	Male	Meteorologist	NIWA	New Zealand	ben.noll@niwa.co.nz
Kotoni	Faasau	Male	Senior Climate Officer	MNRE	Samoa	kotoni.faasau@mnre.gov.ws
Sunny	Seuseu	Male	Project Manager Vanuatu CISRDP (VanKIRAP) Project	SPREP	Vanuatu	sunnys@sprep.org
Shweta	Shiwangni	Female	Scientific Officer (Climatology)	Fiji Meteorological Service	Fiji	Shweta.Shiwangni@met.gov.fj
Jeff	Barnard	Male	Disaster Risk Management, Manager Pacific CCD	IFRC	Fiji	JEFFREY.BARNARD@ifrc.org
Judith	Giblin	Female	Ocean & Coastal Data Risk Analyst	Pacific Community	Fiji	judithg@spc.int
Daeun	Jeong	Female	Researcher	APEC Climate Center	South Korea	downy.apcc@gmail.com
Henry	TAIKI	Male	WMO Representative for the South-West Pacific	World Meteorological Organization		htaiki@wmo.int
Lepani	Vunituraga	Male	Humanitarian Affairs Officer	UN OCHA	Fiji	lepani.vunituraga@un.org
Philip	Malsale	Male	Climatologist	SPREP		philipm@sprep.org
Max Norman	Sitai	Male	Principal Meteorological Officer	Solomon Islands Meteorological Service	Solomon Islands	m.sitai@met.gov.sb
Marcus	Aydlett	Male	Warning Coordination Meteorologist	USA NOAA National Weather Service, Forecast Office Guam	Guam	marcus.aydlett@noaa.gov
Raymond	Tanabe	Male	Director, Pacific Region	NOAA National Weather Service	United States	raymond.tanabe@noaa.gov

Nihmei	Salesa	Male	MCA	SPREP	Vanuatu	salesan@sprep.org
Naheed	Hussein	Male	ClimSA PM	SPREP	Fiji	naheedh@sprep.org
Rodney	Kauramo	Male	Field Support Engineer	UNDP	Solomon Islands	rodney.kauramo@undp.org
Melton	Tauetia	Male	UN Country Cordination Specialist -Tuvalu	United Nation	Tuvalu	melton.tauetia@un.org
John	Ruben	Male	Climate Research & Development Officer	Vanuatu Met Services	Vanuatu	jruben@meteo.gov.vu
Peta	Kerslake	Female	Coordinator	UNEP	Samoa	elisapeta.eteuatikerslake@un.org
Nai Jit	Lam	Male	Deputy Representative	UNHCR	Australia	lamnj@unhcr.org
Anne	Colquhoun	Female	Head of Office	OCHA	Fiji	colquhoun2@un.org
Brandon	Bukunt	Male	Meteorologist	NOAA	Guam	brandon.bukunt@noaa.gov
Jasneel	Chandra	Male	Scientific Officer-Climate	Fiji Meteorological Service	Fiji	Jasneel.Chandra@met.gov.fj
Jiuta	Korovulavula	Male	Programme Officer	UNESCO	Fiji	j.korovulavula@unesco.org
Doug	Ramsay	Male	Manager, Pacific	NIWA	New Zealand	Doug.Ramsay@niwa.co.nz
Kasis	Inape	Male	Assistant Director	PNG National Weather Service	Papua New Guinea	kinape70@gmail.com
Raquel Keani-Leigh	Tanaki New	Female	Senior Climate Officer	Niue Meteorological Services	Niue	raquel.tanakinew@mail.gov.nu
Emmanuel	Etimani	Male	Senior Scientific Officer	MNRE	Samoa	emmanuel.etimani@mnre.gov.ws
Raquel Keani-Leigh	Tanaki New	Female	Senior Climate Officer	Niue Meteorological Services	Niue	raquel.tanakinew@mail.gov.nu
Andrew	Watkins	Male	Technical Leader - Long-range Forecasts	Bureau of Meteorology	Australia	andrew.watkins@bom.gov.au
Elise	Chandler	Female	climatologist	Bureau of Meteorology	Australia	elise.chandler@bom.gov.au

Kevin	Hennessy	Male	Climate Scientist	CSIRO	Australia	kevin.hennessy@csiro.au
Celine	Becker	Female	Project Manager	Bureau of Meteorology	Australia	celine.becker@bom.gov.au
Gabrielle	Emery	Female	Head Subregional Office	UNDRR	Fiji	gabrielle.emery@un.org
Tessa	Tafua	Female	Associate Project Support Officer	WMO	Samoa	ttafua@wmo.int
Evan	Baddock	Male	Hydrologist, QA & Training Manager	NIWA	New Zealand	evan.baddock@niwa.co.nz
Clare	Mullen	Female	Senior Climate Science Capacity Development & Training Officer, EAR Watch	Bureau of Meteorology	Australia	clare.mullen@bom.gov.au
KIKUKO	MOCHIMARU	Female	STAFF METEOROLOGIST	PALAU NATIONAL WEATHER SERVICE OFFICE (WSO Palau)	Palau	Kiku.Mochimaru@noaa.gov
Nazgul	Borkosheva	Female	Programme Management Officer	UNDRR	Fiji	nazgul.borkosheva@un.org
Nathan	Yuave	Male	Climate Officer	National Weather Service	Papua New Guinea	natekyuave@gmail.com
Sophie	Martinoni	Female	Head of French Polynesia Weather Service	Météo-France	French Polynesia	sophie.martinoni@meteo.fr
Hyungjin	Kim	Male	Head, Climate Prediction Department	APEC Climate Center	South Korea	hyungjin@apcc21.org
Glenda	Pakoa	Female	Seasonal Forecaster	Vanuatu Meteorology & Geohazards Department	Vanuatu	gpakoa@meteo.gov.vu
Leiti	Setefano	Female	Database Officer	Tuvalu Meteorological Service	Tuvalu	ltausi0291@gmail.com
Nikotemo	Iona	Male	Climate Scientific Officer	Tuvalu Meteorological Service	Tuvalu	niko.iona@gmail.com
Tavau Vaaia	SIMEONA	Female	Forecast Scientific Officee	Tuvalu Meteorological Service	Tuvalu	tamanuku06@gmail.com
Limoni	Mativa	Male	Senior Forecaster	Tuvalu Meteorological Service	Tuvalu	mativano94@gmail.com

Olivia	YU	Female	Climatologist	Meteo-France New Caledonia	New Caledonia	olivia.yu@meteo.fr
Mwata	Keariki	Female	Assistant Climate Officer	Kiribati Meteorological Service	Kiribati	aco@met.gov.ki
Thomas	Horellou	Male	Meteorologist	French Navy	New Caledonia	thomas.horellou@intradef.gouv.fr
Tekaatu	Uribano	Female	Ag Assistant Climate Officer	KMS ( Kiribati Meteorological Service)	Kiribati	utekaatu@gmail.com
Hyejin	Lee	Female	Project Manager	APEC Climate Center		hyejin.lee@apcc21.org
Silipa	Mulitalo	Male	Principal Scientific Officer	Samoa Meteorological Service	Samoa	silipa.mulitalo@mnre.gov.ws
Taniela	Takeifanga	Male	Meteorologist	Tonga Meteorological Services	Tonga	tanielatakeifanga@gmail.com
Jennifer	Strahl	Female	Meteorology Instructor	Pacific International Training Desk	United States	strahl@hawaii.edu
Laitia	Fifita	Male	Deputy Director	Tonga Meteorological Services	Tonga	laitiaf@met.gov.to
Gary	Vite	Male	Chief Meteorologist	Tonga Meteorological & Coastal Radio Services	Tonga	vitegary@gmail.com
John	Marra	Male	Regional Climate Services Director, Pacific Region	NOAA	United States	john.marra@noaa.gov
Allan	Rarai	Male	Manager	VMGD	Vanuatu	ararai@meteo.gov.vu
Pakoa	Leo	Male	VANKIRAP Agriculture sector Project Coordinator	Department of Agriculture	Vanuatu	pleo@vanuatu.gov.vu
Tauala	Katea	Male	Director	TUvalu Meteorological Service	Tuvalu	tauala.k@gmail.com
Manoah	Tepa	Male	PMO/Forecasting	Solomon Islands Meteorological Services	Solomon Islands	m.tepa@met.gov.sb
Seluvaia	Ve	Female	Chief Technical and Environmental Monitoring Data Management	Tonga Met Service	Tonga	seluf@met.gov.to

Mele	Lakai	Female	Climate Officer	Tonga Met Service	Tonga	melel@met.gov.to
Taumeasina	Fomai	Female	Scientific Officer	Ministry of Natural Resources and Environment	Samoa	sinafomai1999@gmail.com
Royson	Willie	Male	Public Relations Officer	Ministry of Climate Change Adaptation, Vanuatu	Vanuatu	wroyson@vanuatu.gov.vu
Mile Olive	Fonua	Female	Manager of Environment Division	EDNRE	Tokelau	mile.fonua@tokelau.org.nz
Daphne	Kamut	Female	Climatologist/Van_KIRAP Project	Vanuatu Meteorology and Geo Hazards Department	Vanuatu	dnalawas@meteo.gov.vu
Cliden	Lilopeza	Male	Senior Weather Forecaster	Solomon Islands Meteorological Services	Solomon Islands	clidensakiri09@gmail.com
Bipendra	Prakash	Male	Acting Principal Scientific Officer (Climatology)	Fiji Meteorological Service	Fiji	bipen.prakash@met.gov.fj
Albert	Willy	Male	Traditional Knowledge Officer	VMGD for VAN-KIRAP Project	Vanuatu	s11044865@gmail.com
Grace	Johnolson	Female	Principal Scientific Officer, Weather Observation Division	Vanuatu Met	Vanuatu	sjohnolson@meteo.gov.vu
Simao	Teles Fernandes	Male	Meteorologist	National Directorate of Meteorology and Geophysics	Timor-Leste	simaotelesfernandes@gmail.com
Christophe	Point-Dumont	Male	Meteorologist	Météo-France	New Caledonia	christophe.point-dumont@meteo.fr
Thomas	ABINUN	Male	Meteorologist	Météo-France	New Caledonia	thomas.abinun@meteo.fr
Simao	Teles Fernandes	Male	Meteorologist	National Directorate of Meteorology and Geophysics	Timor-Leste	simaotelesfernandes@gmail.com
David	Simeral	Male	Associate Research Scientist, Climatology	Desert Research Institute (Western Regional Climate Center)	United States	dave.simeral@dri.edu
Tom	Evans	Male	Deputy Director	NOAA/National Weather Service, Pacific Region	United States	tom.evans@noaa.gov

Victoire	Laurent	Female	Climatologist	Météo-France	French Polynesia	victoire.laurent@meteo.fr
Kotoni	Faasau	Male	Senior Climate Officer	MNRE	Samoa	kotoni.faasau@mnre.gov.ws
Matt	Blacka	Male	National Program Manager (PECIKS Programme)	Climate Change Cook Islands	Cook Islands	matt.blacka@cookislands.gov.ck
Neil	Livingstone Malosu	Male	Data officer	Van-Kirap Project	Vanuatu	nmalosu@meteo.gov.vu
Litea	Biukoto	Female	Disaster Risk Team Leader	Pacific Community	Fiji	liteab@spc.int
alex	peltier	Male	meteorologist	meteo france new caledonia, wallis & futuna	New Caledonia	alex.peltier@gmail.com
Chelsey	Bryson	Female	Project Specialist	East-West Center		cajbryson@gmail.com
Terry	Atalifo	Male	Acting Director	Fiji Meteorological Service	Fiji	terry.atalifo@met.gov.fj
Kasis	Inape	Male	Assistant Director	PNG National Weather Service	Papua New Guinea	kinape70@gmail.com
Solace	Kepak	Female	climate officer	National weather service	Papua New Guinea	solacer77@gmail.com