

Thirteenth Pacific Islands Climate Outlook Forum (PICOF-13)

23 October, 2023
Nadi, Fiji and Online on Zoom



Hosted in a Hybrid Format by the Secretariat of the Pacific Regional Environment Programme, Pacific Meteorological Desk Partnership and the World Meteorological Organisation

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 (PICOFs) are organised by the Pacific Meteorological Councils (PMC), Pacific Islands Climate Services Panel (PICS Panel), its secretariat the Secretariat of the Pacific Regional Environment Programme (SPREP) and the World Meteorological Organisation (WMO) and supported by various international and regional organisations.

The October PICOF-13, was held in person for the first time since 2019 and was attended in-person by 83 participants and 14 online participants. The PICOF-13 was organized 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) National Meteorological and Hydrological Services (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 PICOF-13 Regional Statement summarising climate and ocean conditions over the past months, the tropical cyclone (TC) and seasonal outlook from November 2023 to April 2024 was produced as an output of this meeting. These products will provide guidance to the National Meteorological and Hydrological Services (NMHSs) in the Pacific region, to develop their specific country outlooks for the season.

This report offers a short summary of material presented during the hybrid 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

- Garlanding ceremony for the directors.
- Director Rossylyn Mitiepo of Niue Meteorological Services said the opening prayer.
- Opening remarks from Salesa Nihmei, SPREP and Bipendra Prakash, Fiji Meteorological Services
- Acknowledged Bipendra as Chair of the Pacific Meteorological Council and the Tropical Cyclone Committee.
- Bipendra Prakash, on behalf of the Fiji Ministry of Infrastructure and Meteorological Services welcomed the representatives and donors from WMO, Crop agencies, SPC, Ministries of Agriculture and in the region, Australia Bureau of Meteorology (BoM), New Zealand National Institute of Water and Atmospheric Research (NIWA), SPREP, the various NMHSs, and the Australian and New Zealand Aid funded Climate and Ocean Support Program in the Pacific (COSPPac).
- Condolences were given to Vanuatu, Solomon Islands and New Caledonia who were experiencing Severe Tropical Cyclone Lola.
- Acknowledged the efforts of NMHSs in the week prior, to develop agriculture and fisheries products as part of the ACCESS-S workshop.
- Stated that there would be opportunities during Stakeholder Days to refine the products.

The Meeting: Objectives

- The Chair of PICO-13, Simon McGree, summarised the objectives of the Forum.
- The focus sectors for PICO-13 were Agriculture and Fisheries.
- Day 1 will be largely focused on NMHSs: discuss seasonal climate, ocean, and TC outlooks. How seasonal outlooks are produced: accuracy, utility, strengths, and weaknesses.
- Discuss how NMHSs obtain and assess available guidance, create national relevance, tailor products to specific user needs and distribute these to the end users.
- To review the WMO Global Annual to Decadal Climate Update from 2021-2025
- Days 2-3 will be sector focused: re-present tailored Agriculture and Fisheries bulletins from the prior ACCESS-S workshop and to further improve agrometeorological and fisheries products.
- Discuss the potential effects of the 2023/2024 El Niño regionally and nationally on sectors, determine sector climate outlook needs, whilst looking to strengthen how NMHSs deliver service to their stakeholders.

Session 1: ENSO update and outlook

The Meeting:

Presented by Daeun Jeong, APEC Climate Centre

- Noted El Niño was observed this year: warmer than normal SST along Central Eastern Equatorial Pacific, Westerly wind anomalies along central and eastern equatorial Pacific, warmer than normal subsurface temperatures.
- Stated Above-normal SST anomalies in the 3.4 and Niño 3 regions are predicted to strengthen during NDJ 2023-24 season, indicating possible amplification of El Niño conditions further west in the Niño 4 region, above normal SST anomalies are also predicted to strengthen.
- Conveyed a 100% chance for El Niño to continue through December 2023, 95% chance to continue through January February and March.

Discussion:

- PIFON: asked at what point the declaration for El Niño should be made.
Ben Noll: stated that different countries have different times to classify an event, depending on the location in the Pacific a country may look at different ocean and atmosphere indicators, for example, countries that sit further from the equator may take longer for impacts to arrive. Also consider Lag time from an El Niño event
- French Polynesia: questioned what the role of climate change was in the indicators of climate change.
APEC CC: replied that it depends on the time scale of climate change, at a seasonal scale it may impact climate.
- SPC: on countries declaring El Niño at different times. There needs to be a regional timeframe to respond accordingly to negative effects.
- John Mara: commented, ENSO dampens effects of climate change, El Niño amplifies it.
- Ben Noll: referring to slide 6 of the ENSO presentation notes that the graphs indicate a possible interaction between the climate change signal and the ENSO signal.

Session 2: Looking Back - Review and Evaluation of May to October Climate Outlook.

i. Atmosphere

The Meeting:

Presented by Ben Noll, NIWA

Reviewed ENSO outlook, Rainfall outlook and temperature outlook from May. All outlooks mostly accurate except rainfall outlook which was only partly accurate.

- Reviewed wind anomalies and air pressure prediction from May-October: showed lower than normal air pressure near and east of the international dateline associated with El Niño
- Reviewed rainfall outlook from PICO-12, MJJAS-2023, model correctly picked up rainfall conditions at the equator and to the west and Northwest Pacific. Modelling did not do well in areas South of the equator in the South Pacific
- Review of temperature outlooks were accurate, warmer than usual in most places.
- Considered that rising air in the central to the far Western Pacific could be linked to 3 years of La Nina, or a climate change element embedded within this signal.

Discussion:

- PNG: Stated that after declaring El Niño, it started raining which brought complaints from customers that expected dryer conditions. How soon does El Niño respond in terms of impact?
Ben Noll: Multiple climate drivers are working at the same time, example, El Niño and MJO, could be out of sync producing Non-El Niño like conditions.
- Niue Met Service: Appreciated the comprehensive presentation. Helped explain cooler temperatures between May-October in the country. Explained well that it's a signal to a developing El Niño.

ii. Ocean

The Meeting:

Facilitated by Judith Giblin, SPC

- Reviewed the predictions of Sea Surface Temperatures (SSTs), Coral Bleaching and Sea Level for May to October 2023
- The SSTs were favoured to be above normal for the central, western, and southwestern Pacific. Observations revealed positive SST gradually expanded westward along the equatorial region from March 2023. Since September, SST anomalies have increased near the Date Line, while weakening in the western equatorial Pacific Ocean.
- The risk for coral bleaching was predicted to be enhanced along the entire equatorial Pacific between 10°S and 10°N latitudes from July. Observations revealed Coral bleaching showed alert level 1 and 2 along the equatorial central Pacific Ocean. The daily coral bleaching for 15 October reveals 'Alert Level 2' for Kiribati (Gilbert, Phoenix and Line). Alert Level 1 for Nauru and waters far western Marshall Islands and eastern FSM. Watch and Warning status surrounding the alert levels.
- The sea level was favoured to be notably higher for most countries across the central to eastern equatorial Pacific. Observed sea level remained higher than normal for most Pacific Island Countries. Patches of anomalies above 20cm observed in Coral Sea and Line Islands of Kiribati.

- Recommended obtaining proof of events, e.g., floods, coral bleaching etc. through a citizen initiative for validation of season outlooks by NMHS's.

Discussion

- No questions

iii. Tropical Cyclones (Southwest Pacific)

The Meeting:

Facilitated by Marcus Landon Aydlett, NOAA

- Noted the shift from ENSO Neutral to El Niño in early 2023. Raised the likelihood of an above normal year for tropical cyclone activity for the USAPI of the western north Pacific. El Niño conditions may strengthen further, prolonging TC activity in the western North Pacific through the end of the year.
- Stated that 2023 was anticipated to be a busier cyclone season than the past 3 years. El Niño conditions support increased TC activity across the USAPI and AS, trend may be favoured but there's no guarantee.
- Noted that as of 20 October, there have been 16 tropical cyclones in the western north Pacific
- Discussed the three tropical cyclones brought direct impacts to the USAPI:
 - Tropical Storm Sanvu (01W), in Pohnpei State, FSM
 - Super Typhoon Mawar (02W) 02W), passing over northern Guam as a Category 4 Typhoon, with impacts felt northward across the CNMI, and earlier in its lifecycle, to Chuuk and Yap States, FSM
 - Super Typhoon Bolaven (15W) 15W), passing through the CNMI between the islands of Rota and Tinian, with impacts to Guam, the northern CNMI and to Pohnpei and Chuuk States, FSM, in its formative stage.

Discussion

- No questions

iv. Impacts (Southwest Pacific)

The Meeting:

Presented by Philip Malsale, SPREP

- Provided a summary of the past 6 months climate rainfall outlook.
- Noted over the general impacts:
 - El Niño events associated with increased cyclone activity in the tropical northwest pacific.
 - Drier than normal conditions are favoured for the off- equatorial region east of the Date Line which is likely to weaken towards the third quarter of this year.
 - Wetter than normal conditions are favoured for islands along the equator and the Melanesian countries.

- Warmer than normal air temperature likely for the whole of the Pacific Islands. Sea surface temperatures are favoured to be above normal across most of western, central, and southwestern Pacific.
- The risk for coral bleaching is enhanced along the entire equatorial Pacific between 10° S and 10° N latitudes from July.
- Sea level is favoured to be notably higher than normal for most of the countries across central to eastern equatorial Pacific, and at PNG, Solomon Is., Vanuatu, and southern Fiji/Tonga/Niue.

Country specific impacts were presented during this session

Kasis Inape, PNG presented on behalf of Melanesia

- PNG events from May: Heavy rains causing extensive flooding- April 2nd
- Stated the causes of flooding:
 - High-intensity downpours occurred over 2 hours, so the impact was massive & unprecedented.
 - No well-designed drainage system could have stood that volume of water. The pit openings could not capture the amount of surface flow.
 - Attributed to climate change. "Rainfall intensities are getting higher."
 - Poor community behaviour, sanitation & hygiene causing blockage of the drainage system. The fridge, washing machine, tires, and other household items were found to be thrown into the drainage, including uncollected wastes.
- Solomon Islands events from May:
 - Logu river in Southeast Guadalcanal - over flooded its banks destroying food gardens including sweet potato, cassava, and banana plantain.
- Vanuatu events from May:
 - Serious shortage of local food after twin cyclones TC Judy & Kevin has led to hunger across the island Futuna. Many boarding schools are forced to close. Replanting of local crops still not ready and going off season.
 - In October 2023, NDMO received complaints from the islands in the Shephard's group that most of their crops in the garden are not growing well after the two Cyclones TC Judy & Kevin
- Fiji events from May.
 - rockslides (3rd June & 27th July).
 - flash floodings (15 August & multiple date in September)
- Extreme events in New Caledonia since May.
 - Extreme drought from May to July 2023: - 74% precipitation deficit. Dryness of the plant cover was amplified by the Tradewinds, which blew more often than
 - Consequences: an upsurge in bush fires, agriculture in difficulty

Kotoni Faasau, Samoa presented on behalf of Polynesia

- Samoa events from May.
 - heavy rain on the 8th of June destroyed multiple roads on Savaii
 - Late dry season onset resulted in may dry vegetation, increasing chances of a fire.
- Cook Islands Events from May.
 - Heavy swells (April)
 - Soil/road erosion
 - Poor performance/yield of certain crops (e.g., Watermelon)
- Tonga events from May.
 - Enduring a drought now
 - Lakes and vegetation are drying up.
 - Excessive heat and dryness lead to plant stress
- Tokelau events since May
 - 2-3 weeks no rainfall
 - May to July have been very dry for Atafu and Fakaofu.
 - Some families ran out of water and refilled from community hall tanks.
 - Severe dusty roads in which Atafu and Nukunonutoban banned all vehicles from running on the roads.
 - Severe influenza outbreak which might be a result of the extreme heat.
 - Vegetations hedges turned brown

Kikuko Kaleb Mochimaru, Palau presented on behalf of Micronesia

- Monsoon Season from June to Oct./Nov. Brings torrential rainfall, hazardous winds, continuous rain. Obscures the view, becomes Hazy.
- Kiribati extreme events: Strong winds reported from Nikunau on 29th September 2023. Strong winds on South Tarawa reported on 24-25th September 2023, heavy rainfall, extreme spring tide.
 - Impacts: damaging land-spout, gradual improvement of groundwater salinity, dengue fever outbreak, reef fish aggregates, land erosion, seawater inundation and agricultural pest's outbreak.
- Extreme events in Chuuk (FSM) since May 20th, 2023: Prolonged periods of very wet conditions
 - Impacts: soil erosion and nutrient loss, oxygen deprivation, disease and fungal issues leading to rotting of sweet potato, eggplant, cucumber, cabbage, yam, sakau (farmers had to harvest prematurely to sell what they had), flooding and landslides, water contamination of wells, rivers and streams, marine and land transportation difficulties e.g. increased cancellation of flights, risk for fisherman, increase in pot holes and unsafe to drive, increase in disease outbreak e.g. diarrhea, typhoid and ocean sedimentation.

Dr. Gibson Susumu, SPC, Impacts of Climate Change on the Agriculture Sector

- Summarized some of the causes of food insecurity: Limited arable lands, surveillance in at least 5 countries have shown significant recurrence of pests and disease problems in the region, declining food production per capita due to aging of farmers and outward migration, high dependency of imports, NCDs due to reliance on poor nutritious foods, increasing population with average agriculture annual growth rate decline, land degradation due to a combination of these challenges.
- Noted the Climate change impacts according to the communities:
 - Fruiting season of crops such as mangos and breadfruit.
 - There has also been an impact to the seasonal production of root crops such as yam.
 - Certain pests and diseases were impacted such as an increase in pest and diseases of bananas and sweet potato.
 - Taro Leaf Blight in the Solomon Islands has also increased in the selected areas.
 - A decline in productivity of cassava which are due to soil health issues.
 - Overall, their area soil health issues affecting production and productivity in general in the countries.
 - Specifically for livestock, we see the reduced performance and productivity as well as an increase in livestock diseases.
- Presented a summary of SPC's approach to building resilience:
 - SPC developed a comprehensive community based participatory vulnerability and food security assessment to determine factors contributing to the vulnerabilities so adaptation responses can be devised around.
 - From the vulnerability assessment, SPC then works with governments and communities to develop adaptation strategies for communities.
 - Implementation is jointly with government, partners and communities.
 - Evaluation of interventions to support scale up and out of lessons.
- Stated that food and nutrition security are an ongoing concern in the region, require effective partnerships at all levels.
- Noted the need for collaborative efforts to streamline data and information and improve communication channels to support dissemination of climate data and information.

Discussion

- SPC: asked how the media receives cyclone and weather info and how this is disseminated across the region. Sometimes this information is missing from the media, for example, we may get cyclone coverage from PNG towards Tonga but ignore those further north.
- SPC: suggested to colleagues at the Pacific Climate Change Center that it is important to include the impact statements from the NMHS's in the next PICO, also looking at the IPCC and publications. Also suggested including more country impact presentations in upcoming PICO.

Session 3: Looking back long term: Status of key variables.

The Meeting:

Presented by John Mara, NOAA

- Stated the global mean sea level has risen 9.1 cm since 1993. 21cm – 24cm from 1880. Average rate is 3.3 mm since 1993.
- Explained this rise in sea level can be caused by:
 - Heating of the ocean, which causes the water to expand; and
 - Melting of glaciers and ice sheets, which transfers water mass from the land to the ocean.
- Natural patterns of variability play an important role in regional and local variation in sea level – they can reach 30 cm above or below normal.
- In some cases, the increase in minor flooding since 1980 is dramatic:
 - Guam from 2 to 22 times/year.
 - Majuro from 2 to 20 times/year; and
 - Pago Pago from 0 to 102 times/year.

Tropical Cyclones and Surface Winds presented by Simon McGree, BOM

- Discussed the trends in tropical cyclones (TCs) which have been examined for the Western North Pacific over 1981 to 2022 seasons and the Southwest Pacific for the 1981/82 to 2022/23 seasons. Results:
 - For both hemispheres in the Pacific region, there has been a decline in the total numbers of tropical cyclones and a decline in numbers of severe TCs (Category 3-5). In the Southwest Pacific the proportion of TCs that become severe TCs has also declined.
 - Trends in the most severe TCs (Category 5) at a sub-regional scale and numbers of TCs within national EEZs have not been examined as there are insufficient numbers of TCs in the historical record to produce a reliable trend.
 - There has been a strong increase in the percentage of wind occurrences greater than or equal to 34 knots (cyclone intensity) in the subtropics of the south Pacific. The same does not apply to the northwest Pacific subtropics.

Discussion

- BOM: responded to Tahiti's question on the movement of cyclones and its possible influence on trends in the South. The answer was that it could be a possibility but it's not something that the Bureau has investigated.
- BOM: responded to New Caledonia's inquiry into the need to analyse TC data from the 80s to 90s. BOM responded that the TC dataset at the Bureau is managed by Yuriy Keleshov who has spent time studying the datasets' homogeneity from the 1981 period. While there is mainly confidence with the dataset, there's still concerns with the early 80s data.

Session 4: Looking Forward – Monthly and seasonal outlooks for November 2023 to April 2024

NOAA and BoM presented the guidance for the upcoming season for atmosphere, ocean, and tropical cyclones respectively.

i. Atmosphere

The Meeting:

Presented by Elise Chandler, BOM

- Stated that there is good agreement between Pacific Regional Climate Centre models and multi-model ensembles for most of the Pacific region over the coming six months. Good agreement between high quality models is common during El Niño.

Rainfall:

- Below normal rainfall over the November 2023- January 2024 period is favoured between southern PNG and Southern French Polynesia, northwest Pacific between Palau and the Northern Marshall islands.
- Above normal rainfall for the same period is favoured between northern PNG islands, eastward to Kiribati including Tokelau and the northern Cook Islands
- Confidence in the outlook is highest in the central equatorial Pacific and in parts of southwest Pacific. Confidence lowest in the subtropics of the northern hemisphere, a typical El Niño pattern
- The El Niño-like rainfall outlook pattern continues over Jan-Mar 2024. For this period there is a wetter outlook over northern PNG, Solomon Is, central Pacific, northern and central French Polynesia. There is a higher chance of below normal rainfall over the north Pacific Islands over this period.

Air Temperatures:

- Above normal air temperatures are favoured over November 2023 to January 2024 for most countries except the northernmost islands around the Northern Mariana Islands.
- Near normal air temperatures are favoured around southern Fiji and Vanuatu. Sea surface temperature and air temperature outlooks align well. This is to be expected where ocean temperatures drive air temperatures. The air temperature outlook for January to March 2024 is like that for November 2023 to January 2024.

Mean sea level pressure:

- Positive mean sea level pressure anomalies (higher pressure) are favoured in the western tropics over November 2023 to January 2024.
- The negative anomalies (lower pressure) extend southeast to the southern Cook Islands. Negative MSLP anomalies, are present in the central equatorial region.
- there is a north/northwest air flow anomaly (stronger southeast trade winds) through the South Pacific subtropics' region into the western warm pool region. This is common during

El Niño events where weaker trade winds and greater than normal warm/wet air flow directed south/southeast.

Discussion

- APEC CC: enquired as to why the figures in the consensus outlook were from September instead of the latest release by the WMO lead centre.
BOM: replied that the Bureau does use the latest figures and statements and that the figures in the presentation did not reflect the actual consensus outlook.

ii. Ocean

The Meeting:

Presented by Ben Noll, NIWA

- The oceanic set-up in 2023 is unlike past strong El Niños as there is widespread above average warmth in the equatorial Pacific.
- Multi-model agreement on above average sea surface temperatures to March 2024 and very likely continuation of El Niño
- Multi-model agreement on lower-than-normal sea levels in the western Pacific, enhanced coral bleaching risk with lower tides + warmer than average seas
- Marine heatwaves occurring near the equator, expected to continue and contribute to coral bleaching risk – Kiribati, FSM, Marshall Islands, Solomon Islands (early 2024), Papua New Guinea (early 2024)
- Higher sea levels along equator (Kiribati) – risk for coastal impacts during highest tides
- Fisheries convergence zone expanded north and east.

Discussion

- NOAA: reminded the participants that there is a possibility of bleaching with low stand.
- PIFON: Questioned how all the information presented is getting to policy makers and eventually easing the impacts on marine resources.
Facilitator: explained that there are currently 8 NMHSs that produce ocean bulletins, and that is how the information reaches relevant authorities. NCOFs are also a good way of getting the information out to stakeholders.

iii. Tropical Cyclones

The Meeting:

Presented by Victorie Laurent, Meteo France

- Presented the results of various TC outlooks:
- BOM TC outlook November 2023- April 2024:
 - An 68% likelihood of having below average number of tropical cyclones in the western South Pacific region this season, with model accuracy historically being low.
 - Average - above average number of tropical cyclones is expected for the eastern South Pacific (60% likelihood of being above average), but model accuracy is historically very low for this region.
- NIWA TC outlook November 2023- April 2024:
 - Elevated activity: Vanuatu, Fiji and the Northern Cook Islands.
 - Normal or elevated activity Wallis & Futuna, Tuvalu, Tokelau, Niue, Samoa, American Samoa, Austral Islands, Southern Cook Islands, Society Islands, Tuamotu Archipelago and Marquesas.
 - Near normal activity: Solomon Islands and Tonga
 - Normal or reduced activity Papua New Guinea, New Caledonia and Northern New
 - 9 to 14 named TCs could occur in the Southwest Pacific from November 2023 April 2024.
 - Between 4-8 severe TCs reaching category 3 or higher may occur anywhere across the region
- ECMWF TC outlook November 2023- April 2023
 - Reduced numbers of tropical cyclone: for island between 20° and 30° of south latitude (Tonga, New Caledonia, and the south of French Polynesia)
 - Enhanced numbers of tropical cyclones: for island between 10° and 20° of south latitude to the west of the International Date Line (Solomon Islands and Tuvalu)
- RSMC Nadi TC outlook November 2023- April 2023
 - Eight to fourteen TCs are expected. On average, around seven TCs affect the RSMC Nadi TCC AoR per season. Thus, above average number of Tcs.
 - On average, around four TCs affect west of Dateline and around three affect east of Dateline per season. This season four to six TCs are expected to affect west of the Dateline, which means near average or above average TC risk. To the east, six to nine TCs are likely, which is an above average risk.
 - For severe TCs (Category 3 or higher), above average risk TCs are anticipated this season, with five to seven severe TCs expected. On average, around three severe TCs affect the RSMC Nadi TCC AoR per season.
- The established El Niño in the tropical Pacific Ocean has influenced this year's tropical cyclone season forecast.

Discussion

- Samoa: Concerning tropical cyclones, enquired if its ok to work with a different service, for example, BOM, before releasing the national statement or to wait for PICOF.

BOM: replied that that is fine, reminded everyone that Fiji Met and NIWA released statements a week before PICOF. Contact the RCC-N Coordinator for assistance.

- New Caledonia: requested if BOM and NIWA could release the outlooks after PICOF as it was released a little too early this year and it caused some panic. The country is current in a drought and concerns on bush fires were high without the cyclone outlooks.

Session 5: Looking Forward - Long-Term

The Meeting:

Presented by Dr. Savin Chand, CSIRO

- TC frequency is a highly debated feature of TC projections, since our knowledge of the potential mechanisms associated with TC frequency is not as robust as those associated with intensity of rainfall. There is general agreement in modeling studies that TC frequency in the Southern Hemisphere (SH) will decline and/or shift poleward.
- There is a consensus from theory and climate modeling that the strongest TCs will get stronger globally in the future and will at least become a larger fraction of total TC frequency. However, basin-wide projections are more uncertain.
- TC size and translational speed are an important determinant of storm surge risk and wind damages. There is no consensus between studies on how these characteristics may change in future, under enhanced warming climate.
- TC-induced storm surge is projected to increase in warming climate. Increases in sea level, average TC intensity, and TC rainfall rates will each generally act to elevate future storm surge risk.

Presented by Dr. John Mara, NOAA

- Flood Frequency and Severity will continue to increase in the Future.
- Near-Term Sea Level Change (2020–2050): As a result of improved science, the time path of scenarios is now more realistic. The range between the Low and High scenarios in 2050 is now 0.28 m (i.e., 0.15 to 0.43 m rise relative to a 2000 baseline).
- There is less divergence between the GMSL scenarios in this near-term period which reduces uncertainty in the projected amount of GMSL rise up to the year 2050. Even if emissions stabilize, we are committed to further SLR for hundreds of years (e.g., 2-5 m) by 2150.
- Long-Term Sea Level Change (2050–2150): The GMSL is projected to continue to rise, the amount depending on the emissions pathway. Due to regional influences, sea level is projected to rise slightly faster in the Pacific than the global average.

Discussion

- CSIRO: responded to a query on the method for extracting data from models. The response was that the state-of-the-art technique is not model or threshold dependent. It looks for the “Marsupial pouch concept” where TC’s are attempting to be protected by the environment and the method detects those environments.

- Palau: questioned if there are studies for cyclone duration like there are frequency and intensity.
CSIRO: replied that there are such studies, from a theoretical point of view, with climate change, tropical cyclones are expected to last longer.
- SPC: stated that it believes that it is important to incorporate the land component into the greater sea level conversation. In particular, understanding the influence of elevation of land on the mean sea level, so changes in sea level of 5cm or 10cm can be better communicated.

Session 6: Annual to Decadal Prediction

The Meeting:

Presented by Melissa Seabrook, UK Met office

- Decadal predictions bridge the gap between seasonal forecasts and climate change projection.
- The WMO lead centre for annual to decadal climate prediction provides forecasts for the next 5 years.
- A climate update report summarizing the key findings is published every May.
- Key headline from 2023 is that there is a 66% chance of exceeding 1.5°C global temperature in the next 5 years.
- Although there is not a high grid point precipitation skill for the PICO region, statistical techniques could be used to predict a large-scale index which is related to precipitation this technique worked with.

Discussion

- SPREP: inquired on the customer base of the UK Met office.
UK Met: replied that it was mainly academics and government. Hoping to expand on the users.
- CSIRO: stated that La Niña events have occurred more often the last decade, unfortunately models don't catch that very well. Does the UK Met see more El Niño or La Niña events from predictions going 5-10 years ahead?
UK Met: replied that they don't investigate individual years and can't comment on individual events, however, they would forecast a likelihood of having a strong El Niño signal in the next 5 years.
- Vanuatu: was curious if the models can predict events like the twin cyclones that hit the country earlier this year.
CSIRO: responded saying that this event was unprecedented in the Pacific in official records, but stated that from a theoretical point of view, considering climate change and warming SST, when a cyclone passes, the ocean may warm faster creating conditions for another event to form soon after the first. Models can't predict these twin events now, but that situation is slowly changing.

Session 7: Summary of Proceedings and feedback

- The PICS Panel Vice Chair closed the workshop for the day

Annex 1: Agenda

Time	Agenda Item	Responsible	Guidance
8:30am - 9:00am	Registration	SPREP	
9:00am - 9:45am	<p>Opening and Setting the Scene</p> <p>Opening prayer</p> <p>Opening remarks</p> <p>Meeting objectives</p>	<p>NMS Rep</p> <ul style="list-style-type: none"> ▪ SPREP Rep ▪ WMO Rep ▪ Fiji Government <p>PICS Panel/RCC Management Committee Chair</p>	
9:45am-10:15am	<p>Session 1: ENSO Status and Outlook</p> <p>Including highlights from Global Seasonal Climate Update (GSCU)</p>	NIWA, BOM, Meteo-France, NOAA, University of Hawaii, APCC , SPREP, SPC	
10:15am-10:45am	Morning Tea and Group Photo		
10:45am-12.25pm	<p>Session 2: Looking Back - Review and Evaluation of May to October Climate Outlook.</p> <p>i. Atmosphere Overview of November to April state of the climate, plus evaluation of the last PICOF outlook</p> <p>ii. Ocean Overview of November to April state of the ocean, plus evaluation of the last PICOF outlook</p> <p>iii. Tropical cyclones Overview of the TCs over May to October</p>	<p>(20 minutes each)</p> <p>NOAA, University of Hawaii, BOM, SPC, SPREP, NIWA</p> <p>NOAA, University of Hawaii, BOM, SPC, SPREP, NIWA</p> <p>NOAA, University of Hawaii, BOM, SPC, SPREP, NIWA</p>	All PICOF sessions are joint presentations. A rep. from the agency in bold will deliver the presentation with support/input from the other listed agencies.

Time	Agenda Item	Responsible	Guidance
	<p>iv. Impacts Overview of climate and ocean impacts over the last six months: NOAA, University of Hawaii, BoM, SPC, SPREP, and NIWA</p>	NOAA, University of Hawaii, BOM, SPC, SPREP, NIWA	
12:25pm - 12:45pm	<p>Session 3: Looking Back Long-Term: Status of key variables</p> <p>A brief examination of long-term trends for variables of interest to Pacific communities: In October 2023, these will be Tropical Cyclones & Surface Winds and Sea Level</p>	(10 minutes each) NOAA , University of Hawaii, BOM , SPC, SPREP, NIWA	
12.45pm-1.45pm	Lunch		
1:45pm - 3:00pm	<p>Session 4: Looking Forward – Monthly and Seasonal Outlooks for November 2023 to April 2024</p> <p>i. Atmosphere PICOFO outlook and RCC Node for LRF individual model/MME guidance and skill comparison</p> <p>ii. Ocean PICOFO outlook and RCC Node for LRF individual model/MME guidance and skill comparison</p> <p>iii. Tropical cyclones PICOFO outlook and RCC Node for LRF individual model/MME guidance and skill comparison</p>	(20 minutes each) NIWA, BOM , Meteo-France, NOAA, University of Hawaii, APCC, SPREP, SPC NIWA, BOM, Meteo-France, NOAA , University of Hawaii, APCC, SPREP, SPC NIWA, BOM, Meteo-France , NOAA, University of Hawaii, APCC, SPREP, SPC	
3:00pm-3:15pm	Afternoon Tea		

3.15pm – 3.45pm	Session 5: Looking Forward Long-Term A brief review of climate change projections for variables of interest to Pacific communities: In October 2023, these will be Tropical Cyclones & Surface Winds and Sea Level	CSIRO, UGCRP, BoM and SPREP	
Time	Agenda Item	Responsible	Guidance
3.45pm- 4.15pm	Session 6: Annual-to-Decadal Prediction What is annual to decadal prediction? WMO Global Annual to Decadal Climate Update for 2021 to 2025	Met Office Hadley Centre	MOHC is the WMO Lead Centre and Global Annual to Decadal Climate
4.15pm - 5.00pm	Session 7: Summary of proceedings & feedback Drafting committees produce Day 1 component of the PICO-13 Report and Statement including media version of the outlooks.		Drafting committee (Communication team) produce Day 1 of Statement (Media version of outlooks)

Annex 2: Participant list

No.	Name	Country/Organisation
1	Walter Tangata	Cook Islands
2	Peter William Graham	Cook Islands
3	Donald Pickering	Fiji
4	Anare Tavo	Fiji
5	Angela Birch	Fiji
6	Karoti Toto Kabwebwenibeia	Kiribati
7	Klaus Jacob	Nauru
8	Andrew John Melanolu	Solomon Islands
9	Harold Norman Vilia	Solomon Islands
10	Paul Bosawai Popora	Solomon Island
11	Tevita Usai Vaea	Tokelau
12	Aleki Manuele	Tokelau
13	Tu'usolo 'Amanakikihe Kaha'u Tonga	Tonga

14	Manatu Samani	Tonga
15	Junior Meter A Lehe Salong	Vanuatu
16	Pakoa Leo	Vanuatu
17	Lucy Andrea Inga Joy	Vanuatu
18	Jayven Jam	Vanuatu
19	Bates Nitoro Manea	Cook Islands
20	Bouchard Tuakeu Solomone	Cook Islands
21	Arieta Daphne Baleisolomone	Fiji
22	Shweta Shiwangni	Fiji
23	Boyd James Mackenzie	FSM, Chuuk
24	Wallace Jacod	FSM, Pohnpei
25	Mwata Keariki	Kiribati
26	Kamaitia Rubetaake	Kiribati
27	Ricky Joram	Nauru
28	Sabestian Detenamo	Nauru
29	Rossylynn Arney Mitiepo	Palau
30	Kikuko Kaleb Mochimaru	Palau
31	Dilwei Maria Ngemaes	Palau
32	Carter Guri	PNG
33	Gabriel Tuno	PNG
34	Kasis Inape	PNG
35	Lee Jacklick	RMI
36	Nover Juria	RMI
37	Kotoni Faasau	Samoa
38	Emmanuel Jacky Etimani	Samoa
39	Max Norman Sitai	Solomon Islands
40	Asi Fangalua Kaufusi Pasilio	Tokelau
41	Akenese Hoponoa Perez	Tokelau
42	Siale Uvea Tahaafe	Tonga
43	Taula Katea	Tuvalu
44	Leiti Setefano Fasiai	Tuvalu
45	Glenda Pakoa	Vanuatu
46	Andrew John Mangau	Vanuatu
47	Moirah Diana Matou	Vanuatu
48	Elise Chandler	Australia

49	Simon McGree	Australia
50	Grant Smith	Australia
51	Geoff Gooley	Australia
52	Stephanie O'Conner	Fiji, SPC
53	Gibson Susumu	Fiji, SPC
54	Zulfikar Begg	Fiji, SPC
55	Judith Giblin	Fiji, SPC
56	Vili Kami	Fiji, SPC
57	Daeun Jeong	Korea
58	Jaewon Choi	Korea
59	Ji Hyun Kim	Korea
60	Dr. Seongkyu Lee	Korea
61	Imgook Jung	Korea
62	Alexander Peltier	New Caledonia, Wallace & Futuna
63	Ben Noll	NZ
64	Bernard Miville	NZ
65	Wati Kanawale	Samoa, SPREP
66	Pata Mase	Samoa, SPREP
67	Naheed Hussein	Samoa, SPREP
68	Terry Atalifo	Samoa, SPREP
69	Philip Malsale	Samoa, SPREP
70	Patricia Mallam	Samoa, SPREP
71	Salesa Nihmei	Samoa, SPREP
72	Yvette Kersalake	Samoa, SPREP
73	Silipa Mulitalo	Samoa, SPREP
74	Victoria Laurent	Tahiti
75	Sunny Kamuta Seuseu	Vanuatu, SPREP
76	Merana Kitione	Fiji, SPC
77	Janita Pahalad	Australia
78	Molly Powers- Tora	NZ
79	Mattaniah Salesa	Samoa
80	Bipen Prakash	Fiji Met
81	Ana Degei	Fiji Met
82	Douglas Fong	Fiji
83	Amy McGowan	Fiji

Knowledge Broker Monitoring, Evaluation and Learning Report

Event	Outputs	Outcomes
ACCESS-S Training 16 – 20 October, 2023 Nadi, Fiji	Media Alert	Media coverage: FBC TV, Radio & Digital: Met Services Developing with Time
	Social Media Post - Facebook Post	
	Participant Certificates - Certificates - Image Gallery Certificate Presentations	
	- Image Gallery Generic - Image Gallery Opening	
PICOF-13 23 October, 2023 Nadi, Fiji	SPREP Webstory - Article on SPREP website - Image Gallery PICOF-13	Fiji Times (Print & Digital): Brace for more cyclones Fiji Times (Print & Digital): Lola not a risk yet Fiji Times (Print & Digital): Senior meteorologist explains severity of El Nino pattern
PICOF-13 Stakeholder Days 24 - 25 October, 2023 Nadi, Fiji	Social Media Post - Facebook Post	
PICS Panel Meeting 26 October, 2023 Nadi, Fiji	Image Gallery PICS Panel Meeting	