



PACIFIC
METEOROLOGICAL
COUNCIL

FIFTH
PACIFIC METEOROLOGICAL COUNCIL
PMC-5



© Secretariat of the Pacific Regional Environment Programme (SPREP) 2023

Reproduction for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder and provided that SPREP and the source document are properly acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written consent of the copyright owner.

Fifth Pacific Meteorological Council (PMC-5)

Apia, Samoa : SPREP, 2023.

70 p. ; 29 cm.



Secretariat of the Pacific Regional Environment Programme (SPREP)
PO Box 240, Apia, Samoa, sprep@sprep.org, www.sprep.org

SPREP's vision: *The Pacific environment, sustaining our livelihoods and natural heritage in harmony with our cultures.*



PACIFIC
METEOROLOGICAL
COUNCIL

**FIFTH
PACIFIC METEOROLOGICAL COUNCIL**

PMC-5

7-9 AUGUST 2019



WORLD
METEOROLOGICAL
ORGANIZATION



Introduction	1
PMC-5 AGENDA ITEMS	3
1 Opening	3
2 Organisation of the Fifth Meeting of the Pacific Meteorological Council (PMC-5)	4
3 Setting the Scene for PMC-5: Objectives and Expected Outcomes	5
4 Report on Actions Taken on Matters Arising from the 4 th Meeting of the Pacific Meteorological Council (PMC) and the Honiara Ministerial Statement	6
5 Pacific Climate Change Science to Services	6
6 WMO Congress and WMO Reform	7
7 The Framework for Resilient Development in the Pacific and the Pacific Resilience Meeting	8
8 Progress on the Pacific Climate Change Centre and relevance to the PMC	9
10 Countries' Reports from National Meteorological and Hydrological Services	11
11 Aviation Weather Services	24
12 Climate Services	26
13 Multi-Hazard Early Warning System (MHEWS)	28
14 Hydrology and Flood Early Warning System	31
15 Marine Weather Services and Ocean Issues	33
16 Communications and Infrastructure	36
17 Training, Education and Research	38
18 Meteorological Services Developments	40
19 Meteorological Services Contribution to Climate Change	41
20 The Pacific Meteorological Desk Partnership and Progress in Implementing the PIMS	42
21 PMC Engagement Strategy	45
22 Media Supporting Meteorological Services	46
23 Review of PMC Terms of Reference	47
24 Venue of the Sixth Meeting of the Pacific Meteorological Council (PMC) and the Third Pacific Ministerial Meeting on Meteorology (PMMM-3)	48
25 Review and Adopt the Report of PMC-5	48
26 Continue Review and Adopt the Report of PMC-5	48
27 Closure of PMC-5	49
Annexes	49



Introduction

The Government of Samoa through the Ministry of Natural Resources and Environment (MNRE) hosted the Fifth Pacific Meteorological Council Meeting (PMC-5, henceforth referred to as the Meeting) at the Tuiatua Tupua Tamasese Efi (TATTE) Convention centre in Apia, Samoa from 7–9 August, 2019. The meeting brought together PMC members from American Samoa, Australia, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United States of America, and Vanuatu. A full list of participants, including partners, donors and observers is included in Annex 1.

The Pacific Meteorological Council (PMC) is a specialized subsidiary body of SPREP, established at the Fourteenth Regional Meteorological Services Directors meeting in Majuro, Republic of the Marshall Islands in August 2011 to facilitate and coordinate the scientific and technical programmes and activities of the Regional Meteorological Services. The PMC replaces the Regional Meteorological Services Directors body and provides policy relevant advice to the SPREP Meeting on the needs and priorities of its member countries and territories in relation to meteorology (weather and climate) and related fields.

The PMC meets on a bi-annual basis.

The PMC-5 was organised around the following objectives:

- i.** Continue to facilitate coordination, networking, sharing of information and discussions among PMC's members, development partners, CROP agencies, United Nations' agencies, collaborating organisations and institutions on current status and advancement of weather, climate, water and ocean services in support of national development and a resilient Pacific;
- ii.** Discuss the contribution of the NMHSs in implementing the Framework for Resilient Development, the Sendai Framework (FRDP), the Pacific Climate Change Centre, and the recent WMO Reform;
- iii.** Review the progress in the implementation of the "Pacific Island Meteorological Strategy" through the PMC Panel work;
- iv.** Provide an opportunity for Women in Meteorology and Hydrology as well as national stakeholders to participate in the PMC.

The expected outcomes of the PMC-5 are:

- i. Awareness of the shared progress of the PIMS and issues since PMC-4;
- ii. Strengthened partnership and networking with development partners, CROP organisations, collaborating organisations and institutions;
- iii. Increased awareness of potential direct access to financial resources by PICTs for development and advancement of weather, climate, water and ocean services;
- iv. Clear linkages provided on how the NMHSs can contribute towards implementing the various strategic priorities outlined in the FRDP and other relevant strategies;
- v. Endorsement of the Pacific Climate Change Science and Services Research Roadmap, discussion on the PMC Engagement Strategy and the Hydrology Gaps and Needs Assessment in the Pacific;
- vi. Updates provided from the PMC Panels (PICS, PIAWS, PIMOS, PIETR, PICI, PHS) on progress of their works and directions for future works of PMC in the development of weather, climate, water, and ocean services.

This report offers a short synopsis of the working papers presented during the Meeting, the key discussion points, and the Meeting recommendations. Action items will be highlighted for ease of reading and a summary of all action items will be included in Annex 2. For more information on a given agenda item please refer to the working papers that were submitted to the Meeting (<https://www.pacificmet.net/pmc/meetings/pmc-5/agenda>).

PMC-5 Agenda Items

■ AGENDA ITEM 1 Opening

1. The meeting was opened with welcoming remarks by the PMC Chair from Samoa, who also acted as the Master of Ceremonies, followed by a prayer from Reverend Maiota Siaea. The meeting was addressed by outgoing PMC Chair. Keynote statements were given by the Director General of the Secretariat of the Pacific Regional Environment Programme (SPREP), and by the WMO Secretary-General Representative and Director of Development and Regional Activities Department. The opening ceremony concluded with a presentation of gifts for special guests and directors, and a video presentation by the Government of Samoa.
2. The Meeting was officially opened by the Honorable Associate Minister for Ministry of Natural Resources and Environment from Samoa.

■ AGENDA ITEM 2 Organisation of the Fifth Meeting of the Pacific Meteorological Council (PMC-5)

2.1 Election of Chair and Vice Chair for PMC-5

THE MEETING:

- **Confirmed** the Representative of Samoa as Chair; and
 - **Confirmed** the Representative of French Polynesia as Vice-Chair:
3. In accordance with the Rules of Procedure, the Meeting host Samoa was appointed as Chair and French Polynesia was appointed as Vice Chair of the PMC.
 4. Mr. David Hiba of Solomon Islands, the outgoing PMC Chair, expressed thanks for the support received since PMC-4, and noted his best wishes to the new Chair and Vice Chair by presenting them with a traditional gift worn by Chiefs of Solomon Islands.
 5. The Chair for the meeting, Mr. Ulu Bismarck Crawley, expressed his thanks to the Meeting and acknowledged the great leadership by Mr. David Hiba in the past two years.

2.2 Adoption of Agenda and Program of Work

THE MEETING:

- **Considered** and **adopted** the Provisional Agenda; and
 - **Agreed** on hours of work;
6. The Meeting reviewed the Provisional Agenda and suggested hours of work
 7. The Meeting agreed to move agenda item 9 to immediately after agenda item 6

2.3 Establishment of a Drafting Committee

THE MEETING:

- **Appointed** an open-ended Report Drafting Committee.
8. The Meeting appointed an open-ended Report Drafting Committee comprising of SPC, New Zealand, American Samoa, IFRC, Fiji, Cook Islands, United States of America, and SPREP. A Report Drafting Committee was appointed to assist with the preparation of the report of the Meeting. While the membership of the Committee is open-ended it should comprise a core of 5 or 6 members. The Vice-Chair of PMC-5 would chair the Report Drafting Committee.

■ AGENDA ITEM 3 **Setting the Scene for PMC-5: Objectives and Expected Outcomes**

THE MEETING:

- **Noted** the objectives and expected outcomes for the meeting; and
 - **Welcomed** the pre-meetings and trainings provided to the PMC.
9. The PMC-5 meeting is convened with the theme, “Science to Services for a Resilient Pacific.” Pre-PMC meetings held during the week 29 July to 6 August 2019 to complement the theme of the PMC, consisting of:
- IMPACT Regional Workshop on IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC);
 - Next Generation of Climate Change Projections for the Pacific and PIETR Panel Meeting;
 - Women Leadership in Meteorology and Hydrology Workshop;
 - Mana Class Communication Training for Met Directors not attending Women Leadership in Meteorology and Hydrology Workshop;
 - Mana Class Communication Training for Participants to the Women Leadership in Meteorology and Hydrology Workshop;
 - 3rd Meeting of the CREWS Pacific SIDS Project Steering Committee;
 - PMC Panel Meetings;
 - Tanoa Session with Donors and Partners PMC-5 is held from 7–9 August 2019.

■ AGENDA ITEM 4 Report on Actions Taken on Matters Arising from the 4th Meeting of the Pacific Meteorological Council (PMC) and the Honiara Ministerial Statement

THE MEETING:

- **Noted** actions taken against the decisions and directives of PMC-4 and the Honiara Ministerial Statement.

■ AGENDA ITEM 5 Pacific Climate Change Science to Services

THE MEETING:

- **Noted** the achievements and initiatives of the projects referred to in this paper which are focussed on 'science to services' relevant to current and future climate change across multidecadal timescales;
- **Recognised** the priority need for ongoing technical support and development of in-country knowledge, capacity and applications in partner PICs in this (climate change) 'science to services' research domain;
- **Recommended** that the new Pacific Climate Change Science and Services Research Roadmap provide key strategic guidance to development and delivery partners as an adjunct to and in support of the ongoing implementation of the Pacific Islands Meteorological Strategy;
- **Agreed to** encourage and requested support from NMHSs and relevant sectors in the delivery of the new NextGen Projections project and in the development of the proposed NextGen Climate Change Science and Services for the Pacific concept note; and
- **Acknowledged** Government of Samoa, PMC and SPREP.

DISCUSSION:

Samoa requested more opportunities for Pacific scientists to be included as authors for peer reviewed publications with the goal of inclusion in IPCC reports. IFRC noted the pending deadline of July 2020 for submitted papers to be considered in WG2 AR6 and recommended that adequate funding be made available to enable Pacific authorship.

IFRC requested clarification on the implications of the release of CMIP6 projections on the ongoing next gen project. CSIRO responded that the NextGen projections project enables development of new features of the CMIP5 projections to enhance utility and functionality of the data for sectors as lead up to developing the NextGen CMIP6 GCMs when they become available. The current project trials different ways of presenting and applying projections science using existing CMIP5 models so that when the CMIP6 GCM archive becomes available new projections can be developed and rolled out in a seamless and timely manner.

■ AGENDA ITEM 6 WMO Congress and WMO Reform

THE MEETING:

- **Noted** the presentation by WMO describing the WMO Constituent Body Reform and the timeline for the transition with relevant meetings over the next two years; and
- **Noted** that regional association V is planning to hold a session sometime during 2020 or early 2021.

WMO presented on the WMO Constituent Body Reform. The aim of the Reform is to make WMO remain fit-for-purpose and to become a more nimble and cost effective organisation. As a result, the World Meteorological Congress (Cg-18, Geneva, June 2018) decided to make significant changes to the structure of the technical commissions (see [Resolution 8](#) of Cg-18), going from eight commissions to two; an Infrastructure commission and a Services commission. Congress also decided to create the Joint WMO-IOC Collaborative Board, the Research Board and the Scientific Advisory Panel. The overall structure of the WMO regional associations remains the same but the role and function of these associations will continue to be reviewed before Congress in 2023. The Reform may have implications for how the PMC organises its work, particularly the PMC panels, and this will be discussed further under agenda item 9.

The Reform aims to make WMO Members and regional associations better engaged in the workings of the technical commissions, which has been traditionally dominated by a relative small group of Members.

The regional association meetings will become better aligned with the Congressional meeting and planning cycles which should be more productive and useful for WMO Members. All six regional association sessions are planning to be next held in 2020, or early 2021.

■ AGENDA ITEM 7 The Framework for Resilient Development in the Pacific and the Pacific Resilience Meeting

THE MEETING:

- **Noted** the Outcome of the Inaugural Pacific Resilience Meeting 2019;
- **Noted** the progress to date on the development of the MandE Framework, Standards of Excellence, Affiliation and the establishment of the IKM Technical Working Group;
- **Encouraged** the strong involvement of the National Meteorological and Hydrological Services in the implementation of the FRDP and PRP; and
- **Recommended** that the Pacific Met Desk explore options for affiliation to the Pacific Resilience Partnership. [Taskforce as a technical working group and to recognize the PMC Panels as affiliates to advance science aspects of their tasking.].

The Meeting was updated on progress in implementing the Framework for Resilient Development in the Pacific (FRDP) and the Pacific Resilience Partnership (PRP) as requested at the PMC-4 in 2017.

Members and partners sought clarification on the final recommendation for the PRP Taskforce to recognize and formalize PMC Panels as PRP Technical Working Groups. Concerns were raised regarding implications for governance arrangements for PMC Panels.

SPREP clarified that the intention was for PMC Panels to be recognized as affiliates of PRP Technical Working Groups rather than to formally become Technical Working Groups themselves. The wording of the last recommendation was changed accordingly.

■ AGENDA ITEM 8 Progress on the Pacific Climate Change Centre and relevance to the PMC

THE MEETING:

- **Noted** the progress of the PCCC;
- **Commended** the Government of Samoa for its commitment to combat climate change and the prioritisation of its grant aid priorities to the PCCC as the host country of SPREP;
- **Commended** the Government of Japan for the construction completion of the PCCC and ongoing commitment to capacity building to address climate change in the Pacific;
- **Commended** the Government of New Zealand for the generous assistance extended to SPREP to operationalise the PCCC with personnel; and
- **Noted** the capacity building initiatives through the PCCC partnerships and encourage the NMHSs to make use of opportunities to enhance knowledge and skills on delivery of science to service products through innovative and collaborative approaches to building resilient Pacific communities.

The Meeting was informed about key milestones achieved for the Pacific Climate Change Centre and the progress on its governance arrangements and the operationalisation of its key functions.

The PCCC will deliver four mutually reinforcing functions: knowledge brokerage; applied research; capacity building through training and learning, and innovation.

Chair of the PMC looking forward to the completion of this work and congratulated all those involved in the project. He noted that we need to make sure this is a vehicle for PMC members to gain the training and capacity building we need.

■ AGENDA ITEM 9

THE MEETING:

- **Requested** the WMO RA V president to work with PMC Chair and Panel Chairs to review the working and governance structure of PMC, and to make appropriate recommendations to PMC-6 regarding the progress of the WMO Reform, the potential establishment of a PMC Management Group, and a dedicated Donor engagement partnership platform; and
- **Recommended** the establishment of a task force to explore the alignment of the PMC and WMO governance structures and develop a timeline to guide coordination. The taskforce should include the Chair, RA-V president, PMC panel chairs together with New Zealand, Australia and open representation from PMC members. Funds need to be identified to operationalise this task force.

The WMO RAV President continued from WMO's presentation in Agenda Item 6. A powerpoint presentation is available for reference.

Following the presentation of the paper, Samoa noted concern that the timing of this recommendation might be premature, given that the PMC has only recently arrived at the current governance structure and WMO reform is still underway.

New Zealand noted the concern of Samoa and agreed in principle with the alignment of PMC to WMO reform recommendation before PMC6.

Australia supported the recommendation made by WMO RAV President to seek alignment of WMO and this council, suggesting that an appropriate timeline be constructed to guide this process.

The Chair then recommended to establish a task force to explore WMO RAV and PMC alignment and review opportunities of engagement and gaps to better enforce the collaboration. The Chair nominated New Zealand and Australia to lead the task force team and include the chair, WMO, and SPREP (5 members).

Marshall Islands congratulated the chair on his appointment and requested the task force be inclusive and provide the opportunity for more PMC Members to be engaged in this working group.

SPREP suggested that the PMC Chair, RA-V President and PMC panel chairs be part of this task force, and open to all membership in addition to Australia and New Zealand. The Chair and the RAV President will continue to discuss throughout the week, with further decisions proposed by the end of the meeting.

■ AGENDA ITEM 10 Countries' Reports from National Meteorological and Hydrological Services

NMHS reports and statements were submitted to the Secretariat prior to the Meeting and summaries of plenary reports and discussion, including key priorities, needs, and gap, are included.

10.1 American Samoa

American Samoa country report was presented by Ms. Elinor Lutu-McMoore, Meteorologist-In-Charge, NOAA NWS WSO Pago Pago. American Samoa focused on Building a Weather Ready Nation (WRN) through providing Impact-Based Decision Support Services (IDSS). IDSS is focused on strengthening partnerships and outreach. Some highlighted projects include the completion of the Maritime Hazard Tsunami Maps, the successful host of the Intra-Samoa Multi-Hazard Early Warning Systems and Disaster Management Forum, which highlighted the presence of WMO Representative (Henry Taiki) and the Disability community. Furthermore, American Samoa acknowledges the hard work and collaboration of Salesa and team in leading the development of Tropical Cyclone tracking maps. American Samoa strongly acknowledges the support of the Pacific Region Director of the U. S. National Weather, Mr. Ray Tanabe, that supports and overlooks the operations and mission of the met office in American Samoa.

10.2 Cook Islands

- 9 CLEWS installed and operational.
- Increase of staff by 2 to 11; 9M 2F.
- Training at FMS; NOAA; SPREP; COSPPAC etc.
- Launch of new website as of May 2019.
- GCF identifies refurbishment of CIMS among other upgrades.
- Hosted RESPAC and COSSPAC.

In the last two years since PMC-4 in the Solomon Islands, Cook Islands has progressed with the installation of 9 Climate Information and Early Warning System, CLEWS on 9 islands with the assistance of UNDP-RESPAC. Cook Islands also hosted the UNDP-RESPAC Board Meeting and the 12th Session of the COSPPAC Steering Committee. These sessions provided some assistance to hydrology in securing a major asset for water resistivity and assisted the Cook Islands Meteorological Service to launch their upgraded website.

Trainings by Fiji Met Service, National Oceanic Atmospheric Agency, SPREP and COSPPAC were also carried out during this time period due to the increase in staff numbers from 10 to eleven since the last PMC. The Green Climate Fund has also identified some shortfalls in the infrastructure of CIMS and has planned to assisted through a project design that is awaiting approval.

10.3 Federated States of Micronesia

Greetings from FSM to PMC and members. Report from 2017 to 2019.

UPDATES

- 3 officers from weather station completed training in Guam.
- 2 officers also just completed forecasting training in Guam.
- Chuuk office is renovated.
- Sign a contract with NOAA for the three offices in FSM to continue support.
- Members of the PEAC climate discussions forum.
- Himowari satellite is operational and acknowledge help from WMO to FSM.
- CREWS projects to be implement in FSM starting in Chuuk.
- FSM elect a new president in July 2019.
- FSM appreciate support NOAA, SPREP and BoM that help with weather and hydrological services in FSM.

CHALLENGES

- FSM will loss funding at the end of combat in 3 years but assurance for funding to continue.
- Hope to have 2 more officers in FSM.
- Establish climate division in FSM and hope this happen in the future.
- improve coordination with the officers.
- Communication between the islands is a major issue.
- Need to increase development of human resource.
- Still have issue with internet within the islands and hope fibre optic cable can solve this soon.
- Chuuk has lot of population living on small islands and getting information to this place is an issue. There is need to improve communication to the islands through HF radio and other means to the islands.
- All weather services staff in all 3 stations have completed cohort of training through Pacific Desk in Guam supported and delivered by NOAA and 2 out of the 3 WSOs have completed 2nd cohort training.
- Completed new and renovated Weather Service Office in Chuuk supported by NOAA.
- Five year fix contract signed with NOAA through the NOAA Pacific Regional Office in Hawaii.
- Himawari Cast Satellite in Chuuk is operational which was supported by JICA and WMO.
- **Key challenges:** sustainability of WSOs' capacity and staff; communication including internet connectivity with low lying islands.

Report covers the period 2017–2019.

ACCOMPLISHMENTS

- As of today, all weather services specialists in all 3 stations completed cohort training through office in Guam. Training was supported by Giner, Ray and Genny.
- 2 of each from the 3 WS office have completed second cohort training in Guam provided by Pacific Desk in Guam.
- Completed new and renovated Weather Service Office in Chuuk, supported by NOAA through Pacific Region HQ in Honolulu.
- 5 year fixed contract with Pacific Region HQ NOAA with annual renewable based on performance.
- FSM WSOs are active members of the PEAC (Pacific Enso Application Concepts) monthly that provides three-month climate outlook for the USAPI including American Samoa and the Hawaiian Islands.
- Himawari Cast Satellite in Chuuk is operational, supported by Japan and WMO.
- Newly elected President of the FSM has just been sworn in, His Excellency Mr. David Panuelo of the state of Pohnpei.
- Acknowledged support by NOAA, BoM, SPREP and others to improve weather, climate and hydrology services in FSM.
- The proposed CREWS will soon be implemented in the FSM (Chuuk) hoping for replicating of the project in Pohnpei and Yap.

CHALLENGES:

- COMPACT of Free Association in 2023 government will lose funding.
- Need to increase number of meteorologists.
- Need to establish climate services in WSO.
- Need to improve coordination between Disaster Office and WSO especially in Chuuk (an internal issue).
- WSO staff nearing retirement and there is a need to build the capacity of young officers.
- Communication between main island and outer islands is still a problem.
- Need to increase development of human resources and develop their capacity.
- Issues on internet connectivity throughout FSM, need to upgrade speed and reliability.
- Need to improve collaborations between WSOs and major stakeholders.
- Need upgrading communication systems in low lying islands for example HF radios, etc.

10.4 Fiji

- Fiji's report has been uploaded on the PMC website.
- Talanoa dialogue as a platform to raise more Pacific Met issues.
- Acknowledge the chair and former chair of PMC for leveraging the PMC momentum and the late former Director of Fiji Met Services, the late Mr. Ravind for Fiji's work under PMC.
- Aligning Fiji Meteorological Services work to the priority areas of Fiji under the National Development Plan 5 years and 20 years.
- FMS is looking forward to working with other Met services in the region especially on formulating service level agreements on the products which Fiji provides to the region.
- FMS is committed to continuing the role of RSMC-Nadi.
- FMS is working towards operationalising the coastal inundation (CIFDP-F) and flood forecasting (FFGS) work that Fiji is piloting, using RCM scenarios for forecasting Fiji's vulnerability to climate especially vulnerability to severe flooding.
- Currently there are 33 female staff with Fiji Met, constitute more than 80% of workforce.
- Fiji urged the continuance of the talanoa session/spirit to raise to a common platform issues about Pacific Met.
- Fiji thanked donor agencies for the support provided so far.

10.5 French Polynesia

The Meteorological Service in French Polynesia is provided by Météo France, a public establishment in charge of weather services as well as climate, sea surface and snow cover monitoring.

PROGRESS MADE OVER THE PERIOD 2017–2019

Weather services delivery

- More contracts finalized with aerodrome operators according to Single European Sky rules (47 airports regularly operated in French Polynesia, 24 with information delivered to pilots).
- Public website modernized in September 2018 with a development in responsive design that allows much better accessibility from any type of support (mobile phone, tablet, computer).
- Final year of the ERHYTM project (R and D project on hydrological risk on the islands of Tahiti and Moorea) to modernize the hydrological measurement network and better understand the behavior of some rivers in heavy rain, through a collaboration between the French State, the local Government and the University of French Polynesia.

Observation and information systems

- Automation of the radiosonde station of Tahiti-Faa'a at the end of 2018.
- 5 lightning sensors installed in French Polynesia, as part of a partnership agreement signed in 2018 between Meteo France and TOA Systems with the support of the Met Service of NZ.
- New high-resolution data reception system of the GOES-17 satellite in Tahiti-Faa'a.
- Upgrade performed on the link between Tahiti and France (8 Mbps Internet connection).

Other actions

- Training of forecasters, especially in the field of cyclone forecasting.
- Evaluation of our limited area model (AROME-FP covering the south-west of the EEZ).
- New workstation deployed for forecasters.
- Improvements in seasonal forecasting (with version 6 of the French ARPEGE climate model).
- Quality Management System : MF is ISO 9001:2015 certified since early 2018.

OUTLOOK FOR THE NEXT 2 YEARS

- Ongoing actions will of course continue.
- At a national level, within the scope of the national project to modernize public action that was launched at the end of 2017 by the French Prime Minister, actions are being taken in French Polynesia with the following objectives by 2022:
 - automate other human surface observation stations than Tahiti-Faa'a.
 - optimize production, reduce the number of forecasters, specialize them on the safety of people and goods, and on high added value services.

Despite this context, first steps are currently taken to fund two major infrastructures:

- a precipitation radar on Tahiti island, in particular to cover the urban area.
- a new building for the service, currently located in the only possible extension area of the Tahiti-Faa'a air terminal.
- On the international side, a MoU was signed at the end of 2017 between MF and SPREP to provide enhanced support to the Pacific meteorological community. The first concrete action in this context is the organization of the next PICOF meeting (October 2019 in Noumea. Other actions will follow under this MoU, and within the framework of the Pacific Initiative for Climate and Biodiversity launched earlier this year by the French President himself.

10.6 Kiribati

- Establishment of weather stations in outer islands are made possible through donor funded projects such as CROSPAC.
- Developing capacity to deliver quality met services and products.
- Require regional supports from PMC partners for resourcing capacity (technologies).
- Same sentiment with other speakers thanking the Government of Samoa as the PMC chair.
- Achievements – completion of a Met Office on Christmas Island to serve the far east, which is 2 hours ahead, thanks support provided by donor.
- Establishment of more weather station in other islands, transmitting data sets on an hourly basis, to mainland – thanks UNDP for the support.
- Thanked CROSPAC project for allowing a staff member to complete training at the BOM in Australia last year.
- Support from the water security project through SPC saw nine automated rainfall gauges being established.
- Kiribas Met plan is in line with Government 20 years plan.
- Future planning – strengthen effort for the met office to deliver quality and more reliable services, revision of the Met Act, marine weather observation in its waters from ships.
- More staffs trained is planned, looking for partnership for resources with PMC members.

10.7 Marshall Islands

- COSPPac project enabled them to train their Met staffs and collaborate for early warning system using traditional knowledge.
- Demand for weather services especially advise and products have increase, and working towards increasing their efficiency.
- Echoed the same sentiment to the hospitality of the Government of Samoa and also as the PMC chair.
- Capacity building in RMI achieved through partnership, looking forward to new ones from PMC members.
- Thanked the Pacific Met desk for supporting 3 levels Courses to train staffs, this contributed to high productivity of work in RMI.
- Continue to engage the support provided by the CROSPAC programme, especially collaborating with partners and stakeholders on early warning system based on traditional knowledge.
- Involved and fully support the UN Oceans related work.
- Have seen increase in demand for weather services – product and advise, especially on water and sanitation.
- Staff is now well-trained with climate related scenarios and could do more community capacity development.
- Partnership with UNEP, UNDP, PREP2, WB will bring more DRM and CC adaptation support that will immensely help RMI.

10.8 Nauru

10.9 New Caledonia and Wallis and Futuna

10.10 Niue

10.11 Palau

10.12 Papua New Guinea

- Made improvements amidst declining infrastructure.
- >20 activities.
- Major milestone achievements.
- 1 of 9 countries recognized for ?
- I CANT HEAR THE SPEAKER!
- 36 pilots?
- Delivered training to ?? ocean services, pilots.
- UNDP WestPac major sources of collaboration.
- **Challenges:** finding relevance since PNG lacks TCs and SLR issues.
- Ground based observational infrastructure problems.
- Congratulate Samoa for successful PMC meeting and hospitality.
- National weather service – decline infrastructure, 11 key outcomes.

SOME MAJOR ACHIEVEMENTS:

1. NWS – Certificate IKO sti.
2. Last 2 years submitted.
3. Indefinite strike to highlight Organization has been restricted – resulted in anticipated grants crucial for progress.
4. Recruitment of 36 pilots.
5. Operational forecast guiding system – developing partners expressed appreciation.

CHALLENGE:

1. Trying to find their relevance in WMO as PNG's location – no cyclones, sea level rise etc.

10.13 Samoa

- Thank all colleagues for the kind words to the people and the Government of Samoa including the organising committee.

ACHIEVEMENTS FOR THE PAST 2 YEARS

- Developed a quality management system to ISO standards and international guidelines on met related quality assurance.
- Upgrading works in office, disseminated quality products to stakeholders especially airlines.
- An Active website that is uploaded frequently with weather reports.
- Marine weather services on marine products such as tide gauge and portal are now accessible with support provided by SPC and SPREP and the Global Oceans product.
- WB/SPC/WMO support for prep projects to upgrade weather forecasting, benefit from GeoScience project.
- Staff went for further training in Japan 'Next Generation' products.
- An improved Tsunami's early warning (centre) system, thanked the CROSPAC project for support in this area.
- Climate change activities – upgrade needed as it was last upgrade in 2014, thanking support provided BOM/NIWA/CROSPAC/CSIRO in this area and climate prediction services supported through the Government of Korea (precise 6 months projections) and downscaled to national scale.
- Strengthen hydrological services – working together for flood forecasting system and water level data, this is a new development. Samoa have had issues with flash floods.
- Looking forward to integrating all meteorological and hydrological project data types. Issues still exists with different data formats, working with NIWA on this regard.
- Improved coordination with other sectors, Climate Change sector, Water Resources division and other local authorities to provide advice on climate related areas.

10.14 Solomon Islands

- Grateful for the opportunity to present Solomon Islands achievements.
- They have continuous partnerships with other organisations in the work they are doing and acknowledge their support.
- They have an approach of reaching the community through a partnership with NGOs under the Australian Humanitarian program, four communities working on TK and EWS. It's going well and through the project, it has helped them expand their human resources through the recruitment of one officer.
- RESPAC project with UNDP, they are working closely with the water resource division, UNDP RESPAC have expanded the hydro stations around Solomon Islands, it's a continuation from a previous project. Under RESPAC, it helps in addressing their water issues and acknowledges this support from UNDP RESPAC.
- In terms of Tsunami, the communities are preparing evacuations plans mainly the ones affected in previous tsunami and this initiative have expanded to include schools.
- The Solomon Island Ministry of the Crown and the Transport Ministry of Taiwan is in a bilateral arrangement under a project that includes downscaling numerical weather observations to 5km resolution, this is also a partnership with seismology and NDMO. Also, it includes the expansion of weather observation stations. Previously agreed on tsunami warnings for the populated areas of Sol. Tsunami is one of the hazards that keeps occurring and is a major concern for them.
- Collaboration with Health Ministry and Taiwan includes a climate EW on Malaria.
- EQ and tsunami partnership with NDMO and seismology and ICT Unit, established 5 seismic stations and all have connected to ORSNET network.
- Major activity ongoing is getting certification part 1745, currently trying to address some of the issues.
- Couple of trainings to mention, acknowledges Ginger for hosting this training for Solomon Is. staff, they are looking at scholarship via WMO centres in Europe for the expansion of staff capacity.

CHALLENGES

- Need proper office, looking at infrastructure project such as ministry office, design is in place but seeking funding.
- DMO joint early warning centre as part of the regional project, design already in place.

RECOMMENDATION

- Expansion of observation network especially with colleagues in Vanuatu and Fiji to come to an arrangement of sharing data with the Government of Solomon Islands.

10.15 Tokelau

10.16 Tonga

10.17 Tuvalu

10.19 Vanuatu

UPDATE ON ACHIEVEMENTS OF THE NMHS FROM 2017–2019

- Install and maintain 11 automatic weather stations around Vanuatu and 7 synoptic stations.
- Improve and update VMGD website for automated products uploads and warning dissemination.
- Installation of weather forecasting displays at Pekoa Air traffic Controller Office.
- Renovate 7 outstations offices and upgrade their communication systems, desktops and displays for the provinces.
- Conduct National Climate outlook forum for VMGD and its climate stakeholders.
- Incorporating Climate services into health sector through a memorandum of understanding.
- New products (EAR Watch) developed and disseminated to stakeholders, continued engagement with regional and international partners on climate issues.
- Development and issuance of the Vanuatu Ocean Outlook for Fisheries and coastal communities.
- 18 new staff recruited.
- Continue to build partnership with other NMS in the region.
- Projects with JICA to provide on job training.
- Thank WMO for their support for capacity development.

Weather services:

- Review document to be certified under ICAO.
- Improvement in the website with automatic updates of information.
- Vanuatu climate update is issue on a monthly basis and disseminated to sector and general public.

Projects:

- Green Climate Fund project with SPREP, BOM, APCC and CSIRO to improve climate services to 6 sectors.
- COSPPac project help developed the Early Action Rainfall (EAR) Watch and Marine Bulletin.

Coordination:

- Work with other partners to develop projects and continue to request support in this area.

- Thanks partners (SPREP, SPC, APCC, BOM, CSIRO, France and WMO) for working closely with VMGD.
- Identify Gaps and Future Needs that would improve the National Meteorological and Hydrological Services The main Gaps and needs identified to improve VMGD services are:
 1. Formal training for newly recruited staffs in Meteorology
 2. Identify appropriate flood forecasting systems to improve services in flood forecasting
 3. Provide appropriate training for all staffs in relevant field to boost capacity, motivation and knowledge in weather, climate and GeoHazards
 4. Linux training is a requirement these days to be able to run latest observations and forecasting systems for weather climate and Geohazards
 5. Specific technical training is required not only for technicians but also for senior staffs to better understand the tools used for analysis so that they could better supervise, mentor, and coach the junior staffs under their supervision. This would help to ensure consistent data availability, quality and quantity at all times.
 6. For the sustainability of the meteorological and geo-hazards observations network recruitment of a well experienced engineer is required to provide guidance for further development
 7. Project management and leadership training is also required for the senior staffs
 8. A strong administration team would be useful to better support the technical Divisions to deliver the services accurately and in time
 9. Strengthening of legal framework to better manage VMGD data, assets and resources for effective services
 10. Capacity gap analysis is required to develop the human resource development and succession planning for the Department

10.20 Australia

- Commitment to the Pacific is strong and will continue to provide support the Pacific NMHSs operations.
- Australia Bureau of Meteorology (ABoM) has been engaged and working with Pacific NMHSs for many years through aid funding, project and programme funding.
- ABoM has provided training to Pacific NMHSs through its Training Center in Melbourne.
- Highlighted 3 partnership in the Pacific and with Pacific NMHSs.
 - 2nd Phase of COSPPac approved with AU\$26 million to year 2022, involve 12 Pacific Island Countries.
 - Partnership with Papua New Guinea on capacity development project.
 - Partnership with Solomon Islands Met Service on community programme in the Solomon Islands.
- All these partnership and programme happening while changes in the ABoM following breached of ICT protocol 2018.
- Committed to Pacific is strong and continue to Pacific NMHSs operation.

10.21 New Zealand

New Zealand's activities have covered all of the priority areas of the PIMS, and are either funded or provided through different agencies, including the Ministry of Foreign Affairs and Trade (MFAT), MetService, NIWA and the New Zealand Civil Aviation Authority (CAA).

In 2019 MFAT became a funding partner on phase 2 of the COSPPac programme. New Zealand's support includes funding for the CLiDE system and has enabled NIWA to install and customise the associated product generation system, as well as to provide tailored training for Pacific NMHSs. MFAT has also supported the Pacific Risk Tool for Resilience (PARTner) pilot, with the Governments of Vanuatu and Samoa. This project integrates a disaster impact mapping and modelling tool, called RiskScape, to assist with risk-based decision-making in the Pacific. This work has also been recently extended to the Marshall Islands and Tuvalu.

NIWA has worked with Pacific Island countries to implement the WMO Framework for Climate Services through the CLEWS programme. This effort will expand considerably over the next three years under NIWA's involvement with COSPPac. NIWA has also implemented climate, flood and coastal hazard early warning systems, notably through development of operational systems in PNG, Fiji, and Tonga. In a related effort, NIWA will soon commence work with Samoa's Ministry of Natural Resources and Environment to implement an impact-based flood warning system.

MetService continues to support Pacific NMHSs on both technical and forecasting matters, including MetService's commitment to the SWFDDP, through the hosting of the website MetConnect Pacific and the daily production of the 5-day severe weather South Pacific Guidance. MetService has also continued to provide specialised technical staff to perform in-country maintenance and remote assistance for GCOS Upper Air Network station equipment at both Funafuti and Tarawa. Over the past 18 months MetService has worked in partnership with TOA Systems to establish a lightning detection network for the Pacific.

Finally, New Zealand recognised the importance of improving aviation weather services in the Pacific, and has continued to participate in regional aviation exercises, including the VOLCEX Volcanic Ash exercise which was led by the New Zealand CAA.

10.22 United States of America

10.23 General Discussion on the Countries' Reports

END DAY 1

■ AGENDA ITEM 11 Aviation Weather Services

11.1 Progress on the PIAWS Panel including outcomes of related regional and international meetings and surveys

THE MEETING:

- **Noted** the report on progress of the Pacific Islands Aviation Weather Services;
- **Acknowledged** the development partners and ICAO Member States for their continued assistance to the development of aviation weather services in the Pacific region;
- **Acknowledged** the US NOAA and the University of Hawaii (UH) for their continued support to enable the PIAWS Panel to have its meetings via tele-video-conference facilities;
- **Reviewed** and **endorsed** the updated TOR for the PIAWS Panel as presented in Attachment 2;
- **Requested** members of the PMC to nominate experts from their countries and organizations, and invite Civil Aviation Authorities (CAAs), International Air Transport Association (IATA), and International Federation of Airline Pilots Association (IFALPA) to nominate representatives, as members of the PIAWS Panel;
- **Endorsed** the establishment of a PIAWS Panel Task Team (Members: Fiji, New Zealand, and Tonga) on ICAO compliance: (a) to develop a work plan for addressing deficiencies in consultation with the concerned ICAO Member States; and (b) to understand current capabilities with regards to the IWXXM implementation and dissemination and to develop a work plan to assist each ICAO Member State in the Pacific region to meet the IWXXM requirements. The Task Team is encouraged to complete this work by June 2020 to enable reporting on progress to the ICAO APANPIRG Met SG meeting in July 2020;
- **Endorsed** the nomination, through the Chair of the ICAO MET Panel, of an expert from the PIAWS Panel to be a member of the Met Panel Working Group on the Met Cost Recovery Guidance and Governance (MCRGG) Ad Hoc Group addressing action MCRGG5/01 on the development of recommendations for cost recovery. The expert will be determined by the PIAWS Panel;
- **Encouraged** members of the PMC through their MWOs to coordinate with respective national authorities for participating in and coordination with the ICAO Asia-Pacific Regional Office, APANPIRG Meteorology Sub-Group (MET SG) and its Working Groups (WGs), and Volcanic Exercise Steering Group (VOLCEX SG) on activities such volcanic ash test exercises, SIGMET collaboration and harmonization, and VAACs back-up test exercises;
- **Endorsed** the request to New Zealand to pursue the development of a web portal for issuing Volcano Observatory Notice to Aviation (VONA), subject to funding.
- **Recognised** the benefits to implement the PMC decisions which are related to aviation weather services, given the crucial importance of regular coordination and communication with the ICAO APANPIRG MET SG and its WGs, and VOLCEX SG;
- **Requested** SPREP to provide financial support to the PIAWS Panel to coordinate and communicate with, and participate in the ICAO Asia Pacific Regional Office activities and bodies such as the ICAO APANPIRG MET SG and its WGs, and VOLCEX SG;
- **Requested** SPREP to assist members of the PMC to develop Service Agreements or equivalent between National Meteorological Services (NMSs) and CAAs;

- **Requested** Fiji Meteorological Service to develop Service Agreements with other NMSs in the Pacific region on the provision of aviation services;
- **Acknowledged** Papua New Guinea National Weather Service (PNG NWS) and Solomon Islands Meteorological Service (SIMS) efforts resulting in authorisation by their respective CAA under Civil Aviation Rule Part 174 to provide aviation meteorological services;
- **Acknowledged** Fiji Meteorological Service efforts which will lead to auditing under ISO 9001: 2015 on 20 and 21 August 2019;
- **Requested** SPREP to organize training for NMSs personnel and auditors on ISO 9001–2015;
- **Acknowledged** efforts of other members of the PMC which will eventually lead to compliance with Civil Aviation Rule Part 174 and Part 100;
- **Requested** SPREP to continue to provide assistance to members of the PMC to develop Civil Aviation Rule Part 174 corresponding document – the Aviation Meteorology Exposition and CAR Part 100 corresponding documents – the Quality Management System (QMS) manual and Safety Management System (SMS);
- **Acknowledged** efforts by members of the PMC for compliance with the requirements for competency assessment, and capacity development for the AMOs and AMFs;
- **Requested** SPREP to continue to provide assistance to members of the PMC on competency assessment and capacity development for the AMOs and AMFs; and
- **Welcomed** the progress on the planning of the South-West Pacific Conference on Meteorology for Aviation which is planned for 2020; and members of PMC are invited to consider hosting the event.

DISCUSSION:

- Fiji reaffirmed its commitment towards developing Service Level Agreements (SLA) with other meteorological offices in the region. Fiji informed the Meeting that rather than limiting the SLA only to aviation services, FMS wants the SLAs to cover Public and Marine Services also.
- Fiji informed the Meeting that FMS, together with Airports Fiji Limited and the RESPAC Project is installing four Automatic Weather Stations (AWS), one at the end of each runway, at Nadi International Airport. These instruments, when operational, will provide real-time data including wind direction and speed to all inbound and outbound flights at Nadi.
- Samoa commented that there is a significant leap to attain ISO 9001:2015 accreditation (from 2008), plus the extra work to attain SMS; these are big challenges for the Pacific SIDS. They also struggle with implementing and maintaining the competencies of their observers. Samoa noted that the FINPAC project had an aviation component, but no other projects have addressed aviation needs. Samoa suggested an aviation project would help with addressing these matters.
- The Cook Islands suggested the formation of a group/forum in order to share experiences and advice on attaining CAR Part 174.

The Solomon Islands informed the Meeting that their Part 174 certification will be issued in the next couple of weeks.

The Bureau of Meteorology informed the Meeting that, through COSPPac, the CliDE database has the ability to automate the production of METAR and SPECI. The Bureau has confirmed these formats meet WMO standards and hopes this effort will help reduce human errors in the production of these messages.

■ AGENDA ITEM 12 Climate Services

12.1 Progress on the Pacific Island Climate Services (PICS) Panel

THE MEETING:

- **Noted** the excellent progress of the PICS Panel, in collaboration with other regional and international partners, toward strengthening climate services in the Pacific Islands region;
- **Noted** that membership of the PICS Panel now includes the following new members: FSM, French Polynesia, American Samoa, Fiji, Kiribati, Tonga, CSIRO, APCC and UKMO. The Panel also invites sector representatives to participate as and when needed;
- **Recognised** the financial support for PICS Panel and PICOF meetings provided by SPREP, WMO, the government of the Russian Federation, Australian Bureau of Meteorology, Republic of Korea and other donors;
- **Recommended** the PICS Panel continued its work as outlined in the ongoing priority actions listed above and to regularly review its membership and ToR in consultation with the PMC and others;
- **Agreed to** support and guide the activities initiated by the PICS Panel, in collaboration with other regional and international partners, thus ensuring the sustained and continuous development of climate services in the Pacific Islands region; and
- **Agreed to** encourage appropriate climate services projects/programmes in the region to contribute small funds to support PICS Panel priority activities (e. g. RTSM).

DISCUSSION:

- Samoa noted the importance of the south west Pacific Tropical Cyclone seasonal outlook and suggested that the timing of development be revisited to enable inputs to the outlook during the PICOF. Samoa also recommended further examination of the accuracy and methodology of producing the seasonal tropical cyclone forecast. The Chair confirmed that the suggestions were noted.
- Papua New Guinea commended the work of the PICS Panel in forging a pathway for climate services in the region and highlighted the importance of NCOFs in linking with sectors and developing joint products. PNG suggested that other NMHSs take this approach. The Chair agreed with this suggestion.
- Papua New Guinea recommended explicit reflection of climate change services in the ToR of the PICS Panel. The Chair confirmed that climate change services will be reflected in the work of the PICS Panel and could be incorporated into PICOFs in the future.
- Kiribati acknowledged the excellent work of COSPPac in supporting climate services development in the region.

12.2 Progress on the Pacific Island Regional Climate Centre (PI-RCC)

THE MEETING:

- **Noted** the establishment and progress of the Pacific RCC;
- **Recognised** the value of the Pacific RCC as a hub for regional climate products and services;
- **Approved** the PICS Panel to serve as the coordination committee of the Pacific Island Regional Climate Centre (PI-RCC).
- **Recommended** the PICS Panel continue to work to tailor the RCC so that it meets the needs of all the NMHSs in the Pacific Islands region; and
- **Encouraged** all NMHSs in the Pacific Islands region to utilise the RCC products and actively utilise the Climate Services Help Desk.

DISCUSSION:

- Fiji acknowledged the work of the PICS Panel and requested clarification on how RCC products will compliment products developed by NMHSs. Fiji requested the Panel to ensure that RCC products do not duplicate NMHS products. The Chair confirmed that the main stakeholder for the RCC are NMHSs and the RCC is designed to support them, in line with the WMO guidelines for establishment of RCCs.
- Papua New Guinea thanked the PICS panel on creation of the RCC which is a one stop shop and emphasised that the onus is now on NMHSs to downscale the products to meet their national needs. The Chair confirmed that the Panel and node leads will work to tailor information from the RCC to meet the needs of individual NMHSs.

■ AGENDA ITEM 13 Multi-Hazard Early Warning System (MHEWS)

13.1 Tsunamis

THE MEETING:

- **Noted** the progress and updates from the work of the ICG/Pacific Tsunami Warning System and the PICT Regional Working Group on Tsunami Warning;
- **Acknowledged** IOC, WMO, and other partners for supporting collaborations in progressing development of the global tsunami warning system;
- **Invited** PMC Members that provide tsunami warnings to review the competency framework for tsunami warning personnel version 1 and the guidelines for local tsunami source best practice version 1 and provide feedback to the Chair of the IOC PICT Regional WG of the ICG together with any input recommendations for improving the PTWS; and
- **Recommended** the Chair of the PIMOS panel to work with the Vice Chair of the ICG/PTWS and the Co-Chairs of PICT Regional WG on Tsunami warning and Mitigation to ensure that marine observations, communication infrastructure and other marine and ocean objectives related to tsunami warning and response are aligned with the ICG/ PTWS objectives.

DISCUSSION:

- It was noted that Tokelau still does not have a warning service provider, the request was made to Samoa and New Zealand to follow up to resolve this issue.
- Tonga mentioned with concern that NOAA had removed the two DART buoys close to the Tonga Trench and wanted to know how these instruments being gone impacted the time to warn for an event in the region.
- The SMS service previously provided by NOAA is not functioning. Members noted the value of the SMS to their operations.

13.2 Progress of ORSNET

THE MEETING:

- **Noted** the progress of ORSNET with the availability of ORSNET services to national tsunami warning centres;
- **Noted** the commitment and contribution of all ORSNET countries in the development and running of this regional network;
- **Requested** of ORSNET members to seek more regional contributions to the network to improve long term sustainability noting that these contributions to the system which go to the Pacific Tsunami Warning System to improve early detection and forecasts;
- **Requested** support for ORSNET activities and development towards tsunami early warning; and
- **Noted** the ORSNET bulletins produced for members and indicated there will be future products for volcanic monitoring.

13.3 Upscaling the Development of Pacific Coastal Inundation Early Warning Forecast Systems

THE MEETING:

- **Noted** the considerable progress and ongoing work to support early warning systems and coastal inundation impact-based forecasting in the region;
- **Recognised** the need for tailored coastal inundation forecasting and early warning systems and climate change projections for Pacific Island countries due to their unique bathymetry and hazard exposure;
- **Tasked** the PIMOS Panel to coordinate the development of coastal inundation forecasting and early warning systems in the region to ensure compatibility of services and best-practice methods tailored to reef-fronted island coastlines are employed;
- **Recognised** the urgent need for improved coastal inundation MHEWS and impact-based forecasting in an environment of increasing hazard and risk due to climate change;
- **Requested** development partners to invest in the replication, upscaling and to further build upon the recent successes of operational models in Marshall Islands, Tuvalu and Fiji, thus improving the sustainability and compatibility of these services across the region;
- **Requested** development partners to invest in the expansion of the regional ocean observations network – especially adding to the wave buoy network, and also support the collection of high-resolution baseline (bathymetry and topography) data, to support coastal inundation forecast systems; and
- **Tasked** the PIMOS panel to explore frameworks to share inundation related data between different NMHSs efficiently.

DISCUSSION:

- Marshall Islands acknowledged the excellent presentation from SPC and noted the benefits of their coastal inundation MHEWS efforts in the region.
- Cook Islands acknowledged support from SPC and requested that wave buoys be deployed in their waters.
- The Chair recognised development and research assistance from partners and the need to upscale and implement some of the work as well as recommendations from this work.
- USA noted the lack of observing networks available to PICs and suggested an additional recommendation be included indicating the interest for more ocean observing stations in the region.
- Micronesia supported this intervention and indicated their interest in deploying wave buoys in FSM waters.
- Tonga supported the point made by USA and noted the importance of increased wave and ocean monitoring, in particular, the collection of high-resolution baseline bathymetry data to support coastal hazard models. Tonga also requested to include an intervention emphasising the importance of sharing data from ocean monitoring systems across the region and urging partners to engage and thus enhance replication of successful implementation of coastal MHEWS through data sharing.

13.4 Building the capacity of Pacific Island States to respond to Extreme, Weather, Water and Ocean Events

THE MEETING:

- **Noted** the importance of ensuring information to support preparedness and response to extreme weather events, water and ocean risks;
- **Noted** the need for long-term strategic investment in capability that supports critical gaps in preparedness and response at short time scales;
- **Agreed to** commission through SPREP, in cooperation with members, WMO to coordinate with other CROP agency partners to undertake a study to scope a decadal Pacific regional extreme weather, water and ocean response program initiative; and
- **Agreed to** use the outcomes of the scoping study to inform deliberations at the next PMC Ministerial Meeting in 2020.

DISCUSSION:

SPC thanked the President of RAV for this critical paper and recognised the role of other regional agencies, specifically SPC and IFRC in DRR, ocean science, and hydrology and noted that some gap analysis exist which can contribute toward the scoping study. SPC supports the recommendations and would like to collaborate along with SPREP on development of terms and implementation of the scoping study and may have funds to contribute toward the activity.

WMO suggested that the wording of recommendation 3 be revised to be WMO to coordinate with CROP agencies.

Australia supported the recommendations and indicated interest to devote expertise and resources toward the scoping study.

RMI noted that a scoping activity is what we already know and recommended stronger language than scoping study to focus on action. Recommended to highlight the urgency, recognized the regional expertise that may contribute without waiting for a study to be commissioned.

Tonga noted the suggested timeline is in line with the Forum Leaders Meeting timeline and the importance to articulate a strong position both technically and financially and to raise this issue to the Forum Leaders Meeting. Furthermore, the Meeting need to be able to show the investments that have been made with continued issues. The leaders need to see what has been done and what approach it needs to take to change it for the better. Although Tonga agrees with RMI, it needs to stick with the 2020 goal to make the strongest presentation for the Pacific Islands.

■ AGENDA ITEM 14 Hydrology and Flood Early Warning System

14.1 Pacific Hydrological Services (PHS) Panel Progress Updates

THE MEETING:

- **Noted** the progress of PHS panel including the revised Term of Reference and Workplan;
- **Noted** the Needs and Gaps Analysis undertaken by consultant;
- **Encouraged** Hydrology counterparts and technical partners to provide feedback via online survey;
- **Acknowledged** current support through the Panel Partners, and request continued access to resources and opportunities for the implementation of the PHS workplan; and
- **Recommended** the Council members to further strengthen and extend support and collaboration with hydrologists. This should include sharing of resources, data, and development of joint actions and initiatives for national and regional benefits.

DISCUSSION:

- Australia, Niue, and PNG noted they would like to be included in the PHS panel.

14.2 Flash Flood Guidance System

THE MEETING:

- **Noted** the implementation of the FFGS is a major step towards mitigating some of the adverse impacts associated with these events and the setting up of dedicated communication channels between the various stakeholders, especially with National Meteorological Agency. There is uniqueness 'in this FFGS project apart from other projects as Flash floods are hydro-meteorological events and require meteorology and hydrology expertise and collaboration with the disaster management office and relevant agencies;
- **Recognised** the funding for the FijiFFGS as part of the Climate Risk and Early Warning System (CREWS) program through an agreement between Environment and Climate Change Canada (ECCC) and WMO;
- **Recommended** the availability of various historical and real-time hydro meteorological data and other information to ensure that the FFGS provides the highest quality data and information to forecasters; and
- **Requested** the PHS panel to support the existing FFGS project and to work with interested NMHSs on how to extend this FFGS project to the region.

DISCUSSION:

- Papua New Guinea also highlighted that FFGS is operational in PNG through Southeastern Asia-Oceania Flash Flood Guidance(SAOFFG) System.
- French Polynesia noted the presentation on the Fiji-FFGS and enquired if Fiji has tested and verified the Fiji-FFGS without the use of radar image. Fiji responded the FFGS is robust and will operate without the input of radar image. Nonetheless, incorporating the radar images into the FFGS will boost the FFGS accuracy. This was supported by PNG.

■ AGENDA ITEM 15 Marine Weather Services and Ocean Issues

15.1 Progress on the Pacific Island Marine and Ocean Services (PIMOS) Panel

THE MEETING:

- **Appreciated** the collaboration and coordination of regional and international partners to progress the work of the PIMOS Panel toward strengthening marine and ocean services in the Pacific Islands;
- **Recognised** and requested continued financial support for PIMOS Panel provided by SPC, SPREP, Australia, WMO, JICA, NOAA, the government of Korea, and other donors;
- **Recommended** the PIMOS Panel continue its work as outlined in the ongoing priority actions listed above and to regularly review its membership and ToR in consultation with the PMC and others;
- **Reaffirmed** the role of the PIMOS Panel to undertake these activities in collaboration with other regional and international partners, including the Data Buoy Cooperation Panel, OceanObs'19, the WMO-IOC Joint Commission on Oceanography and Marine Meteorology (JCOMM), IOC Pacific Tsunami Warning System (PTWS) Intergovernmental Coordination Group, the Pacific Islands Global Ocean Observing System (PI-GOOS), the Pacific Community Centre for Ocean Science (PCCOS), and the opportunities presented by the UN Decade of Ocean Science for Sustainable Development; and
- **Invited** NMHSs to reaffirm the work of the PIMOS Panel and to encourage appropriate marine and ocean services projects/ programmes in the region to support PIMOS Panel priority activities in the workplan.

15.2 Defining the roles of PMC and NMHS in Responding to Ocean Acidification

THE MEETING:

- **Noted** that the PMC-4 Final Report endorsed the inclusion of ocean acidification as a priority;
- **Recognised** the urgency of monitoring, researching and responding to ocean acidification at both national and regional scales, and the value that PMC, NMHS, SPREP, SPC, USP, and other partners can add by helping coordinate and advocate for that work;
- **Agreed to** design a path forward that defines the roles PMC and NMHS wish to take with respect to monitoring, researching, and/or coordinating responses to ocean acidification under the PIMOS panel;
- **Recommended** that national governments and appropriate national agencies establish baseline monitoring necessary to capture natural variability in ocean carbon chemistry and understand long-term trends;
- **Recommended** that future ocean observation platforms include ocean acidification monitoring;
- **Agreed to** coordinate national inventories of OA work currently underway in each country and of needs for addressing OA; and
- **Agreed to** advocate for more donor support for regional-scale OA work to address those needs.

DISCUSSION:

Samoa emphasized the role of NMS linking to Climate change which now incorporated. In Samoa's country report, they are in the process of procuring a monitoring buoy. Emphasized that Ocean acidification is part of NMHS work.

15.3 International obligations of Marine Meteorological Services in the Pacific

THE MEETING:

- **Recognised** the need to ensure NMHSs fulfil their international obligations as Marine Meteorological Services and provide the best meteorological information to local ocean users;
- **Requested** to have NMHSs' representatives be members of existing national Maritime Committees with other relevant agencies for improved national coordination in the delivery of safety of navigation services and the broadcasts of maritime safety information;
- **Agreed to** share key information from IMO Audits (IMSAS) findings related to gaps and challenges in the delivery of Marine Meteorological Services with the PIMOS panel to support regional coordination of donors' assistance to NMHSs;
- **Requested** development partners to coordinate with the PIMOS Panel a regional approach to implement Quality Management Systems and stakeholder engagement fora for the enhanced delivery of Marine Meteorological Services in accordance with international conventions, codes and guidelines and for the safety of all ocean users; and
- **Requested** NMHSs to prioritise strengthened services for domestic mariners and shipping agents for improved safety.

DISCUSSION:

Australia queried about the formal connection between PIMOS work and the recognised Met Area Coordinators and offered support and guidance to the PIMOS Panel in this respect.

SPC noted that through the Pacific Regional Navigation Initiative, they are working closely with Australia and New Zealand to update navigational charts and improve safety of navigation.

Samoa raised the issue of difficulties faced by many national agencies in terms of coordination. Different agencies report to different conventions. Samoa recommended that more inter-agency program-based meetings are fruitful, citing examples of the hydrography section combining with the marine division to conduct a marine-related workshop – marine interagency forum – and the COSPPac Ocean and Tides workshop as best practice. Samoa supported the recommendation to support more interagency fora (recommendations 2 and 4).

SPC noted the importance of this point and offered to support coordination programs, as recently undertaken in Vanuatu with the ocean stakeholder workshop. As a point of clarification, under recommendation 2, NMHSs must be members of the national maritime coordination committee. Regarding recommendation 4, SPC is using quality management system as a guide to good processes in order to proceed with successful implementation.

NZ stated that they have a Met Area Coordinator and also offered to provide advice and guidance to PIMOS or NMHSs on how to link Marine Meteorological Services with maritime users in-country.

Samoa indicated that sharing of marine-related information rests with the agency in countries such as the Fiji Met Services is responsible for sea boundaries between Fiji and Tonga.

Kiribati supported the recommendations considering the number of ocean-related incidents happening in their country and requested the recommendation be strengthened to provide weather information and services for domestic shipping agents.

15.4 Opportunities presented by the Pacific Community Centre for Ocean Science and UN Decade of Ocean Science for Sustainable Development

THE MEETING:

- **Noted** the establishment, purpose and developing services of the Pacific Community Centre for Ocean Science (PCCOS);
- **Recognised** the opportunities for development and collaboration presented by PCCOS and the upcoming UN Decade of Ocean Science for Sustainable Development, particularly with regard to increasing access to resources, capacity development and transfer of marine technology; and
- **Tasked** the PIMOS Panel to identify science and service opportunities through PCCOS and the UN Decade of Ocean Science that align with the Pacific Islands Meteorological Strategy (PIMS 2017–2026).

■ AGENDA ITEM 16 Communications and Infrastructure

16.1 Communications and Infrastructure – Progress on the Pacific Island Communication and Infrastructure (PICI) Panel

THE MEETING:

- **Noted** the progress and updates from the PICI panel workplan and its priorities Acknowledge WMO, ITU and other partners for supporting collaborations in progressing the development of National Emergency Telecommunication Plans and policies;
- **Acknowledged** the University of Hawaii for providing the teleconference facilities to host meetings;
- **Acknowledged** the World Bank funded Multi-Hazard Impact Based Early Warning System Project in Samoa and Tonga for enhancing the rapid alert notification system (RANS) for emergency communication. A policy brief on RANS for Samoa was shared with stakeholders;
- **Recommended** amendments to current PICI TOR to include responsibility into identifying best practices for working with the private sector to find solutions – options, best practices, guidelines and way forward in ensuring maintenance issues and interoperability of systems.
- **Recommended** the establishment of a Communication Infrastructure and technical; maintenance position within SPREP PMDP to support the work of the panel and provide policy advice and technical support to the NMHSs;
- **Recommended** the ongoing identification of policies and frameworks and opportunities for NMHS to collaborate and develop National Emergency Telecommunication Plans (NETP);
- **Recommended** a review of existing Pacific NMHS communications options for telemetry needs to be conducted with consultation with each country;
- **Recommended** to consider bulk purchasing option and optimal contractual arrangements (both region and local) for both cellular and satellite providers for purchasing of airtime and data;
- **Recommended** the consideration and review of options and methods to integrate non-automated observations and automatically-generated standard synoptic and Metar messages that consider the significant and on-going increase in automated data collection;
- **Recommended** to seek support and funding for a calibration tool-kit and associated training for meteorological and hydrological instruments and equipment and for a process at the regional level for other Pacific NMHSs that do not have the capability;
- **Recommended** to work together with PIETER panel to explore the development of accredited on-the-job training guidelines, material, and funding for Pacific technical staff for AWS and Climate Early Warning systems operations and maintenance;
- **Encouraged** the implementation of a rapid alert notification system (RANS) by individual states;
- **Recommended** to work together with PIMOS panel to ensure that marine observation and communication infrastructure objectives and outcomes are aligned; and
- **Recommended** the PICI panel work with the PICS panel to outline, document then present to the PMC the range and extent of data integration and quality issues currently impacting Pacific meteorological records. This would be followed by submitting a list of remedial actions to assist NMSs improve the quality of their data.

DISCUSSION:

BoM requested an additional recommendation be added to the Working Paper to enable collaboration between the PICI Panel and the PICS Panel on data integration and quality management. NIWA supported this motion and expanded that data quality issues need to be addressed. Samoa also supported this suggestion. The Chair noted the request and an additional recommendation was added accordingly.

Nauru highlighted that their EMWIN System was not operational and requested assistance. The University of Hawaii responded that the operational upgrade of the systems has been completed and will be shipped by October 2019.

16.2 National Emergency Telecommunications Plans (NETP)

THE MEETING:

- **Recommended** that an emergency broadcasting system be included in the Digital Television multiplex system;
- **Recommended** a coordination talk-group – accessible by all ERN users – to be incorporated when the ERN moves to a trunked architecture;
- **Recommended** to put in place a system to ensure that restoring road access to essential telecommunication facilities are priorities following a storm or similar event; and
- **Recommended** to maintain international cooperation with stakeholders to enhance local and regional capacity and networks.

■ AGENDA ITEM 17 Training, Education and Research

17.1 Progress on the Pacific Islands Education, Training, and Research (PIETR) Panel

THE MEETING:

- **Noted** the progress made by the PIETR Panel in the implementation of the Pacific Islands Meteorological Services Strategy 2017–2026 specially under the Pacific Key Outcome 9;
- **Noted** proposed 'IPCC Pacific Engagement Write Shop' proposed for 23–27 September 2019;
- **Acknowledged** the contribution of partners in the implementation of PIETR related activities; and
- **Encouraged** members to assist with the coordination and implementation of weather, climate, climate change, hydrological and oceans related to education, training and research to better highlight progress to date.

17.2 Progress on the Regional Training Centre Feasibility Study

THE MEETING:

- **Noted** the progress made since the PMC 4 and the work carried out by the consultants in terms of addressing the issue of feasibility of the RTC for the Pacific;
- **Recognised** the contribution of the UNDP RESPAC project and the funding provided from the Russian Federation;
- **Recommended** SPREP, USP and FMS to collaborate and work according to the framework prescribed and carry out assigned roles and the timelines proposed for introduction of classes by 2021; and
- **Requested** other Donors and partners to contribute funding or in kind resources to ensure that the RTC can commence implementation ASAP.

DISCUSSION:

The Caribbean institute for Met and Hydrology (CIMH) noted their long standing regional training centre role for the Caribbean and offered their support in the development of a Pacific RTC.

17.3 Pacific Climate Change Science and Services Research Roadmap

THE MEETING:

- **Noted** the development of the draft Pacific Climate Change Science and Services Research Roadmap;
- **Recognised** the intended purpose and aim of the Research Roadmap as an adjunct to the FRDP and PIMS in relation specifically to providing strategic guidance to key stakeholders in relation to the development and implementation of Pacific Climate Change Science and Services research;
- **Endorsed** the draft Pacific Climate Change Science and Services Roadmap as final;
- **Requested** that the PIETR panel of the PMC take responsibility for overseeing subsequent development and implementation of the Research Roadmap going forward; and
- **Recommended** that the PIETR Panel closely collaborates with the PICS Panel in the finalization and implementation of the Pacific Climate Change Science and Services Roadmap to enable cohesion with the implementation plan of the Pacific Roadmap for Strengthened Climate Services and related PICS Panel activities.

DISCUSSION:

Samoa requested clarification on the status of the training centre and how the PMC will address the institutional arrangements. The presenter confirmed that these discussions are ongoing.

Samoa reiterated their support for the Climate Change Services Research Roadmap and the RTC and commended the work put into it to date. UNDP emphasised the recommendation of the RTC feasibility study to ensure linkages between the RTC and PCCC to ensure coherence of activities.

Samoa also commented: They appreciate the work put in towards the research road map and reiterated their support in this.

IFRC requested an additional recommendation be added to the Working Paper reflecting collaboration between the PIETR Panel and the PICS Panel to ensure coherence with the Pacific Roadmap for Strengthened Climate Services. A recommendation was added accordingly.

■ AGENDA ITEM 18 Meteorological Services Developments

18.1 The Republic of Korea – Pacific Island Climate Prediction Services Project

THE MEETING:

- **Noted** and welcome the official launch of the ROK-PI CliPS Phase 2 project in October 2018 in accordance with the requests outlined in the PMC-4 meeting report;
- **Recognised** the importance of the newly launched ROK-PI CliPS project in strengthening the capacity of the Pacific Island NMHSs to utilize high quality climate prediction information;
- Applauded the efforts of the APEC Climate Center to maintain the continuity of PICASO development through self-funded updates and capacity building in 2018, as well as the joint efforts of APCC and SPREP to secure funds for the ROK-PI CliPS Phase 2 project;
- **Recommended** all NMHS Directors to consider providing historical station-based data to SPREP upon request for the project duration or through formal data agreements;
- **Recommended** that this project and the COSPPac project coordinate their activities and trainings in the region, as well as contribute to the technical discussions in the PICS Panel; and
- **Recommended** that Pacific Island NMHSs consider the use of PICASO and CLIK-P for generating seasonal outlooks.

DISCUSSION:

The Republic of the Marshall Islands thanked ROK for the presentation and expressed anticipation for the future of the activities. RMI requested the Meeting to support extending the initiative to all countries, including those in the northern Pacific.

NZ requested a softening of the language of the last recommendation to enable individual NMHSs to make a choice as to whether to incorporate into SOPs.

Samoa expressed appreciation for the assistance provided and recommended that the project work closely with COSPPac to implement activities.

Tonga noted that a hybrid dynamical and statistical systems works best for Tonga and suggested that an impact-based forecast from one to three months will be of especial help to the agriculture sector. RoK responded that they are happy to note this.

Niue requested a change to the wording of the first recommendation to replace 'to provide' with 'consider'. Samoa seconded this recommendation. The recommendation has been altered accordingly.

END DAY 2

■ AGENDA ITEM 19 Meteorological Services Contribution to Climate Change

19.1 Connecting Climate Change Science to Action

THE MEETING:

- **Noted** the importance of continued engagement in IPCC processes.
- **Noted** the successful outcomes of the IMPACT SROCC Workshop.
- **Encouraged** the continued active engagement of IPCC focal points.

DISCUSSION:

New Caledonia thanked the presenter and noted that better mutual understanding between scientists and decision-makers is key. IPCC was created to improve the link between scientists and economists at the global level and this should be mirrored at the national level, involving economists to increase our impact in the decision making process. This is what New Caledonia is implementing nationally to include other views and it adds other parameters to the decision making.

IFRC noted the necessity of more Pacific scientists with PhDs to increase Pacific authorship within the IPCC assessment cycles and special reports, and suggested that this be considered by the PIETR Panel. IFRC also highlighted that the analyses available in the IPCC reports is fairly high level and suggested that efforts also be channeled towards making the outputs of upstream scientific analyses and reports digestible for decision makers as these are more specific to Pacific islands. The presenter acknowledged these suggestions.

Samoa noted that contributions to AR6 and reminded the meeting that the Special report on cryosphere submission date is near.

Cook Islands noted that the PIETR Panel has been reviewing this to better understand how to take advantage of these opportunities. He acknowledged that the IPCC writeshops held have been very useful for better understanding the publishing process and encouraged more such initiatives so that the IPCC focal points can take part and contribute to the report.

SPREP noted there are national obligations to align with as well.

■ AGENDA ITEM 20 The Pacific Meteorological Desk Partnership and Progress in Implementing the PIMS

20.1 Progress on the PIMS

THE MEETING:

- **Noted** the effort by the Pacific Met Desk and its Partners to secure funds to support the implementation of the Pacific Island Met Strategy;
- **Recognised** the need for better coordination between different projects contributing to implementing the PIMS;
- **Recommended** improving the capacity of the PMDP to coordinate and implement the PIMS.

DISCUSSION:

None.

20.2 Opportunities and Challenges in Project Proposals

THE MEETING:

- **Noted** the current challenges with CIS project /programme development and implementation particularly at the national level;
- **Noted** the need for more coordination at the regional level to maximize benefit at each of the NMHS;
- **Recommended** that the Strengthened Weather and Climate Services for Resilience Development for Pacific Islands prioritise work in FSM, Kiribati, Nauru, Samoa, and Tonga.

DISCUSSION:

SPREP requested clarification on the last recommendation put forward by the GCF. The presenter provided clarification that initial consultation with the GCF revealed need to better rationalize country participation in the various concurrent projects. In particular, the GCF asked to see where each project adds value and to avoid duplication of activities and outputs.

SPC offered support to assist coordination and to provide inputs into the proposals. WMO requested clarification on the first recommendation, asking for further information on specifically what challenges have been faced and what we can do about these challenges. The presenter took into account this point.

BoM requested clarification as to why Timor Leste has now been excluded from the Enhancing Early Warning Systems to build greater resilience to hydro and meteorological hazards in Pacific Small Island Developing States (SIDS) project. The presenter responded that the proposed activities in Timor Leste have instead been included in a UNEP project.

APCC requested that SPREP reconsider the last recommendation, as the original inclusion of all countries did not represent duplication but rather enabled complementary activities to occur across projects in all countries. SPREP noted the importance of this comment but emphasised the requirement of rationalization from the GCF.

WMO: The challenges are not only at the national but also at the regional level especially the regional organizations implementing CIS.

The WMO highlighted that all country NDAs have already agreed upon the project proposal with SPREP. Therefore, if the final recommendation remains, SPREP will need to discuss with the NDAs before any changes are made.

Papua New Guinea requested removal of the word 'only' from the third recommendation, replacing with 'prioritize'. The Chair agreed and the recommendation has been changed accordingly.

SPREP stated that they will seek bilaterals with country NDAs to seek support for the project at the leaders meeting.

Niue acknowledged the support and work done in moving projects forward and noted the challenges faced in dealing with the project, particularly related to waiting times for no objection letters. At the national levels, this process is tedious and can cause delays in progress.

Cook Islands acknowledged the assistance that the UNEP project consultant provided to Cook Islands in developing activities for this project.

FSM provided closing remarks before departure.

20.3 Progress on the UNEP GCF Project Proposal for Tuvalu, Marshall Islands, Palau, Cook Islands, and Niue

THE MEETING:

- **Noted** the status of the proposed programme on “Enhancing Climate Information and Knowledge Services for resilience in 5 island countries of the Pacific Ocean”, its objectives and components.
- **Endorsed** the proposed programme as it contributes to the Pacific Island Meteorological Strategy 2017–2026 and the Pacific Roadmap for Strengthened Climate Services 2017–2026.
- **Conveyed** to the Board of the Green Climate Fund through the Chair of PMC endorsement of the proposed programme and ask that they positively consider the UNEP Funding Proposal on “Enhancing Climate Information and Knowledge Services for resilience in 5 island countries of the Pacific Ocean”.

DISCUSSION:

PNG noted that this presentation complemented the previous presentation and recommends that the recommendations be aligned with those in item 20. 2.

RMI thanked UNEP for their coordination of the proposal over the last months. RMI indicated strong government support for the suggested interventions planned in the GCF proposal. RMI thanked PNG for their support and welcomed further engagement.

Samoa noted concern that the timeline has been delayed and hoped that the proposal would be finalised and underway by the next PMC.

SPREP noted that SPREP would be engaging with GCF process in the coming weeks. As the desk that supports PMC SPREP would raise the status of projects in the pipeline that pertain to Pacific Met Community and is also willing to update NDAs on progress of all three GCF initiatives.

Niue thanked UNEP for the presentation and coordination undertaken between SPREP, GCF, partners and countries in taking the project ahead. Noted challenges in getting priorities recognised in the proposal. It was required to justify 7 million worth of activities in a small nation like Niue. The process is very challenging at national level. A lot of layers, waiting time for decision-makers to agree with the proposal and the challenge of not duplicating activities at the national level. Recognises the great opportunity for GCF funding but also recognises the very real challenges. At the end of the day, the national decision making processes can hold up timelines. In Niue Project Oversight Steering team have to discuss all proposals. When Ministers attend regional meetings, they may not be aware of these projects. Encouraged those attending the leaders meeting to support this project.

The Chair acknowledged the challenges that Niue has highlighted for project proposal development across the region and noted this would justify further training for country focal points in GCF preparation and arrangements.

Cook Islands acknowledged the assistance of the consultants who are supporting this process and drawing together this proposal in coordinating government consultation. Looks forward to the successful presentation of this project and noted that it has national support.

FSM requested the opportunity to give a closing remark prior to his early departure. Asked not to be left behind. Support and assistance is needed to build a resilient Pacific.

■ AGENDA ITEM 21 PMC Engagement Strategy

THE MEETING:

- **Requested** SPREP, and invites key donors and partners to collaborate to prepare a draft PMC Donor and Partner Engagement Platform for presentation to the PMC for approval and launch in 2020 at the 3rd Pacific Ministerial Meeting on Meteorology. Note that the Platform must also make clear connections its contribution to the Pacific Resilience Partnership for acknowledgement of the PRP in support of the FRDP;
- **Requested** SPREP and invites key donors and partners to coordinate a detailed review of the PMDP; to consider its mandate, roles and functions, modalities of its services and resourcing; to prepare a costed plan of additional resources for priority resourcing and implementation, so as to support it to coordinate and facilitate more effectively PMC partnerships and regional initiatives. This review and its results are to be presented to the PMC for approval and launch in 2020;
- **Requested** SPREP to prepare a noting paper for the consideration of the 29th SPREP Meeting 2019, and for the PMDP and SPREP to make connection to the FRDP and PRP secretariats a general note of this initiative.

DISCUSSION:

Marshall Islands fully supports this program and in doing so, asked that we keep in mind the successes of past and ongoing projects. Noted the importance of flexibility in these projects. The unique nature of Met offices cannot be easily covered by all projects. The inclusion of flexible funding should be included in the platform. Secondly, RMI noted that another priority for donor support is the inclusion of human resource support for qualified project management, particularly in the case of small Met offices which struggle to cope with multiple projects.

Samoa highlighted the importance of institutional strengthening for small to medium size NMHSs and this should be featured in the costed plan.

Vanuatu noted concern about the focus on support for the regional agencies and requested additional support for project management be housed within the countries.

SPREP reminded the meeting of PKO 10, the need for a regional coordination mechanism supporting the NMHSs at the regional level is critical. Understanding which activities are happening and what priorities exist. Noted RMI's priority for flexible funding.

WMO noted that the PMC is an open platform for PMC members and partners. However, the consultant report on the platform, bullet 1, item 2 the platform would be closed door.

SPC requested clarification on the definition of 'partners' in the context of the consultant report.

SPREP clarified that partners refers to all partners in this room who are engaged in projects in collaboration with NMHSs and indicated this should be clearly defined in the report.

American Samoa requested the inclusion of language that would allow for some flexibility so that Pacific Islands Territories such as American Samoa, Guam, CNMI, Wallis and Futuna, etc. . . could be eligible for donor funds outside of their respective governments. American Samoa understands the restriction due to governance structures, but requests to identify options for the Territories to be eligible for donor funds. In addition, American Samoa requests the engagement with Territories on potential projects that they might be able to participate in with and/or without donor funding.

■ AGENDA ITEM 22 Media Supporting Meteorological Services

THE MEETING:

- **Acknowledged** efforts of the Media across the region in promoting the issues of the PMC;
- **Agreed to** continue working with the SPREP media outreach programme to strengthen media and communication capacity;
- **Supported** a proposal to meet with Pacific Media CEO's through an appropriate platform for enhanced communications;
- **Supported** the value of Mana Classes and request donors to support future media trainings at the PMC meetings; and
- **Recognised** and Support the importance of updating the Broadcast Climate and Disaster Resilient Plans across the Region.

DISCUSSION:

WMO acknowledged and thanked the SPREP media team and the media community for their contributions to the meeting and look forward to ongoing support and participation in future meetings.

Cook Islands thanked SPREP for the presentation and noted the usefulness of the mana training provided. Also noted that the training delivered to the Cook Islands Met Service has helped their staff better manage social media and outreach responsibilities. Looks forward to continued presence of media at the PMC.

■ AGENDA ITEM 23 Review of PMC Terms of Reference

THE MEETING:

- **Noted** that the Terms of Reference is still current.

DISCUSSION:

Samoa suggested to review the ToR to clarify the open nature of the meeting and participation of all partners in the PMC.

Tonga agreed with Samoa, but asked that the meeting reserve the right to hold a closed session when considered necessary by the Members.

Pacific Met Desk is tasked to review the ToR document from Tonga and Samoa and circulate findings to Members.

Nauru requested clarification, does the SPREP Meeting reserve the right to revoke PMC recommendations, seeing as PMC is a subsidiary body under the SPREP Meeting.

SPREP noted that a formal response could be made available if required but added that a legal counsel would be best placed to answer the question, but added that PMC was established as a subsidiary body to SPREP in order to create a formal mechanism to elevate the concerns of the body to the SPREP meeting and then on to the Pacific Forum Leaders.

■ **AGENDA ITEM 24** Venue of the Sixth Meeting of the Pacific Meteorological Council (PMC) and the Third Pacific Ministerial Meeting on Meteorology (PMMM-3)

THE MEETING:

- **Noted** the decisions from the PMC-4 and the PMMM-2 when nominating the next host; and
- **Noted** the relevant ROP's for hosting the meeting.

DISCUSSION:

Cook Islands offered to host the PMC-6 and PMMM-3 meetings (2020). Noted the significant logistics required and recognised the excellent hospitality provided by the Samoan Government for PMC-5. Noted that he has the full support of his CEO to host this meeting.

WMO recommended that the text of item 4. a. of this working paper be changed to delete all text after "every four years".

The meeting welcomed the invitation by the Cook Islands to host the PMC-6 and PMMM-3 in the Cook Islands.

Samoa asked for clarification on Ministerial meeting, which will be in 2020 instead of 2021.

■ **AGENDA ITEM 25** Review and Adopt the Report of PMC-5

■ **AGENDA ITEM 26** Continue Review and Adopt the Report of PMC-5

The meeting adopted the draft report of PMC-5.

■ **AGENDA ITEM 27** Closure of PMC-5

Annexes

ANNEX 1.1 Participants List

	NAME	INSTITUTION	POSITION	CONTACT
1	Mr Alan Porteous	New Zealand	Group Manager, Climate Data and Applications (NIWA)	alan.porteous@niwa.co.nz
2	Ms Aliitasi Faumuina	Samoa	Principal Administration Officer	aliitasi.faumuina@mnre.gov.ws
3	Mr Allan Rarai	Vanuatu	Manager, Climate Services	ararai@meteo.gov.vu
4	Mr Aminisitai Loco	SPC	Senior Hydrogeologist	aminisitail@spc.int
5	Ms Andrea Waqa-Montu	UNDP Fiji	UNDP Communications Officer	andrea.waqa-montu@undp.org
6	Dr Andrew Johnson	Australia	BoM CEO and Director	Andrew.Johnson@bom.gov.au
7	Dr Andrew Tait	New Zealand	Chief Scientist – Climate, Atmosphere and Hazards, NIWA	andrew.tait@niwa.co.nz
8	Ms Annie Maua	Samoa	Scientific Officer – Weather services	annie.maua@mnre.gov.ws
9	Mr Arona Ngari	Cook Islands	Director Met	arona.ngari@cookislands.gov.ck
10	Dr Awnesh Singh	USP	Senior Lecturer	singh_aw@usp.ac.fj
11	Ms Azarel Mariner	SPREP	COSPPac Capacity Development Officer	azarelm@sprep.org
12	Dr Bapon Fakhruddin	Tokin and Taylor	Technical Director	bfakhruddin@tonkintaylor.co.nz
13	Mr Barassi Botelanga	Nauru	Director of Nauru Emergency Services	barassi.botelanga@gmail.com
14	Mr Bernard Miville	New Zealand	Manager Operational Forecasting, NIWA	bernard.miville@niwa.co.nz
15	Ms Bo Ra Kim	Korea	Senior International Project Manager, APECC	bkim@apcc21.org
16	Ms Cheryl Tan	WMO		ysctan@wmo.int
17	Mr Chia-Ping Cheng	Central Weather Bureau	Deputy Director General	mark.cpcheng@gmail.com
18	Mr Christopher Bartlett	Australia Pacific Climate Partnership	Resilience and Knowledge Manager	Christopher.Bartlett@apclimatepartnership.com.au
19	Mr David Hirasia	Solomon Islands	Director Met	david.hiba@met.gov.sb
20	Mr Doug Ramsay	New Zealand	Manager, Pacific NIWA	d.l.ramsay@outlook.com
21	Mr Eden Skilling	FSM (Pohnpei)	Official In Charge	Eden.Skilling@noaa.gov
22	Ms Elinor Lutu-McMoore	American Samoa	Meteorologist In Charge	elinor.lutu-mcmoore@noaa.gov
23	Ms Emarosa Romeo	Samoa	Principal Hydrology Officer	emarosaromeo@gmail.com
24	Mr Eseese Ah Ken	Samoa	Senior Scientific Officer	eseese.ahken@mnre.gov.ws
25	Ms Esline Garaebiti	Vanuatu	Met Director	gesline@vanuatu.gov.vu
26	Dr Espen Ronneberg	SPREP	Climate Change Adviser	espenr@sprep.org

	NAME	INSTITUTION	POSITION	CONTACT
27	Mr Faalavelave Taulapapa	Samoa	Ozone officer	faalavelave.taulapapa@mnre.gov.ws
28	Ms Faapisa Aiono	Samoa	Senior Scientific Officer Samoa Meteorological Services	faapisa.aiono@mnre.gov.ws
29	Ms Faauluuluga Tautau	Samoa	Pacific Capacity Building Officer	faauluuluga.papalii@mnre.gov.ws
30	Hon.Fiame Naomi Mataafa	Samoa	MNRE Minister	fiame@mnre.gov.ws
31	Ms Filomena Nelson	SPREP	Climate Change Adaptation Adviser	filomenan@sprep.org
32	Ms Foini Jancey U Fesolai	SPREP	CCR Programme Assistant	foinjanceyf@sprep.org
33	Ms Folauhola Latu'ila	Tonga	Assistant Geologist	flatuila@naturalresources.gov.to
34	Dr Geoff Gooley	CSIRO	Research Manager	geoff.gooley@csiro.au
35	Ms Gingerlei Porter	UoH	Univ. of Hawaii Pacific Intl Training Desk	tasiadmin@uhtasi.org
36	Mr Graham Elley	NIWA	Principal scientist – Environmental Monitoring	graham.elley@niwa.co.nz
37	Ms Gutu Likou	Samoa	Assistant Scientific Officer – Weather services	gutu.likou@mnre.gov.ws
38	Mr Hans Wesche	Tokelau	Senior Biosecurity Officer	hans.wesche@tokelau.org.nz
39	Mr Henry Taiki	WMO		HTaiki@wmo.int
40	Ms Iacinta Fanene	Samoa	Senior Expenditure Accountant	iasinta.fanene@mnre.gov.ws
41	Mr James Lunny	Meteorological Service of New Zealand	WMO Manager	james.lunny@metservice.com
42	Ms Jasmine Chambers	Australia	Global and National Science Relationships, BoM	
43	Mr Jochem Zoetelief	UNEP	Head, Climate Services and Capacity Building Unit	jochem.zoetelief@un.org
44	Mr Johannes Berdon	FSM	Official In Charge	johannes.berdon@noaa.gov
45	Mr John Powell	NIWA	Climate Database Technician	john.powell@niwa.co.nz
46	Prof.Jong-Seong Kug	POSTECH	Senior Professor	jskug1@gmail.com
47	Mr Joseph Lukangaw	FSM	Official In Charge	joe.lukangaw@noaa.gov
48	Ms Josephine Wilson	WMO	Senior Programme Manager, Major Projects	jowilson@wmo.int
49	Ms Joy Papao	Solomon Islands	Project Manager Water Sector Adaptation	joy.papao@undp.org
50	Mr Junior Lepale	Assistant Scientific Officer – Climate Services	Ministry of Natural Resources and Environment – Meteorology	junior.lepale@mnre.gov.ws
51	Ms Justine Kawi	PNG	Weather Officer	kawijmrs@gmail.com
52	Ms Kamaitia Rubetaake	Kiribati	Climate officer	rubetaake.kamaitia@gmail.com
53	Ms Kathryn Clarkson	IFRC	Head of Pacific Office	kathryn.clarkson@ifrc.org

	NAME	INSTITUTION	POSITION	CONTACT
54	Ms Katie Pogi	Samoa	Senior Scientific Officer-Geology	katie.pogi@mnre.gov.ws
55	Ms Kayleen Rotina Hagovena Fanega	Solomon Islands	Project Assistant	k.fanega@met.gov.sb/ kayleenhagovena@gmail.com
56	Ms Kehaolani Slade	Samoa	Capacity Building Officer	kehaolani.slade@mnre.gov.ws
57	Ms Kisolet Lina Posanau	PNG	Climate Officer	solel.posanau@gmail.com
58	Mr Kosi Latu	Director General	SPREP	kosil@sprep.org
59	Mr Kotoni Faasau	Scientific Officer – Climate Services	Ministry of Natural Resources and Environment – Meteorology Division	kotoni.faasau@mnre.gov.ws
60	Mr Lameko Talia	Samoa	Principal Scientific Officer	lamekotalia@mnre.gov.ws
61	Ms Linda Tonawane	Solomon Islands	Principal Forecaster	linda.tonawane@gmail.com
62	Ms Lotomaulalo Levi	Samoa	Principal Watershed Officer – Water Resource Division	lotomaulalo.levi@mnre.gov.ws
63	Mr Maccarios Samuelu	Samoa	Meteorologist	maccarios.auvae@mnre.gov.ws
64	Mr Malaki Iakopo	Samoa	Assistant Chief Executive Officer – Water Resource Division	malaki.iakopo@mnre.gov.ws
65	Ms Margaret Paul	Tokelau	Tourism Officer	siauala.paul@tokelau.org.nz
66	Ms Maria (Dilwei) Ngemaes	Palau	Meteorologist In Charge	maria.ngemaes@noaa.gov
67	Mr Martin Sharp	SPREP	Project Manager, Intra-ACP GCCA+ PACRES Project	martins@sprep.org
68	Ms Mary Powers	WMO	Director DRA	mpower@wmo.int
69	Ms Masako Ogawa	JICA	Chief Advisor	mogawa.pccc2020@gmail.com
70	Mr Matagi Tupai	Samoa	Assistant Mechanic Officer	matagi.tupai@mnre.gov.ws
71	Mr Mattaniah Salesa	Samoa	Climate Technician Ministry of Natural Resources and Environment – Meteorology Division	mattaniah.salesa@mnre.gov.ws
72	Ms Maylene Joshua	Palau	Weather Service Specialist	maylene.joshua@noaa.gov
73	Ms Metua Ngaoire	Cook islands	Trainee Observation Officer – Cook Islands Met Service	metua.ngaoire@cookislands.gov.ck
74	Mr Michael Maehaka	Solomon Islands	Senior Hydrologist	mmaehaka@mmere.gov.sb
75	Mr Michaelsign Mili	Samoa	Assistant Mechanic Officer	michaelsign.mili@mnre.gov.ws
76	Ms Miliesi Kapuafe	Tuvalu	Assistant Environmental Health Officer	anilosa89@gmail.com
77	Mr Misaeli Funaki	Fiji	Director Met	Misaeli.Funaki@met.gov.fj
78	Mr Moemalo Malaefatu Leavasa	Samoa	Senior Scientific Officer	malaefatu.leavasa@mnre.gov.ws
79	Ms Molly Powers	SPC	Team Leader, Ocean Literacy and Maritime Capacity	mollyp@spc.int
80	Dr Moritz Wandres	SPC	Specialist – Physical Oceanography	moritzw@spc.int

	NAME	INSTITUTION	POSITION	CONTACT
81	Mr Mulipola Ausetalia Titimaea	Samoa	ACEO – Samoa Meteorology Division Ministry of Natural Resources and Environment – Meteorology Division	ausetalia.titimaea@mnre.gov.ws
82	Ms Naama Sinei Fili	Samoa	Principal Payroll Officer	naama.sinei@mof.gov.ws
83	Ms Nerisa Malaki	Tokelau	Meteorology Officer	setunerisa@gmail.com
84	Mr Nikotemo Iona	Tuvalu	Acting Director	niko.iona@gmail.com
85	Mr Norman Henry	New Zealand	GM Science Strategy	norm.henry@metservice.com
86	Mr Ofa Fa’anunu	Tonga	Director Met	ofaf@met.gov.to
87	Ms Olivetti Bentin	Samoa	Manager Cash Flows and Investments	olivetti.bentin@mof.gov.ws
88	Dr Olivia Warrick	Red Cross	Senior Pacific Climate Adviser	
89	Dr Patila Amosa	National University of Samoa	Dean Faculty of Science	p.amosa@nus.edu.ws
90	Mr Patrick Paddy Pringle	Climate Analytics Consultant	SPREP	patrickp.ext@sprep.org
91	Ms Paula Acethorp	Civil Aviation Authority NZ	Chief Meteorological Officer	paula.acethorp@caa.govt.nz
92	Ms Pauline Pogi	Samoa	Principal Policy and Regulatory Enforcement Officer	p.pogi@mnre.gov.ws
93	Mr Paulo Wong	Samoa	Hydrology Officer	lusiano.taito@mnre.gov.ws
94	Mr Peter Sinclair	SPC	Water Resources Assessment and Monitoring Coordinator	peters2@spc.int
95	Mr Philip Malsale	SPREP	COSPPac Climatologist	philipm@sprep.org
96	Mr Pisi Seleganiu	Tuvalu	Head Water and Plumbing Division	afaaso80@gmail.com
97	Ms Raquel Keani-Leigh Nevine Tanaki	Niue	Climate Trainee	raquel.tanakinew@mail.gov.nu
98	Mr Reginald White	RMI	Director Met	reginald.white@noaa.gov
99	Ms Rennate Tekanene	Kiribati	Water Engineer Outer Island	carenistoo@gmail.com
100	Dr Robert Duncan McIntosh	SPREP	Oceanography Officer	robertmc@sprep.org
101	Ms Rosanna Galuvao	SPREP	Executive Assistant to the Director General	rosannag@sprep.org
102	Ms Rosslynn Mitiepo	Niue	Director Met	rossy.mitiepo@mail.gov.nu
103	Mr Roy Harris	Nauru	Secretary for National Emergency Services	royharris111@gmail.com
104	Mr Salesa Nihmei	SPREP	Meteorology and Climate Adviser	salesan@sprep.org
105	Mr Samir Paniani	Samoa	Senior Information Technology Officer	sam.paniani@gmail.com
106	Mr Samuel Maiha	PNG	Director Met	samuelmahai25@gmail.com
107	Ms Sanita Tusani	Samoa	Principal Accountant	sanita.tusani@mnre.gov.ws

	NAME	INSTITUTION	POSITION	CONTACT
108	Ms Sefanaia Nawadra	UNEP	Head, Pacific Sub-regional Office	sefanaia.nawadra@un.org
109	Mr Seko Ponofasio	Samoa	Assistant Scientific Officer	seko.ponofasio@mnre.gov.ws
110	Ms Seluvaia Finaulahi	Tonga	Senior Forecaster/ Head of Climate Section	seluf@met.gov.tofseluvaia@gmail.com
111	Mr Semi Qamese	SPREP	Monitoring and Evaluation Officer, PACRES	semiq@sprep.org
112	Ms Sharon Grace Johnolson	Vanuatu	Principal Scientific Officer Observations	sjohnolson@meteo.gov.vu
113	Mr Silipa Mulitalo	Samoa	Senior Forecaster	silipa.mulitalo@mnre.gov.ws
114	Mr Simon McGree	BoM COSPPac		
115	Ms Siosinamele Lui	SPREP	COSPPac Climate Traditional Knowledge Officer	siosinamelel@sprep.org
116	Mr Sitivi Tumanuvao	Samoa	Mechanic	sitivi.tumanuvao@mnre.gov.ws
117	Mr Soane Laitia Fifita	Tonga	Chief Meteorologist	laitiaf@met.gov.to
118	Mr Sugata Narsey	Bureau of Meteorology	Research Scientist	sugata.narsey@bom.gov.au
119	Ms Sylvie Castonguay	WMO	Communications Specialist	SCastonguay@wmo.int
120	Mr Taaniela Kula	Tonga	Deputy Secretary for Natural Resources	tkula@naturalresources.gov.to
121	Ms Tagaloa Cooper	SPREP	CCR Director	
122	Ms Taina Temakei	Water and Sanitation Monitoring Officer	Ministry of Infrastructure and Sustainable Energy	t.tamaroa@mise.gov.ki
123	Mr Talalelei Levuka	Samoa	Technical Mechanic	talalelei.levuka@mnre.gov.ws
124	Ms Tali Fonoti	Samoa	Administration Officer	tali.fonoti@mnre.gov.ws
125	Mr Tame Ah Kuoi	Samoa	Hydrology officer	tame.ahkuoi@mnre.gov.ws
126	Ms Taua Janet Aroni	Samoa	Meteorology Technician	taua.aroni@mnre.gov.ws
127	Ms Teagaiotupu Jasmine Leilani Perez	Tokelau	Meteorology Officer	teagai.jasmine@gmail.com
128	Mr Terry Atalifo	Fiji	Principal Scientific Officer – Climate	terry.atalifo@met.gov.fj
129	Ms Tessa Tafua	WMO	Programme Associate	ttafua@wmo.int
130	Ms Teuila-Jane Fruean	SPREP	COSPPAC Technical and Finance Assistant	teuilajane@sprep.org
131	Ms Theresa Sherful Fogaoloula	Samoa	Senior HR and Training	theresa.fidow@mnre.gov.ws
132	Mr Thierry Nervale	SPC	Deputy Director Oceans and Maritime	thierryn@spc.int
133	Ms Tiaseu Meripa Siaosi	Samoa	Senior Capacity Building Officer	meripa.siaosi@mnre.gov.ws
134	Mr Tile Tofaeono	Samoa	Principal Scientific Officer – Climate Services MNRE	tile.tofaeono@mnre.gov.ws
135	Ms Tumau Neru	Samoa	Principal Officer – Ozone	tumau.neru@mnre.gov.ws

	NAME	INSTITUTION	POSITION	CONTACT
136	Mr Tumua Anthony Mccarthy	Samoa	Principal Agritourism Officer	anthony@samoa.t4avel
137	Mr Tupai Robert Ah Sam	Samoa	Principal Tourism Climate Change Officer	robert@samoa.travel
138	Mr Ueneta Toorua	Kiribati	Director Met	cmo@met.gov.ki
139	Ms Uimai Ulua	Tuvalu	Assistant Forecaster	princessjosephinenpaeagi@gmail.com/uimailauti@gmail.com
140	Mr Ulu Bismark Crawley	Samoa	CEO MNRE	bismarck.crawley@mnre.gov.ws
141	Mr Vaaua Wilson	Samoa	Scientific Officer	vaaua.wilson@mnre.gov.ws
142	Mr Vailoa Jesper Iefata	Samoa	Scientific officer – Geoscience	vailoa.iefata@mnre.gov.ws
143	Mr Viliame Vereivalu	Fiji	Principal Scientific Officer – Hydrology Division	viliame.verevalu@met.gov.fj
144	Mr Viliamu Iosefa	Samoa	Assistant Scientific Officer	viliamu.iosefa@mnre.gov.ws
145	Mr William Worworkon	Vanuatu	PSO-Training and community Liaison	wbworwor@meteo.gov.vu
146	Dr Won Moo KIM	APEC	Research Fellow	kwmski7@naver.com
147	Mr Yuji Kunisue	Japan	Samoa IT Expert	desperado_kamo@yahoo.co.jp
148	Mr Yuji Ueno	Japan	JICA Expert	yuji.ueno.2@gmail.com
149	Ms Yvette Kerslake	UNDP	Assistant Resident Representative/ Programme Manager – Env, CC and DRR	yvette.kerslake@undp.org
151	Mr Ray Tanabe's	NOAA		raymond.tanabe@noaa.gov
152	Ms Jennifer Lewis	NOAA		jennifer.lewis@noaa.gov
153	Mrs Petra Svickova	Barani Design Technologies		petra.svickova@baranidesign.com
154	Mrs Zuzana Kuciakova	Barani Design Technologies		zuzana.kuciakova@baranidesign.com
155	Mr Brian Bellew	Baron Weather – United States	Global Business Development Manager – Varysian	brian.bellew@baronweather.com
156	Mr Bradley Maxfield	Campbell Scientific – United States	Senior Sales Engineer – Varysian	bmaxfield@campbellsci.com
157	Mrs Corinne Malot	Campbell Scientific, Inc – Australia	South East Asia Sales Manager – Varysian	corinne@campbellsci.com.au
158	Mr Andrew White	Comptus – United States	President – Varysian	awhite@comptus.com
159	Ms Angie Ng	Davis Instrument – Singapore	Sales Manager – Varysian	angie@acez.com.sg
160	Ms Doris Chia	Davis Instruments – USA	Sales Executive – Varysian	henry@acez.com.sg
161	Mr Henry Yeo	Davis Instruments – USA	Representative Agent – Varysian	henry@acez.com.sg
162	Mr Cristian Mazzero	Delta OHM – Italy	Sales Engineer – Varysian	c.mazzero@deltaohm.com

	NAME	INSTITUTION	POSITION	CONTACT
163	Mr Richard Stedronsky	EEC – USA	Director, Strategic Business Dev and Partnerships	sted@eecweathertech.com
164	Mr Tim Cookes	Enterprise Electronics Corporation (EEC)	Sales Manager	tim.cookes@essweather.com
165	Mr Richard Chappuis	EWR Radar Systems, Inc	VP/Business Development	rchappuis@ewradar.com
166	Mr Jamie McKay	Gill Instruments	Business Development Manager	jamie.mckay@gillinstruments.com
167	Mr Dougal Harding	Hach Pacific (OTT HydroMet)	Regional Sales Manager	dharding@hach.com
168	Mr Lothar Schulte-Sasse	LEONARDO Germany GmbH	Head of Sales and Marketing	L.schulte-sasse@selex-es-gmbh.com
169	Dr Jens Didszun	LEONARDO Germany GmbH	Product Manager	j.didszun@selex-es-gmbh.com
170	Mr Stewart Neale	Observer Instruments (Gill Instruments)	Sales Engineer	stewartn@observer.com
171	Mr Caleb Aw	OTT HydroMet	Business Development Manager	caleb.aw@otthydromet.com
172	Mr Adam Hibberd	Vaisala Pty Ltd	Senior Sales Manager	adam.hibberd@vaisala.com
173	Mr Robert Ireland	Vaisala Pty Ltd	Regional Director	robert.ireland@vaisala.com
174	Ms Claire-Louise Copping	Varysian	Events Manager	claire.copping@varysian.com
175	Mr Luke Pierce	Varysian	Director – Global Public Partnerships	luke.pierce@varysian.com
176	Ms Nanette Woonton	SPREP	Communications, Head	nanettew@sprep.org
177	Ms Angelica Salele	SPREP	Communications	leannem@sprep.org
178	Ms Leanne Moananu	SPREP	Communications	angelicas@sprep.org
179	Mr Robert Sullivan	SPREP	Communications	roberts.ext@sprep.org
180	Mr Luteru Tauvale	Samoa	PhD Student	ltauvale@gmail.com
181	Mr Fa'amatua'inu Lenata'i Suifua	Samoa	Chief Executive Officer – STA	faamatuainu@samoa.travel
182	Mr Hugues Ravenel	Météo-France	Director	hugues.ravenel@meteo.fr
183	Ms Isabelle Schmidely-Leleu	Météo-France	Director	isabelle.leleu@meteo.fr
184	Mr Michael Tamanikaiyaroi	Samoa	MNRE	
185	Mr Timothy Devoe	Samoa		
186	Mr Shin Furuno	RESTEC	Consultant	
187	Lealofisa Tafuaatua	Samoa	MNRE	
188	Perise Kerlake	Samoa	MNRE	
189	Mr Navin Bhan	UNDP	Project manager	Navin.bhan@undp.org

	NAME	INSTITUTION	POSITION	CONTACT
190	Mr Dean Solofa	AgriMet Consulting	Consultant	dsolofa@gmail.com
191	Mr Asovale Talaia	Samoa	MNRE	
192	Mr Tikeri Taulagi	Samoa	MNRE	
193	Ms Lise Vailaau	Samoa	MNRE	
194	Ms Antonia Mala	Samoa	MNRE	
194	Pelenatete Pio	Samoa	MNRE	
196	Mr Siaki Taulala	Samoa	MNRE	
197	Ms Sieni Akeripa	Samoa	MNRE	
198	Mr Sale Rimoni	Samoa	MNRE	
199	Mr Fred Aferita	Samoa	MNRE	
200	Ms Popotafea Molimuao	Samoa	MNRE	
201	Mr Sio Ale	Samoa	MNRE	
202	Mr Lapanafou Taulapapa	Samoa	MNRE	
203	Folole Alapati	Samoa	MNRE	
204	Mr Epeli Tagi	SPREP	Network and Systems Specialist	epelit@sprep.org
205	Mr Ierusalem Anitelea	Samoa	MNRE	
206	Dr David Farrell	CIMH	Director	dfarrell@cimh.edu.bb

ANNEX 1.2 Opening statement by Associate Minister of the Ministry of Natural Resources and Environment Afioga Taefu Lemi Taefu

Noting the progress of PMC since its inception as RMSD in 1993. This shows the importance and relevance of the work of PMC, of the NMSs, SPREP, WMO, CROP and partners. He noted that climate change is affecting all sectors, and that the Pacific is experiencing the brunt of the impacts. Extreme weather patterns will intensify, with higher risk of losses from tropical cyclones. The findings of science is worrying for all governments, although we have been increasingly improved our early warning systems and predictions. He noted the importance of the workshops in the previous week such as on the IPCC Special Report on Oceans, Next Generation Predictions and the Mana Master Class. It demonstrates the commitment of the region to a clean environment and the fight against climate change.

1 OPENING ADDRESS

The session was opened by Ulu Bismarck Crawley, CEO of MNRE, Samoa, who acknowledged the dignitaries on the podium. He noted that this was an important session as it would make decisions on the outcomes of various other related meetings.

2 OPENING PRAYER

Reverend Aliota Sea, who offered greetings to all in the name of Jesus Christ, and expressed wishes that the participants had enjoyed Samoa. A Church Choir from EFKS performed a hymn for participants. The Reverend noted the theme of PMC5, of science to services for a resilient Pacific. He spoke of his fears of climate change, that it is real and will affect all, young and old. Strong tropical cyclones, extreme weather events and floods have affected all of the Pacific. How can we minimize the effects and how can we solve this problem. He called on PMC members to use their scientific knowledge to assist the region to build resilience. Scientific understanding belongs to scientific minds, so it needs to be made understandable by all stakeholders. The importance of gender equality should also be made a priority, as we have knowledgeable female scientific minds. As PMC deliberates, members should have faith and trust in the Lord. The Reverend closed with a prayer for the success of PMC5 and for the safe return of members to their homes.

3 WELCOME BY SAMOA

Opening statement by Associate Minister of the Ministry of Natural Resources and Environment Afioga Taefu Lemi Taefu. He welcomed participants and offered apologies from Deputy Prime Minister Fiaame. Samoa is pleased to host this meeting, which has grown considerably since its first meeting in Vanuatu in 1993. This shows the importance and relevance of the work of PMC, of the NMSs, SPREP, WMO, CROP and partners. He noted that climate change is affecting all sectors, and that the Pacific is experiencing the brunt of the impacts. Extreme weather patterns will intensify, with higher risk of losses from tropical cyclones. The findings of science is worrying for all governments, although we have been increasingly improved our early warning systems and predictions. He noted the importance of the workshops in the previous week such as on the IPCC Special Report on Oceans, Next Generation Predictions and the Mana Master Class. It demonstrates the commitment of the region to a clean environment and the fight against climate change. As members we must become fully engaged at all levels so that the collective knowledge can benefit all. This must be harnessed to inform and guide regional frameworks and strategies. He acknowledged the invaluable contributions by SPREP, WMO and partners, as well as the providers of meteorological equipment present. Everyone has responsibility to take action to create a clean environment, build resilience and ensure no one is left behind.

4 KEYNOTE STATEMENT, KOSI LATU

Keynote statement by Kosi Latu, Director General, SPREP, acknowledged the dignitaries, and the excellent work of the outgoing PMC chair and of the members of PMC. He welcomed the growing numbers of women leaders in meteorology. He thanked Samoa and particularly the team from Samoa Met Service. There has been a strong growth and interest in the meteorology sector, which had been neglected for too long. PMC has met at the Ministerial level since 2015. The engagement of the private sector is an important contributor to this community of practice. New partners are also coming on board to support the work of PMC and its members, which requires us to improve coordination to meet the priorities identified by PMC through PIMS. The theme of PMC5 is important to bear in mind, so that key stakeholders and decision makers can be informed properly by the science. The Paris Agreement was a testament to the success of translating science into policy. PMC needs to translate science into services and information that can be understood by the wider community, in language that is accessible. The work of the expert panels established by PMC are making sterling efforts to provide services to sectors. The Hydrology Panel has galvanized work in this sector for PMC. The establishment of the PCCC at SPREP provides opportunities for the PMC to cooperate and enhance their contributions to the communities in the fight against climate change. The role of NMSs will be enhanced through the PCCC, which will open on 5th September 2019 during the Pacific Environment Ministers Meeting. Research carried out by Tonkin and Taylor has shown the value of early warning – spending US\$1 for early warning would save US\$6 in damages. Partnerships are important to SPREP and for PMC, and the MOU signed with Meteo France will bring greater cooperation and support for the region. The importance of working with the media is also an area where we need to improve, so that the experiences of the region can be shared more widely. This can be assisted by the media training that has been implemented by SPREP. He concluded that the region needs to come up with tailor made solutions to our challenges in the Pacific.

5 KEYNOTE STATEMENT, MARY POWER

Keynote statement by Mary Power, Representative of the Secretary General and Director of the Development and Regional Activities Department, WMO, thanked Samoa and its Met Service in hosting the PMC. She acknowledged the contributions of Australia, Environment Canada, New Zealand, APCC and other partners. The theme of PMC5 highlights the importance of NMSs in the fight against climate change and in building resilience. She welcomed the greater attention to hydrology. Meteorology contributes to sustainable development and poverty reduction and helps us implement the SDGs. The PMPD is an important partnership for WMO and its presence in the Pacific at SPREP. The updated PIMS has benefitted greatly from the partnership with NMSs and sectors in the region. Directors of NMSs must have the resources to carry out their mandates in assisting communities with resilience building. She looked forward to strengthening partnerships at PMC5.

ANNEX 1.3 Address by PMC-4 Chair, Solomon Islands

Good morning everyone. Associate Minister for Natural Resources, SPREP DG, Mary Power WMO, OFA, RAV President, Ulu, Mariota, Methodist Church of Apia, Directors and other government officials, development partners, media, ladies and gentlemen. It is a great honour to address you as the chair of PMC 4. I wish to extend my appreciation to the government of Samoa for the hospitality. Nine years ago, we built a canoe in Marshall Island through PIMS to serve all countries. I am the 4th captain of this canoe, we are meet with challenges and celebration. We have lost director Kumar and I want this council to recognise his contribution. We also have members who attend first time, Misa, Esline, Elenor, Acting Director for Tuvalu and Tokelau.

There are many progress since 2017 and one is Hydrological panel set up in Honiara. I would like to recognise WMO and SPREP for allowing the women in leadership to join in this PMC 5. I also acknowledge the presence of media in this PMC 5.

I would like to acknowledge local organising committee, SPREP and WMO and donors and Government of Samoa, DFAT, Canada, Korea, CSIRO, CREWS, IMPACT, Varisian, UNDP, COSPPac and NOAA.

ANNEX 1.4 Keynote Statements

Keynote address by David Hiriassa, Solomon Islands, Chair of PMC4, who noted that PMC was built in Majuro, Marshall Islands as a va'a for the region. There have been challenges as well as celebrations, and offered condolences to Fiji for the loss of Ravind Kumar and who contributed so much to PMC. He welcomed the new members of PMC from Fiji, American Samoa and Vanuatu.

Address by current chair of PMC, David Hiriassa, Solomon Islands, and thanked Samoa for hosting PMC5. He noted that PMC was built in Majuro, Marshall Islands as a va'a for the region. There have been challenges as well as celebrations, and offered condolences to Fiji for the loss of Ravind Kumar and who contributed so much to PMC. He welcomed the new members of PMC from Fiji, American Samoa and Vanuatu. He highlighted progress since 2017 such as the Hydrology Panel, and the actions of SPREP and WMO to promote the role of women in meteorology. He also thanked the sponsors of the meeting.

Keynote statement by Kosi Latu, Director General, SPREP, acknowledged the dignitaries, and the excellent work of the outgoing PMC chair and of the members of PMC. He welcomed the growing numbers of women leaders in meteorology. He thanked Samoa and particularly the team from Samoa Met Service. PMC has met at the Ministerial level since 2015. The engagement of the private sector is an important contributor to this community of practice. New partners are also coming on board to support the work of PMC and its members, which requires us to improve coordination to meet the priorities identified by PMC through PIMS. The theme of PMC5 is important to bear in mind, so that key stakeholders and decision makers can be informed properly by the science. The Paris Agreement was a testament to the success of translating science into policy. PMC needs to translate science into services and information that can be understood by the wider community, in language that is accessible. The work of the expert panels established by PMC are making sterling efforts to provide services to sectors.

Keynote statement by Mary Power, Representative of the Secretary General and Director of the Development and Regional Activities Department, WMO, who noted theme of PMC5 highlights the importance of NMSs in the fight against climate change and in building resilience. She welcomed the greater attention to hydrology. Meteorology contributes to sustainable development and poverty reduction and helps us implement the SDGs. The PMPD is an important partnership for WMO and its presence in the Pacific at SPREP. The updated PIMS has benefitted greatly from the partnership with NMSs and sectors in the region. Directors of NMSs must have the resources to carry out their mandates in assisting communities with resilience building. She looked forward to strengthening partnerships at PMC5.

ANNEX 2

Chair congratulates new chair and vice chair and have trust in the coming chair and it reflects true leadership in this council.

Chair and Vice chair received gifts from Solomon Islands. The gifts are from the island of Malaita. They are worn by chiefs as a sign of authority and leadership. With this presentation, the current chair handed over the leadership of PMC5 to Samoa as incoming Chair.

ANNEX 3

The meeting also noted the importance of gender balance and appreciated efforts of WMO through CREWS project to enable more women to be part of the meeting.

Lot of discussions will take place which will allow decision. Over 200 registration and between the two day 150 people will coming in and going out. Also record for the national government. 21 out of 26 SPREP members attend this meeting. Also more presence of hydrology officers present at this PMC than before. Previous PMC is 5 days and PMC 5 is only 3 days of events and it is short so keep to time. There will be side events during lunch and the meeting is going green with less printing.

We also have regional and local journalist and they may approach you to get your stories. We ask for your cooperation. As we have tried to promote this PMC and work we do, if you use social media and use this hashtag #PacificMet.

ANNEX 4

The Secretariat presented a progress report on actions taken on matters arising from PMC-4. The Council was invited to discuss and make decisions on the report.

PURPOSE 1: To report on actions taken against the decisions and directives from the 4th Pacific Meteorological Council (PMC-4).

Summarized in Attachment 2.

Implemented by SPREP, WMO, PMC Chair, PMC panels Council members and Panels.

Updates to the work will be presented by Panels.

Updated work of the Panel and created and established Hydrology panel.

Continue supporting the PICOF in the region. PICOF 3 targeting Health section in Samoa, and PICOF 4 focusing on technical office.

Development of the Regional Research Roadmap.

Feasibility study conducted for RCC.

Detailed information will be presented by the PICS panel.

PMDP projects – continue to provide support to the countries.

As well as projects in the Pipeline, More information on these are presented under Agenda Item 20.

Establishment of New partnerships – NEW MOU signed with Meteo-France.

PICOF-5 will be the first collaboration.

Renew all other MOU's with other partners.

Actions and progress noted.

ANNEX 5

OBJECTIVE

- Provide an overview of development and progress over the last 2 years.
- Provide some new activities.

PCCSP – 2009–2012

PACCSAP program 2012–2015

AUD\$40 investment funded by the Australian Government in developing new scientific understanding of climate change in the Pacific.

These projects have been gold standard for the Pacific.

- New Knowledge in form of data, information, tool and resources.
- Enhanced in country capacity and established new partnership.
- Widespread leveraging off this work to present day, on going DFAT support.

UPDATE

- 2016–2018 – DAFT funded project – science based climate information services in the Pacific: communicating new findings, supporting application and developing in country capacity.
- Development of non technical guidance materials to facilitate development and application of science.
- Development of new Pacific climate change science data and information content for ADB funded regional climate change consortium for Asia Pacific.
- Establishment with PICS panel of Climate change projection node of WMO RA V PACIFIC REGION Regional Climate Centre.
- Affiliation with Asia Pacific to facilitate link between climate science/services and adaptation science/services across Asia/ Pacific.
- Development of PIETR panel Pacific Climate science and services Research Roadmap.
- Enhanced Pacific IPCC engagement.
 - Planning workshop in Melbourne.
 - Writeshop.
- Nextgen projection for the western tropical Pacific – APCP and SPREP \$1.2m.
 - Lead by CSIRO and partner with SPREP.
 - leverage off both the outcome of previous work by PACCSAP.
 - commenced MAY 2019 for 18 months and finish December 2020.
 - First regional workshop last week in Apia with 50 participants from across the partner PICs.
 - **Objective:** develop a strategic framework for nextgen 2.0 climate change science and services in the Pacific.
- Contribute to PKO 5 and 6.



PACIFIC
METEOROLOGICAL
COUNCIL