

行政院所屬各機關出國報告  
(出國類別：國際會議)

赴邦交國索羅門群島  
參與第 4 屆太平洋氣象理事會議(PMC4)及  
第 2 屆太平洋部長級氣象會議(PMMM2)  
出國報告

服務機關：交通部中央氣象局  
姓名職稱：張修武副局長、程家平主任  
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出國期間：106 年 8 月 11 日至 21 日  
報告日期：106 年 10 月 30 日



## 摘要

中央氣象局受邦交國索羅門群島(Solomon Islands)之邀，於民國 106 年 8 月以觀察員的身分參與「第 4 屆太平洋氣象理事會」(PMC4)及「第 2 屆太平洋部長級氣象會議」(PMMM2)相關活動。本次赴索主要重點如下：

- (1)協助索國於會議中報告我國與索國合作進行的「氣象與地震早期預警系統」設置的初步成果。
- (2)瞭解太平洋各國氣象單位對天氣及氣候的監測、預報與服務能力。
- (3)瞭解南太平洋氣象與氣候變遷相關區域合作計畫。
- (4)尋求氣候變遷跨領域調適應用研發的國際合作機會，使我國能強化對西太平洋極端氣候事件的掌握及對氣候服務能力的提升。

本次與會，我國與索國合作建置複合式氣象災害之早期預警與災害風險管理之機制與能力提升計畫，引起多個國家與相關國際組織的興趣，有機會成為未來我國推廣與南太各國合作之重要基礎。

關鍵詞：南太平洋、索羅門群島、氣候變遷調適、災害早期預警系統

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## 一、背景與目的

氣候變遷是人類需共同面對的問題，極端氣候與全球暖化不僅對先進國家造成重大的衝擊與影響，更使得低度開發及小島等弱勢國家，面臨國土流失與糧食短缺等生存問題。為促成國際合作針對氣候衝擊尋求解決之道，並協助弱勢國家進行氣候調適，聯合國大會宣布 2014 年為小島嶼發展中國家(Small Island Developing States; SIDS)國際年，提醒世界各國重視小島嶼國家因天然條件限制將遭遇的氣候變遷災難。

太平洋氣象理事會(Pacific Meteorology Council; PMC)即是由南太平洋的小島國家以及相關的區域支援國家於 2011 年 8 月 12 日於馬紹爾群島成立，為太平洋區域環境計畫秘書處(Secretariat of the Pacific Regional Environment Programme; SPREP)的附屬機構。SPREP 原為 1970 年代由聯合國環境規劃署 UNEP、SPC、SPEC、ESCAP 共同提出初步計畫，後為 UNEP 之區域海洋計畫(Regional Seas Programme)下之組織。1993 年起藉由 SPREP 成立協議(Agreement Establishing the South Pacific Regional Environmental Programme)之簽訂，以區域國際組織獨立運作。2004 年南太平洋區域環境計畫秘書處考量其會員國地理區域已包含北半球國家，故將名稱中限縮地理區域之南(south)字以秘書處(secretariat)取代，以做更廣泛的區域合作。SPREP 亦為目前太平洋區主要推動氣候變遷議題的區域組織之一。

太平洋氣象理事會每 2 年定期召開 1 次會議，專司太平洋地區氣象服務的科學、技術、活動協調與輔導。太平洋氣象理事會的前身為太平洋區域氣象局長會議(Meeting of the Regional Meteorological Directors; RMSD)，RMSD 在 2011 年第 14 會期協議於會後召開第 1 屆太平洋氣象理事會。太平洋氣象理事會由太平洋區域環境計畫秘書處會員國之氣象相關部會首

長組成。目前會員包含：澳大利亞、庫克群島、斐濟、法國、吉里巴斯、密克羅尼西亞聯邦、紐西蘭、紐埃、巴布亞紐幾內亞、馬紹爾群島、薩摩亞、索羅門群島、東加王國、吐瓦魯、美國、萬那杜等，而世界氣象組織（World Meteorological Organization; WMO）、韓國 APEC 氣候中心 (APCC) 及日本國際協力機構 (JICA) 等國際組織為觀察員。

太平洋氣象理事會的宗旨在於促進和協調區域氣象作業和服務的活動以及相關氣象科學和技術的發展，並提供太平洋區域環境計畫秘書處政策諮詢及其成員國於氣象(天氣和氣候)相關領域的優先議題建議。依照 PMC 的組織章程，其功能包括：

- (1) 提供開放討論的論壇，並就太平洋區氣象服務相關議題進行合作。
- (2) 在互惠和互補的基礎上，共同支持創新的國家和區域永續發展目標。
- (3) 和相關部門及組織進行合作。

本次會議為第 4 屆理事會議，於 2017 年 8 月 14 日至 17 日間於索羅門群島首都荷尼亞拉 (Honiara) 舉行，並接續於 8 月 18 日召開第 2 屆太平洋氣象部長會議。

索羅門群島為我邦交國，地處南緯 12 度附近，高溫高濕屬熱帶海洋性氣候，是南半球熱帶氣旋生成的主要區域，且位於環太平洋地震帶上，經常遭受地震與地震引發的海嘯威脅，對於索國本身以及周邊國家構成嚴重威脅。該國在 2007 年發生芮氏規模 8.1 地震，造成島嶼位移、引發海嘯，並造成 52 人死亡，及數以千計民眾無家可歸。2013 年又發生芮氏規模 8 的強烈地震，深度 28.7 公里，所幸震央位於人口較少最東端的提摩度省聖塔克魯斯島，仍然造成至少 5 人死亡，數十棟民宅受損或全毀，強震並引發兩次高約 1.5 公尺的小海嘯，之後並有約 20 起餘震，最大震度規模達 6.6。

此外，索國的氣候條件適合登革熱病媒蚊生長，因此受到相當大的登革熱傳染威脅，惟目前登革熱病媒蚊在索羅門群島之現況分布，及其可能與當地居民人口特徵或病史之交互作用，仍待進一步調查分析。

索國受到極端天候和地震的威脅，其政府部門對於當地氣象服務能力提昇有所期盼，自 102 年 10 月份索羅門群島環境部(Ministry of Environment, Climate change and Disaster Management；MECDM)部長及氣象局(Solomon Islands Meteorological Services；SIMS)局長來臺與我國進行首次氣象合作雙邊會談，索國即持續表達對於觀測系統強化、氣象預報能力提升、人員訓練及氣候變遷調適發展的需求與急迫性。本局自該年起即持續派員赴索與其合作強化氣象服務及早期預警系統之作業能力，自 105 年 7 月起，本局在科技部的支持下，與衛福部、中研院、中原大學、中華民國氣象學會、國際氣候發展智庫等機構之相關單位，共同規劃執行索國「氣象與地震早期預警系統」設置計畫，獲得索國高層重視，並於今(106)年 4 月底，由索國副總理率團來臺與我國進行氣象合作雙邊協議的簽定，索國也擬於第 4 屆太平洋氣象理事會議中向各國分享本計畫之具體成果。本局於收到索國環境部長之邀請函(如附錄 1)後，隨即進行相關參與工作的規劃與準備。

## 二、 與會過程

第 4 屆太平洋氣象理事會議於 2017 年 8 月 14 日至 17 日間於索羅門群島首都荷尼亞拉(Honiara)舉行，並接續於 8 月 18 日召開第 2 屆太平洋氣象部長會議(PMMM2)。本次會議由交通部中央氣象局(Central Weather Bureau；CWB)副局長張修武率團，團員包括中央氣象局氣象資訊中心程家平主任，以及國際氣候發展智庫(International Climate Development

Institute；ICDI)趙恭岳執行長，共同出席與會。

索國位於南太地區交通不便，團隊成員搭乘新加坡航空 SQ877 班機於 8 月 11 日自臺北出發，於新加坡轉搭 SQ235 班機轉往澳洲布里斯本，再搭索羅門航空 IE701 班機於 8 月 12 日下午抵達索國首都荷尼亞拉。承我駐索國大使館翁副參事等於機場協助入境，其後至下榻旅館辦理入住手續後，即和大使館同仁討論目前與索國合作進展，以及此行會議重點。翁副參事關心本團會議安排，也介紹當地的氣候環境、風土民情，並提醒應注意事項。

8 月 12 日晚間本團與索國氣象局代局長 Mr. Lloyd K. Tahani 及該局兩位同仁聚餐，雙方除針對本次會議的參與方式與議題目標進行討論外，並對雙方的氣象作業現況與重點進行交流，以增進雙方的相互瞭解。

8 月 13 日大會安排所有與會者搭乘船隻前往索國首都北方的恩吉拉 (Nggela) 島瞭解當地風土文化，並說明因氣候變遷及海水上升對此島實際造成的海岸侵蝕和居地淹沒等危機，各國與會者均對南太平洋島國臨海地區所面臨之氣候變遷風險和衝擊感到印象深刻。

第 4 屆太平洋氣象理事會議以 "Sustainable Weather, Climate, Ocean and Water Services for a Resilient Pacific" (永續的天氣、氣候、海洋及水服務建構太平洋地區的恢復力) 為主題，整體會議的相關議程安排得相當緊湊(如附錄 2)，8 月 14 日為正式會議開始的第 1 天。

本次會議中世界氣象組織及太平洋區域環境計畫秘書處均分別報告了其發展的策略規劃(Strategic Plan)，並強調未來氣候與氣象發展，需與聯合國於 2015 年所發布，預期於 2030 年實現的 17 項永續發展目標(Sustainable Development Goals；SDGs)相結合(如圖一)，並且特別強調海洋議題之重要性。



# SUSTAINABLE DEVELOPMENT GOALS



※ 此表由CSRone永續報告平台翻譯與製作

圖一、聯合國 2030 年永續發展目標

WMO 的策略規劃(2016~2019)是植基於 3 項全球社會需求，訂定了 7 個優先的策略領域及 8 項預期結果。此 3 項全球社會需求包括：(1)改善對於生命及財產的保護；(2)終結貧窮、確保生活的永續恢復力、糧食安全、水及能源的永續取用、健康的生活、性別平等與經濟成長、對抗氣候變遷；(3)自然資源的永續利用及改善環境品質。7 個優先的策略領域包括：(1)災害風險降低；(2)全球氣候服務框架(Global Framework for Climate Service - GFCS)；(3)WMO 整合式全球觀測系統(Integrated Global Observing System - WIGOS)；(4)航空氣象服務；(5)極區與岡山區域；(6)能力建構；(7)WMO 的治理。8 項預期結果包括：(1)改善服務品質及服務遞送；(2)災害風險降低；(3)改善資料處理、模式和預報；(4)改善觀測集資料交換；(5)特定研究改善；(6)能力發展強化；(7)夥伴關係強化；(8)改善校率及有效性。

SPREP 新一階段的 10 年(2017-2026)策略規劃，係奠基於其過去策略規

劃 2011~2015(延至 2016) 之成果並進行修正，此外，執行方針將根據薩摩亞途徑(SAMOA Pathway1)、永續發展目標(SDG)以及其它重要的區域性和全球性承諾與協定來規範及排序優先目標。在未來 10 年內 SPREP 將致力於 4 個優先領域包括：(1)氣候變遷的恢復力；(2)生態體系和生物多樣性的保護；(3)廢棄物管理和汙染物控制；(4)環境治理。

PMC4 的會議中各會員國亦分別報告其國家氣象作業的能力之發展，以及未來與區域合作之規劃。索羅門群島氣象局代理局長特別向各國分享我國與其合作建置之「氣象與地震早期預警系統」，以提升索國複合式氣象災害之災害風險管理機制與早期預警能力(詳細內容如附錄 3)，此計畫引起多個國家與相關國際組織的興趣，有機會成為未來我國與南太各國合作之重要基礎。

本次會議亦特別於 17 日安排召開捐助者會議(Donors Meeting)，邀請太平洋地區重要捐助國如澳洲、芬蘭、韓國、日本等進行報告，並且邀請聯合國氣候變遷綱要公約下設之綠色氣候基金 Green Climate Fund (GCF) 進行報告，然後以公民咖啡館方式進行配對討論，協助受援國與捐助國及單位進行媒合。芬蘭外交部資深環境顧問 Matti Nummelin 亦指出太平洋地區的氣象當局都肩負龐大的工作量，必須應對包含熱帶氣旋、氣候變化之變向、氣候監控、氣候變遷、氣象預報等例行氣象資訊工作，還有因應數個經濟部門的需求。而芬蘭理解上述考量，在現行與太平洋區域環境署共同執行的 FINPAC 計畫中，協助太平洋地區的開發中小島國家。會議最後討論下一屆 PMC5 舉辦地點，目前規劃於 2019 年於薩摩亞 Samoa 舉辦。

18 日舉辦第 2 屆太平洋氣象部長會議，由索國副總理主持開幕。太平洋氣象部長會議為太平洋地區最高階的氣象會議，透過本會議讓各國共同討論太平洋地區氣象基礎建設與人才、服務的具體條件與目標，開發中小

島國家 (Small Island Developing States ; SIDS) 多在太平洋地區，皆已受到不同類型的自然災害與氣候變遷的影響。WMO 秘書長 Prof. Petteri Taalas 提到過去 50 年太平洋地區的空氣溫度 (air temperatures) 整體升高攝氏 0.9 度，而海水溫度 (sea temperatures) 升高了攝氏 1 至 1.5 度，這兩者都遠比全球平均升高攝氏 0.6 度來得多。同時太平洋地區現在較 1975 至 1989 年間相比第四級與第五級暴風的數量增加了一倍。他呼籲各國應該強化夥伴關係 SDG17，協助彼此在氣候變遷調適相關的工作。澳洲政府在會議中提出總值達 3 億美元的區域援助發展計畫，而日本政府則另再提出 5 億美金的氣候援助方案。索國副總理並於會議中呼籲各國應建立區域氣象基金 (Regional trust fund on meteorology)，以因應未來的氣候風險增加可能性。最後各國共同強調氣象能力在未來因應氣候變遷的重要性。

19 日上午，本團赴索國氣象局查看我國與索國合作設置氣象及地震觀測儀器及早期預警系統狀況，索國目前在氣象監測部分，每 3 小時接收自氣象站以電話回報的電碼資料，使用 NOAA 的 EMWIN (Emergency Managers Weather Information Network) 系統接收各式衛星雲圖，2016 年 JICA 亦在其觀測坪架設碟型天線及接收器，提供 HIMAWARI-8 衛星產品；預報員進行天氣預報主要參考澳洲網站及 ECMWF 網站的數值天氣預報產品；紐西蘭氣象局提供大雨 (24 小時 100 毫米) 預測圖以供預警參考。索國氣象局預報人員需發布各省分的今明天氣預報、洋面預報 (每日兩次)，另外亦須做航空氣象的工作發報 TAF，然因該國探空觀測設施已停用多時，因此預報員僅依據數值模式、天氣圖或是如 winddty 網頁進行資料分析與預報作業。發布預警資訊，包括洪水預警、長浪預警、海嘯警報以及熱帶氣旋消息等，預報產品主要透過網頁傳遞至 NDMO 辦公室，再經由廣播電台透過調幅頻率 (AM) 廣播至各省。索國氣象預報人員目前使用的預報產品、技術多來自鄰近的澳洲、紐西蘭和斐濟提供，這些國家亦提供鄰近島國教育訓練，目前預報

作業資訊較為零散，若能有整合性的預報資訊提供索國預報人員將有相當大的助益。19日中午，本團赴我國駐索國大使官邸餐敘，向羅大使報告本次會議內容。

20日下午本團搭乘索羅門航空 IE700 班機自荷尼亞拉啟程，經澳洲布里斯本、新加坡，於 21 日下午 1 點 15 分返抵國門。

### 三、氣象與地震早期預警系統

本局在科技部的支持下，與衛福部、中研院、中原大學、中華民國氣象學會、國際氣候發展智庫等機構之相關單位，所共同規劃執行的索國「氣象與地震早期預警系統」建置計畫，旨在協助索國充分運用環境監測或預報資訊進行相關風險的控管，以達到預防、應變及減低災損的目標。茲簡要說明此系統建置與運作的重要概念：

在氣象預警方面：索羅門群島受到氣候變遷的影響，使得面臨海岸侵蝕和海平面上升(漲潮)、颱風帶來的劇烈降雨與洪水問題加劇、糧食安全等嚴重威脅。索國目前僅有 6 個傳統地面氣象觀測站及 1 個損壞的探空站，各站觀測儀器常因故障後缺乏經費而長時間缺漏。本局將與索國合作於人口密集區及其上游建站，自動收集大氣環境的溫、濕、風、壓和雨量資料，增加氣象站有利對索國大氣環境狀況的瞭解以及進行劇烈天氣對各地影響程度的研判，以及對劇烈降雨可能引發的淹水狀況進行監測，以滿足氣象相關早期預警作業的需要。目前本局已與索國合作建置的 3 個測站位置如圖二所示；實際的測站設置現場狀況如圖三所示；相關自動氣象站觀測到的資料即時經由通訊網路收整到位於索國氣象局(SIMS)的資料收集伺服器，並經由本局所提供的索國環境協同分析系統(Solomon Islands Synergistic Analysis For the Environment; SoSAFE)進行相關產品的製

作與整合顯示，整體作業系統的架構概念如圖四所示；此系統除可收整顯示索國自身的氣象與地震觀測資料外，並可接收與顯示本局所提供的各種衛星及數值預報資料，同時也可經由網路連結國際各重要作業中心所提供的相關監測及預報資料，此系統可查詢顯示的主要資訊及產品列表如圖五所示；此系統的查詢顯示操作介面及產品範例則如圖六所示。

在跨域應用預警方面：索羅門群島為熱帶小島嶼發展中國家，氣候條件非常適合病媒蚊生長，登革熱因此成為索國極大的公衛隱憂。由於我國亦位於登革熱的疫區，對於登革熱的防治相當有經驗，衛福部亦長期派遣醫療團赴索協助相關防治與醫療工作，本局與中原大學合作，透過索國環境部(MECDM)協調健康醫療部(Ministry of Health and Medical Services)提供索國登革熱的病歷資料，將分析索羅門群島登革熱流行與氣象因子之相關性，並鑑定疾病風險因子甚至是高風險區域預測，預期建立一氣象預測登革熱流行預警系統，可由先期的氣象資料，協助索羅門群島衛生單位能即早因應登革熱之流行。

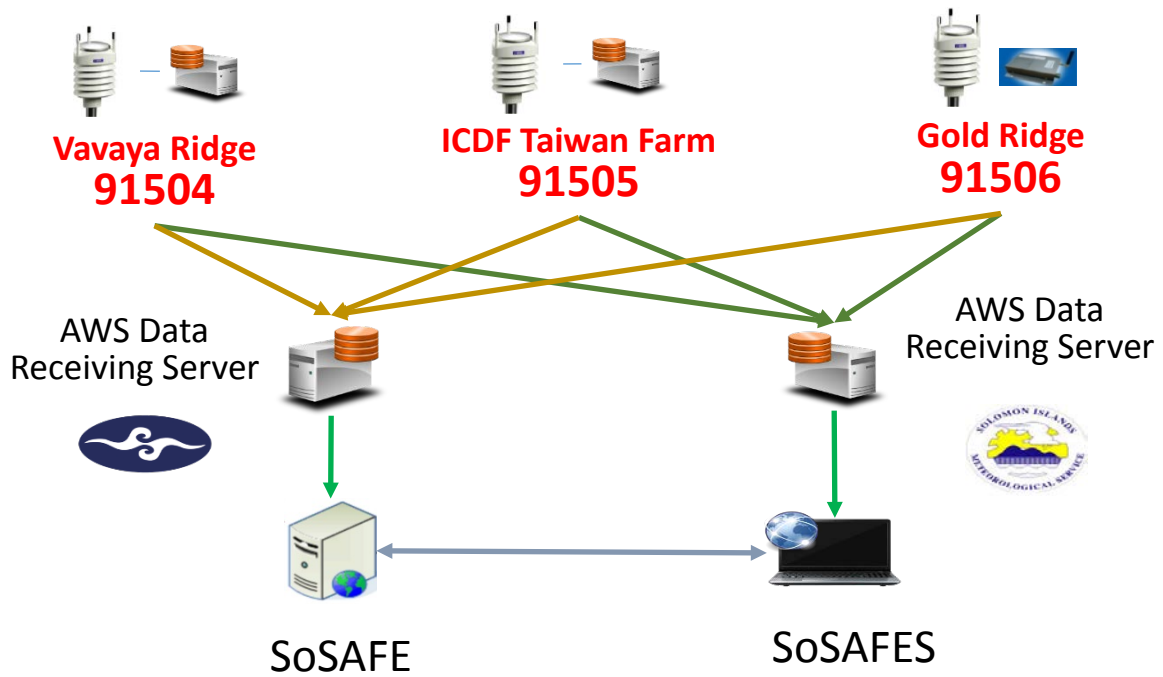
在地震預警方面：由於索羅門群島強震發生的位置大多處於西南方的板塊聚合帶附近，本局將於鄰近板塊聚合帶的沿海地區與索國合作建置強震儀，初步使其先發揮現地型地震預警功效，當強烈地震發生後，P波率先由強震儀測得，進而預估後續接續而來的破壞性S波及海嘯，讓沿海地區人民能在獲得警報訊息後，快速疏散至高處躲避海嘯威脅。待後期索國電力及通訊環境建設完備之時，再將前期建置的地震儀串連網路，建構即時地震監測網，搭配適當的地下速度模型，使其有地震定位能力，進而發展為地震速報系統，將可自主處理地震波形資料，解算出地震參數並對外發布地震報告，甚至是海嘯警報。



圖二、索國氣象站與地震站設置位置



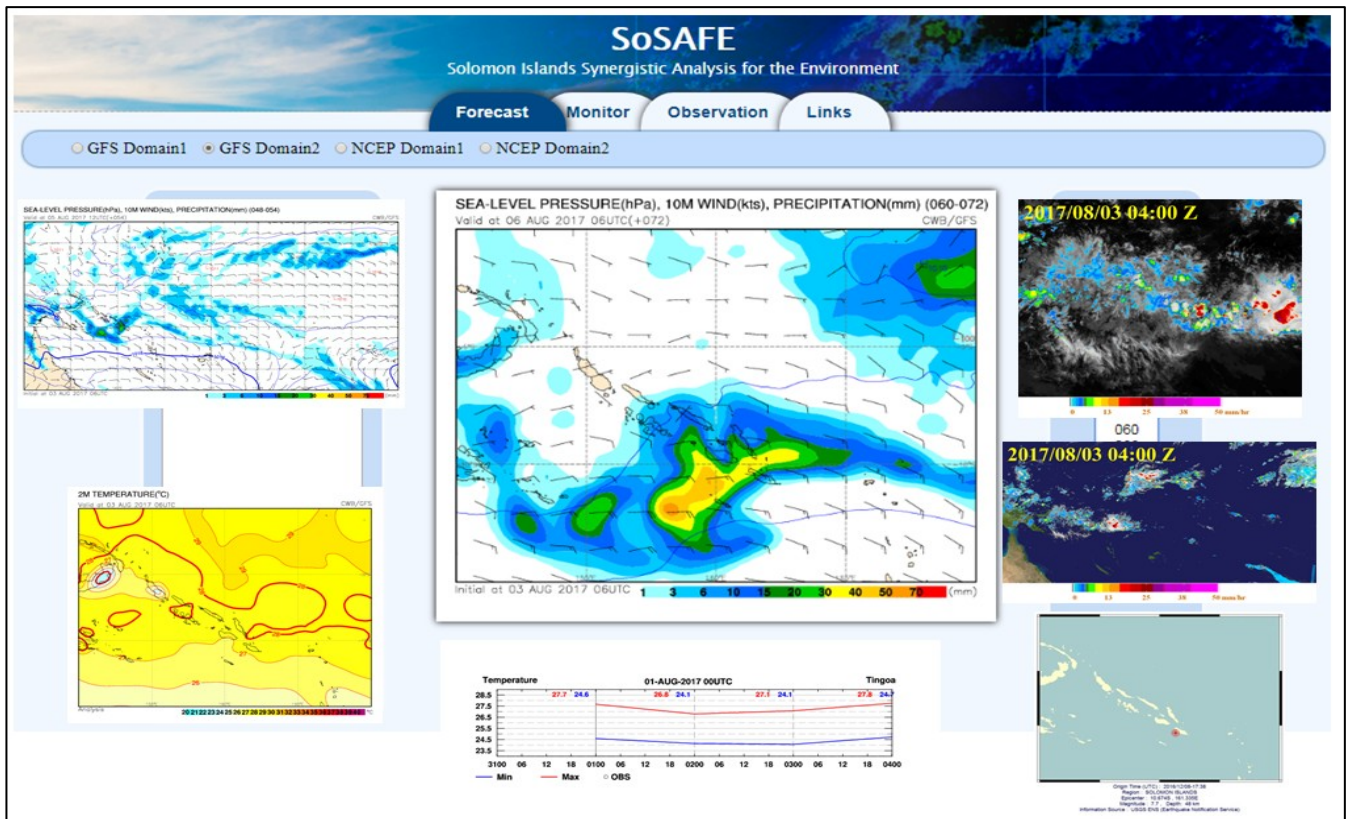
圖三、索國氣象站與地震站設置



圖四、索國氣象站網路連線架構

Main	Sub-menu	Item	frequency	source	
OBS (15MB/hr)	Temperature Model Forecast Stations		Synop : 91520, 91502, 91503, 91507, 91517, 91541, 91546 AWS : 91504, 91505, 91506	3 hrs 1 hrs	Obs from MIC Fct from MFC (MOS)
	Satellite	Domain1	H8 VIS	10 min	MSC
		Domain2	H8 IR	10 min	MSC
		H8 IRE	10 min	MSC	
Monitor (4MB/hr)	Rainfall		Time-series(AWS)	1 hrs	MIC
	Satellite	Domain1	QPE	10 min	MSC
		Domain2	QPE+IR	10 min	MSC
Earthquake		waveform	>6 levels	SCMAN	
Forecast (6MB/hr)	CWB-GFS	Domain1	T2M, SLP+Windbar-10M+accrain	6 hrs(0~72)	MIC(Gra)
	NCEP-GFS	Domain2	T2M,SLP+Windbar-10M+accrain	12 hrs(0~72)	MIC(Gra)
Q-Link	SIMS		<a href="http://met.gov.sb/">http://met.gov.sb/</a>		
	SWFDDP		<a href="http://swfddp.metservice.com/global-ukmo-pacific-eps-meteograms/solomon-islands-honiara">http://swfddp.metservice.com/global-ukmo-pacific-eps-meteograms/solomon-islands-honiara</a>		
	ECMWF		<a href="http://www.ecmwf.int/en/forecasts/charts/swfdp_pacific/">http://www.ecmwf.int/en/forecasts/charts/swfdp_pacific/</a>		
			<a href="http://mag.ncep.noaa.gov/model-guidance-model-parameter.php?group=Model%20Guidance&amp;model=GFS&amp;area=SPAC&amp;ps=area">http://mag.ncep.noaa.gov/model-guidance-model-parameter.php?group=Model%20Guidance&amp;model=GFS&amp;area=SPAC&amp;ps=area</a>		
	NCEP NWS		<a href="http://www.weather.gov/ppg/gfs_precipitation">http://www.weather.gov/ppg/gfs_precipitation</a>		

圖五、索國氣象與地震早期預警系統(SoSAFE)產品列表



圖六、索國氣象早期預警系統操作介面範例

目前在聯合國 UNDP 的氣候變遷與糧食安全相關專案給予經費支持下，正由紐西蘭 NIWA（負責：觀測通訊等儀器設備供應、現場指導、資料傳輸交換）與 SIMS（負責：用地、架設施工、交通運輸）合作執行建置自動雨量站及自動氣象站系統，於 2015 年 9 月考察時，已初步完成第 1 階段的 2 處雨量站和 2 處氣象站，未來將持續建置達成全部 11 處自動雨量站和 6 處自動氣象站，但尚非全部省分都有，且以雨量觀測為主，若要蒐集較完整氣象資訊，增加站數是必要的。在會議期間 NIWA 表達非常期待與本局設置的系統進行資料交換與技術交流互動。

此外，目前由世界銀行 CRISP 計畫經費支持下，亦正由萬那杜共和國氣象局與 SIMS 合作於索國中部及東部建置 5 處地震觀測站，該計畫負責人員已表示非常有興趣於參考我代表團使用之地震感測儀器，亦樂意與我方就此計畫所預期佈設的地震觀測設施與資料進行互動交換，補強南太平洋環



地震帶的站網配置與密度。

#### 四、觀察心得

太平洋地區島嶼國家不但是受全球氣候變遷影響最鉅地區，同時多數太平洋島嶼國亦為低度開發國家 (Least Developed States; LDS)。受限於有限的技術與財政能力，來自國際的各類型軟硬體與經費支援，對於太平洋島國在發展面對氣候變遷的調適 (adaption) 與減緩 (mitigation) 上都不可或缺。目前太平洋島國在應對全球氣候變遷上所缺乏的要件有下列主要 3 項：資金 (funding)、技術 (know-how)、獨立自理氣象服務的能力建構 (capacity building in independent meteorological services)。

以本次會議來說，我國獲得邀請的機會，來自於我國近年來對於索國協助其氣象能力提升的成果。索國位於南緯 12 度附近，屬熱帶海洋性氣候，高溫高濕，大部分島嶼雨量充沛，索國附近區域係南半球熱帶氣旋好生地，雖熱帶氣旋的直接破壞機會少，仍會構成嚴重威脅甚至可能導致大範圍嚴重洪災。這些由熱帶氣旋引起的劇烈降雨與洪水問題等嚴重威脅，加上該國位於環太平洋地震帶，相關海嘯預警機制需求迫切，我國與其合作發展早期預警速報系統技術將有助於索國對於天然災害的應變作為。我國未來若要持續參與太平洋區域的相關會議機制，持續投入協力工作將會是重要關鍵。

舉例來說，韓國 APCC 本次在會議中扮演重要角色，其原因起自於韓國自 2015 年啟動大韓民國：太平洋島嶼氣候預測服務計畫 (ROKPI-CLIPS, 以下稱韓國太平洋島嶼氣候計畫)，提供太平洋島嶼國家客製化、在地化的季節性氣候預報資訊，並與其合作建構氣象預報能力。由韓國政府透過太平洋島國論壇秘書處 (Pacific Islands Forum Secretariat, PIFS) 出資，

APEC 氣候中心(APEC Climate center ; APCC) 與太平洋區域環境署(SPREP) 共同執行。韓國太平洋島嶼氣候計畫的執行期間由 2015 至 2017 為期 3 年，其主要目標為強化以季節為單位，面對氣候風險脆弱的社群之能力，同時開發客製化區域氣候服務資訊系統。此計畫著眼於建立這些脆弱社群的調適能力、建立氣候資訊系統以供使用，以及經由強化國家氣象服務達到提升社群氣候回復力及完善國家開發計畫之貢獻。在本次會議中韓國充分展現了其拓展技術援外的企圖心，值得我國借鏡。此外，索國在本次會議中，分享了與我國合作的協力經驗，由於成果明確可期，使得美國、澳洲、紐西蘭、日本等國皆表達有興趣與我進一步合作，後續效益值得積極投入。

本次會議另一重點就是綠色氣候基金(Green Climate Fund ; GCF)的角色提升。目前 GCF 申請通過的 35 個專案中南太各小島國就佔了 12 個，為專案通過數佔比最高的 GCF 輔助對象，其中以 UNDP 申請 GCF 通過的吐瓦魯專案(第 15 件)為例(專案名稱：吐瓦魯沿岸調適計畫 Tuvalu Coastal Adaptation Project, TCAP, GCF 資助金額為 3 千 6 百萬美元)，即是奠基於五項與沿岸社區以及生態調適相關的子計畫上(各計畫經費約落在\$1~5 百萬美元間)，當中 UNDP 參與了 3 項子計畫的經費捐贈或專案執行，其他子計畫捐贈單位包含：GEF-LDCF (the Least Developed Country Fund) 全球環境機構-低度開發國家基金、澳洲外交部(DFAT)、日本國際協力機構(Japan International Cooperation Agency, JICA)以及世界銀行，協力單位包含：太平洋區域環境署(SPREP)、太平洋共同體秘書處(SPC)。未來 GCF 在區域的角色將愈見增加，我國若想參與，前導計畫的提出是重要的。

## 五、建議與結語

(一) 綜觀本次會議討論，可發現氣候變遷與永續發展目標的連結會是未來

國際間重要的議題，然要提升我國在此議題的能見度，建議持續投入協力各國氣象與氣候變遷調適能力工作會是關鍵。

- (二) 由於我國在本次會議中所分享的協力經驗，美國、澳洲、紐西蘭、日本等國皆有興趣與我進一步合作，後續效益值得積極投入。
- (三) 未來 GCF 在區域的角色將愈見增加，我國若想參與，前導計畫的提出是重要的。

此行感謝我國駐索國大使館、索羅門群島環境部、索國氣象局(SIMS)的協助，使本團得以順利與會。

與索國氣象局繼續合作，設置更多適當的氣象觀測設施，並持續與其合作改善其氣象預警作業系統為未來重要工作。索國為我重要友邦，屢次於 UNFCCC 締約國會議 COP 大會中發表友我立場，未來我將持續配合政府整體外交政策進行氣象合作交流，並提升其面對氣候變遷威脅的能力。

附錄 1、PMC4 邀請函



**Solomon Islands Government**  
Ministry of Environment, Climate Change, Disaster Management and Meteorology  
P.O. Box G21, Honiara, Solomon Islands  
Tel (677) 21348, Tel-Fax: (677) 28054

10 July 2017

To: The Central Weather Bureau (CWB)  
Ministry of Transport and Communications  
Republic of China (TAIWAN).

Dear Sir/Madam,

**RE: The 4<sup>th</sup> Meeting of the Pacific Meteorological Council (PMC-4) 14<sup>th</sup> to 18<sup>th</sup> August 2017  
Honiara, Solomon Islands.**

We have the honour to invite your team's participation for the 4<sup>th</sup> Meeting of the Pacific Meteorological Council (PMC-4) scheduled to take place in Honiara from the 14<sup>th</sup> -18<sup>th</sup> August 2017.

Grateful if your office could indicate availability to participate as an Observer at the meeting at your earliest convenience to the Ministry of Foreign Affairs and External Trade, Protocol Division, Mr. Kereta Sanga (email: [KSanga@mfael.gov.sb](mailto:KSanga@mfael.gov.sb)) and Ministry of Environment, Climate Change, Disaster Management and Meteorology, Undersecretary – Technical, Mr. Chanel Iroi (email: [c.iroi@met.gov.sb](mailto:c.iroi@met.gov.sb)). For any enquiries and assistance please do not hesitate to contact them.

Please accept, Excellency, the assurance of my highest consideration.

Sincerely,



Hon. Samuel Manu'uli  
Minister for Ministry of Environment, Climate Change, Disaster Management and Meteorology  
Honiara, Solomon Islands

附錄 2、PMC4 及 PMMM2 議程

<b>Time</b>		<b>PMC4 Agenda Item</b>	<b>Lead</b>
<b>Monday 14 August</b>			
07:30 – 09:00		Registration at FFA Conference Centre	SPREP
09:00 – 10:00	<b>Agenda Item 1:</b>	<b>Opening Ceremony</b>	
	<b>1.1</b>	Opening Prayer	Government of Solomon Islands
	<b>1.2</b>	Welcome	Government of Solomon Islands
	<b>1.3</b>	Address	Current Chair of PMC
	<b>1.4</b>	Key Note Statement	SPREP
	<b>1.5</b>	Key Note Statement	WMO
	<b>1.6</b>	Opening Address	Government of Solomon Islands
10:00-10:30		<b>Group Photo and Morning Tea</b>	
10:30-11:00	<b>Agenda Item 2:</b>	<b>Organization of the Fourth Meeting of the Pacific Meteorological Council (PMC-4)</b>	
	<b>2.1</b>	Election of Chair and Vice Chair for PMC-4	PMC-3 Chair
	<b>2.2</b>	Adoption of Agenda and Program of Work	PMC-4 Chair
	<b>2.3</b>	Establishment of a Drafting Committee	PMC-4 Chair
11:00-11:15	<b>Agenda Item 3:</b>	<b>Setting the Scene for PMC-4: Objectives and Expected Outcomes</b>	SPREP
11:15-11:30	<b>Agenda Item 4:</b>	<b>Report on Actions Taken on Matters Arising from the 3<sup>rd</sup> Meeting of the Pacific Meteorological Council (PMC-3) and the Nuku'alofa Ministerial Declaration</b>	SPREP
11:30-11:45	<b>Agenda Item 5</b>	<b>WMO Strategic Plan</b>	WMO
11:45-12:00	<b>Agenda Item 6</b>	<b>SPREP Strategic Plan</b>	SPREP
12:00-12:15	<b>Agenda Item 7</b>	<b>Contribution to the Implementation of the Sustainable Development Goals (SDGs)</b>	UNESCAP
12:15-12:30	<b>Agenda Item 8</b>	<b>Framework for Resilient Development in the Pacific (FRDP)</b>	SPREP
12:30-12:45	<b>Agenda Item 9</b>	<b>Outcomes of the UN Oceans Conference</b>	SPREP
12:45-1:00	<b>Agenda Item 10</b>	<b>Outcomes of the Multi Hazard Early Warning System and Disaster Risk Reduction Global Platform Meetings in Cancun, Mexico.</b>	Mr 'Ofa Fa'anunu (Tonga), Mr Arona Ngari (Cook Islands), Mr Lloyd Tahani (Solomon Islands), Mr Alex Montoro (SPREP)

			and WMO
1:00-2:00		<b>Lunch</b>  <b>Side Events</b> Room 1- Side Event 1: RIMES (TBC) Room 2 - Side Event 1: NIWA Solomon Islands Climate Early Warning	
2:00-3:00	<b>Agenda Item 11</b>	<b>Countries' Reports from National Meteorological and Hydrological Services</b>	
	<b>11.1</b>	American Samoa	
	<b>11.2</b>	Cook Islands	
	<b>11.3</b>	Federated States of Micronesia	
	<b>11.4</b>	Fiji	
	<b>11.5</b>	French Polynesia	
	<b>11.6</b>	Kiribati	
	<b>11.7</b>	Marshall Islands	
	<b>11.8</b>	Nauru	
	<b>11.9</b>	New Caledonia & Wallis and Futuna	
	<b>11.10</b>	Niue	
	<b>11.11</b>	Palau	
	<b>11.12</b>	Papua New Guinea	
3:00-3:30		<b>Afternoon Tea</b>	
3.30-4.30	<b>11.13</b>	Samoa	
	<b>11.14</b>	Solomon Islands	
	<b>11.15</b>	Tokelau	
	<b>11.16</b>	Tonga	
	<b>11.17</b>	Tuvalu	
	<b>11.18</b>	Vanuatu	
	<b>11.19</b>	Australia	
	<b>11.20</b>	New Zealand	
	<b>11.21</b>	United States of America	
	<b>11.22</b>	General Discussion on the Countries Reports	
7:00 – 9:00pm		Sunset Event	
<b>Tuesday 15 August</b>		<b>Agenda Item</b>	<b>Lead</b>
8:30 – 9:30	<b>Agenda Item 12</b>	<b>Aviation Weather Services</b>	
	<b>12.1</b>	Progress on the PIAWS Panel including outcomes of related regional and international meetings and surveys	PIAWS Panel Chair and ICAO
	<b>12.2</b>	Compliance with ICAO requirements including Annex 3, QMS (ISO 9001-2015)	ICAO

		CAR Document/ Part 174 and competency assessment and capacity development of AMOs and AMFs.	
	<b>12.3</b>	Cost recovery for aviation weather services.	PIAWS Panel Chair
	<b>12.4</b>	Future Work of the Pacific Island Aviation Weather Services (PIAWS) Panel including Terms of Reference.	PIAWS Panel Chair
9:30 - 9:40		<b>Discussions, Questions and Answers</b>	
9:40 – 10:25	<b>Agenda Item 13</b>	<b>Climate Services</b>	
	<b>13.1</b>	Progress on the Pacific Island Climate Services (PICS) Panel	PICS Panel Chair
	<b>13.2</b>	Progress on the establishment of the WMO RA-V Pacific Islands Regional Climate Centre	PICS Panel Chair
	<b>13.3</b>	A review of second Pacific Island Climate Outlook Forum (PICOV-2) and plans for PICOV-3	PICS Panel Chair
10:25-10:35		<b>Discussions, Questions and Answers</b>	
<b>10:35-11:05</b>		<b>Morning Tea</b>	
11:05-11:50	<b>Agenda Item 14:</b>	<b>Multi-Hazard Early Warning System (MHEWS)</b>	
	<b>14.1</b>	Outcomes of the Twenty-seventh Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXVII)	IOC-UNESCO and Tonga
	<b>14.2</b>	Oceania Regional Seismic Network (ORSNET)	Vanuatu
	<b>14.3</b>	Pacific Resilience Program (PREP) in Samoa and Tonga	SPC, Samoa and Tonga
11:50-12:00		<b>Discussions, Questions and Answers</b>	
12:00:12:45	<b>Agenda Item 15</b>	<b>Hydrology and Flood Early Warning System</b>	
	<b>15.1</b>	Hydrology	SPC and SPREP
	<b>15.2</b>	Flood Early Warning System	Fiji Meteorological Service
	<b>15.3</b>	Opportunities for establishing UNESCO International Hydrology Programme in the Pacific region	UNESCO
12:45-12:55		<b>Discussions, Questions and Answers</b>	
12:55-1:55		<b>Lunch</b>  <b>Side Events</b> Room 1- Side Event 3: Samoa: Improvement of early disaster warning using Smartphone App	

		Room 2 - Side Event 4: IPCC	
1:55-2:40	<b>Agenda Item 16:</b>	<b>Marine Weather Services and Ocean Issues</b>	
	<b>16.1</b>	Progress on the Pacific Island Marine and Ocean Services (PIMOS) Panel	PIMOS Panel Chair
	<b>16.2</b>	Methodologies to evaluate climate change impacts on storm surge/storm wave hazards in SIDS	RESTEC
	<b>16.3</b>	Coastal Inundation Forecasting in Fiji and Tuvalu	SPC, WMO, Fiji and Tuvalu
2:40-2:50		Discussions, <b>Questions and Answers</b>	
2:50-3:35	<b>Agenda Item 17:</b>	<b>Communications and Infrastructure</b>	
	<b>17.1</b>	Progress on the Pacific Island Communication and Infrastructure (PICI) Panel	PICI Panel Chair
	<b>17.2</b>	National Emergency Telecommunication Plans (NETP) and opportunity for NMHSs to link	PRCCT and WFP
	<b>17.3</b>	RANET	US NOAA
3:35-3:45		<b>Discussions, Questions and Answers</b>	
3:45-4:15		Refreshment	
4:15-5:00	<b>Agenda Item 18</b>	<b>Training, Education and Research</b>	
	<b>18.1</b>	Progress on the Pacific Island Education, Training and Research (PIETR) Panel	PIETR Chair
	<b>18.2</b>	The Pacific Regional Meteorological Training Centre	Mr. Ravind Kumar (Fiji) and Prof. Elisabeth Holland (USP)
	<b>18.3</b>	Impacts of climate change for the Pacific according to the latest findings of the Intergovernmental Panel on Climate Change (IPCC) and Future priorities of the IPCC	Dr. Joy Jacqueline Pereira (Vice-Chair of IPCC Working Group II)
5:00-5:10		<b>Discussions, Questions and Answers</b>	
5:10-5:30	<b>Agenda Item 19</b>	Republic of Korea- Pacific Islands Climate Prediction Project Update	APCC. SPREP
7:00 – 9:00pm		Sunset Event APCC & SPREP	
<b>Wednesday 16 August</b>		<b>Agenda Item</b>	<b>Lead</b>
9:00-9:15	<b>Agenda</b>	FINPAC Project	SPREP



	<b>Item 20</b>		
9:00-9:30	<b>Agenda Item 21</b>	Forum Fishery Agency (FFA) Observer Program	FFA
9:30-9:45	<b>Agenda Item 22</b>	COSPPac Project	BoM
9:45-10:15	<b>Agenda Item 23</b>	<b>Pacific Island Meteorological Strategy</b>	
	<b>23.1</b>	Presentation of the Final Draft of the Reviewed Pacific Island Meteorological Strategy (PIMS) 2017-2026 for Endorsement	SPREP
	<b>23.2</b>	Discussions and Endorsement	
10:15-10:45		<b>Morning Tea</b>	
10:45-11:15	<b>Agenda Item 24</b>	<b>The Pacific Roadmap for Strengthened Climate Services</b>	
	<b>24.1</b>	<b>Presentation of the Final draft of the Pacific Roadmap for Strengthened Climate Services (PRSC) 2017-2026 for Endorsement</b>	SPREP
	<b>24.2</b>	Discussions and Endorsement	
11:15-11:30	<b>Agenda Item 25</b>	Pacific Climate Change Centre (PCCC) and Role in Supporting Meteorology in the Pacific	SPREP
11:30-12:00	<b>Agenda Item 26</b>	Review of PMC Terms of Reference	
12:00-1:00		Lunch  <b>Side Events</b> Room 1- Side Event 5: JAXA-Real-time Rainfall Watch Room 2 - Side Event 6: Forecast-based Financing: A roadmap for Solomon Islands	
1:00-3:00	<b>Agenda Item 27:</b>	<b>PMC-4 Outcomes, Donor and Partners Roundtable and the Ministerial Meeting</b>	
	<b>27.1</b>	Review and Finalize the Second Pacific Ministerial Meeting on Meteorology (PMMM-2) Agenda	All
	<b>27.2</b>	Briefing for Donor and Roundtable Meeting	All
3:00-3:30		<b>Refreshment</b>	
6:00-9:00pm		Sunset Event	
<b>Thursday 17 August</b>		<b>Agenda Item</b>	<b>Lead</b>
8:30-10:00	<b>Agenda Item 28:</b>	<b>Partner and Donor Roundtable</b>	
	<b>28.1</b>	<b>Setting the Scene</b>	SPREP
	<b>28.2</b>	Roles of the NMHSs and the PMC in	WMO/SPREP

		Sustainable Development	
	<b>28.3</b>	Presentation of the PIMS 2017-2026 and PRSCS 2017-2026 Needs and Priorities	SPREP/WMO
	<b>28.4</b>	<u>Speed Dating</u> : between Donors and Partners with National Meteorological and Hydrological Services	
10:00-10:30		Refreshment	
10:30-11:30	<b>28.5</b>	Donors and Partners Presentations and Discussions- Linkages to Support the PIMS/PRSCS/NMHSs	DFAT, WMO, EU, and GCF
11:30-12:30	<b>28.6</b>	Panel Discussions: Climate Resilience in the Pacific	DFAT, WMO, Foreign Affairs Finland, JICA, Tonga, and SPREP
12:30-1:00	<b>28.7</b>	Mapping Exercise	
1:00-2:00		Lunch <b>Side Events</b> Room 1- Side Event 7: ICAO (tbc) Room 2 - Side Event 8: FINPAC-Lord Howe Community-based Early Warning System in Solomon Islands.	
2:00-3:00	<b>28.8</b>	Open Dialogue	
	<b>28.9</b>	Closing	
3:00-3:30		Refreshment	
3:30-3:45	<b>Agenda Item 29:</b>	<b>Venue of the Fifth Meeting of the PMC</b>	
3:45-4:45	<b>Agenda Item 30:</b>	<b>Review and Adopt the Report of PMC-4</b>	
4:45-5:00	<b>Agenda Item 31:</b>	<b>Closure of PMC-4</b>	

## **PMMM2 Aug.18 Meeting Agenda Items**

**08:30 - 09:00 ARRIVAL OF DIGNITARIES**

**09:00 - 10:00 Agenda Item 1: OFFICIAL OPENING**

- 1.1 Opening Prayer (*Government of Solomon Islands*)
- 1.2 Welcome (*Government of Solomon Islands*)  
*Video of Solomon Islands and Cultural Welcome*
- 1.3 Keynote Address (Director General of SPREP)
- 1.4 Keynote Address (Secretary General of WMO)
- 1.5 Official Opening Statement (Prime Minister of Solomon Islands)

**10:30 - 11:00 BREAK: GROUP PHOTO and MORNING TEA**

**11:00 – 11:30 Agenda Item 2: ORGANISATION OF THE SECOND PACIFIC MINISTERIAL MEETING ON METEOROLOGY (PMMM-2)**

- 2.1 Designation of Chair for PMMM-2 (Chairman of PMMM-1)
- 2.2 Adoption of Agenda and Program of Work

**11:30 – 12:00 Agenda Item 3: OUTCOMES OF THE NUKU'ALOFA MINISTERIAL DECLARATION AND THE OUTCOMES OF THE PMC-4**

- 3.1 Update on the Outcomes of the Nuku'alofa Ministerial Declaration for sustainable weather and climate services for a resilient Pacific (SPREP)
- 3.2 Presentation of the Outcomes of PMC-4 (Chairman of PMC-4)  
Discussions/Interventions/statements from Ministers.

**12:00 - 12:45 Agenda Item 4: CONTRIBUTION OF NMHSs TO THE SUSTAINABLE DEVELOPMENT GOALS (SDGs), INTERGOVERNMENTAL PANEL OF CLIMATE CHANGE (IPCC) AND THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)**

- 4.1 Contribution of National Meteorological and Hydrological Services (NMHSs) to the Sustainable Development Goals (SDGs) (UNESCAP)  
Discussions/Interventions/statements from Ministers.
- 4.2 Contribution of NMHSs to the Intergovernmental Panel on Climate Change (IPCC).  
Discussions/Interventions/statements from Ministers.
- 4.3 Contribution of NMHSs to the United Nations Framework Convention on Climate Change (UNFCCC) (SPREP)  
Discussions/Interventions/statements from Ministers

**12:45 - 14:00      BREAK: LUNCH**

**14:00 - 15:00 Agenda Item 5: METEOROLOGICAL SERVICES SUPPORTING PACIFIC COMMUNITIES**

- 5.1 Hydrology (Samoa)  
Discussions/Interventions/statements from Ministers
- 5.2 Contribution of Meteorology to Aviation Safety (Chairman of PIAWS Panel)  
Discussions/Interventions/statements from Ministers
- 5.3 Coastal Inundation Forecasting  
Discussions/Interventions/statements from Ministers

**15:00 - 15:30 Agenda Item 6: COORDINATION OF METEOROLOGY IN THE PACIFIC**

- 6.1 Presentation of the revised Pacific Islands Meteorological Strategy (PIMS) 2017-2026 and the Pacific Roadmap for Strengthened Climate Services (PRSCS) 2017-2026 (Chairman of the PMC-4)  
Discussions/Interventions/statements from Ministers.
- 6.2 The Pacific Climate Change Centre (PCCC) (SPREP)  
Discussions/Interventions/statements from Ministers.

**15:30 - 16:00      BREAK: AFTERNOON TEA**

**Agenda Item 7: DISCUSSION ON THE HONIARA MINISTERIAL STATEMENT**

**Agenda Item 8: CLOSING OF MEETING**

### 附錄 3、索羅門氣象局於 PMC4 的發言報導

## SOLOMON ISLANDS PUSH TO IMPROVE EARLY WARNING SYSTEM



*By Ben Bilua of Island Sun Newspaper, Solomon Islands*

**15 August, 2017, Honiara, Solomon Islands, PMC-4** – The Director of Solomon Islands Meteorology Service says the government is pushing to improve the country’s early warning systems.

Reporting back to the 4th Pacific Meteorological Council in Honiara this week, Mr Lloyd Tahani said national service’s achievements include infrastructure development, improved early warning systems through the installation of rain and tide gauges, staff capacity building and providing services to other stakeholders.

Mr Tahani said Solomon Islands infrastructure observation network had improved since 2014, thanks to a United Nation’s Development Programme’s project, Resilience in the Pacific (SIDS) otherwise known as RESPAC.

He said early warning devices such as rain gauges and tide gauges were being installed throughout the country as part of an effort to improve early warning system.

Mr Tahani said the devices not only provided weather updates but also information that were tailored to other stakeholders such as agriculture, water resources and health sector.

He said Solomon Islands meteorology (climate section) had forged partnership programmes with other Government ministries and also non-government organisations to implement some of the programmes related to weather and community resilience.

“One example is our special collaboration with Solomon Islands Ministry of Health and Medical Services on malaria forecast, where we provide malaria forecast updates for the health sector.

“This forecast is mainly measuring rainfalls and with records of rainfall per season, we can make approximation on possible breeding of mosquitos,” Mr Tahani said.

He said Solomon Islands Met Service also worked with Solomon Islands Red Cross on early warning systems.

Mr Tahani said the programme also reached out to disaster-prone communities that are living close to rivers in Honiara.

He said that project was supported by the Secretariat of Pacific Regional Environment Programme through funds from Finnish-Pacific Project (FINPAC).

Meanwhile Mr Tahani said Solomon Islands Meteorological Service was also improving its seismic systems with the help of Republic of China Taiwan.

He said a Memorandum of Understanding had been signed between Solomon Islands Government and Taiwan to seal the partnership.

Commenting on human resource development, Mr Tahani said Solomon Islands was also building the capacity of its staff, especially in forecasting and climate services.

He also acknowledged donor partners that have supported Solomon Islands Met Services. - #PMC4 #PacificMet

附錄 4、訪問行程照片



PMC4 團體照



SPREP 秘書長(中)與東加局長(右)主持開幕



索羅門局長進行報告



WMO 秘書長報告





與 WMO 秘書長 Petteri Taalas 和 SPREP 秘書長 Kosi Latu 合影



至 SIMS 進行訪查

## WORLD MET ORGANIZATION TO FOCUS MORE ON PACIFIC MET SERVICES IMPROVEMENT



*By Repeka Nasiko of Fiji Times*

**14 August, 2017, Honiara, Solomon Islands, PMC-4** – The World Meteorological Organization (WMO) is placing more emphasis on improving and funding Pacific meteorological services programs that ensure capacity building for countries in the regions.

While speaking at the opening of the 4th Pacific Meteorological Council meeting in Honiara, Solomon Islands, WMO development and regional activities director Mary Power said the assistance by the global body to the region was decided at the WMO Congress in 2015.

“WMO has plans for specific vulnerability programs for SIDS (small Island developing states) and small island territories,” she said.

“At the last WMO Congress we did initiate a new program for SIDS and small island territories, which is now focusing on bringing in additional projects in the Pacific, Caribbean and the Indian Ocean regions.

“WMO has many core programs that support activities in the region.

“We are putting a very strong emphasis on SIDS in our efforts to mobilise additional forces through some of our finance mechanisms.”

Ms Power urged members of the Pacific Meteorological Council to take advantage of some of the programs being supported by the global body.

“Some of you are still not members of WMO so we would welcome an opportunity to discuss this with you here, and also perhaps considering what support WMO can give and whether your countries would like to join WMO.

“We have set up meetings here in Honiara and hopefully we could also meet with the relevant minister here in the Solomon Islands.”

Fiji Meteorological Services director Ravind Kumar said Fiji was one of a few countries in the region that would benefit from new WMO-funded programs.

“The Fiji Meteorological Services is going to benefit from a project called the Climate Risk Early Warning System,” he said.

“Another project that is in the pipeline where a number of regional countries including Fiji are going to benefit from is the Green Climate Fund on Enhancing Multi-Hazard Early Warning Systems in the Pacific.” - #PMC4 #PacificMet

Mr Kumar said the PMC allowed regional directors to discuss each national meteorology service’s needs and how best we could meet these needs with the assistance of regional and global partners. - #PMC4 #PacificMet

## **PACIFIC NEEDS TO SHARE MORE INFORMATION – REGIONAL DIRECTOR**



*By Ana Uili of MEIDAC, Tonga*

**15 August, 2017, Honiara, Solomon Islands, PMC-4** – The head of the Pacific Islands Forum Fisheries Agency (FFA) has called on the Pacific to break the barrier of withholding information from one another.

Director General Mr. James Movick made the call while delivering a presentation to the Pacific Meteorological Council (PMC) on the overview of FFA’s observer program.

He said that one of the main challenges in the Pacific region is people are not sharing information.

“Getting everybody to understand that sharing information more broadly is valuable. So that’s part of this process that we’ve been trying to encourage to coordinate frameworks.”

Chair of PMC and Acting Director of Solomon Islands Meteorology service Mr. Lloyd Tahani said sharing information is very essential for the advancement of products.

“Sharing of data especially with regards to climate and weather data is very important, and as the FFA Director General alluded this morning they also found sharing of data to be difficult especially in this part of the world where data is still a political issue.”

He stressed that signing of agreement between countries can help promote the idea of information sharing and revert the benefits gained back to the countries the data comes from.

“Frameworks such as PMC will create more value where collaboration can be made to achieve those approaches, and make it much easier because you would have head of countries coming to discuss and talk about regional needs, and through those process data can be easily shared and used for the betterment of respective Pacific island countries.”

Tahani stated that development partners and donors such as the Climate and Oceans Support Program in the Pacific (COSPPac) from Australia, and Republic of Korea require data sharing to help them develop products that Pacific countries can use in decision making to be resilient against climate change impact. – #PMC4 #PacificMet

## **WEATHER AND CLIMATE INFORMATION VITAL FOR DEVELOPMENT, SAYS KIRIBATI MET DIRECTOR**



*By Bentaake Kiima of Broadcasting & Publications Authority, Kiribati*

**15 August, 2017, Honiara, Solomon Islands, PMC-4** – The Kiribati Meteorological Services (KMS) Director has highlighted the vital role of weather and climate

information in development in his country report during the Fourth Pacific Meteorological Services in Honiara, Solomon Islands.

On the achievements Kiribati have made since the last meeting in 2015, Mr Ueneta Toorua acknowledged regional agencies, donor partners and other organizations that have supported the Kiribati Meteorological Services directly or indirectly over the last two years.

These partners included the Japan International Cooperation Agency (JICA), Government of Fiji through Fiji Meteorological Services, Fiji Airways and World Meteorological Organization, Building Safety and Resilience in the Pacific (BSRP) under the Pacific Community (SPC), Africa Caribbean Pacific – European Union, United Nations Development Programme, Least Development Country Funds (LDCF), Finnish Pacific (FINPAC) project, and the Climate and Oceans Support Program in the Pacific (COSPPac).

Some of the achievements Mr. Toorua mentioned in his report were the completion of the in-country refresher training to meteorological observers, technical support and guidance toward compliance to Part 174 as required in weather service for aviation, the ongoing three construction of a new meteorological building at Cassidy Airport on Kiritimati Island, support to have automatic weather stations that will soon to install in three outer islands (Nonouti, Abemama and Maiana), and manual equipment for Bonriki and Cassidy Airports.

He added that among the external support, the Kiribati government has also put some effort into improving the national meteorological service. He also highlighted the need for inclusion of a project-funded staff position to the permanent office, provision of office vehicle to support Met operations on Kiritimati.

Mr. Toorua said the government was also reviewing a KMS proposal on a re-structure for 2018, which would provide additional positions for qualified managers post to improve compliance to national and international regulations and requirement.

The director said that the government of Kiribati had a vision called the KV20, where tourism and fisheries were key priority areas for “a quantum leap” in terms of Kiribati Development plans.

“Weather and climate information plays a very important role in development and therefore we looking forward to more support,” said Mr. Toorua.

He said the government was seeking more support to expand the Climate Early Warning System and the re-opening of their manual stations for full coverage, and support to establish an Observation and Forecasting Office next to airport in the capital Tarawa. The government also wanted support to enable more staff to undertake meteorologist training courses, support to improve early warning communications to all Kiribati outer islands, which were out of range from internet and

telephone networks, and support to improve base services on how weather and climate information can assist health, tourism and fisheries in Kiribati. - #PMC4 #PacificMet

## **NEED FOR MORE TRAINING ON TSUNAMI EARLY WARNING SYSTEMS FOR PMC MEMBERS**



*By Repeka Nasiko of Fiji Times*

**15 August, 2017, Honiara, Solomon Islands, PMC-4** – Strengthen tsunami early warning trainings for national weather and climate offices is being urged at the Pacific Meteorological Council meeting in Solomon Islands yesterday.

The recommendation was raised at the 4th PMC Pacific Island Communication and Infrastructure panel discussion. It came from the Intergovernmental Coordination Group for the Pacific Warning and Mitigation System (ICG/PTWS) Pacific Island Countries and Territories (PICT) working group that held its fifth meeting in Honiara, Solomon Islands last week.

Working group chairman ‘Ofa Fa’anunu explained there was a need for continued support for regional meteorological service staff to be trained in seismology and tsunami early warning systems and operations.

“The IOC (International Oceanography Commission) International Tsunami Information Centre identified training needs and training institutes that will support training programs for island countries.

“We requested the PMC Pacific Island Communications and Infrastructure panel to continue to improve on the infrastructure and communication for seismic data collection and warning dissemination platforms,” he said.

“We have also requested the IOC International Tsunami Information Centre and other relevant partners to continue to support the pilot aim of the Tsunami Ready Program in PICTs.”

He said Vanuatu, Tonga, Cook Islands and Niue have all expressed interest in implementing the Tsunami Ready Program that was piloted in Samoa.

Marshall Islands National Weather Services director Reginald White said the recommendation by the ICG/PWTS PICT working group reflected the needs of regional weather services that also issued tsunami warnings.

“We set up these panels so that we can have experts in their fields advise us on what we need to improve on and one of that is training for our staff in the area of tsunami warning,” he said.

“We are meteorologists and we cannot understand all of the risks and technical capabilities in regards to seismology and if our panel comes back with recommendations that can help us with our work then we have to listen to those recommendations.”

The recommendation by the working group was taken into account by the PMC. – #PMC4 #PacificMet

## WMO TO STRENGTHEN PRESENCE IN ASIA PACIFIC REGION



*By Pita Ligaiula of Pacific Island New Association (PINA)*

**16 August, 2017, Honiara, Solomon Islands, PMC-4** – The World Meteorological Organisation (WMO) has boosted its presence in the Asia and Pacific region with the opening of its office in Singapore to better service the needs of member countries.

This was revealed by WMO Secretary General Petteri Taalas when addressing Pacific Meteorological Council (PMC) in Honiara today.

“We will also strengthen our office in Samoa.

“To enhance our impact we have started building our partnership with other players. For us the important players are World Bank, ISDR, SPREP, Intergovernmental Oceanographic Commission, ICAO, IMO and WHO. These partnerships we are building I would like also to happen at country level,” Taalas told delegates and members of PMC.

He also welcomed the participation of many delegates at PMC and stressed the importance of collaboration between stakeholders.

“It is also important that the small countries are working together. By working together we can achieve more than by running the business as independents.

“It’s important to work with governments, and we can get these development funding from external sources but for long term sustainability, interaction with individual governments is something we need to promote,” he said.

The WMO DG also highlighted the importance of the upcoming COP23 meeting in November in the work WMO does with partners and donors.

“It’s important we play our political card in a right way and WMO was quite visible at COP22 in Marrakesh and the next challenge is our presence at COP23 in Bonn.

The WMO and several of our partners will be looking forward to the release of the status of Global climate report in the November meet,” Taalas said.

The WMO, through the Commission for Climatology and in cooperation with its members, has issued annual statements on the status of the global climate to provide credible scientific information on climate and its variability. – #PMC4 #PacificMet

## **COASTAL FLOODING AND SAFETY OF LIFE AT SEA ARE KEY PRIORITIES**



*By Ruci Vakamino of Wansolwara*

**16 August, 2017, Honiara, Solomon Islands, PMC-4** – The Pacific Island Marine and Ocean Services (PIMOS) panel has made progress on its key priorities of coastal flooding and safety of life at sea.

According to the outgoing PIMOS chair, Dr Tommy Moore, their biggest project at the moment is the Coastal Inundation Forecasting Demonstration project that is currently underway in Fiji.



“This is the second phase of that program and it started early this year and I think this current phase is focusing on Maui Bay and Nadi town,” he said.

Dr Moore said the panel felt coastal flooding and safety of life at sea were the greatest priorities for the region.

“We needed something to focus our efforts on because there’s a lot of work that can be done. We needed something to really keep us on point.”

He added that last week Samoa asked the panel to look at climate change and ocean acidification.

Samoa Meteorological Division Assistant Chief Executive Officer Mulipola Ausetalia Titimaea said that for Samoa, this means they can better monitor the situation and health of their oceans.

“Ocean acidification is an impact of climate change. This is because of the carbon dioxide,” Titimaea explained.

He added that excess carbon dioxide in the atmosphere is absorbed by the ocean and causes the an increase in the ocean’s acidity.

“That’s why it is quite important to monitor ocean acidification,” Titimaea reiterated.

Niue and Fiji were elected as co-chairs of the panel in a meeting on Saturday, August 12.

One of the roles and responsibilities of the PIMOS panel is to look for options to improve coastal inundation forecasting and disseminating information to vulnerable communities. – #PMC4 #PacificMet

## **UNESCO TO BOOST SUPPORT FOR SUSTAINABLE WATER SERVICES IN THE PACIFIC**



*By Yvette D’Unienville of Tuvalu Broadcasting Services*

**16 August, 2017, Honiara, Solomon Islands, PMC-4** – The United Nation Education Scientific and Cultural organisation (UNESCO) wants to increase its support for sustainable water services in the Pacific Island countries.

It plans to bring to the region its International Hydrological Programme (IHW), which is the only intergovernmental programme in the UN system devoted to water research, water resources management, and education and capacity building.

As part the programme, Dr Ian White, Professor of Water Resources from the Australian National University, is carrying out a study in Pacific Island countries to identify the best way UNESCO's expertise can help meet the water needs and priorities.

When he briefed the 4th Pacific Meteorology Council in Honiara, Solomon Islands, he said UNESCO is committed to national priorities, the SIDS (Small Island Developing State) Accelerated Modalities Of Action (SAMOA) Pathway, and the UNESCO SIDS Action Plan. It is also committed to Sustainable Development Goal 6, which aims to ensure availability and sustainable management of water and sanitation for all.

"We heard yesterday how important sustainable developments are. Pacific regional organisations say sustainable development is the prime objective," said Dr White.

Sustainable development is also one of the three core areas of UNESCO.

Research is an integral part of hydrological services as was pointed out by Espen Ronneberg, the Acting Director for the Climate Change Division at the Secretariat for the Pacific Environment Programme (SPREP).

"Hydrology includes more resource assessment, water quality and more management, ground water, research and, for this region, rain water.

"Hydrology and hydrology services are important for drought warning. It cuts across health, infrastructure, design, agriculture, disaster risk reduction, industry and environment."

Dr White's study will be completed next month.

Then a scoping report will be presented at a regional consultation meeting in Nadi, Fiji in October. There, UNESCO will raise awareness of about its water programmes to regional organisations and stakeholders.

Following that meeting, UNESCO will carry out consultations with countries on water quality, water security and hydrology.

The exercise will be completed in December 2017 and will include recommendations for pilot activities and priorities for resource mobilisation.

UNESCO has an office in Samoa that oversees the programmes it runs in Pacific island countries. – #PMC4 #PacificMet

## WEATHER SERVICES A NEVER-ENDING STORY



By Yvette T D'Unienville of Tuvalu Broadcasting Services

17 August, 2017, Honiara, Solomon Islands, PMC-4 – The Finnish-Pacific (FINPAC) project is wrapping up the Pacific countries with a stark reminder to other projects and organisations that weather and climate is a never-ending story and the work has to go on.

FINPAC will wind up next month and has called on other regional organisations and partners to continue the good work it has started in the region to reduce the vulnerability of Pacific island country villagers' livelihoods to the effects of climate change.

At the 4th Pacific Meteorological Council (PMC-4) meeting in Honiara, Solomon Islands, Climate and Meteorology Officer of the Secretariat of the Environmental Programme (SPREP), Salesa Nihmei, said communication through stories is one of the key highlight of the four-year (2012-2015) regional project.

“One of the key achievements of the FINPAC Project in the region was engaging the media for the first time to tell the stories of the Pacific Meteorological Council to the people in their countries.

“The media coverage of the PMC supported by FINPAC at the PMC-3 in 2015 in Tonga now got support from Climate and Oceans Support Program (COSPPac) and the United Nation Development Program – Disaster Resilience for Pacific (RESPAC) project to attend again at this meeting.”

Council members expressed their appreciation to FINPAC for a job well done.

A tanoa (kava bowl) was presented by SPREP Director General Kosi Latu at the

meeting today to as a token of appreciation from the region to Dr Matti Nummelin, Senior Environmental Adviser for Sector Policy at Department for Development Policy in the Ministry for Foreign Affairs in Finland.

He also thanked the previous manager of the FINPAC Project Christina Leala Gale.

The first Pacific Ministerial Meeting on Meteorology was another outcome of the FINPAC project aimed at raising the visibility of the NMHSs and gain support from political leaders. This was successfully hosted in Tonga in July 2015 and now established to also meet regularly with the PMC meetings.

FINPAC worked with 14 countries including Tuvalu. There they conducted a baseline survey for the Teone area on weather and climate information and traditional knowledge and as a result developed a community climate and disaster resilience plan.

They also developed a monthly climate bulletin that is translated into Tuvaluan, and strengthened partnerships between the national meteorological service, Red Cross, Tuvalu media, local fishermen and the Disaster Management Office.

Across the region, the project has also introduced integrated forecasting and warning tools that are now used operationally in some National Meteorological Services (NHMSs).

Mr Nihmei said the FINPAC approach in engaging communities on community-based early warning system has now been adopted by the International Federation of Red Cross in the projects it carried out in the region with National Red Cross Societies.

“Some you may ask why Red Cross?” Mr Nihmei said to the meteorology directors.

He then gave the floor to Olivia Warrick, of the Red Cross and Red Crescent Climate Center, who said Red Cross was presence in all the Pacific countries.

“National Red Cross societies are supported by a global network such as the International Federation of Red Cross (IFRC), which provides secretarial services to national societies, and the Red Cross society climate center is also present in the Pacific countries.

“The National Red Cross societies are legally mandated to support the governments of the country in disaster management and has the expertise in community volunteering network in all national branches,” added Ms Warrick.

In some countries, FINPAC has engaged weather forecasters for the first time with communities to discuss how their products can be improved and used for decision making.

FINPAC also supported the use of traditional knowledge of weather and climate

forecasting for people in communities.

“A compendium of the many stories collected from the Pacific countries are being published and distributed to the Pacific countries and partner organisations to demonstrate how weather and climate information can be used to support different sectors,” added Nihmei.

Other NGOs and partners are now also actively engaging the national meteorological services to assist with community-based activities.

FINPAC also contributed to the operations of the national meteorological services observations systems.

“In support, to strengthen the observations systems, we did an assessment in all the Pacific regions and based on the assessment, we acquired observation equipments.

FINPAC has strengthened the role of the Pacific Met Desk Partnership at SPREP in providing the services and support to its member countries and provided a lot of lessons learned for future projects. – #PMC4 #Pacificmet

## Pacific Ministers urged to decide wisely for the region



Australian Ambassador of the Environment Patrick Suckling addresses PMMM-4

*By Yvette D'Unienville of Tuvalu Broadcasting Services & Ruci Vakamino of Wansolwara*

**18 August, 2017, Honiara, Solomon Islands, PMC-4** – Ministers were today requested to make wise decisions on actions concerning the Pacific region by the acting Prime Minister of Solomon Islands, Manasseh Maelanga, when opening the

second Pacific Meteorological Ministerial Meeting on Meteorology (PMMM-2) in Honiara today.

“Your meeting is to discuss and agree on decisive actions that the NMHSs (National Meteorological and Hydrological Services) and disaster management offices need to undertake to ensure better, new, improved and innovative services, rendered to the people of this region,” Maelanga said.

In reference to the theme of the meeting, ‘Sustainable Weather, Climate, Ocean and Water Services for a Resilient Pacific,’ Maelanga also made several suggestions to the ministers.

In his address, Australia’s Ambassador of the Environment Patrick Suckling shared the importance of information-based actions in the work on climate variability and climate change.

“The strength of collaboration and the technical expertise coming into this region focusing on evidence-based policy is what we are focusing on,” said Ambassador Suckling

“Preparedness of community based of information about weather and climate is absolutely essential to people and during emergencies.”

The visiting Australian envoy also assured the meteorological community in the Pacific of his country’s continued support.

“From our Bureau of Meteorology perspective, this is something very significant and that we are looking to build on over the next 10 years. This meeting is a milestone step forward.

“Because there are so many ministers and experts here, we are rock solid supporters of your work and we will always stand shoulder to shoulder with Pacific Island counterparts across the spectrum of challenges that climate change has brought on us.”

Present at the Ministers Meeting in Honiara today were the deputy Prime Ministers of Samoa and Tonga and ministers from Fiji, Nauru, Solomon Islands, Tokelau, and Vanuatu Australia was represented by its Ambassador of the Environment, the New Zealand High Commissioner to Solomon Islands represented his country as well as high level representatives from American Samoa, Cook Islands, Federated States of Micronesia, Kiribati, Marshall Islands, New Caledonia, Papua New Guinea and Tuvalu.  
– #PMC4 #PacificMet

## Met service plays crucial role in aviation safety



*By Linny Folau of Matangi Tonga Online*

**18 August, 2017, Honiara, Solomon Islands, PMC-4** – The importance of meteorological services to support safe and efficient of aviation and the safety of people who are travelling by air was reaffirmed during the Second Pacific Ministerial Meeting on Meteorology on 18 August in Honiara.

Director of Meteorology of Tonga Meteorological Service and chair of the Pacific Islands Aviation Weather Services (PIAWS) panel of experts 'Ofa Fa'anunu said in their efforts to try and ensure the importance of meteorology to aviation efficiency, one main outcome the panel proposed was for a regional project to try and address deficiencies.

He said the PIAWS panel, Pacific Meteorological Council (PMC) and SPREP (Secretariat of the Pacific Regional Environment Programme) need to work together to formulate a regional project to see how to raise funds to address the needs of the region as a whole.

“One of the other priority was cost recovery. The panel was also tasked to work with ICAO (International Civil Aviation Organisation) to urgently look at cost recovery strategy, with a model that can be used in the region bringing together the civil aviation authority and met service to look at this in a fair and transparent manner.”

Fa'anunu said the some of the main hazards to aviation causing air accident included heavy rain, wind shear during takeoff and landing for aircraft, among others.

Important met services provided include the accurate reading of air pressure is very important for pilots.

Very cold temperatures can also cause aircraft to burn up more fuel.

In addition, providing tropical cyclone information, local aviation reports at airport are

important for flights,

Minister for Natural Resources in Niue Dlaton Tagelagi did raise the absence of the role of the Pacific Aviation Safety Organisation (PASO) 's in PIAWS presentation.

SPREP Director General Kosi Latu noted the minister's observation and offered that SPREP was willing to facilitate a meeting between the two bodies.

"We are willing to fly the chair of PIAWS to Vanuatu to talk with PASO if PASO is willing."

Tonga's Deputy Prime Minister Hon Siaso Sovaleni also reaffirmed Tonga's commitment to ensuring safer skies through better met services. – #PMC4 #PacificMet

## Regional trust fund on meteorology proposed



*Solomon Islands Deputy Prime Minister Hon Manasseh Maelanga (Photo credit: Jenny Davson-Galle)*

*By Pita Ligaiula of Pacific Island News Association (PINA)*

**18 August, 2017, Honiara, Solomon Islands, PMC-4** – Solomon Islands Deputy Prime Minister Manasseh Maelanga has suggested a Pacific 'self-sustaining trust fund' to support the work of National Meteorology and Hydrology Services (NMHSs) in the region.

Maelanga made the statement today while opening the Second Pacific Ministerial Ministers Meeting (PMMM-2) on Meteorology, in Honiara.

"These are only suggestions that I think will assist our governments in their quest to ensure that sustainable weather, climate, ocean and water services are provided to



build the resilience of the Pacific region.”

He said the minister meeting needed to discuss and agree on decisive actions that the NMHSs and disaster management offices have to undertake to ensure better, new, improved and innovative services are rendered to the people of the Pacific region.

“On the issue of ‘cost recovery,’ I urge all of you to think carefully and innovatively on how NMHSs can recover costs of the services it provides. What other services or products can be provided on a commercial basis?”

“On ocean observation, we are all surrounded by the ocean but this region has made limited investments in ocean observation. We need to do this not only for weather and climate purposes, but also to improve our understanding of the overall health of our ocean and resources in it.

He said globally, majority of the natural disasters are hydro-meteorological in nature.

“In the Pacific region, a lot of natural disasters that we had experienced are also related to water and climate. Because of our isolation, limited capacity and the vast ocean we are situated in, we are indeed very vulnerable to the impacts of climate change and climate variability including weather extremes.

“The incidences that I mentioned calls for the attention of our respective NMHSs as well as the disaster management offices to ensure new, vital and improved services are provided to our governments, our people and our communities. They need to understand the nature of these threats and make informed decisions to avoid or reduce their impacts.

“With our increasing population, proliferation of information technology coupled with the geographic spread of our islands, the demand for timely and accurate meteorological and hydrological information also increases. Nevertheless, I believe with the goodwill support we have received from our development partners and other collaborating organisations, new and improved services will be established.

World Meteorological Organisation (WMO) Director General Petteri Taalas Secretary-General said NMHSs can contribute to sustainable development and disaster risk reductions.

“Strengthening the capacities of the Pacific National Meteorological Services remains a major priority including modernising their infrastructure, equipping them with staff with highest technical skills, providing them with sufficient resources, raising their political visibility.

“The contribution of the international community to the sustainable development of the Pacific countries through the improvement of Met Services is being increasingly recognised, and it must be paired by the necessary support and investments at the national level,” Taalas said.

The WMO head also re-emphasised that the Pacific National Meteorological Services are critical actors in supporting the sustainable development of their countries.

“There is increasing awareness among policymakers and the general public of the socioeconomic benefits delivered by weather and climate services.

“Through this and future meetings, the Ministers responsible for meteorology in the Pacific, together with SPREP and WMO, have a major role in raising the visibility of the Pacific National Meteorological Services in the national and regional development agendas,” said Taalas. – #PMC4 #PacificMet