

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

**MEETING OF THE REGIONAL SUBPROJECT MANAGEMENT TEAM (RSMT) FOR
THE SEVERE WEATHER FORECASTING AND DISASTER RISK REDUCTION
DEMONSTRATION PROJECT (SWFDDP) FOR THE SOUTH PACIFIC ISLANDS**

**Severe Weather Forecasting Disaster Risk Reduction Demonstration Project
Regional Subproject Management Team**

Nadi, Fiji, 26-29 August 2013



FINAL REPORT



(from left front row) Jenni Rauhala, Filomena Nelson, Haleh Kootval, Peter Chen, Steve Ready, (Pst.) Sovakiwai Qeqe, Alipate Waqaicelua, Rick Jones, (from left back row) Henry Taiki, Tauala Katea, Manoah Tapa, Ofa'Fa'anunu, Ian Shepherd, Dan Beardsley, Neville Koop, James Lunny, Arona Ngari, David Gibson, Mike Bergin, Ray Tanabe, Hidehiko Murata, Misaeli Funaki.

Executive Summary

The third meeting of the Regional Subproject Management Team (RSMT) for the Severe Weather Forecasting and Disaster risk reduction Demonstration Project (SWFDDP) for the South Pacific Islands was held at Tanoa International Hotel, Nadi, Fiji, 26-29 August 2013.

Presentations by NMHS members highlighted that good work has taken place that has not necessarily transpired through the four-monthly progress reports. As a result, future reporting will take account of the work that takes place outside of severe weather events. The meeting noted that several severe weather events had occurred since the last meeting of the RSMT in November 2010. As an example, TC Evan, caused fatalities and significant damage during December 2012. A case study of TC Evan was presented at the meeting as an illustrative example of case study creation.

The Secretariat thanked Met Office UK, ECMWF, NOAA USA, JMA Japan, RSMC Wellington New Zealand, Australian BoM, and RSMC Nadi Fiji for their support to date and continued commitment to the success of the SWFDDP. RSMC Wellington has continued to host and maintain the SWFDDP Web portal, MetConnect Pacific (MCP), and to deliver the South Pacific Guidance (SPG) charts on MCP, and will continue to do so.

It was noted there are no hard criteria for the transition of the Project from Demonstration to the subsequent Phase IV, known as the “continuing development phase”. Given that there are a number of concerns and challenges facing the Project at this stage, it is important that these issues be addressed before moving to an “operational or continuing development” phase. The biggest challenge lies in the transfer of overall management and coordination of SWFDDP from the Secretariat to the WMO Region, and what body might have the capability and capacity to shoulder this role. There are sustainability issues especially in relation to long-term funding, to support training and website redevelopment. The WMO Secretariat will investigate how this might be done and who will be involved.

The meeting agreed to the following set of criteria to be implemented by each participating NMHS, which are due to be evaluated in 18 months’ time (April 2015):

- an appropriate non-TC warning system implemented and is operating smoothly
- severe weather and wave forecasts & warnings are verified using the spreadsheet provided
- all participating countries produce at least one case study per year
- all participating countries to complete all SWFDDP progress reports in full before the deadlines prescribed (six monthly)
- demonstrate on a continual basis that the relationships between NMHSs and Disaster Management and Civil Protection Authorities (DMCPAs), the media and the public are strong and healthy, with regular communications before, during and after severe weather events

Close working arrangements between the SWFDDP RSMT and the RA V TCC are likely to continue in much the same way as in the past, for the foreseeable future.

The importance of regular training was highlighted, with particular recognition of the effectiveness of in-country training. The expected re-start of the NOAA/NWS Pacific Training Desk within RSMC Honolulu may be a source of future training, on products and delivery.

A new (draft) Regional Subproject Implementation Plan (RSIP) was developed.

1. OPENING

1.1 The meeting of the Regional Subproject Management Team (RSMT) of the Severe Weather Forecasting Disaster risk reduction Demonstration Project (SWFDDP) opened by its Chairperson, Mr Steve Ready (New Zealand), at 09:30 AM, Monday 26 August 2013, at the Conference Centre, Tanoa International Hotel, Votualevu Road, Namaka, Nadi, Fiji. Dedication of the meeting was provided by Pastor Sovakiwai Qeque, and opening remarks were made by Mr Peter Chen on behalf of the Secretary-General of WMO, and by Mr Ready.

1.2 Mr Chen recalled the current state of advanced NWP systems which have led to increasingly skillful weather forecasts over the recent decades, and that advances will continue into the future. As well, NWP systems provide an accurate indication of developing extreme weather events, thereby are a very relevant component of routine and severe weather forecasting and warning programmes at many National Meteorological and Hydrological Services (NMHSs). It is in this context that the Severe Weather Forecasting Demonstration Project (SWFDP) initiative is intended to: 1) enhance the use and application of outputs of existing NWP systems, in the improvement of severe weather forecasting through WMO's Global Data-Processing and Forecasting System (GDPFS) programme (of the World Weather Watch Programme), and, 2) thereby improve the delivery of weather warning services through the Public Weather Services (PWS) Programme.

1.3 The WMO's SWFDP represents a systematic and practical approach for building capacity, and transferring new knowledge and skills. The SWFDP has been implemented successfully in the southern Africa region. In this region, the second project is in progress and involves 9 South Pacific Island States. A third project is ongoing in Eastern Africa with the participation of 7 countries. Other plans have been initiated to develop SWFDP regional projects in Southeast Asia and another for the Bay of Bengal region. In total, 42 countries are involved, and 27 of these are Least Developed Countries.

1.4 Mr Chen further recalled the SWFDDP for the South Pacific Islands initiated its full demonstration in November 2010. The present evaluation of the demonstration phase of the SWFDDP shows that Small Island Developing States (SIDS) can increase their capacities in operational severe weather forecasting, which should further strengthen the technical basis for building or enhancing their national weather forecasting and warning services. This meeting will address technical aspects that are needed to further improve the application of current science and technology (e.g. EPS) to forecasting and improving warning services (e.g. probabilistic forecasts of hazardous weather), to more effectively supporting the disaster management and civil protection organizations within their respective countries, and coordinated effectively within a geographical region of several NMHSs.

1.5 Noting the need for ensuring the long-term sustainability of the benefits gained with mature SWFDPs, through making the transition into routine operations of the project's successful elements, the Steering Group for the SWFDP developed an additional project phase entitled: "Continuing Development Phase", when the project has developed sufficiently its framework through its initial phases for it to be fully assumed under the responsibility of the respective Regional Associations, including project management, and the raising of necessary resources to sustain the project. This strategy was endorsed by the sixteenth session of the WMO Meteorological Congress, in May 2011.

1.6 Mr Ready explained his view that the SWFDDP initiative is one of two landmark positive changes in his 3 decades of experience in operational forecasting in the Southern Pacific Region. The project is providing the opportunity to improve severe weather forecasting and to enhance the exchange and coordination of warnings programmes across the South Pacific region for non-TC related weather hazards, and fully complements the TC Programme in addressing all weather hazards and warnings in the region.

1.7 The meeting expressed its warm appreciation to Mr Alipate Waqaicelua, Permanent Representative of Fiji with WMO and Director of the Fiji Meteorological Service, for hosting the meeting and for making excellent local arrangements. The meeting also thanked US NOAA NWS for their significant financial contribution to the organisation and running of the meeting.

2. ORGANIZATION OF THE MEETING

2.1 Adoption of the Agenda

The meeting adopted the agenda as provided in Annex 1.

2.2 Working arrangements

2.2.1 The documents for the meeting are posted on the WMO web site at:

http://www.wmo.int/pages/prog/www/DPFS/Meetings/RAV-SWFDDP-RSMT_Fiji2013/DocPlan_000.html

2.2.2 The participants are the members of the SWFDDP Regional Subproject Management Team (RSMT). Mr Ausetalia Titimaea (Samoa) was absent however represented by Ms Filomena Nelson (NDMO Samoa) who is also a member. Mr James Lunny (New Zealand) assisted the Chairperson. Mr Ueneta Toorua (Kiribati) was replaced Mr Tareti Kireua (Kiribati). Mr Hidehiko Murata represented JMA. Mr Mike Bergin (Australia) represented the TCC-RAV. Mr Dan Beardsley represented the NWS International Office. Regrets were noted for Mr Sionetasi Pulehetoa (Niue), Mr Benoit Brouke (Météo-France), Ms Linda Anderson Berry (Australia BoM), Mr Ian Lisk (Met Office UK), and Mr David Richardson (ECMWF). Observers included Mr Neville Koop of SPREP, and Ms Jenni Rauhala (FMI/FINPAC). The list of participants at the meeting is provided in Annex 2.

3. EVALUATION OF THE FULL DEMONSTRATION OF THE SWFDP FOR SOUTH PACIFIC

3.1 Overall framework

3.1.1 The Secretariat briefed the meeting on the developments, that have taken place since the last meeting of the RSMT (November 2010) in the overall guidance for the SWFDP as provided by WMO constituent bodies, including Cg-16 (2011), CBS-15 (2012) and its Steering Group for SWFDP (2012), and Presidents of Technical Commissions (PTC, 2013), and the relevant bodies of or associated with WMO RA V.

3.1.2 A few key points were emphasized, including from the World Meteorological Congress (2011), and CBS-15 (2012).

3.1.3 From Congress-15:

3.1.3.8 Congress therefore approved a vision for the SWFDP as an end-to-end, cross-programme collaborative activity led by the GDPFS, in which the participants in the Projects:

- 1) Make best possible use of all existing and newly developed products and facilities at the global, regional and national levels, including high-resolution NWP and ensemble prediction products, and very-short-range forecasting, including nowcasting, tools;*
- 2) Establish sustainable services of reliable and effective early warnings tailored to the needs of the general public and a wide range of socio-economic sectors in LDCs, SIDCs and developing countries;*

- 3) *Ensure a continuous improvement cycle and quality assurance of services, including efficient and responsive feedback loops between the NMHSs and the end users at the national level.*

3.1.3.9 *The SWFDP should therefore engage all WMO Programmes that concern the real-time prediction of hydrometeorological hazards, through their respective technical commissions, from observations, to information exchange, to delivery of services, education and training, and to the transfer of relevant promising research outputs into operations.*

3.1.3.12 *Congress agreed that the SWFDP should be maintained and supported as an important model for enhancing Members' disaster risk reduction and service delivery programmes ...*

3.1.4 From CBS-15:

4.4.1.1 *While the scope of the GDPFS spans the production of day-to-day weather forecasts, the Commission recalled that Cg-XVI agreed that priority should be given to forecasting severe and high-impact weather and related-phenomena over a wide-range of forecast scales, including through the implementation of the Severe Weather Forecasting Demonstration Project (SWFDP) in all WMO Regions. Recognizing the great impact of this Project in assisting WMO Members to deliver effective warning services through improved forecasting capabilities, using the "Cascading Forecasting Process", the Commission reinforced its strong support to the SWFDP.*

4.4.1.2 *... the Commission noted that some participating countries have experienced difficulties to effectively participate in the SWFDP, and therefore recommended the development of country-specific implementation plans within the SWFDP, addressing their gaps and weaknesses, to facilitate the participation of least-capacity NMHSs, including those from Least Developed Countries and Small Island Developing States. These plans should include a review of current levels of services, training requirements and outputs, and stakeholders' engagement, with a view to ensuring on-going sustainability of projects.*

4.4.1.4 *... the Commission stressed the importance to move SWFDP forward with a phased approach; starting with manageable elements, first focusing on most important severe weather identified by the participating countries for protection of life and property, and expand the scope, including cross-programme activities (e.g. flood forecasting).... However, recalling that EC-64 urged that as a part of SWFDP regional projects, consideration be given to collecting and conveying the requirements for the Basic Systems, including WIGOS and WIS, in the participating countries, the Commission agreed that these elements should be addressed together with aspects related to severe weather forecasting and warning services in the initial phases of the project.*

4.4.1.5 *The Commission acknowledged the importance of the continued project-critical support from advanced global centres that provided NWP and satellite-based products, and the equally project-critical roles played by the regional centres. The Commission recognized the substantial amount of human resources devoted to the project by the leading regional centres and acknowledged that resource constraints in regional centres must be taken into consideration when planning the project especially in latter phases, in order to ensure a transition to sustainable operations....*

4.4.1.6 *The Commission noted the inadequate resources available for supporting existing and setting up of new regional projects.... the Commission recommended the establishment of a*

3.2 Lessons from a Case Study

3.2.1 Mr Jones (WMO consultant) and Ms Nelson (Samoa) presented a case study of Tropical Cyclone (TC) Evan, which occurred during the period 11 -15 December 2012 and heavily impacted the South Pacific region. The study focused on the forecasts and warnings in Samoa, and the alerting of the national disaster management office, and warnings provided to the general public.

3.2.2 Ms Nelson (Samoa National Disaster Management Office) presented Samoa's experience during the passage of TC Evan. It focused on: the procedures followed in monitoring the tropical depression, which later on was named as TC Evan on the 12th of December 2012; the warnings issued and the timing of these warnings; and the responses by Disaster Management Office, the response agencies and the communities. The presentation also highlighted the challenges and issues faced by the Samoa Meteorology Services which range from timing of warning issuance right down to the community understanding of the warnings and taking actions accordingly. It also summarized key lessons learnt from this event which included building confidence of forecasters to enable them to make more informed and quick decisions, better collaboration and interaction with the regional meteorological services such as RSMC Nadi, twinning arrangements with more experienced NMSs during monitoring of tropical depressions and cyclones to help build confidence in forecasts and warnings issued, improvements to the lexicon used in the special weather bulletins, inclusion of potential damages likely to be caused when the different cyclone wind forces made landfall, and continuing media liaison to enable better understanding and communication of warnings.

3.2.3 In the SWFDDP context, the development of this case study was intended to illustrate basic ideas of why case studies should be done, as well as a reasonable format that case studies could follow. The development of case studies is a required activity, primarily intended for learning purposes, in the implementation of the SWFDDP, however very few have been actually developed. It was noted that the method of developing case studies was part of the SWFDDP in-country training that has been provided to all participating countries.

3.2.4 The representative from Tonga reminded the meeting that for some countries, Tropical Cyclones are an infrequent event. This infrequency should be accounted for in the design and maintenance of the warning system.

3.3 SWFDDP achievements and gaps

Review of the Progress Report of the Demonstration

3.3.1 The RSMT reviewed and discussed the Progress Report (version of 12 August 2013) of the SWFDDP regional project over its entire full demonstration period: from 1 November 2010 to 28 February 2013, discussed and identified its strengths and weaknesses in the progress made by the participating NMHSs in relation to the five main goals of the project, which updated section 4 of the pre-session version of the Progress Report:

To improve the ability of NMHSs to forecast severe weather events

All NMHSs agreed that the SWFDDP products and, in particular, the SPG charts have helped to give NMHSs more confidence in forecasting a significant weather or large wave event.

To improve the lead-time of alerting these events

All NMHSs (who issue warnings) agreed that the SWFDDP products helped them provide a good lead-time (generally, 24 to 48 hours for alerts, and 12 to 24 hours for warnings) or enabled them to issue warnings which would not in the past have been issued.

To improve the interaction of NMHSs with Disaster Management and Civil Protection Authorities (DMCPAs) before, during and after severe weather events

A few NMHSs did not have regular interactions with their respective DMCPAs. Most had interactions in relation to a major (severe) weather event. Fiji Meteorological Service (FMS) is a member of the Fiji Disaster Management Council to which it provides a pre Cyclone season briefing. A disaster awareness week provides information to all stakeholders. During cyclone season there is regular contact with the DMCPA, which also continues during the dry season. Vanuatu, Tuvalu, Cook Islands, and the Solomon Islands stated that the NMHS works closely with their respective DMCPAs. The Tuvalu Met Service is a member of the National Disaster Council. The Kiribati Met Service (FMS) now reports to the office of the President as does the NDMO, which is similar to Tonga which reports to the same ministry as their NDMO. The relationship between the Tonga Met Service and DMCPA is very strong and the latter is briefed in person during major events. Samoa interacts with the DMCPA on a regular basis including briefings at the beginning of the dry season and wet seasons.

To identify gaps and areas for improvements

Vanuatu and Fiji found it difficult to verify their forecasts without observations, in particular large damaging swells. Kiribati found difficulties with the SPG coverage as it does not cover the northern islands. A few NMHSs cited resource problems (e.g. equipment, human resources). NMHSs were very appreciative of the in-country training provided and found the individual tutoring very helpful in their understanding of how to use the SWFDDP products effectively. There is an ongoing need for focused training.

To improve the skill of products from Global Centres and RSMCs through feedback from NMHSs

NMHSs found it difficult to forecast localized severe convective events from the guidance provided. They also found it challenging to deal with variations (inconsistencies) amongst the various global NWP products, when they occur.

3.3.2 The meeting also reviewed and discussed the evaluation of the weather warnings, based on feedback from the general public, the Disaster Management and Civil Protection Authorities (DMCPA), and the Media. The following was concluded, which updated sections 5.1 – 5.3 of the pre-session version of the Progress Report:

Feedback from the general public

Outside the TC season, many NMHSs received little or no feedback from the public. Samoa has received feedback from the public, users and stakeholders on warning products issued by NMS through e-mail, direct telephone calls, social media such as Facebook, during public and stakeholder consultations, awareness workshops and trainings, media such as TV, radio and newspapers, and through personal interactions, conversations with relatives, friends and colleagues. For particular events, some NMHSs have been acknowledged for issuing timely warnings. In the Cook Islands this has come in the form of letters to the editor and post event TV interviews.

Feedback from the DMCPA

The Vanuatu National Disaster Management Office is appreciative of the warning service provided by the Vanuatu Meteorology and Geo-Hazards Department (VMGD), and a MOU has been signed to reinforce this close working relationship.

Many NMHSs report little on-going feedback outside of the TC season.

Fiji is playing a leading role in the Coastal Inundation Forecast Demonstration Project (CIFDP) and the organizational setup means Fiji has been drawn into a closer role with its Disaster Management Centre. The Fiji NDMO is an integral part of the National Coordination Team established for the Fiji. For an event, the NDMO provides daily Situation Reports to all key stakeholders.

The Samoa Disaster Management Office is housed under one Ministry with the National Meteorological Service, and this has greatly help in fostering a close collaboration between the two agencies. The NMS and the NDMO regularly discuss issues and areas for improvements in relation to weather services as well as appropriate responses by the civil protection authorities in Samoa and the community at large.

The Cook Islands belongs to the same emergency response team and receive regular feedback.

The Kiribati NDMO had appreciated KMS's efforts to provide special weather bulletins.

The Tonga National Emergency Management Office (NEMO) relies heavily on TMS for warning guidance. A monthly coordination meeting with NEMO, TMS and the Geological Survey Unit is held to discuss disaster and warning related issues.

During emergencies the Solomon Islands Met Service will brief the Prime Minister and Cabinet and the DMCPA's.

Feedback from the Media

The Fiji media have found the Meteorological Service Website very useful for obtaining the latest forecasts and warnings. During major events the FMS is in regular contact with media outlets. Prior to the TC season there are number of visits with media to discuss the upcoming season. In late 2012 the FMS set up a media training workshop which led to operating practices. The media are invited to activities of the FMS for which they are appreciative.

Generally, there was little feedback from the media except during and after major events.

Solomon Islands, Vanuatu, Kiribati, Tonga, and Samoa noted that media promptly relayed warnings. The Samoa media provides feedback through media conferences with the NMSs and DMO. Six monthly media training and awareness programs also provide a forum to information exchange between the media, NMS and the DMO. The Cook Islands develop reports for the media which are used in published articles about the events. Tuvalu conducts monthly weather related radio programs.

Objective verification by the NMHSs

There was no objective verification done by any of the NMHSs.

Non-Tropical Cyclone warning system matrix

3.3.3 Mr Gibson (Vanuatu) presented the non-TC warning system that is implemented at Vanuatu, including several new public severe weather bulletins that were instituted since the beginning of the SWFDDP, such as: the Severe Weather Warning Bulletin, 3-day Severe Weather Outlook, High Seas Forecasts / Warnings, and the TC Outlook extended from 3-day to 5-day forecast range. The main issue that has arisen is that non-TC warnings are not yet taken seriously by the public. More public

promotion of these new bulletins is needed. Also noted is that localized hazardous events are hard to predict with confidence.

3.3.4 Two tables covering the existing and proposed non-TC warning system for participating countries were reviewed to capture any changes. One table dealt with the types of warnings and associated criteria for a group of countries with an independent or mostly independent forecasting capability (Samoa, Solomon Islands, Vanuatu and Tonga) and the other, for Fiji and countries that obtain forecast and warning services from Fiji (Kiribati, Tuvalu, Niue and Cook Islands). The tables are found in Annex 3.

3.3.5 The RSMT noted the commitment by NMHSs to undertake the following actions:

- 1) In the near future, at a date to be decided, Fiji Meteorological Service (FMS) will expand its provision of alerts and warnings for those countries that rely on FMS forecasting services.
- 2) Samoa will consider the feasibility of issuing Heavy Rain and Heavy Swell Warnings.
- 3) Solomon Islands and Tonga will investigate whether a Heavy Rain Warning might be added to their suite of warnings.

Verification of forecasts and warnings

3.3.6 Mr Jones presented an overview of basic concepts behind, and the importance of the verification activity for the SWFDP. Through the demonstration, no NMHSs had completed or submitted the required verification activity for weather warnings. Some NMHSs do carry out verification of daily public forecasts, however.

3.3.7 Mr Lunny (New Zealand) presented a revised Excel spreadsheet for this activity developed by RSMC Wellington, and proposed that it be implemented within the NMHS's daily procedure as part of the next phase of the SWFDDP. Earlier versions of this spreadsheet had been introduced to the NMHSs as part of SWFDDP in-country training conducted by RSMC Wellington. An example of the spreadsheet is found in the Annex 4.

PWS / Warning Services component of the SWFDDP

3.3.7 In responding to a PWS questionnaire provided by the Secretariat to the RSMT NMHS members, each member provided a comprehensive summary of their respective weather warning programmes focusing on the component of delivery of warning services, including the challenges and requirements to address those challenges.

It was evident in the summaries that interactions with DMCPAs and other agencies were more prominent than what appeared in the Project's four monthly progress reports. As a result, future reporting will take account of the work that takes place outside of severe weather events.

Fiji

Fiji Meteorological Service (FMS) is a member of Fiji's Disaster Management Council, which is headed by the Honourable Prime Minister. Before the onset of TC Seasons, a meeting is usually convened where FMS may be required to provide the activities outlook for the season. Then, a National Disaster Awareness Week, involving all key stakeholders, is organized to raise awareness and educate the communities on the approaching TC season. During the season, and especially if Fiji is under threat, representatives of the NDMO, like the Divisional Commissioners, and District officers, would normally

visit FMS for a briefing. The Police and Army would also visit such briefings. The FMS's interaction with the NDMO usually ends after a threat has passed. This is when the NDMO would concentrate on the response, recovery, rehab and rebuilding aspects of their mandate. Interaction with DMCPA happens all throughout the year and not only dedicated to weather-related issues.

The Fiji NDMO is an integral part of the National Coordination Team established for the Fiji CIFDP (CIFDP-F). It is also one of the signatories to the Definitive National Agreement for the CIFDP-F.

As an event unfolds, and/or when one is in progress, the NDMO provides daily Situation Reports to all key stakeholders. These would include all reports from all sectors of the country.

The Fiji Media is provided with twice daily media releases, before, during and when a severe weather event is about to exit the country. Radio and TV visit FMS daily during events for recorded and live interviews. FMS has also called and participated in live and recorded media conferences with the print, audio and TV media organizations. FMS makes appointments with all media outlets in Fiji for a visit and discussions prior to TC Seasons. During these visits, the FMS and media also exchange notes on how the other operates, and put faces to names whilst building partnerships and respecting each other's "territory". FMS also ran a media training workshop by media representatives in Fiji in 2012 where the FMS staff got to learn first-hand how the media works and how to utilize the media to the utmost benefits of disseminating the message of the Meteorological Service. After this training, it was agreed on the way forward which is being currently implemented. The media is always invited to any and all activities of FMS that the country and the region should know about. The CIFDP-F Stakeholders' Workshop, World Met Day, new capital projects, etc, are some, to name a few. The media is most appreciative of these arrangements.

Samoa

Samoa's public weather service arrangements ensure that the warning products reach the at risk communities in a timely manner prior to impact. The warnings issued by the Samoa Meteorology Services (SMS) are disseminated to the community through the media, the Disaster Management Office, and other stakeholders and users using email, direct delivery, website and social media. Samoa is planning to develop a legislation to formalize national arrangements for issuance of day to day public weather services, severe weather including tropical cyclones and other warning services for tsunami and earthquakes. The SMS uses opportunities through public consultations and training, Disaster Management Office's village awareness programs, social media, newspaper publications, telephone directory, TV and radio programs to raise public awareness of public warning services including severe weather and cyclones, flooding and so forth. Feedback from the public and users of weather services and products are given to SMS through various means including direct telephone calls and emails, newspaper articles. and personal conversations with colleagues, families and friends. The SMS aims to further improve its public weather services including severe weather warning products, warning dissemination through SMS, lexicon used in warning products, more outreach programs, and exploring twinning arrangements between the SMS with more experienced NMSs to strengthen capacity in severe weather monitoring, forecasting and warning issuance.

Solomon Islands

Solomon Islands Meteorological Service (SIMS) is the National Weather Service provider under the act of parliament, 1985.

The three important components or organizations that play a role in the efficient delivery of severe weather warnings are the NMS, NDMO and the Media.

The warnings must reach from the top level of the Government to the local communities of the Solomon Islands. This is the standard Operation Procedure (SOP). Director of SIMS advises the Permanent Secretary and Minister for Severe Weather, who then report to the Cabinet and the Prime Minister. SIMS also sends this to the NDMO and Media separately. NDMO will make a safety Message and re-send along with the warnings or advisories to the Media, which then may report to the general Public.

SIMS has improved the capability of forecasting severe weather using the South Pacific Guidance and NWP outputs posted on the MetConnect Website.

The thresholds decided by SIMS from the knowledge of the project considering its local needs are: more than 25-knot winds and 2.5-metre swells that can affect small crafts and canoes, and inundate low lying islands, and heavy rainfall accumulations in excess of 100mm in 24 hours that can cause flash flooding in streams, rivers and low lying areas. From these thresholds advisories or warnings are forecasted for moderate to heavy swells, heavy rain (flood) and strong winds.

The lead time target for warnings and forecasts is 24 to 48 hours to give ample time for the general public to receive the information and to prepare to take precautionary measures when necessary.

Work is done with the Quality Management System (QMS) on standard Operation Procedures (SOP).

SIMS will set up a Severe Weather Section of its own and is looking forward to sending forecasters to the Pacific Desk Training in Honolulu National Weather Service for further training to fine tune the warning system that is already in place to target local situations and do verification.

SIMS Forecasters appreciate the Project for important improvements made to its forecasting and service delivery capabilities.

SIMS works very closely with the Media during severe weather. As an example, in the case of TC Freda, SIMS sent warnings by fax and email to the Local National Broadcasting Radio (SIBC), Newspapers, FM stations and also had interviews with them. SIMS also had interviews with the Local TV. The foreign Media such as Radio New Zealand, ABC and Tok Pisin News called for interviews during this event.

Although SIMS always tried to discourage the local Media from getting information from other countries, there is no law that can stop them from doing that.

Vanuatu

Vanuatu has a warning system for non-tropical cyclone events, particularly for heavy rainfall, rough seas and heavy swells. This is supported by three to five day outlooks for these events. Warnings are issued by Vanuatu Meteorology and Geo-Hazard Department (VMGD) directly to the National Disaster Management Office (NDMO), the media, social media and to communities throughout Vanuatu. The NDMO also relays the warnings through its communication channels. NDMO has made texts available to forecasters so that when warnings are issued, the texts, mostly precautionary advice, are inserted into the warnings. All warnings, including other services and products issued by VMGD have standard operating procedures (SOPs). The VMGD is the official authority to issue marine warnings, severe weather warnings, volcanic eruption warnings, earthquakes and Tsunami Advisories. It does not issue "Flood Warning" as this task rests with the Department of Water.

The VMGD houses the NDMO, which is within the same Ministry, and this allows for close coordination during an event. An MOU has been established between the two departments regarding the roles each Department plays during an event. VMGD continues to run outreach programs for communities on services it provides, and has close collaboration with other government departments and non-government departments.

An MOU was recently signed between VMGD and the Vanuatu Broadcasting and Television Corporation. Vanuatu's local media (Radio, Television, Print media) use VMGD's products and services most of the time. Despite this there is no legislation in place preventing local media from using other source of information. VMGD always feeds the media with new stories, and updated products, which allows them to use these products, which are tailor-made for Vanuatu's needs.

There are nine forecasters at the VMGD, and seven of them are Science graduates, four of which are Meteorologists. Plans are underway to recruit more forecasters. There are more than ten forecast products issued daily, and the forecasts range from 24-hour forecasts, three-day forecasts, and seven-day forecasts. Warnings are issued every three and six hours. Forecasters use a wide range of aids and tools, including aids available on Met Connect Pacific to provide forecasts and warnings. The VMGD has adequate resources to sustain its operations. Budget is growing every year to sustain the operations, in particularly the warning systems.

Cook Islands

Considering that all forecast products are from outside of the Cook Islands, resources are utilized within the ranks of CIMS staff to tailor-make these products through the media for stakeholders. The dissemination of the warnings is assisted by the Emergency Management Cook Islands (EMCI) as the facilitator during disastrous events, through the Disaster Risk Management Plan in which both agencies are key players. The continuous dialogue between these agencies strengthens the dissemination of warnings to the community through the media via outreach activities such as awareness programmes, visits and brochures.

The full potential of the media should be utilized to get that warning to the last person and the last mile. Endeavors should be encouraged to assist in building the capacity of the region in media presentation and service delivery.

Tonga

In reference to non-TC severe weather, Tonga Met Service (TMS) issues Heavy Rain Advisories, Strong Wind and Gale Warnings and Damaging Swells Advisories in accordance to specific criteria in the SWFDDP matrix. In addition, TMS also issues Extreme High Tide Advisories based on a high tide criteria of >1.82m in the tide charts provided in the Bureau of Meteorology Sea Level Monitoring Project. Flood warnings/advisories are not done due to a lack of hydrological expertise. A possibility of flooding is described under each heavy rainfall advisories that are issued. All non-TC warnings and advisories are issued as part of the Routine Weather Bulletins. All bulletins are issued directly to the media, the DMCPA's, the maritime community and the public at the same time through SMS text, e-mail, website, HF broadcasts and live telephone interviews on Tonga's main AM radio that covers the whole 170 islands of Tonga.

The present arrangements work well, however there are a few gaps identified that the project could capture in the future, as follows:

- There is a need to fine tune the warnings/advisories to language that is in line with traditional knowledge and a level that is understandable by the populations most at risk.

- User feedback mechanisms need to be developed to ensure the warning/advisory centre is accountable to specific user group needs to ensure better service delivery.
- Assistance is needed to set up flood warning/advisory criteria for Tonga.
- Severe Weather Forecaster training is needed with a particular emphasis on competencies in communicating warnings/advisories.
- Support for improving Marine Observations.

Kiribati

Kiribati has found SWFDDP useful with positive impacts for the country especially the National Meteorological Service. Prior to the introduction of this project, the Kiribati Meteorological Service (KMS) did not issue any weather forecasts considering the lack of resources and capability within the Service, and the long tradition that this was not their mandate, rather it has always relied on RSMC Nadi. In this regard, any documentation of significant weather events was hardly done.

Soon after SWFDDP was introduced, there were developments at the KMS which included organizational structure, issuing of special weather bulletins and improvement in response to weather request/queries. Responsible staff (KMS) found SWFDDP (MetConnect Pacific) a “one- stop shop” for tools required to provide weather services, it enabled the staff to share ideas as they visited and worked from the same guidance of the MetConnect Pacific pages.

Despite those successes, there are also issues KMS continually faces on the implementation of public weather services in Kiribati which includes slow in Internet connection, no clear outline of weather forecasting roles in the existing job descriptions, where the duties are only limited to providing a forecast amendment if necessary, and translation of what FMS has produced for Kiribati. Lastly but not the least is limited financial (budget) support and feedback on weather forecasting services.

In terms of the existing products from SWFDDP, the SPG geographical coverage is limited to few degrees North of the Equator, in this regard, it is very hard to see any systems in the North that might have impacts on the Kiribati regions especially to the northern Islands, which are situated about 10 degree north of the Equator. KMS recommends that the domain used in the charts should also be used in the SPG.

KMS has noticed an increased need of weather forecasting services in the country and therefore is hoping to see the continuation of the SWFDDP in the future. At the national level, KMS is currently working on the proposal for a new organizational structure so that there will be dedicated staff to do weather forecasts, looking for funding supports for Technical Assistants (TAs) to come to the country to build capacity of the responsible staff, to take the lead in preparing Kiribati weather forecasts, and lastly but not the least, funding to establish a well equipped weather forecasting office.

Tuvalu

Tuvalu Meteorological Service (TMS) collaborates closely with the NDMO and Media Department, and disseminates information and warnings to them directly. Media is the main channel of the delivery of forecast services and warnings but they do not broadcast 24 hours a day. Dissemination is done through the radio station only. Meetings are held regularly with both stakeholders on a monthly basis but a concern is that there is no kind of legislation or law governing the warning production and dissemination. TMS is recognized as the official warning authority without any legislation being in place.

TMS currently issues its own weather bulletins (public weather bulletin) and this is one of the achievements that has developed since the last SWFDDP meeting in Wellington in 2010. Yet, TMS still relies on Nadi for non-tropical and tropical cyclone warnings and marine bulletins. All TMS observers are trained locally or during the in-country forecast training (MetConnect Pacific), some attended the Honolulu Pacific Desk where the daily public weather forecasts are produced as part of their normal shift work. They will be responsible to lead the daily morning weather briefings, MSL map discussion, brief mariners or any visitors etc.

In general, it is essential for the project to continue to the next phase for forecasting consistency and warning service delivery. In the mean time, progress is underway to produce legislation and a Strategic Plan in fulfill and maintain operational obligation of the Service. The TMS very much appreciates the NZ MetService for their continuous support and effort in the overall management and coordination of the project ever since the project's initiation.

Niue

During a severe weather event (Tropical Cyclone), warnings are sent to the Disaster Council, Media, Government Heads of Departments including the Minister and the Secretary to the Government. Media will broadcast the warning on the Radio and Television to the community. Information regarding the warnings is passed to the members of the Niue Disaster Council by the NMS Director. Media and Chief of Police are also members of the Council. Niue will need to develop SOPs related to the above.

Currently there is a Bill submitted to Cabinet and is yet to be passed by Parliament. Warning production and dissemination is included in the Bill. Cabinet and Government of Niue recognize the current process as an official authoritative method of disseminating disaster warning.

The delivery process of warnings is strengthened through collaboration of NMS and key organizations, where it involves Secretary to Government as the Chair of the Niue Disaster Council and Directors of key government agencies. Prompt action is taken when the disaster is seen to be a high risk for the people, and timing is considered in order to allow people to take precautionary measures at the early warning stage. Under this arrangement, dissemination of warnings from Niue Meteorological Service to all stakeholders works very well, but it is a challenge when the Disaster Council delays the issue of the Alert. Disaster warnings particularly for Tropical Cyclones, advised by the Director of Niue Meteorological Service, as a member of the Council, are sometimes not considered.

Niue Meteorological Service has held national workshops in each village and the voice of the community is prominent. They would like the Niue Met Service to issue the color coded Alerts instead of the Niue Disaster Council, since in their view Niue Met Service has more knowledge in weather warnings and they are more inclined to take heed of the warnings. Information on TC warning disseminated to Broadcasting Corporation of Niue (BCN) is misinterpreted by some staff working on the radio. Instead of reading the actual text provided by Niue Met Service they sometimes tend to explain it in their own words.

Nadi produces the forecasts and warnings for Niue. Niue Met Service issued a 3 day forecast using the guidance and models from MetConnect Pacific under SWFDDP. A senior staff is always paired up with another staff (trainee or limited knowledge) when they work on shift. Percentages of resources for production (of forecasts and warnings) are: Financial resources – 80%, Staff time – 80%, and Staff

expertise – 80%. Percentages of resources for Delivery (of products) are: Financial resources – 50%, Staff time – 50%, Staff expertise – 50%.

Point of entry of information is only at the national level within the DRM system. The Niue Disaster Council is considered as the executive committee. Director of Niue Meteorological Service is a member of the Disaster Council. Feedback is obtained from the public (National Workshops/ Village Workshops/ Phone call), from the DRM (through Niue Met Service Director), and Media (Phone call, e-mail). Village workshops are held when funding is available. Media in Niue show greater interest in information produced by NMS. They also pick up stories from other Web sites or from other local people and they question the validity of the information. They would contact the Director to verify the information. In the Niue Meteorological Bill there is provision for official source of information recognizing Niue Meteorological Service as the only source.

There are intention and plans to establish a Niue Met Service Web site and a regular radio program this year. Currently, Niue Met Service provides a daily TV weather both in Niuean and English with graphics and other information to BCN. Once the Web site is established, video footage of various disasters, regular updates of weather and climate information, and warnings will be included with possible link to a social network medium. Use of text message to deliver to all mobile phones in Niue on weather warning information will improve service delivery. Funding to improve Web site development and features for media, including funding for village workshops to provide education and awareness for the communities on disaster warnings and some new developments is needed, as well as experts' visits from more experienced NMSs and visits to more experienced NMSs.

Reports of the participating regional centres

3.3.8 The representatives of the participating regional centres provided updates of their activities and contributions to the SWFDDP, since the 2010.

RSMC Nadi-Tropical Cyclone Centre (FMS)

The Fiji Meteorological Service continues to play its vital role as the RSMC for the Southwest Pacific region. Since the inception of the SWFDDP web portal, RSMC Nadi has developed some new products to specifically cater for severe weather phenomena, which are experienced in Fiji and the region. Some of the developments which has occurred since the last meeting are as follows.

In 2010, RSMC Nadi started issuing the 3-Day Tropical Cyclone Outlook map as guidance to the NMHS's in the region. During the 2010/11 Tropical Cyclone Season, RSMC Nadi started issuing the 72-hour Uncertainty Tropical Cyclone Map. During the 14th Session of RA V TCC Meeting it was agreed that RSMC Nadi cease issuing Special Advisories for Samoa as the responsibility will be shouldered by the Samoa Meteorological Service. RSMC continues to provide Special Weather Bulletins related to Tropical Cyclones for Tonga, Cook Islands, Tuvalu, Tokelau and Fiji. The weekly telephone conference between RSMC Nadi and RSMC Wellington on tropical cyclone related activities start in also started in 2010.

Since the availability of forecasting guidance products on the SWFDDP MetConnect South Pacific Web site, it has to be noted that those National Meteorological Services in the South Pacific involved in the SWFDDP have began to develop their own capacities and become more independent of RSMC

Nadi, and are working on generating new products. The RSMC Nadi has been able to produce a few new warning products which are non- TC related. Currently, these products are only produced for Fiji.

The WMO Coastal Inundation Forecasting Demonstration Project includes a national sub-project in Fiji (CIFDP-F), and is in progress following a Stakeholders Workshop in early 2013. The project is proposed to span to the end of 2015. The next phases include: System Development and Implementation, Pre-operational test, and Live Running and Evaluation as its final phase. The aim is to improve integrated services delivered by FMS for its national disaster management organization.

RSMC Darwin (Australian BoM)

The Australian Bureau of Meteorology and RSMC Darwin continued to contribute regional NWP guidance and tropical climate monitoring products during the full demonstration phase of the SWFDDP in RA V from November 2010 to August 2013. RSMC charts and NWP products have been available on the RSMC Darwin web site and a selection of regional NWP products is available directly on the MetConnect Pacific web page. Gridded model data is also available to SWFDDP participating countries via ftp.

Routine RSMC Darwin tropical products include the Weekly Tropical Climate Note, analysis charts for MSLP, gradient wind and 200 hPa levels, and monthly and biennial regional climate summaries. The Tropical Weekly Climate Note is available via email and links to a new tropical climate product called the MJO (Madden-Julian Oscillation) Monitoring web page, available on the Bureau's web site.

The Bureau's NWP model suite was upgraded several times during the SWFDDP demonstration phase, with the LAPS model suite replaced by ACCESS models in 2012 and an upgrade of ACCESS to the APS1 version in early 2013. The tropical model (ACCESS-T) was replaced with an improved global model (ACCESS-G) with 40 km horizontal resolution, improved physics and 70 vertical levels. ACCESS-TC, the moveable high-resolution tropical cyclone model is run for all TCs in the SWFDDP area.

Future developments may include the provision of the full 7-day forecast period of ACCESS-G products for SWFDDP domains and also ACCESS-TC charts on the MetConnect Pacific web site. The development of 'poor man's ensemble' rainfall charts for the south Pacific and of specialized severe weather diagnostic products may continue once further ACCESS model upgrades (to the APS2 version) are completed.

The Bureau has also supported the SWFDDP with training activities, including several in-country training programs focusing on tropical cyclone forecasting. The TC Module software has been rolled out in several south Pacific countries, providing an improved capacity to issue tropical cyclone forecast maps. Bureau forecaster secondments to RSMC Nadi continued until 2011, funded by AusAID. The 8th and 9th WMO Southern Hemisphere TC Training and Public Weather Workshops for RA V countries were hosted by the Bureau in 2009 and 2011 and the next workshop will be held at RSMC Nadi in September 2013, to be conducted by the Bureau's national TC training coordinator.

The Bureau expects to be able to maintain its current support of SWFDDP activities through the ongoing provision of RSMC Darwin products and representation in the SWFDDP management group.

RSMC Wellington (New Zealand MetService)

RSMC Wellington has continued to host and maintain the SWFDDP web portal, MetConnect Pacific (MCP), update the South Pacific Guidance (SPG) charts on MCP twice a day and develop in-country training material for delivery in nine participating countries, with the help of NOAA NWS staff in Samoa and Fiji. This training was made possible by the kind sponsorship of the New Zealand Ministry for the Environment (MfE) and the New Zealand Ministry of Foreign Affairs and Trade (MFAT). Funding for a 3rd version of MCP has been gratefully made available by the NOAA NWS International Office and the necessary development work is likely to be carried out in the near future. RSMC Wellington noted there are no hard criteria for the transition of the Project to Phase 4. Given that there are a number of concerns and challenges facing the Project at this stage, it is important that these issues are addressed before moving to an “operational or continuing development” phase. Refer to 4.1 for more details. The biggest challenge lies in the transfer of overall management and coordination of SWFFDP from the Secretariat to the region and what body might have the capability to shoulder this role. There are sustainability issues especially in relation to long-term funding of training and website redevelopment. RSMC Wellington has made it quite clear that its role is limited to the day to day production of the SPG charts and the ongoing maintenance of MCP.

Reports of the participating global centres

3.3.8 The representatives of the participating global NWP centres provided updates of their activities and contributions to the SWFDDP, since the 2010.

National Weather Service USA - NCEP and RSMC Honolulu

The NWS provides various products to the SWFDDP’s MetConnect Pacific Website. The NCEP provides a south Pacific sector covering the SWFDDP area from the Global Forecast System (GFS). The numerical weather prediction guidance includes precipitation, surface, and upper air parameters every 3 hours out to 192 hours and then every 12 hours out to 384 hours. GFS is run 4 times daily

RSMC Honolulu maintains an experimental WRF model covering the SWFDDP area with a high resolution sectors over Fiji and the Samoa. The WRF is being run locally at RSMC Honolulu twice daily and provides 3 hourly forecasts out to 48 hours.

Starting in 2013, a team led by Dr Yi Leng Chen at the University of Hawaii started a parallel WRF effort aimed at providing high spatial and temporal resolution model guidance for American Samoa. RSMC Honolulu coordinated with Dr Chen to expand the initial 12 km WRF domain to cover the SWFDDP area. One of the benefits is simulated reflectivity fields produced at 3km resolution covering the Samoa region. The model is run twice daily and provides hourly forecasts out to 72 hours.

TRAINING

RSMC Honolulu staff assisted with two SWFDDP training sessions in Fiji and Samoa.

DIRECT FUNDING SUPPORT

USA/NOAA provided direct support to MetService NZ to fund the development of a third revision of upgrades for the MetConnect Pacific site.

USA/NOAA initially offered to host an RSMT meeting in Honolulu in 2012. Due to logistics and cost, it was later decided to hold the meeting in Fiji and USA/NOAA provided funds WMO to help cover meeting costs and travel for several participants.

PACIFIC DESK

The Pacific Training Desk (PTD) hosted at RSMC Honolulu was suspended in 2011 to complete an assessment of the program's efficacy. The Pacific Desk will resume in late 2013 with new students starting training in early 2014. The new PTD curriculum will support SWFDDP project goals and will provide a limited amount of in-country training.

FUTURE SUPPORT

USA/NOAA will continue to provide NWP data in support of SWFDDP. The PTD will also help to satisfy training requests of participating countries.

JMA (Tokyo)

JMA opened its dedicated website for SWFDP on 15 November 2010. JMA added specialized satellite products tailored to users of SWFDDP, including the Heavy Rainfall Potential Areas on 30 March 2011. The JMA's dedicated website for SWFDP has moved from the old site to the new site: http://www.wis-jma.go.jp/swfdp/ra5_swfdp_spi.html

NWP products

JMA operates the Global Spectral Model (GSM; TL959L60) four times a day (at 00,06, and 18UTC with a forecast time of 84 hours and at 12UTC with a forecast time of 264 hours). JMA also operates a global ensemble prediction system for one-week forecast (WEPS). It runs once a day at 12UTC and the forecast range is 11 days. The detail of the JMA's NWP suite is available on the following site: <http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/outline2013-nwp/index.htm>

The list of the products of GSM and WEPS for SWFDDP is found in ANNEX A of the implementation plan document. It is noted that the products of GSM 00UTC runs are limited to 84 hour forecasts because of the forecast range. The products of GSM 12UTC runs fully cover 5 day forecast range. It is also noted that EPS products are only available for WEPS 12 UTC.

Satellite products

JMA provides two types of special products for SWFDDP. One type is a real-time imagery targeting a specified small area. For SWFDDP, six specified small areas are predetermined. The other type is Heavy Rainfall Potential Area, which indicates an area of deep convective clouds causing heavy rainfall.

JMA plans to start operating the next-generation Himawari-8 and -9 satellites in 2015 and 2017, respectively, to replace the current MTSAT-2 satellite (Himawari-7). After this replacement, more new-types of satellite products might be available in the future.

Other JMA international services for NMHSs

(1) Satellite Animation and Interactive Diagnosis (SATAID) Tool

SATAID is a set of CAL software for MS-Windows that enables the use of a range of meteorological data with a focus on satellite imagery. The latest version of SATAID and related programs can be downloaded from the SATAID Program Page (<http://www.wis-jma.go.jp/cms/sataid/>).

JMA Data Collection or Production Centre (DCPC) runs SATAID service to facilitate the utilization of satellite imagery and numerical weather prediction (NWP) products, in cooperation with NMHSs in RA-II and RA-V. This project features JMA's SATAID software, which enables users to process and display satellite and NWP data using a local personal computer.

(2) Global wave model

JMA operates a global wave model (GWM) four times a day and provides its Grid Point Value data on GTS and from JMA WIS Server. JMA also started to run a global wave model ensemble system once a day (12 UTC initial). The system is still under test mode and there is no concrete plan to disseminate its products to NMHSs.

4. TRANSITION OF SWFDDP TO THE NEXT PHASE

4.1 The meeting, having reviewed the progress, achievements and shortfalls of the demonstration, discussed various aspects of the possible transition of the SWFDDP into the "Continuing Development Phase", as requested by CBS for SWFDP subprojects that have undergone a full demonstration phase. The Meeting agreed that the following criteria and actions need to be satisfied:

1) An appropriate non-TC warning system has been implemented in all participating countries and is operating smoothly and can be verified using the verification tool provided or a similar tool.

Action (i): All NMHSs include RSMC Wellington on the distribution list for all alerts, warnings & advisories.

Action (ii): All NMHSs, in collaboration with their DMCPAs, provide feedback on the performance of the warning system in the country's progress reports.

2) All participating countries are verifying severe weather and wave forecasts & warnings using the tool provided during the in-country training or an equivalent tool

Action: All NMHSs submit verifications to RSMC Wellington with each progress report.

3) All participating countries, in collaboration with their DMCPAs, produce at least one case study per year, using the SWFDDP template or an equivalent template

Action: All NMHSs submit at least one case study per year to RSMC Wellington of a severe weather or wave event affecting their country with the first one due by 30 June 2014

4) Demonstrate on a continuing basis that the relationships between NMHSs and other Disaster Management and Civil Protection Authorities (DMCPAs), the media and the public are strong and healthy, with regular communications before, during and after severe weather events

Action: All NMHSs submit copies of meeting minutes, emails or diary references of any telephone contacts as part of progress reports which show there is continuous improvement in coordination and communication when dealing with severe weather events.

5) All participating countries to complete all SWFDDP progress reports in full before the deadlines prescribed

Action: All RSMCs and NMHSs are compliant

4.2 Mr Ready indicated that RSMC Wellington is fully committed to maintaining its operational contributions to the SWFDDP but is no longer prepared to carry out project management functions, such as fund-raising for SWFDDP activities, secretariat support for organizing training and reporting and Project oversight once it shifts from CBS.

4.3 Mr Chen indicated that the WMO Secretariat would explore suitable arrangements for the transfer of the overall management and coordination of the SWFDDP to a suitable regional body that is capable of taking on this role. However, he acknowledged there was still a considerable push by the WMO Secretariat for developing and implementing new SWFDDP regional projects. In the meantime, he encouraged the RSMT to review activities in the Implementation Plan.

4.4 Mr Koop stated that SPREP, through the Pacific Meteorological Desk Partnership (PMDP), would consider taking on the project management and coordination role for the SWFDDP in Phase IV, either partly or wholly, subject to further discussions between SPREP and WMO. Such a possible role is supported by:

- 1) At PMC-2, SPREP was requested to assist in fundraising for supporting and sustaining the SWFDDP
- 2) The current MOU between SPREP and WMO provides some WMO funding in support of the Pacific Meteorological Desk Partnership (PMDP).
- 3) SPREP is currently involved in the management of the Finland Pacific Reduced Vulnerability of the Pacific Island Country Villagers' Livelihoods to the Effects of Climate Change ("FINPAC") project. A brief presentation relating to FINPAC activities relevant to the SWFDDP was given by Ms Jenni Rauhala, an observer from the Finnish Meteorological Institute temporarily based at SPREP.

Synergy between SWFDDP and TCC RA-V

4.5 Since its inception at the TCC meeting in Niue in 2008, the SWFDDP has been closely aligned with the work of that committee. In addition, RA V formally established the RSMT reporting arrangements through the TCC at the Bali meeting in 2010. Tropical cyclones are a key component of the work of the SWFDDP and the structures associated with the delivery of cyclone warning services are similar if not identical, to those for other severe weather hazards and therefore inform the development of those services. The key relationships already developed with NDMOs, media and

community groups through cyclone warning services are particularly important in establishing new severe weather warning services. This close working arrangement between SWFDDP and RA V TCC is likely to continue in much the same way for the foreseeable future.

Revision of the SWFDDP Regional Subproject Implementation Plan (RSIP)

4.6 Mr Shepherd briefed the meeting on a draft structure of a new RSIP, including its major chapters and subheadings. The RSMT agreed to the proposed changes.

Progress reporting

4.7 The RSMT agreed to produce progress reports for three reporting periods: 1 October 2013 to 31 March 2014, 1 April to 30 September 2014, and 1 October 2014 to 31 March 2015, before a full evaluation is completed against the criteria in 4.2, and before the next RSMT meeting is scheduled. The reporting documentation (previously Annex H and Annex I) has been overhauled to cater for a revised set of evaluation criteria and the introduction of a new verification tool.

4.8 The RSMT agreed to retain the actual names of the representatives of the participating NMHSs and Centres in the RSIP, noting that these names have been put forward by the Permanent Representatives (PR) of the respective participating WMO Members. Changes to these representatives will require official notification by the relevant PR.

4.9 The meeting reviewed and revised a draft revised RSIP, which is found in Annex 5. The draft RSIP will be finalized by 30 September 2013.

4.10 A key outcome of SWFDDP has been focused around service delivery and ensuring that the improvements in NWP from global centres actually produces good outcomes in the face of severe weather events at community level. Over the past 5 years there has been significant development in the skill of forecasters and the development of a variety of new warning products and services across the region. However the meeting felt that the uptake of these products at community level needed a stronger focus and indeed increased resourcing. For this reason the meeting decided to add a position of PWS representative to the RSMT (see revised RSIP) to provide a strong focus on quality service delivery and engagement with communities.

5. OTHER BUSINESS

5.1 The RSMC Wellington has received requests for access to the MetConnect Pacific Website, which is intended for the exclusive use by operational weather forecasting centres within the SWFDDP project. The RSMT agreed to migrating to new access passwords, managed by RSMC Wellington, to be completed by the end of September 2013.

5.2 All other requests for access to MetConnect Pacific will be considered on a case-by-case basis. In each case, those wishing to access MetConnect Pacific must request from RSMC Wellington a non-commercial license (for access to Met Office UK data) to be signed and approved before access can be granted. All current users who are not a NMHS or a RSMC or a Global Centre will also be required to submit an application for a non-commercial licence before a new password will be issued.

5.3 Since the start of the SWFDDP in November 2009, MetConnect Pacific has only been available through the internet. There are times when the Internet is either slow or not working in the

Pacific and this becomes an issue in the lead up to a hazardous weather event. In order to ensure that all Pacific island countries are able to receive SWFDDP information at all times, it is proposed that other methods of dissemination be investigated (e.g., EMWIN) as an alternative to MetConnect Pacific. It was noted, however, that there are significant hurdles to overcome in preserving the security of the data on a different platform. The RSMC Wellington will explore options on alternative methods of dissemination.

5.4 Mr Lunny informed the RSMT that Mr Philip Wiles, Pacific Islands Global Ocean Observing Systems Officer (PI-GOOS), SPREP, has recently recommended that a simple tool could be developed which adds tidal information to sea level offset. By comparing with past data, an estimate could be made if the total sea level will exceed a certain percentile probability, and specific high tide times could be added to MetConnect Pacific; thus providing the PICT's NMHSs with a further useful forecast tool. Further discussion will occur between Mr Wiles and Mr Lunny.

6. RECOMMENDATION

6.1 Recognizing the success of past in-country training, the RSMT recommended that this practice be continued, and as frequently as possible.

6.2 Noting that non-TC warnings are not yet fully understood, and therefore not taken seriously by the public, the RSMT recommended more public promotion of this type of warning.

6.3 Noting the non-Tropical Cyclone warning system matrix presented at the meeting, the RSMT noted the commitment by NMHSs to undertake the following actions (refer to section 3.3.5):

- 1) In the near future, at a date to be decided, Fiji Meteorological Service (FMS) will expand its provision of alerts and warnings for those countries that rely on FMS forecasting services.
- 2) Samoa will consider the feasibility of issuing Heavy Rain and Heavy Swell Warnings.
- 3) Solomon Islands and Tonga will investigate whether a Heavy Rain Warning might be added to their suite of warnings.

6.4 The RSMT recommended that the demonstrated verification Excel spreadsheet be implemented within the NMHS's daily procedure.

6.5 As requested by the Kiribati Meteorological Service (KMS), the RSMT recommended the region covered in the SPG charts should be extended to five degrees north.

6.6 Noting the requests made by NMHSs to continue with the SWFDDP, the RSMT recommended all members to promote the Project and raise its awareness wherever possible.

6.7 The RSMT agreed on a set of criteria must be followed before the SWFDDP can be considered in Phase IV (refer to section 4). These criteria are:

- 1) An appropriate non-TC warning system has been implemented in all participating countries and is operating smoothly.

- 2) All participating countries are verifying severe weather and wave forecasts & warnings using the tool provided during the in-country training or an equivalent tool .
- 3) All participating countries, in collaboration with their DMCPAs, produce at least one case study per year, using the SWFDDP template or an equivalent template (first one due by 30 June 2014).
- 4) Demonstrate on a continual basis that the relationships between NMHSs and other Disaster Management and Civil Protection Authorities (DMCPAs), the media and the public are strong and healthy, with regular communications before, during and after severe weather events.
- 5) All participating countries to complete all SWFDDP progress reports in full before the deadlines prescribed.

6.8 The RSMT recommended that the WMO Secretariat explore suitable arrangements for the transfer of the overall management and coordination of the SWFDDP to a suitable regional body that is capable of taking on this role (refer to section 4).

6.9 Noting that RSMC Wellington has received requests for access to the MetConnect Pacific website, which is intended for the exclusive use by operational weather forecasting centres within the SWFDDP project, the RSMT agreed to migrating to new access passwords, managed by RSMC Wellington, to be completed by the end of September 2013.

6.10 Noting the Internet connectivity in the participating Pacific Islands is not reliable, the RSMC Wellington will explore options on alternative methods of dissemination other than MetConnect Pacific (e.g., EMWIN) (refer to section 5).

7. CLOSING

7.1 The Chairperson of the RSMT, Mr Ready, expressed his appreciation to the participants for having contributed actively to the meeting, as well as to Mr Alipate Waqaicelua, the staff of the Fiji Meteorological Service and the Fiji Government for hosting the meeting in Nadi. He thanked NOAA/NWS USA for their significant financial contribution to the organization and running of the meeting, and also their assistance provided over the last few years. Mr Ready also thanked the WMO Secretariat in the meeting preparation over the last few months. He expressed hope for the SWFDDP to continue to be successful in going forward.

7.2 The meeting of the Regional Subproject Management Team (RSMT) for the SWFDDP-South Pacific Islands closed at 16:40 on Thursday, 29 August 2013.

AGENDA

1. OPENING

2. ORGANIZATION OF THE MEETING

3. EVALUATION OF THE FULL DEMONSTRATION OF THE SWFDP FOR SOUTH PACIFIC

3.1 Overall framework

3.2 Lessons from a Case Study

3.3 SWFDDP achievements and gaps

- Cascading Forecasting Process: roles of participating countries
- Review non-TC warning system matrix and address the gaps
- Verification of forecasts and warnings
- Review PWS component of the SWFDDP

4. TRANSITION OF SWFDDP TO THE NEXT PHASE

- Proposed criteria for SWFDDP progressing to phase 4
- Future of RSMT
- Progress reporting
- Synergy between SWFDDP and RCC in RA V
- Implementation Plan

5. ANY OTHER BUSINESS

- Protected access to SWFDP MetConnect Webpages
- Dissemination of project web pages (e.g. via EMWIN, GeoNetCast)

6. CONCLUSION AND RECOMMENDATION

7. CLOSING

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WEATHER and WAVE WARNING MATRIX for WEATHER SYSTEMS other than named tropical cyclones

Type	Heavy Rain Alert	Heavy Rain Warning	Flood advisory/or warning	Wave Alert	Wave Warning	"Strong wind warning or advisory"	Gale Warning (land + sea)	Comments
Samoa criteria for issuing bulletin		100-150mm within next 24 hours (proposed)	50-100mm within next 12 to 48 hours		7-9ft swells (proposed)	20 to 33 knots	25 - 33 knots	
Name of Samoa bulletin		Heavy rain warning (proposed)	Flood Advisory in RWB		High Swells warning (proposed)	Small Craft Advisory in RWB	High Wind Advisory in RWB	
Vanuatu criteria for issuing bulletin		100mm or more in next 24 hours			2.5 metres or more expected within next 24 hours	Winds expected to be 25 knots or more for sea within next 24 hours. For land, 20 knots or more within next 24 hours (Covered in SWW bulletin)	winds expected to be 34 knots or more within next 24 hours	
Name of Vanuatu bulletin		SWW			HSW, MW	SWW, MW	SWW, MW and HSW	SWW-Severe Weather Warning MW - Marine Warning HSW-High Seas Warning
Solomon Islands criteria for issuing bulletin			More than 100mm expected in the next 24 to 48 hours	Swells expected to be greater than 2.5 m in the next 24 to 48 hours		Winds expected to be 25 to 33 knots and above in the next 24 to 48 hours	Winds expected to be more than 33knots in the next 24 to 48 hours.	
Name of Solomon Islands bulletin		To be considered	Flood Advisory	Swell Advisory in RWB		RWB	Gale Warning	
Tonga criteria for issuing bulletin	More than 100mm expected in the next 24 hours		NIL	Swells expected to be greater than 4m		Winds expected to be > 21 to 33 knots	Winds expected to be > 33 knots during current forecast period	
Name of Tonga bulletin	Heavy Rain Advisory (RWB) Note: "Flash flooding in low lying areas" may be added to this bulletin. Note: Tonga is considering whether to issue a specific Heavy Rain Warning amongst its heavy rain advices.				RWB	RWB	RWB	In relation to tropical cyclones, alerts/warnings are no longer issued in a SWB but a Tropical Cyclone Advisory bulletin.

RWB = Routine Weather Bulletin

SWB = Special Weather Bulletin

WEATHER and WAVE WARNING MATRIX for WEATHER SYSTEMS other than named tropical cyclones

Type	Heavy Rain Alert	Heavy Rain Warning	Flood advisory/or warning	Wave Alert	Damaging Swell Warning	"Strong wind warning"	Gale Warning (land + sea)
Criteria	Low probability of 100mm or more in current forecast period or risk applies to 1st Outlook day	Moderate/high risk of 100mm or more in current forecast period (midnight tonight/tomorrow)		3m to 4m swells during current forecast period or > 4m applies to 1st Outlook day	> 4m swells during current forecast period (midnight tonight/tomorrow)	> 21 to 33 knots	> 33 knots during current forecast period
Kiribati	RWB (Nadi)	RWB (Nadi)	Not done	To be considered - RWB (Nadi)	RWB (Nadi)	RWB (Nadi)	SWB (Nadi)
Tuvalu	RWB (Nadi)	RWB (Nadi)	Not done	To be considered - RWB (Nadi)	RWB (Nadi)	RWB (Nadi)	SWB (Nadi)
Fiji	SWB (Nadi)	SWB (Nadi)	SWB(Nadi) - see criteria below	To be considered - RWB (Nadi)	SWB (Nadi)	RWB (Nadi)	SWB (Nadi)
Niue	RWB (Nadi)	RWB (Nadi)	Not done	To be considered - RWB (Nadi)	RWB (Nadi)	RWB (Nadi)	SWB (Nadi)
Cook Islands	RWB (Nadi) for Rarotonga only	RWB (Nadi) for Rarotonga only	Not done	To be considered - RWB (Nadi)	RWB (Nadi)	RWB (Nadi)	SWB (Nadi)

RWB = Routine Weather Bulletin

SWB = Special Weather Bulletin

Criteria for Flood Advisory/Warning

The flood warning criteria is different for each river. The Standard Operating Procedure(SOP) is different for each river. Thus, when the alert level, critical level is reached, the respective warning is issued.

RWB (Nadi)

Heavy Rain Alert and Heavy Rain Warning banners to be issued by RSMC Nadi in a RWB for this Country (or Rarotonga) in the near future (2013)

To be considered - RWB (Nadi)

The issuing of Wave Alerts or Heavy Swell Alerts in RWB for this Country to be considered by RSMC Nadi in the near future (2013)

THIS WORKSHEET IS FOR HEAVY RAIN EVENTS UNRELATED TO TCs

Use a new row if the event lasts more than one day

Event Number	Event Start Date (dd/mm)	Type of Weather	SPG Chart: 4 days out	SPG Chart: 3 days out	SPG Chart: 2 days out	SPG Chart: 1 day out	SPG Chart: on the day	Was a warning issued (Yes or No?)	How many hours before start of event was warning issued?	WARNING WAS:				
										Successful, or partially successful {A}	False Alarm {B}	Issued late {C}	NOT Issued {C}	Correct Negative {D}
1	01.nov	Heavy Rain	Low	Low	Moderate	Moderate	High	Yes	12	1				
2	02.nov													1
3	03.nov													1
4	04.nov													1
5	05.nov													1
6	06.nov													1
7	07.nov	Heavy Rain	NIL	NIL	Moderate	Moderate	Moderate	Yes	6	1				
8	08.nov	Heavy Rain	NIL	NIL	Low	Moderate	Moderate	Yes	6	1				
9	09.nov													1
10	10.nov	Heavy Rain	NIL	Low	NIL	NIL	Low	Yes	-3			1		
...	...													
...	...													
...	...													
35	25.janv	Heavy Rain	NIL	NIL	NIL	Moderate	High	Yes	2	1				
36	25.janv	Heavy Rain	NIL	NIL	NIL	NIL	Low	No					1	
37	25.janv	Heavy Rain	NIL	NIL	NIL	NIL	Moderate	Yes	2		1			

4 1 1 1

POD = 67%

RSIP, with Annexes, is available at:

http://www.wmo.int/pages/prog/www/CBS-Reports/documents/RSIP_SWFDDP-Fiji-August2013.doc