

# Eleventh Meeting of Regional Meteorological Service Directors



10-14 July 2006, Noumea, New Caledonia

**SPREP**

Secretariat of the  
Pacific Regional  
Environment  
Programme



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PO Box 240

Apia

Samoa

E: [sprep@sprep.org](mailto:sprep@sprep.org)

T: +685 21 929

F: +685 20 231

W: [www.sprep.org](http://www.sprep.org)

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## Executive Summary

The Eleventh Meeting of Regional Meteorological Service Directors (11RMSD) emphasized ten issues, namely: 1) Strategic planning for meteorological services in the Pacific region; 2) Maintaining meteorological equipment to meet World Meteorological Organisation (WMO) requirements; 3) Extending invitations for future RMSD meetings; 4) Improving coordination and collaboration among meteorology and hydrology programmes' activities and projects; 5) Participation and coordination/collaboration in meteorological and other related international fora; 6) Training; 7) Emergency response (integrated multi-hazards approach); 8) Enhancing meteorological services for aviation; 9) Management and exchange of climate data and; 10) RMSD institutional strengthening.

Furthermore, the meeting concluded with 35 recommended actions to address these 10 issues, agreed that the period of implementation would be 18 months, and requested a report on the status of the recommendations at the 12RMSD. A list of all 35 recommendations is attached at the end of the report.

The six highest recommendations were:

### **Strategic Plan**

*Action:* Set up a task team, under the leadership of the Secretariat of the Pacific Regional Environment Programme (SPREP) and in collaboration with other agencies in the Council of the Regional Organisations in the Pacific (CROP), to prepare a plan for updating the Needs Analysis, including identifying funding. .

### **Equipment Issues**

*Action:* National Meteorological Services (NMS), on an as-needed basis, will inventory their observational equipment, and with the help of regional instrument centres, identify outdated equipment and required spares and submit requests to WMO and other possible donors for replacements.

### **Training**

*Action:* Request WMO and the International Civil Aviation Organisation (ICAO), along with relevant Civil Aviation Authority (CAA) representatives, to conduct a workshop on the enhancement of aviation support.

### **Observations**

*Action:* Request WMO to assist, where needed, NMSs in meeting reporting (RBSN - Regional Basic Synoptic Network and RBCN: Regional Basic Climatological Network) and other requirements for adequate national and regional climate and weather services.

*Action:* Establish a task team on Automatic Weather Stations (AWSs). Their terms of reference would be to research available studies and information on AWS currently available applicable to small island nations, areas which could be standardized (e.g., data format, sensor specifications), etc. (Proposed task team: Tonga (chair), American Samoa, French Polynesia, New Zealand.)

### **Management**

*Action:* Request SPREP and WMO to review ways of strengthening, and advocating the use of RMSD as a forum for reporting to governments, agencies, etc. to better enhance visibility of the Met Services as a regional entity.

# Acknowledgements

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- United States of America National Oceanic and Atmospheric Administration (US NOAA)
- World Meteorological Organization (WMO)
- United States of America Global Climate Observing System (US GCOS)
- Australian Aid for International Development – Pacific Islands Climate Prediction Project (AusAID PICPP).

SPREP also thanks its 11RMSD co-hosts, Meteo France and the Government of New Caledonia, for the generous and excellent co-hosting services and facilities provided for the meeting and participants. In particular, SPREP acknowledges Mr Nicolas Beriot, Director Meteo France, New Caledonia and his staff for their efforts and assistance to SPREP in preparations for the 11RMSD. In particular Mr Georges Naturel and Ms Valerie Deschamps assisted with organisation of transport to the various hosted events, and Secretariat operations of the meeting.

SPREP also thanks Mr Henry Taiki, World Meteorological Organization Subregional Office in Apia, for his close collaboration in the planning of the 11RMSD.

SPREP acknowledges and thanks the following organizations for their participation and contribution to the 11RMSD:

- Australian Aid for International Development (AusAID)
- National Institute of Water and Atmospheric Research (NIWA)
- Secretariat of the Pacific Geoscience Commission (SOPAC)
- Secretariat of the Pacific Community (SPC)
- University of Oklahoma (UO)
- World Meteorological Organisation (WMO).

Finally, this report has been compiled through the hard work and effort of the 11RMSD drafting team led by Mr Jim Weyman (Director NOAA NWS Honolulu Weather Forecast Office), and comprising Mr ‘Ofa Fa’anunu (Director Tongan Meteorological Service), Ms Mary Power (SOPAC), and Mr Ram Krishna (Australia Bureau of Meteorology) — to whom many thanks are due.

# Acronyms used and their explanation

AFTN	Aeronautical Fixed Telecommunication Network
AGO	Australian Greenhouse Office
AISR	Aeronautical Information System Replacement
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ATEWS	Australian Tsunami Early Warning System
AusAID	Australian Agency for International Development
AWS	Automatic Weather Station
BoM	Bureau of Meteorology, Australia
CAA	Civil Aviation Authority
CGPS	Continues Global Positioning System
CLASS	Comprehensive Large Array-data Stewardship System
CLIPAC	Climate Information Products for Pacific Island Countries
CROP	Council of the Regional Organisations in the Pacific
DPS	Department of Public Safety
EC-LVII	Fifty-seventh session of the WMO Executive Council
EMA	Emergency Management Australia
EMWIN	Emergency Managers Weather Information Network
ENSO	El Niño-Southern Oscillation
ETOPS	Extended-range Twin-engine Operational Performance Standards
EU	European Union
FMS	Fiji Met Service
FSM	Federated States of Micronesia
FY06	Fiscal Year 2006
GCOS	Global Climate Observing System
GEF	Global Environment Facility
GEO-IDE	Global Earth Observing Integrated Data Environment
GEOSS	Global Earth Observing System of Systems
GFE	Graphical Forecast Editor
GOOS	Global Ocean Observing System (U.S.)
GOSIC	Global Observing System Information Center
GTS	Global Telecommunications System
GUAN	Global Upper Air Network
GSN	Global Surface Network
HF	High Frequency
ICAO	International Civil Aviation Organisation
ICU	Island Climate Update (Bulletin)
IDEA Center	Integrated Data and Environmental Applications Center
IOC	Intergovernmental Oceanographic Commission

IPRC	International Pacific Research Center
ISCS	International Satellite Communications System
ISO	International Standards Organization
ISS	Information Systems and Services
IT	Information Technology
JICA	Japan International Cooperation Agency
KAP	Kiribati Adaptation Programme
LDCs	Least Developed Countries
LRIT	Low Rate Information Transmission
LRUS	Low Rate User Station
LTP	Long-term Plan (e.g. 7LTP: seventh ...)
MDG	Millennium Development Goals
MOU	Memorandum of Understanding
NAA	National Archives of Australia
NAPA	National Adaptation Programme of Action
NCDC	National Climatic Data Center
NGO	Non-Government Organization
NHS	National Hydrological Services
NIWA	National Institute of Water and Atmospheric Research
NMHS	National Meteo-Hydrological Services
NMS	National Meteorological Services
NOAA	National Oceanic and Atmospheric Administration
NWP	Numerical Weather Prediction
NWS	National Weather Service (NOAA)
NZ	New Zealand
NZAID	New Zealand Agency for International Development
OPMET	Operational Meteorological
PacIOOS	Pacific Integrated Ocean Observing System
PaCIS	Pacific Climate Information System
PDC	Pacific Disaster Center
PEAC	Pacific ENSO Applications Center
PI-CPP	Pacific Islands Climate Prediction Project
PICs	Pacific Island Countries
PIFS	Pacific Islands Forum Secretariat
PI-GCOS	Pacific Islands - Global Climate Observing System
PI-GOOS	Pacific Islands - Global Ocean Observing System
PI-HYCOS	Pacific Islands - Hydrological Cycle Observing System
PNG	Papua New Guinea
PPBES	Planning, Programming, Budgeting, Execution System (NOAA)
PRC	Programme Review Committee
PRIDE	Pacific Region Integrated Data Enterprise
PriMO	Pacific Risk Management 'Ohana
RANET	Radio Internet



RA V	Regional Association five (WMO)
RAP	Regional Action Plan
RBCN	Regional Basic Climatological Network
RBSN	Regional Basic Synoptic Network
RCC	Regional Climate Center (WMO RA V)
RMI	Republic of Marshall Islands
RMSD	Regional Meteorological Services Directors
RMTC	Regional Meteorological Training Center, Philippines
RSMC	Regional Specialized Meteorological Center
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCOPIIC	Seasonal Climate Outlook in Pacific Island Countries
SERREAD	Scientific Educational Resources and Experience Associated with the Deployment of Argo profiling floats in the South Pacific Ocean
SIDS	Small Islands Developings States
SIP	Special Implementation Project
SNAP	Strategic National Action Plans
SOA	Safety Oversight Audit
SOPAC	South Pacific Applied Geoscience Commission
SPaRCE	Schools of the Pacific Rainfall Climate Experiment
SPC	Secretariat for the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SPSLCMP	South Pacific Sea Level Climate Monitoring Project
TAF	Terminal Aerodrome Forecast
TC	Tropical Cyclone
TCC	Tropical Cyclone Committee
TEMCO	Territorial Emergency Management Coordinating Office
TOHS	Territorial Office of the Homeland Security
TSP	Technical Support Project
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFIP	United Nations Fund for International Partnerships
US	United States (of America)
US NWS	National Weather Service
USOAP	Universal Safety Oversight Audit Programme
VCP	Voluntary Cooperation Programme
VHF	Very High Frequency
WAFS	World Area Forecast System
WHYCOS	World-HYCOS
WIS	WMO Information System
WMO	World Meteorological Organisation
WSO	Weather Service Office
WWF	World Water Forum
WWW	World Weather Watch

# 1. Official Opening

The 11th Meeting of the Regional Meteorological Services Directors (RMSD) organised by the Secretariat of the Pacific Regional Environmental Programme (SPREP) was held in Noumea, New Caledonia, at the kind invitation of the Government of New Caledonia and Meteo France. The opening began with a prayer by Mr Jotham Napat, the Principle Delegate from the Vanuatu Meteorological Services. This was followed by addresses by the Honourable Mr Michel Mathieu, High Commissioner of the French National Government; Mr Gerald Cortot, representative of the President of the Government of New Caledonia; Mr Jean Leques, Mayor of Noumea; and Mr Pierre-Etienne Bisch, President of Meteo France. They welcomed the delegates on behalf of the Governments of France, New Caledonia, and Noumea and on behalf of Meteo France, respectively. The speakers emphasized the importance of this meeting because of the threat to Pacific Island Nations by meteorological disasters such as those associated with tropical cyclones, heavy rainfall, drought, other severe weather and global climate variability and change impacts. Also Dr Tokiyoshi Toya, representative of the World Meteorological Organization (WMO) and Mr Bruce Chapman, SPREP representative, echoed the thoughts of the other speakers concerning the importance of this meeting. They thanked the Governments of France, New Caledonia, and Noumea, and Meteo France for hosting this meeting and for providing the delegates a very warm welcome.

# 2. Meeting Arrangements

The elected chair as host of the 11RMSD, Mr Nicolas Beriot, provided apologies and requested vacancy of duties due to a busy schedule during the period of the meeting. This was accepted and the following officers were appointed: Chair - Mr Arona Ngari, Director of Cook Islands Meteorological Service and President of WMO Regional Association (RA) V. Vice-Chair - Mr Mulipola Ausetalia Titimaea, Assistant Chief Executive Officer of the Ministry of Natural Resources, Environment, and Meteorology, and Head of Meteorology Division of Samoa. Drafting Committee: Mr Jim Weyman (USA National Weather Service), Ms Mary Power (South Pacific Applied Geoscience Commission, SOPAC), Mr Ram Krishna (Australia Bureau of Meteorology), and Mr 'Ofa Fa'anunu (Tonga Meteorological Service).

### 3. Meteorological Service Directors' Presentation on Topics of Concern for Pacific Island Meteorological Services

#### 3.1 Institutional Strengthening of National Meteorological and Hydrological Services

*(Arona Ngari, Director of Cook Islands Meteorological Service and President of WMO Regional Association (RA) V)*

Mr Ngari discussed the following major items which were reviewed later in the meeting for consideration of action items and recommendations:

- The need for National Meteo-Hydrological Services (NMHS) strategic and management plans and how the NMHS will help to obtain the national objectives and goals and the Millennium Development Goals (MDGs).
- The requirement to look at aviation support and the possibility of cost recovery to help support the operations of the NMHSs.
- NMHS Directors need to participate proactively, especially in the area of human resources. Pacific small island states and local NMHS are losing talented, trained people to some of the large countries in the area. National governments must be made aware of the impacts of inadequate human resources.
- Communications throughout the region are sometimes poor and expensive; however there are some developments like Radio Internet (RANET) which have the potential to change this.
- NMHSs must form a solid collaboration and coordination with other national government agencies and organizations to be able to work effectively and also to demonstrate their support and value in accomplishing national goals and objectives.
- NMHSs should participate/ collaborate as much as possible in international organizations such as WMO's Commissions and workshops and the International Civil Aviation Organization (ICAO) through their national ministry of aviation and regional associations such as SPREP, SOPAC, Secretariat for the Pacific Community (SPC), and others.
- As a way forward, proposed the development of a regional strategic plan; participation in WMO's Commissions, task teams, working groups, and as rapporteurs; and identification of what needs to be done and publicize it.

## 3.2 A review of the Strategic Plan: Development of Meteorology in the Pacific Region - A Reminder

*(Mulipola Ausetalia Titimaea, Assistant Chief Executive Officer of the Ministry of Natural Resources, Environment, and Meteorology, and Head of Meteorology Division of Samoa)*

Mr Titimaea strongly emphasized the requirement for a NHMS strategic plan which is linked to the National strategic plan and the MDGs. For the NMHSs to be effective and to receive the support required the NMHSs mission and required resources must be incorporated into the national strategy plan. He mentioned:

- Guiding statement from the recent WMO RA V meeting especially sections 16.3.4 and 16.3.5.
- Vision statement and goals. The goals should reference the need to meet obligations of the countries in the various Agreements and Conventions the country has signed.
- Objectives should provide the framework of short, medium, and long-term priorities which are based on mutually-agreed upon identified needs; raise the profile of the NMHS; cooperate/coordinate with national, regional, and international development partners.
- There was a call to update the needs analysis published in 2000, promote these updated needs for funding purposes, then to review these needs at each SPREP RMSD meetings for progress, revalidation, and priorities.
- Two common priority areas for all countries are:
  - 1) Severe weather warning services (forecasting and technical level training and state of the art equipment required) and
  - 2) Seasonal and Climate Prediction Services which is currently being addressed in many different ways through New Zealand, Australia, United States, and other countries programs in the area and through the future WMO RA V Regional Climate Centre (RCC).
- Requirement for supporting infrastructures for weather and climate observational networks (working with Pacific Islands - Global Climate Observing System (PI-GCOS), Pacific Islands - Global Ocean Observing System (PI-GOOS), Global Earth Observing System of Systems (GEOSS), universities, and others) and physical structure and institutional strengthening (which may require restructuring of the NMHS to be more closely aligned with agriculture, climate program, etc.).

### 3.3 Fiji Meteorological Service (FMS) Regional Service: Recent Developments

*(Rajendra Prasad, Director FMS and RSMC Fiji)*

Mr Prasad gave a recap of Fiji Meteorological Service (FMS)'s vision, mission, organization, performance of Regional Specialized Meteorological Center (RSMC) Nadi - Tropical Cyclone Committee (TCC), tropical cyclone occurrence and trends in the Southwest Pacific and recent developments in RSMC Nadi's prediction and warning capabilities. He mentioned that because of the positioning of FMS as a Department within its national government, FMS was mainly responsible for maintaining its own infrastructure with very little resources and lowering budgets which posed challenges in maintaining regional operations and services. He revealed that there had been a general decline in the number and quality of weather and climate observations within the Southwest Pacific which was impacting FMS's services for the region. Fiji and some other Pacific Island countries had been forced to automate their observation programmes which were not running too well. Lack of reliable communications links was still a major concern for RSMC Nadi in terms of providing an effective warning service under extreme conditions.

Because of this situation, Mr Prasad believed:

- There is a need to focus on the use of new data sources such as satellite data (mostly via Internet currently), the use of improved models (and the use of consensus forecasts) which are very accurate and are generally better than a human forecaster beyond the 2 day period, and new data display software which enables the forecaster to better visualize what is happening and what is expected.
- There needs to be a source of back up communications to ensure continuity of operations under severe weather situations.

Mr Prasad ended with the following recommended needs for further discussion:

Meteorologist training, improvement of regional synoptic observation network and reporting, improve communications, improve access to satellite and numerical weather prediction model data, feedback on RSMC Nadi performance, improve access to tropical cyclone impact data and reports, in-service training on new techniques and developments, regular consultations with stakeholders to get requirements and priorities, and general education and awareness on a number of topics.

### 3.4 Communication Systems, Vanuatu and Pacific Region Experience and Perspective

*(Jotham Napat, Director Vanuatu Meteorological Service)*

Mr Napat emphasized the importance of communications for the region. The Vanuatu Meteorological Service uses RANET, Global Telecommunications System (GTS), Internet, Emergency Managers Weather Information Network (EMWIN), and High Frequency (HF) e-mail. RANET looks very promising, but the long-term issue is spare parts and how to get them. Plus RANET has a limited range. Also the Council of Regional Organisations in the Pacific (CROP) must coordinate among agencies to ensure there is no duplication.

- There were many lessons learned from the Tonga tsunami warning issued in May 2006. There was no system in place to monitor or to get information. During the tsunami exercise the NMS was the focal point for Vanuatu's participation. Now the Government

is looking at NMS for seismology, volcanology, and hydrology. But now communications are more important than ever, and a low-cost solution must be found.

- Also need technical training to maintain systems. There is a technical regional support center for support of PI-GCOS which could be expanded to help if requested.

Web sites are important but need training and a host site. Mr Howard Diamond of Auckland University discussed the training and assistance available, if requested, via the PI-GCOS web portal. One intent of the PI-GCOS portal is to provide centralized web support (e.g., server, software, licenses) to aid NMHSs in the region that would like a web presence. Countries wanting to establish a web site via the PI-GCOS server, should contact Howard at [howard.diamond@noaa.gov](mailto:howard.diamond@noaa.gov). If countries choose to establish a web site via the PI-GCOS server, they own and maintain complete control over the content. PI-GCOS is merely there in order to provide support if requested. Christina Lief administers the PI-GCOS server as part of the Global Observing System Information Center (<http://gosic.org>) at NOAA's National Climatic Data Center and has provided web page authoring training in the past. She is currently working with SPREP on some in-country training sessions for a couple of months. SPC is also looking at hosting some web sites.

Mr Napat expressed his sincere appreciation to USA/NZ Climate Change Partnership bilateral for restoring to operational status the Baurerfield upper air site which is now providing regular upper air soundings. Funding for the restoration of the site was provided by NOAA/NCDC's US GCOS Program and installation and technical assistance was provided by the NZ Meteorological Service, Ltd.

## 3.5 Weather and Climate

*(Sionetasi Pulehetoa, Director Niue Meteorological Service)*

Mr Pulehetoa briefed the group on Niue's weather information, climate information, and stakeholders. He then discussed data archiving and data access in past and current situations. He then discussed his Issues/Problems and Recommendations.

- *Issues/Problems:* Lack of ownership rights of NMHS for climate data held by others, technical assistance is required, lack of maintenance support in exchange for data, no payment to NMSs for labour towards recording/preparation of data, and outside institutions earn or benefit from data they use or sell from NMSs.
- *Recommendations:* Acknowledgement of data used, awareness for NMHS to be cautious in the release of climate data, review financial support/cost recovery for staff and labour, and technical support/maintenance assistance for observing equipment.

Following the presentation, there was discussion concerning a policy on ownership and use of climate data. Resolution 40 covers real-time exchange of data but not climate data. Currently there is no policy for requests for data, especially requests for large amounts of data. There was a suggestion that there be a small NMHS workshop to discuss this issue of ownership and to develop a draft policy or a template for a policy. Mr Titimaea said Samoa was looking at developing a separate policy for themselves. Dr Salinger mentioned that the early data from Niue has now been digitalized and NIWA will send it to Niue.

## 3.6 Enhancement of Aviation Services in the Pacific

*(Ofa Faanunu, Director Tonga Meteorological Services)*

This issue came out of the WMO RA V meeting because some concerns were raised. The basic emphasis of aviation meteorology is on the safety and efficiency of air navigation. The International Civil Aviation Organization (ICAO) ensures safety and efficiency of flight through 18 annexes (standards) to the ICAO Convention. Annex 3 applies to meteorology. ICAO conducts audits to check the compliance with the various Annexes (Safety Oversight Audit, SOA – an audit pertaining to only one annex and Universal Safety Oversight Audit Programme, USOAP – an audit on all of the annexes). If ICAO conducts an audit and the organization is not in compliance then it is placed on a deficiency list.

Aviation meteorology concerns identified in the region (Asia/Pacific Air Navigation Planning and Implementation Regional Group: APANPIRG and Special Implementation Project (SIP) are:

- Long-standing deficiencies related to the provision of basic meteorological services (inaccurate/missing/non-reliable aerodrome reports).
- Lack of meteorological information to support Extended-range Twin-engine Operational Performance Standards (ETOPS) flights.
- Shortfalls of Operational Meteorological (OPMET) data from the south Pacific sub-region.

Strategies to enhance meteorological service to aviation in the Pacific:

- Ensure ICAO Annex 3/WMO Technical Regulations are met and a copy of Annex 3 kept on each station.
- Ensure sustainable development of meteorological services to aviation by developing a strategic plan and maintain an operations plan.
- Develop an emergency plan to ensure continuity of services during natural disasters or other disruptions.
- Have the legislation act amended or established so the legislation aligns aviation meteorological services with ICAO/WMO provisions.
- Hold consultation meetings/agreements to promote greater cooperation among stakeholders at a national level.
- Develop and implement a training and maintenance plan to ensure staff is adequately trained.
- Attend international meetings (APANPIRG MET/Sub-group) to promote greater regional cooperation and learn from developed states.
- Develop a quality assurance plan to ensure a quality management system is in place.
- Develop or initiate cost-recovery plan or regulations under a legislative act.

*Discussion:*

1. There was some discussion regarding meteorological services to aviation. There was a question that if all of the strategies given in the presentation were in place, would you be able to meet the ICAO audit? The answer was yes, any country could meet the Annex 3 standards if these were done.
2. One country said they had been through an extensive audit this year and checked for Annex 3 standards. The main problem found was having proper documentation to show that they followed Annex 3. Good documentation is needed on how to make correct observations.

3. It was pointed out that ICAO allows for cost-recovery but no one is doing it – not FMS, New Zealand or anyone else for the Terminal Aerodrome Forecasts (TAFs) issued. But the requirement is for Class I meteorologists to issue the TAFs.
4. Many of the countries didn't fully understand what is required and by which ones. One country was told that they couldn't use the Internet for aviation support, but had to use World Area Forecast System - International Satellite Communications System (WAFS/ICSC).
5. One country suggested that WMO meet with ICAO on behalf of the small island states and express some of the problems they face and their disappointment with some of the Annex 3 requirements. Discussion after this indicated that the NMHSs should coordinate/collaborate with their national civil aviation authority, because they are usually the country's focal point for ICAO matters and have input into the information contained in the various annexes.

It was felt that there was an urgent need to inform and coordinate activities in the Aviation Met field. The feeling was, many NMS were often not involved in decision making in-country and many States were not familiar with the requirements of ICAO. There was further agreement that there was a need to address deficiencies in services to aviation in the region as recommended by ICAO.

## 3.7 New Zealand Report

*(Garry Clark, International Operations Manager, New Zealand Meteorological Service)*

Mr Clarke mentioned several things regarding the New Zealand Meteorological Service:

- Continue to install mStar AWSs – 29 installed in New Zealand and one in the United Kingdom. Plans to install one in Tuvalu and Kiribati. These meet WMO standards, provide “one-minute winds”, and are easy to maintain.
- NZAID has funded for receiving tropical cyclone information because they now see the usefulness of such data.
- Upgrading radar network with Sigmets Doppler radars.
- Increasing “one-minute” data sampling available, and have received funding through Crown contract.

The GCOS Technical Support Project (NOAA GCOS funded) located in New Zealand has been active with its primary focus on restoration of GUAN sites and its secondary focus on restoring GSN sites. The Project has assisted in restoring upper air operations at Tarawa, Funafuti, Bauerfield, and Penryhn atoll and is conducting GUAN site surveys at Port Moresby and Honiara. The Project also has been actively involved in identifying and preparing regional spare kits, maintenance support, monitoring, metadata, and training. In addition, New Zealand has provided general or specific support to Pitcairn, Tuvalu, Tokelau, Kiribati, and to many southwest Pacific NMSs.

## 3.8 Kiribati Report

*(Moreti Tibiriano, Acting Director, Kiribati Meteorological Service)*

Because of Kiribati's identified risk associated with climate variability and climate, the government has developed a policy statement and strategy: National Adaptation Programme and Action (NAPA) and Kiribati Adaptation Programme (KAP). In each of these, there is a component to upgrade the Kiribati NMS. Mr Tibiriano listed his objectives and goals for the



Kiribati NMS. He then listed the status of the RANET, EMWIN, and SCOPIC systems and his development of a workforce management strategy which identified gaps in the work force such as adequate training for NMS personnel. Mr Tibiriano expressed his deep appreciation to NOAA and JICA for the ongoing training they provide, to the Fiji Meteorological Service for providing thermometers to replace Kiribati's old thermometers, and to WMO, NOAA, and New Zealand for the support their provided via the Technical Support Project.

### 3.9 American Samoa Report

*(Alan Olson, Meteorologist in Charge, Weather Service Office, Pago Pago, American Samoa)*

Mr Olson thanked the organizers, sponsors, organizations and hosts of this important meeting. He stated the Governor of American Samoa believed the future of the Pacific Islands hinges on the continued support and cooperation among countries involved in the region.

American Samoa continued to work towards improving the monitoring, forecasting, mitigation, response and outreach for natural disasters. Tsunami and tropical cyclone events are the highest priority for resources but climate monitoring, mitigation and successful outreach has gained more importance.

WSO Pago Pago continued to work with the Territorial Office of Homeland Security (TOHS), the Territorial Emergency Management Coordinating Office (TEMCO), Department of Public Safety (DPS) and other agencies to upgrade their early warning dissemination network. American Samoa in 2000-2001 partnered with the National Weather Service to research, purchase and install a NOAA All Hazards Weather Radio alert system. A preliminary system has been operating since 2004. A more advanced system and higher-powered transmitter will be operating by the end of 2007. Because of terrain and distance, not all villages will be able to receive the radio broadcast. Therefore a siren warning system for the islands and a communication partnership with the private media, including radio, television, cable and cell phone providers has been implemented to fill this gap.

Because of the importance of outreach/education of the end users, the outreach functions of several agencies have been consolidated under the guidance of TOHS. The US NWS (NOAA's National Weather Service) continues to play a critical role working with TOHS to provide this outreach and education to the people of American Samoa.

### 3.10 French Polynesia Report

*(Yves Gregoris, Directeur, Meteo France, French Polynesia)*

Mr Gregoris listed seven areas of achievements or concerns:

1. French Polynesia completed ISO9001 certification this year. Mr Gregoris has offered to share his experience and to help others if requested. They have 6 upper air sites, but many of them are in remote sites and use hydrogen generators. Because of an accident in Tunisia with hydrogen, they are encouraged to use helium but it is very difficult to get to locations.
2. Working with New Caledonia on a joint hydrological project in conjunction with PI-HYCOS. Water resources and waste disposal is a big problem in French Polynesia because of the population and tourists. Also they experience flooding problems.

3. They are currently drafting a strategic plan based upon Meteo France's 10-year plan. This plan will highlight the importance of the NMHS, have performance measures, and will hopefully support budget requests made.
4. Working with partners. Held a regional training workshop for south Pacific countries on instrumentation repair. They are interested in holding a workshop on quality of service for aviation based upon their ISO 9001 experience. Because French Polynesia has over 40 airports widely separated, some of which are ETOPS sites, they have worked hard on aviation support.
5. Emphasized the need for data sharing and importance of web sites. Mr Gregoris offered to provide advice for countries to set up web sites.
6. French Polynesia wants to help act as source for finding funding for south Pacific projects.

### 3.11 Australia Report

*(Gary Foley, Deputy Director, Australian Bureau of Meteorology)*

Mr Foley addressed capacity building in Australia. He first provided an overview of the Bureau of Meteorology (BoM) operations and staffing levels in its various sections. He emphasized the following areas:

1. Monitoring and sustaining the surface observing network. It is becoming harder to maintain and the costs have increased.
2. BoM is currently refurbishing its radar network and installing additional Doppler radars.
3. BoM is further emphasizing the use of remote sensing because of the difficulties with maintaining surface networks, data-void areas, and the need for higher-resolution data sets.
4. The Internet is becoming one of their main methods for dissemination data and information. BoM now averages about 600 million hits per month, many for the radar data which is available.
5. BoM is going to implement the US Graphical Forecast Editor (GFE) which will create an Australian Digital Forecast Database. The GFE will mean a new way of forecast preparation for Australian meteorologists, where they will value-add to gridded Numerical Weather Prediction (NWP) fields, and from which fields will be generated a range of text and graphical products.
6. Then he covered BoM activities in severe weather, oceanographic services, aviation services, special services unit, climate services, climate seasonal outlooks, flood warning service, and water resource assessment.

### 3.12 Papua New Guinea Report

*(Samuel Maiha, Acting Director Papua New Guinea National Weather Service)*

Mr Maiha first provided a brief background of Papua New Guinea (PNG), its National Weather Service (NWS), and the natural hazards it faces especially climate related droughts and floods during El Niño and La Niña respectively, extreme weather events. He discussed PNG's Medium-Term Development Strategy 2006-2010: priorities are:

- 1) Rehabilitation and maintenance of organization infrastructure,

- 2) Poverty reduction and promotion of incoming earning Opportunities, and
- 3) HIV prevention.

While maintaining current services levels, to get development support, the NMS must align its goals and objectives within the framework of these three strategies, especially poverty reduction which can be achieved through the mitigation and lessening the impacts of meteorological hazards. Funding has been increased from USD \$0.8M to USD \$1.3M since the transfer of NWS to the Transportation Department. The number of staff went from 96 in 1996 to 66 in 2006. Mr Maiha identified the following PNG NWS Development Strategy to better support users and to get better government funding:

1. Awareness. Implemented sign pointing to office, celebration of World Meteorological Day with both private and public stakeholders, and collaboration with users and stakeholders. Through this one and linking to government's development strategy, need to draw attention of government to sustain current levels of NWS.
2. Development of Provincial Climate Networks. Increase observations without excess costs. NWS will act as coordinator, advisory and data storage. Enhanced data collection network will improve seasonal forecasting.
3. Linking Meteorology and Climate Services with Government's Medium-Term Development Strategy through disaster prevention using strategies of effective early warning systems especially to rural communities, well-informed society (awareness) in weather and climate, enhanced seasonal forecasts, and better farming techniques. Develop partners to play a crucial role in the development of NWS to meet the needs of the government's development strategy.

### 3.13 Effective Communication System in Tuvalu

*(Taula Katea, Acting Director, Tuvalu Meteorological Service)*

Mr Katea emphasized the following:

1. Communication systems for observations. Most observations are transmitted to Funafuti via HF radio and then Funafuti transmits regionally and internationally via wireless internet, RANET HF e-mail system, and/or facsimile.
2. EMWIN System. Serves as an excellent backup tool. Need new EMWIN PC, upgraded software and operating system, and trained local staff to maintain EMWIN.
3. RANET with respect to HF e-mail system. HF radio horizontal antenna needs to be switched to whip antenna, need backup power for RANET e-mail system PC and DC-AC inverter, and RANET HF e-mail system to be installed at synoptic stations.
4. Data transmission over HF radio. Require higher HF frequency for better reception.
5. Effective approach for sustainable communications.

*Discussion:* Garry Clark said that there was being work done on the Kiribati RANET and EMWIN systems and there should be a big improvement when Mr Katea returns home.

### 3.14 Federated States of Micronesia (FSM) Report

*(David Aranug, Meteorologist in Charge Weather Service Office Yap and Acting National FSM Weather Service Coordinator)*

Mr Aranug discussed the following items:

1. Brief description of the Federated States of Micronesia islands.
2. Weather Service Office (WSO) communications – Aeronautical Fixed Telecommunication Network (AFTN/Met), Aeronautical Information System Replacement (AISR), bulletin form, telephone, facsimile, HF Radio, and Satellite phones.
3. HF radio and RANET are used for outer island communications.
4. RANET is located at three sites on Yap's main island plus all populated neighboring islands; three locations on Pohnpei's main island plus all inhabited neighbouring islands; but none have been installed in Chuuk islands yet.

## 4. PI-GCOS

The meeting was informed of the background to the preparation of the PI-GCOS Action plan and the PI-GCOS Implementation Plan. The GCOS Action Plan was developed in response to the recognized decline in climate observing networks in the region. The PI-GCOS programme at SPREP was established to address this, governed by PI-GCOS Action and Implementation Plan. The goal of the plan is to establish a robust and sustainable PI-GCOS that meets the long-term needs of the region and the world for climate observations. The objectives identified for projects and activities to be established and implemented in the action plan are:

- To continually advocate the importance of GCOS observing systems to policy applications on the part of national governments and other interested users (e.g. to inform governments and users of the social, cultural, and economic implications of GCOS).
- To respond to the September 1999 WMO request for the provision of historical GSN and GUAN metadata and data (when requested) by 2003, to rescue all existing climate data for the region by 2005, and to fully archive quality-controlled climate data in digital form for the Pacific region by 2008.
- To establish a permanent GCOS infrastructure by the end of 2002 with professional capacity within the region as appropriate (e.g. national GCOS coordinators and regional or national climate centres).

The five key Implementation Programme Components are:

- PI-GCOS Advocacy;
- Sustaining Operational Observing Networks;
- Collecting, Rescuing, Managing, and Exchanging Regional GCOS Data;
- Accessing and Developing Appropriate Products and Services; and
- Building Capacity for the Long-Term PI-GCOS Sustainability.

PI-GCOS Steering Committee has the prime responsibility for oversight for the implementation of the plan which consists of a base-line of 31 project concepts planned for through to 2008. Other interested parties for this action-planning document include the GCOS Secretariat, the United Nations Framework Convention on Climate Change (UNFCCC)'s Subsidiary Body for Scientific and Technological Advice (SBSTA), and funding agencies such as the GEF and donor nations with a vested interest in moving towards a robust and sustainable PI-GCOS.

Of the 3 highest priority projects:

- 1) establish and maintain a regional PI-GCOS manager;
- 2) establish and maintain individual National PI-GCOS Focal Points;
- 3) demonstration project for PI-GCOS in Samoa and Cook Islands.

The first two have been implemented and a project proposal for the third will be submitted to NZAID in August 2006 for funding: Climate Information and Products for Pacific Communities (CLIPAC) – a SPREP/NIWA Demonstration Project involving Cook Islands and Samoa, derived from PI-GCOS IP Project #3.

Some other projects have commenced, and belong to an ongoing project already in place e.g., the Island Climate Update and the Pacific ENSO Applications Center (PEAC) Bulletin on El Niño-Southern Oscillation (ENSO) may need additional funding; other projects need further development before submission to donors. Phase I of the project Enhanced Application of Climate Predictions in the Pacific will be completed in December 2006, and

a project proposal for a second phase has been submitted to the Australian Agency for International Development for funding.

The RMSD endorses the establishment and operation of the PI-GCOS Technical Support Project (TSP). The PI-GCOS TSP is the result of the US-New Zealand Climate Change Partnership bilateral activity. The original intent of the PI-GCOS TSP was to support GSN and GUAN sites in the region, however that support is being expanded to cover such issues as communications e.g. RANET, as well as some limited support for non-GCOS observing requirements in the region e.g. provision of related surface equipment.

## 5. US National Oceanic and Atmospheric Administration (NOAA) Integrated Data and Environmental Applications (IDEA) Center

The meeting was briefed on the US NOAA IDEA Center. The concept of the centre is to form the next-generation data centre which not only stores various sources of data but also looks at data integration and enhanced capabilities to develop and deliver information products designed to support the needs of Pacific Island governments, communities and businesses. The IDEA Center conceptual framework for the Pacific is for an integrated data and environmental applications centre addressing three key theme areas:

- climate and coastal communities;
- hazards risk management and marine and
- coastal ecosystems and resources.

The end to end products and services produced by this centre in collaboration with its partners are planned to be on multiple time scales from minutes to thousands of years. One of the principal activities of the NOAA IDEA Center will be support for global and regional ocean and climate observing systems in the region and, in part, the IDEA Center flows from the Global Earth Observing System of Systems (GEOSS) concept and component observing systems such as GCOS, the emergence of NOAA support for PI-GCOS initiatives, Global Ocean Observing System [U.S.] (GOOS), PI-GOOS and the US Pacific Islands Integrated Ocean Observing System (PacIOOS) which will be part of the US contribution to GOOS in the Pacific. In addition, NOAA's support for existing climate bilaterals/partnerships with Australia and New Zealand and a number of NOAA climate, ocean and observing system programs in the Pacific. The interest for such a centre emerged, for example, from NOAA's support for the International Pacific Research Centre (IPRC); NOAA's Planning, Programming, Budgeting, Execution System (PPBES) method for budget development; US Congressional input; and the Pacific Region Integrated Data Enterprise (PRIDE) Working Group and projects. It addresses the opportunity to integrate a variety of functions on a regional scale in a part of the world where:

- a) recent efforts in climate, coastal services and ocean observations reflect a "One-NOAA" approach;
- b) there is a recognized need to serve an area in which the US has a direct and shared interest;
- c) there strong sensitivity to environmental factors such as rising sea level and tropical cyclones;
- d) enhanced integration of NOAA data and information management programs could help provide the expertise to address such factors; and
- e) there is strong US Congressional interest and support.

The initial objectives of the IDEAS Center are summarized below:

- Regional and Global Observing Systems
  - Support for US contributions to PI-GCOS
  - Support for PI-GOOS
  - Emergence of PacIOOS (product development, data management and outreach; climate as priority)
- Applications and Data Product Development
  - Fiscal Year 2006 (FY06) PRIDE Proposal Process – Climate a priority
  - Wave and water level product line
  - Coastal climatology project
  - Climate services partnership (e.g., product development, web infrastructure, training, user engagement)
- Education and Outreach
  - PacIOOS and climate risk management as high priorities
- Technology and Systems Development
  - PRC IT planning – supporting NOAA-wide partnership in the Pacific
  - IDEA Center IT needs analysis and system design study
  - Support for standards (e.g., Comprehensive Large Array-data Stewardship System, CLASS and Global Earth Observing Integrated Data Environment, GEO-IDE)
- Supporting Critical Partnerships
  - NOAA, Pacific Risk Management ‘Ohana (PRiMO), SPREP, SOPAC
  - IDEA Center nodes (e.g., IPRC, Pacific Disaster Center (PDC), NOAA offices)
  - Pacific Climate Information System (PaCIS)
- Strategic Planning & Program Development
  - Contributions to NOAA-wide climate priorities
  - “One NOAA” demonstration project(s) [e.g., PRIDE]

The concept and establishment of the NOAA IDEA Center is built upon the following emerging opportunities:

- Support for regional observing systems
  - PI-GCOS, PI-GOOS (regional), PacIOOS (US domestic)
- Pacific Risk Management ‘Ohana’ (PRiMO)
  - Hazard-resilient communities
  - Climate risk management a focus for interagency collaboration
- Pacific Climate Information System (PaCIS)
  - Pacific El Niño Applications Center (PEAC) review and guidance from NWS’ Climate Services Division
  - Integrated program of observations, forecasting, research assessment, data management and information services – realization of a regional climate service
- “One NOAA” in the Pacific
  - Pacific Regional Center; coordinated approach to IT systems planning & cross-NOAA support
  - PaCIS as a possible “One NOAA” regional demonstration.

## 6. US Pacific Climate Information System (PaCIS)

Pacific Climate Information System (PaCIS) is an US integrated system of observations, forecasting, outreach and education, research assessment, data management and information services. It is planned to be the US contribution to the WMO RA V Virtual Regional Climate Center. Its vision is “Resilient and sustainable Pacific communities using climate information to manage risks and support practical decision-making in the context of climate variability and change.” Its proposed mission includes to:

- Clarify climate information needs and guide monitoring, research, forecasting and assessment
- Provide access to critical data, research and new climate information products and services
- Translate research and assessment results into useful and usable climate information
- Interpret global and regional climate forecasts for local applications
- Enhance regional and local capabilities to manage risks and support sustainable development in the context of climate variability and change
- Enhance collaboration among national, regional and international institutions and programs

PaCIS is built upon lessons learned concerning climate information services from PEAC and other climate-related activities in the Pacific. Some of these lessons learned were:

- Focus on integrated climate-society system
- Decision-makers interested in information on a continuum of timescales:
  - Addressing today’s problems
  - Planning for the future
- Early and continuous partnership with users essential:
  - Shared learning and joint problem-solving
  - Outreach and dialogue programs as priority activities
  - Building trust and credibility a long-term endeavour (“eyeball to eyeball”)
- Collaborative, participatory process with users:
  - Continuous, interactive dialogue
  - Co-production of knowledge
  - Document and share experiences
- Problem-focused approach:
  - Understand place, context, history and decision making process
  - Useful and usable information responsive to user needs
  - Continuum of timescales
  - Climate information system vs. event forecasting
- Address both process and products:
  - Integrated program of observations, monitoring, forecasting, assessment, education and applications – with continuous evaluation and adjustment
- Build on existing systems, institutions, programs, relationships and networks:
  - Recognize the vital role of trusted information brokers
  - Partnerships between science and operations
  - The PaCIS program elements are:



- Education, Outreach and User Information:
  - User dialogue and feedback
  - Educational materials
  - Weather Service Offices (WSOs) as local experts/coordinators in partnership with experts in key sectors
- Operational products and services:
  - Develop and evaluate PaCIS services
  - Regional climate services test bed
  - Cross-regional coordination
  - Support regional observations and data management systems (e.g., PI-GCOS, PI-GOOS, PacIOOS)
- Research and assessment to enhance resilience:
  - Regional downscaling and local applications
  - Enhanced understanding of nature and consequences of climate variability and change with a focus on extreme events
  - Support for regional vulnerability assessment and adaptation programs

The next steps and timeline for the emergence of PaCIS are:

- Prepare Draft Implementation Plan (Spring 2006)
- Convene Regional Steering Committee and Working Groups (Summer 2006)
  - Education, Outreach, User Needs
  - Operational Products and Services
  - Research and Assessment
- Steering Committee and Working Groups complete Initial Implementation Plan (Fall 2006)
  - Living document with routine evaluation and revision.

## 7. Schools of the Pacific Rainfall Climate Experiment (SPaRCE)

The meeting was briefed on the latest initiatives within SPaRCE, a NOAA-funded initiative under PI-GCOS, the objectives of which are to:

- Enhance rainfall data collection in the Pacific;
- Work in collaboration with schools, NMSs, etc; and
- Encourage/enhance weather and climate education.

The project has recently acquired a set of basic tipping bucket rain gauges with data logging systems which are being installed in deserving locations.

The RSMDs expressed its appreciation for the work of the NOAA-funded SPaRCE and thanked them for the support they have provided over the years in increasing rainfall data from the south Pacific.

## 8. Automatic Weather Stations

The meeting was informed of experiences of various NMSs with Automatic Weather Stations including stations with data loggers without communications facility. It was also informed of some new developments in AWSs developed in-house within the NZ Meteorological Service which was in great demand from various agencies in New Zealand. The meeting discussed the merits and demerits of AWSs. It felt that while there were many advantages, there were also many drawbacks.

Among the reasons cited for transfer to AWSs are

- a) increasing cost of manual observations;
- b) need for more or more frequent observations;
- c) need for observations from remote locations; and d) the need for more consistent observations.

The recognised disadvantages are that:

- a) visual sensors (cloud height visibility) expensive;
- b) loss of data when unserviceable;
- c) communications can be expensive; and maintenance is expensive in remote locations.

It concluded that there great caution needed to be exercised when taking the leap from conventional instrumentation to automatic stations. In addition the following are important considerations:

- a) site representativeness of the surrounding area;
- b) number and type of sensors exposed as per manual station;
- c) sensor accuracy and calibration; and
- d) WMO standards.

The NZ Met Service has a dual systems configuration (including dual communications), which while incurring greater initial capital cost, reduces maintenance and calibration costs; provides greater accuracy and consistency of reporting.

There was considerable discussion on the uses of Automatic Weather Stations to complement the manual stations. It was felt that there was little information available in terms of items such as accuracy, cost-benefit, cost recovery and sustainability.

## 9. Pacific Communications Side Meeting

Mr Ed Young (NOAA) reported on the outcomes of the Pacific Communications Side Meeting, a 2-day meeting held July 7-8, 2006 prior to the 11th RMSD and presented the recommendations to the meeting (attached). He then requested endorsement of these by the meeting, and participants from the Communications side meeting would be available for further discussion. It was noted that some of the RMSDs who had RANET projects, were not able to participate in the Pacific Communications Side Meeting due to inadequate funding.

In the context of the above, the meeting suggested that in order to sustain RANET activities in Pacific Island countries, there needs to be an improvement of in-country technical capacity to support the system (rather than relying on “fly-in” support). It was noted that the RANET Project was still in a demonstration phase, an outgrowth of decisions made at the 9th and 10th SPREP RMSD meetings, and RANET sites are not available to many countries. It was also stated that RANET as a community development project, is viewed very positively by AID agencies, and the program should continue to expand if funding continues to be available and other agencies beyond the meteorological and climate communities are included. There was discussion of the need for additional intensive training for on-site technicians to better maintain EMWIN, LRIT, HF Digital e-mail systems, etc.

For RANET, the Pacific Side Meeting recommended contacting Worldspace/First Voice International for their consideration in deploying an additional satellite to provide a backup in case of a failure of the Worldspace AsiaStar satellite. The Pacific Communications Side Meeting also recommended continuing a search for an equivalent satellite operator to cover Eastern Pacific countries outside of the Worldspace RANET broadcast. It was mentioned that more can be done with EMWIN/RANET sites, which could re-transmit meteorological/climatological/ tsunami data and products to other local agencies within a line-of-sight VHF broadcasts.

The communications group called for a Communications Development Expert Meeting to develop a report for endorsement by the SPREP RMSDs and others, for future collaborative communications projects in the Pacific Islands; they indicated this was a high priority.

Discussion was held on technical equipment status/needs (for RANET and then more generally) and the difficulty of accessing parts and the need for a regional instrument calibration and a spare parts supply depot (“bank”). The RMSDs noted that there is a GCOS Technical Support Project operating out of Wellington for maintenance and repair activities, but this center focuses mainly on supporting the global upper air network (GUAN) and the global surface network (GSN). They also noted that there was a WMO RA V Regional Instrumentation Centre in Melbourne that was for more general maintenance, repair, and training for WMO members. The communications group suggested the RMSDs might want to endorse the concept of weekly checklists for the equipment/network status to be sent to the Technical Support Project in Wellington.

The RMSDs later endorsed the 26 recommendations contained in the Pacific Communications Side Meeting Report. However, the RMSDs requested that they be involved in all future side meetings and associated reports/recommendations for which a request for their endorsement will be made. This request was made to ensure the RMSDs fully understood the details of the respective responsibilities, timing, funding, etc. for various proposed recommendations and initiatives.

## 10. Enhanced applications of climate predictions project

Janita Pahalad, Australia Bureau of Meteorology (BoM) reported to the meeting on the Enhanced applications of climate predictions project Phase I. The Project is in response to Pacific Meteorological Needs Analysis, May 2001 and has been fully funded by Australian Aid Agency, AusAID. there are nine participating Pacific Island Countries (PICs): Fiji, Cook Islands, Vanuatu, Samoa, Tonga, Niue, Solomon Islands, Kiribati and Tuvalu.

She described the pilot projects undertaken in Phase I (climate forecasting for sugar cane industry, water sector and fisheries sector linking to resource availability) and activities (media, public affairs, and communications training).

Software (SCOPIIC) has been developed and installed in all 9 PICs. Meteo France (New Caledonia and French Polynesia) have also been given a copy each. One participant noted that despite SCOPIIC there is still a reluctance to make seasonal climate predictions in some places – seasonal forecasts

Vandana Naidu (AUSAID) outlined the findings of the Pacific Islands Climate Prediction Project (PI-CPP) Phase I review and requested that the meeting endorse the findings of review of Phase I PI-CCP and its recommendations for Phase II. PNG raised their non-involvement in Phase I and their desire to be involved in Phase II. Vandana advised that AusAID PNG is currently in discussion with PNG with regard to their inclusion in Phase II activities.

Ms Pahalad outlined the Design of Phase II, based on the above review. Phase II will cover Fiji, Cook Islands, Niue, Tonga, Vanuatu, Tuvalu, Solomon Islands, Kiribati, and Samoa and discussions are underway for the inclusion of PNG.

Phase I of this project ends Dec 2006, but it appears likely that AusAID will fund a phase II. Phase II will continue the pilot projects implemented under Phase I, expand these to other PICs, and consider additional pilot studies with the other client groups. Additional focal areas could include seasonal prediction and agricultural management; health sector; and renewable energy (hydro power). In Phase II, BoM will also include modification of SCOPIIC to incorporate new analysis tools and products (including development of automated reports in local languages wherever appropriate and allowing easy exchange of data with ClimSoft).

Countries expressed their satisfaction with the activities under taken under Phase I and supported activities proposed for Phase II, especially further training for NMS on seasonal climate prediction and indices. They also requested that BoM and CROP ensure that strong linkages are developed between PI-CCP and other climate related activities in the region (SPSLCMP / PI-GOOS PI-HYCOS). There was also a suggestion that PI-CPP develop and disseminate products developed from SPSLCMP data.

The RMSD endorsed the findings of the review of Phase I and endorsed the recommendation for a second phase of the PI-CPP.

## 11. Island Climate Update Bulletin

Dr Jim Salinger (NIWA) and Ms Linda Yuen (SOPAC) provided an update on the Island Climate Update (ICU) Bulletin and the recent review of stakeholders. Review revealed responses by sector (hydrology, agriculture, met, disaster management, oceanography and geology) and also a ranking or perceived priority climate risks (extreme rainfall events, floods, drought, tropical cyclones, storm surge, high winds, sea level variation and extremes of temperature) with floods, Tropical Cyclone (TC), extreme rainfall being highest.

There were several ideas discussed regarding the translated of the ICU into different languages for wider dissemination and use in countries and consider expanded engagement with countries regarding the content of ICU and monthly predictions/ forecasts via the monthly pre-publication teleconference.

The RMSD recognizes the ICU to be of high value and utility related to climate prediction in the region, and as such endorses its continued production. The RMSD thanks NZAID, SOPAC, SPREP and NIWA for this effort.

## 12. BoM Pacific Islands Data Rescue Project

The Australian Bureau of Meteorology (the Bureau) obtained funding from the Australian Greenhouse Office (AGO) to undertake data rescue activities in five PICs which are relatively close to and of strategic importance to Australia (Papua-New Guinea, Solomon Islands, Vanuatu, Fiji and Kiribati) during 2005-2006. The project was undertaken in partnership with New Zealand under the AGO's Bilateral Climate Change Partnership program and was managed by the Bureau's National Climate Centre.

This project was important because PIC climate data cover a broad spatial area and are extremely important to local, regional and global climate studies and forecasts. As a consequence, additional data from the region could prove critical in advancing the understanding of climate variability and change, leading to more accurate climate prediction systems, and development of effective strategies to cope with the effects of both short-term climate variability and long-term climate change.

All meteorological records were reorganized according to National Archives of Australia (NAA) standards to make them more accessible for use or further action. Inventories of weather data and metadata were created. The improved storage conditions (e.g., acid-free boxes) and record locator system eliminated the immediate risk of the manuscripts deteriorating further. Meteorological personnel were provided capacity training in effective records management and instruction to maintain these systems. These actions should increase the likelihood that these records will be securely stored in the future. In addition, a gap analysis will allow the Members involved to determine their key entry requirements to ensure all required data are available in electronic form. Although not part of the project, it was noted that Samoan records are probably at a high risk of deterioration and it is proposed that storage to NAA standards be enacted as soon as practicable there.

A clearer idea has emerged as to strategies needed for permanent preservation of the data, which may include imaging manuscripts, preferably in-country, to ensure that the original manuscript will always be available. Then transfer the images to some type of permanent electronic storage media as a disaster backup.

It was also noted during this project that there is an urgent need within small counties to transfer electronic data from existing at-risk systems such as the MS-DOS based CliCom system, and Excel spreadsheets, to generic, interchangeable data management software such as ClimSoft from Zimbabwe. This is expected to be pursued during 2006-2007.

Both this project and recent other projects (e.g., the AusAID-funded project "Pacific Island – Climate Prediction Project") indicate that in terms of capacity-building, the countries believed in-country, hands-on training by visiting experts was the most effective. By contrast, some countries' representatives indicated centralized workshops in one country, while more efficient administratively, are less effective. This is partly because there is only one attendee from each country; and often the people who do attend are not those who will be directly involved in implementing the new technology or techniques.

## 13. Tropical Cyclone Climatology

Mr Howard Diamond (Auckland University) made a presentation on a PhD project he has begun working on entitled "A Climatological Study of Tropical Cyclones in the Southwest Pacific Ocean Basin". The intent of this research is to look at the recent abundant body of literature on Tropical Cyclone (TC) studies in the Atlantic and Caribbean basins, and to a lesser extent in the Northwestern and Northeastern Pacific basins. In particular, given its proximity to the highly populated Caribbean Islands and developed Eastern and Gulf of Mexico coasts of the United States, a greater amount of observational data has been available for these areas which leads to a high number of TC studies for these basins. One thrust of this research is to see if the techniques used in those basins can be applied to the Southwest Pacific Basin.

This research will:

- Add to the knowledge base of the climatology of TCs in this region;
- Explore possible relationships to climate change and other extreme meteorological events (e.g., heavy precipitation events), and;
- Enhance the ability to produce better seasonal outlooks to aid the regional island states in the region to better prepare for such extreme events.

This work is primarily a physical geography research project. However, given the great impact that TCs have on people, the plan is to incorporate a human geographical element into this effort, because I believe strongly that such an element is essential for making the overall research both relevant and usable. The human geographical element will take the form of a discussion chapter of issues related to the effects of TCs, and will not constitute a formal research effort in the traditional sociological sense, but will be accomplished by interviewing users, probably via a survey tool, in the various Pacific Island nations in the basin in order to get a sense for the affects that a climatology of TCs in the region can have on people. Mr Diamond is actively seeking any non-digital TC data (e.g., older paper tracks data, etc.) that he can utilize to help better describe what is happening in the region in the context of things such as El Niño, the Interdecadal Pacific Oscillation, and the Madden-Julian Oscillation. Howard's goal is to work closely with all the RMSDs and make his research a resource that all countries in the region can take advantage of. Mr Diamond is also working closely with the Australian Bureau of Meteorology (e.g., Yuri Kuleshov) on a related bilateral US/Australia Climate Action Partnership project on producing a unified and high-quality TC database for the region; Mr Kuleshov's work was briefed at the RA-V Tropical Cyclone Committee meeting in Adelaide in May 2006, and Mr Diamond believes that his research has tremendous synergy with what the BOM is doing.

The RMSDs recognizes the value of this academic project, and believes it will be of high value and utility for aiding TC climate prediction in the region, and as such endorses his continued progress and supports countries helping provide him with as much non-digital data as possible. The RMSDs thanked Howard for his efforts in taking on this project, and his desire to work with the RMSDs from the start is much appreciated; the RMSDs looked forward to hearing of the progress of this effort as it moves towards its conclusion in 2010.

## 14. South Pacific Sea-Level and Climate Monitoring Project (SPSLCMP)

Philip Hall, Project Manager for Phase IV of the South Pacific Sea-Level and Climate Monitoring Project (SPSLCMP), provided an update on the Project on behalf of AusAID (project sponsor) and BoM (project managing contractor). His presentation, which was

supported by the document, SPSLCMP Phase IV Project Design Brief (a copy of which was provided to all RMSD meeting participants), addressed the following areas:

- Project management and partnership arrangements for Phase IV;
- Phase IV objectives and design strategy;
- The Strategic Review of the Project planned to be completed in late 2007; and
- Development of a collaborative Communications Strategy for Phase IV.

The SPSLCMP is succeeding in its goal to provide an accurate continuous long-term record of sea level in the Pacific region for partner countries and the international scientific community. Phase IV of the Project commenced on 1 January 2006 and will run until 31 December 2010. It will build on the achievements of Phases I, II and III and extend the Continues Global Positioning System (CGPS) to all participating PICs.

The SPSLCMP is a highly visible project and is repeatedly referred to in forums discussing climate change in the region. The increasing profile of climate change issues is expected to increase interest in the SPSLCMP and other climate activities both internationally and in the region.

The information generated from the SPSLCMP is meant to assist PIC governments to make more informed decisions about managing their coastal environments and resources. It also provides information that helps people in the region understand climate change and climate variability issues. NMSs remain responsible for providing PIC specific reports on sea level as part of the formal network linked to this project. A collaborative communications strategy is essential to the continuing success of the project.

The project is highly technical in nature with high dependence on BoM, Geoscience Australia and SOPAC specialist inputs. Opportunities for capacity building in Phase IV will focus on technical support for the project. The proposed next phase of the successful PICPP, however, which focuses on capacity building of NMSs in using climate data, is envisioned as an appropriate mechanism for assisting PICs to actively use SPSLCMP data for local requirements.

Long term sustainability remains a concern. The strategic review scheduled to be completed by October 2007 will address links to other relevant emerging regional activities (including the Australian Tsunami Warning System, PI-CPP, PI-GCOS and PI-GOOS), stakeholder roles beyond the current Phase IV and commitments to upgrading monitoring equipment.

The 11RMSD was asked to commit to support the activities of the SPSLCMP through to the completion of Phase IV, including their active participation in the:

- Establishment of Memorandums of Understanding (MOUs) between Australia and participating countries;
- Development and implementation of a Communication Strategy for Phase IV; and
- 2007 Strategic Review.

## 15. The Australian Tsunami Early Warning System (ATEWS)

Mr Gary Foley described the vulnerability of Australia to tsunami from active seismic zones in both the Pacific and Indian Oceans. The 26 December 2004 Indian Ocean event gave impetus to the awareness of the Government concerning the tsunami threat, and resources have since been allocated to establish a robust monitoring and warning capability by June 2009. The project calls for a continuous seismological warning capability by GeoScience Australia linking to the Bureau of Meteorology who will issue warnings to emergency managers and the public. Strategic deployment of an array of instruments ranging from seismographs to sea level monitoring equipment, including deep ocean buoys is planned. Development of the Australian Tsunami Early Warning System (ATEWS) is seen as

enhancing the effectiveness of the well-established Pacific Tsunami Warning System operated out of Honolulu in the southwest Pacific, to the benefit of neighbouring Pacific Island countries.

In conjunction with the ATEWS, an international aid project sponsored by AusAID and involving SOPAC, Emergency Management Australia (EMA) and the Bureau of Meteorology is underway. Over the next 12 months an assessment of the capacity of SOPAC members in respect of tsunami warning and mitigation will be undertaken. This will contribute to Intergovernmental Oceanographic Commission (IOC) assessments for the Pacific area. Australia will be seeking to negotiate MOUs with a number of PICs to help facilitate the new tsunami-warning network.

## 16. Regional Disaster Risk Reduction and Disaster Management Framework

The Pacific Regional “Disaster Risk Reduction and Disaster Management Framework for Action 2005 – 2015” was developed through regional and national consultations over two years and was endorsed by the Pacific Leaders in Madang in 2005. It is based upon the Global Framework agreed to in Kobe.

The Mission stated in the Framework is to: “Build capacity of Pacific island communities by accelerating the implementation of disaster risk reduction and disaster management policies, planning and programmes to address current and emerging challenges through:

- a) Development and strengthening of disaster risk reduction and disaster management, including mitigation, preparedness, response and relief/ recovery systems;
- b) Integration of disaster risk reduction and disaster management into national sustainable development planning and decision-making processes at all levels; and
- c) Strengthening partnerships between all stakeholders in disaster risk reduction and disaster management.”

The Framework is focused around 6 key themes:

- a) Governance: Organisational, Institutional, Policy and Decision-making Frameworks
- b) Knowledge, Information, Public Awareness and Education
- c) Analysis and Evaluation of Hazards, Vulnerabilities and Elements at Risk
- d) Planning for Effective Preparedness, Response and Recovery
- e) Effective, Integrated and People-Focused Early Warning Systems
- f) Reducing Underlying Risk Factors

Each theme is defined by a series of outcomes expected to be achieved by 2015. The framework is seen as an effective mechanism to coordinate, through a participatory process, the development, implementation, monitoring and reporting of strategic national action plans (SNAPS) that reflects achievable short and medium-term priorities. To achieve this, a network of regional assistance and development partners that work in the different fields of disaster risk reduction and disaster management has committed to a partnership arrangement to improve regional cooperation, coordination and collaboration and work with countries at the national level. During the period of this meeting, a technical team comprising staff from SOPAC, UNDP, SPREP and PIFs are in Vanuatu assisting with the national assessment there. Plans are in place to follow up with RMI.

The “open-ended” partner network currently includes: South Pacific Applied Geoscience Commission (SOPAC) – the coordinating agency and: Pacific Islands Forum Secretariat (PIFS), Secretariat of the Pacific Regional Environment (SPREP), Secretariat for the Pacific Community (SPC), International Federation of the Red Cross and Red Crescent (IFRC),



United Nations Development Programme (UNDP), United Nations Office of the Coordination for the Humanitarian Affairs (UNOCHA), International Strategy for Disaster Reduction (UNISDR), United Nations Children's Fund (UNICEF), Asian Development Bank (ADB), United States Agency for International Development (USAID) / The Asia Foundation (TAF) / Office of United States Foreign Disaster Assistance (OFDA), United Nations Economic and Social Commission for Asia and the Pacific / Pacific Operations Centre (UNEPOC), Pacific Disaster Center (PDC), South Pacific Tourism Organisation (SPTO), University of the South Pacific (USP), Fiji School of Medicine (FSM), Department of Meteorology-Fiji, World Meteorological Organization (WMO), Australasian Fire Authorities Council (AFAC), Emergency Management Australia (EMA), New Zealand Ministry of Civil Defence and Emergency Management (NZMCDM), Ministry of Foreign Affairs-France, World Bank (WB), European Union Commission for the Pacific (EU), Australian Agency for International Development (AusAID), New Zealand's International Aid & Development Agency (NZAID) and The Foundation of the Peoples of the South Pacific International (FPSPI).<sup>1</sup>

## 17. PI-GOOS Work Programme and 2005-2006 Activities

The Pacific Islands Global Ocean Observing System (PI-GOOS) has been set up to assist sustainable development in the region via improved capacity building, long-term ocean observations, and delivery of useful marine/climate products. Based on this, PI-GOOS aims to assist improvement of:

- Marine and coastal water quality
- Mariculture development
- Coral reef health
- Climate observations; and
- Disaster mitigation and preparedness.

A synergy has emerged for PI-GOOS to work together with PI-GCOS for the development of ocean-climate information products in the region as well as delivery of relevant marine services and education initiatives via the Met Service Regional Network. With this in mind, Dr Sarah Grimes, PI-GOOS Co-coordinator, provided a presentation that considered the:

1. Overview of PI-GOOS;
2. Structure of the PI-GOOS Program in the next three years in response to the regional needs; and
3. Promotion and invitation for Pacific Island Country representatives to select PI-GOOS National Focal Points, which will assist the delivery of appropriate ocean/climate products to their countries.

Discussions in response to the presentation resoundingly recognized a need for :

1. Implementation of the PI-GOOS Program in the Pacific, and assistance and direction from PI-GOOS Representatives in each Pacific Island Country;
2. Improved ocean/climate science education programs in schools and general public awareness; and
3. Strengthened collaboration between PI-GOOS and PI-GCOS activities.

There was some interest from the PIC Met Directors to use the Met Services as an avenue for developing relevant PI-GOOS activities and subsequent delivery on-ground, in collaboration with the PI-GCOS network in the region. Specific feedback included:

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<sup>1</sup> Note that the once-only used acronyms in this paragraph are not included in the list on pp. 7-9.

- Niue: Expressed interest for introduction and use of Scientific Educational Resources and Experience Associated with the Deployment of Argo profiling floats in the South Pacific Ocean (SEREAD) materials.
- Fiji: Expressed concern as to the way in which PI-GOOS could develop when the Met Services are already overloaded and that infrastructure in the region is not necessarily capable of using products developed overseas. This was noted and will be considered by the PI-GOOS Secretariat in conjunction with the PI-GCOS Secretariat in the development of the priority products for the region.
- Papua New Guinea: Agreed for a need to develop appropriate marine/climate applications for the region.
- Cook Islands: Suggested the possibility of combining some ocean and climate monitoring equipment as well as developing a “maintenance team” that is capable of undertaking technical maintenance on this equipment (strengthening the PI-GOOS/PI-GCOS partnerships).
- French Polynesia: Recognizes the importance of ocean observations in the development of marine/climate applications and in particular seasonal climate predictions,

Both the PI-GOOS and PI-GCOS presentations instigated offers of support to assist the PICs in the most appropriate manner suitable to continue the development of useful ocean/climate products for the region.

## 18. Pacific Islands-HYCOS Project and Flood Forecasting

Ms Linda Yuen presented the Pacific Islands-HYCOS project on behalf of Mr Marc Overmars. The project is the Pacific regional component to the World HYCOS or WHYCOS which is a WMO programme aiming at improving basic observation activities, strengthening international cooperation and promoting free exchange of hydrological data.

She went over the history of the project. Several regional and international consultative processes e.g. WMO RA V Expert Meeting on Hydrological Needs (Fiji, 1999), Regional preparatory meeting for 3rd World Water Forum (Fiji 2002), 3rd WWF (Japan, 2003) identified the key water issues that affect Pacific SIDS. An action plan (Pacific Regional Action Plan on Sustainable Water Management or Pacific RAP) was produced to address these issues. Actions in the Pacific RAP are organized under 6 themes: water resources management, island vulnerability, awareness, technology, institutional arrangements and finance.

NZAID provided funds in contribution to the identified hydrological training and climate information needs of the region. The 3-year hydrological training programme has just ended and the trainees have now attained a common level of skill to enhance their abilities to carry out hydrological monitoring as well as to train other technicians in their respective NHS.

The Island Climate Update bulletin is the production of a partnership between SOPAC, SPREP and NIWA in collaboration with BoM, PEAC and Pacific NMS. The bulletin is now in its sixth year of production and has recently conducted a review. Improvements to the bulletin based on recommendations from the review will be made to cater to the climate information needs of readers.

The Pacific Islands-HYCOS proposal was developed by SOPAC, WMO, UNESCO and Fiji Met Services and submitted to the EU Water Facility. Funding for the project was approved for €2.5M. The total cost of implementing the 3-year (2006-2009) project is €3.5M and on-going SOPAC projects will also contribute to PI-HYCOS activities.

Pacific Islands-HYCOS objectives are to:

- Provide a common level of skill to assess and monitor water resources;

- Provide water-related information and hazards warnings for national development and environmental management;
- Establish and maintain information databases and archives; and
- Build capacity for the mitigation and adaptation for climate change and land-use impact on freshwater resources.

The seven main components of Pacific HYCOS are:

1. Flood forecasting capability. To develop and implement a methodology for flood forecasting in selected critical catchments. A flood modelling workshop was held in Samoa. A planned flood forecasting workshop is to be held in Brisbane in October 2006.
2. Water resources assessment in major rivers. Countries with surface water resources have in place a network of near-real time hydrological observing stations and the capability to securely archive incoming data. Technician in NHS have been trained in the Hydrological training programme for the last three years to carry out related activities.
3. Water resources databases. Countries to have secure national hydrological databases, meet data quality standards, and have the capability to maintain them & generate information products to meet users' needs.
4. Drought forecasting. To develop and implement a common approach to drought forecasting in participating countries. Encourage increased collaboration between NMS and NHS if they are not already within the same agency. Also investigate possible collaboration with BoM PI-CPP for information on drought indices and prediction models.
5. Groundwater monitoring and assessment. To establish in countries a basic capability in monitoring and assessment of groundwater resources.
6. Water quality monitoring and assessment. To establish in countries a basic capability in monitoring and assessment of water quality and chemistry.
7. Project management. To have project management systems in place and implemented.

Project implementation will begin upon recruitment of a project coordinator and an advisor. Activities to be carried out in close consultation with project partners, NHSs as well as contracted consultants.

## 19. Updates on WMO Activities

- a. Dr T. Toya (WMO) and Mr Henry Taiki (WMO SRO/SWP-Apia) provided an update of information on WMO activities. These included:
  - i) the major outcomes of the Fourteenth session of Regional Association V (South-West Pacific);
  - ii) the major outcomes of the Fifty-eight session of WMO Executive Council;
  - iii) RA V projects, in particular the “Upgrading of Low Rate Users Stations (LRUS) in Pacific Small Island Developing States to Access Meteorological satellite Images in Low Rate Information Transmission (LRIT) Format” and Finland Government “Preparedness to Climate Variability, Natural Hazards and Global Change in SIDS, Pacific Region”);
  - iv) the WMO Information System (WIS) and;
  - v) the training courses offered by the WMO Regional Meteorological Training Center (RMTC) in the Philippines.
- b. Outcomes of the Fourteen Session of Regional Association V (South-West Pacific) which was held in Adelaide, Australia, from 9 to 16 May 2006. Fifty-five representatives from 20 out of 21 Members and 4 observers from 3 non-members, and 3 observers from international and regional organizations attended the session. Mr Arona Ngari (Cook Islands) and Ms Sri Woro B. Harijono (Indonesia) were elected President and Vice-President of the Association, respectively. Nineteen resolutions were adopted. Furthermore, five Working Groups, namely:
  - i) Working Group on Planning and Implementation of WWW (World-wide web??) in Region V,
  - ii) Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean,
  - iii) Working Group on Climate Matters,
  - iv) Working Group on Agricultural Meteorology, and
  - v) Working Group on Hydrology.In addition, 2 new Working Groups were established:
  - i) the Management Working Group, and
  - ii) the Working Group on Natural Disaster Prevention and Mitigation.The Association also identified six priority areas with regards to the preparation of the WMO Seventh Long-term Plan (7LTP), namely:
  - i) natural disasters prevention and mitigation;
  - ii) maintenance and strengthening of WWW programme;
  - iii) improved understanding and prediction of the nature of climate change and variability;
  - iv) implementation of operational hydrology;
  - v) enhancement of human resources development;
  - vi) strengthening the collaboration with relevant regional bodies; and decided to develop the RA V Strategic Plan.
- c. Outcomes of the Fifty-eight Session of WMO Executive Council which was held in Geneva from 12 to 30 June 2006. Major outcomes include:
  - i) nomination of acting member for the Executive Council: Mr Yap Kok Seng (Malaysia) and Mr P. E. Bisch (France);

- ii) Members are strongly encouraged to become member of GEOSS;
  - iii) the evaluation of WMO 6LTP, the preparation of the WMO Strategic Plan 2008-2011 for submission to the Fifteenth World Meteorological Congress, and the preparation of operating plans;
  - iv) renaming of WMO Regional Training Centers to include other disciplines such as hydrology; and
  - v) requested the Secretary-General to provide Regional and Subregional Offices more flexibility and resources.
- d. The WMO Technical Cooperation Programme, which is part of the Voluntary Cooperation Programme (VCP), regular budget cooperation activities, programme for the LDCs, Trust Funds, UNDP, GEF, United Nations Fund for International Partnerships (UNFIP), World Bank, WMO Disaster Assistance Fund, and cooperation with NGOs and private sectors. The WMO VCP is a remarkable example of the spirit of friendship and cooperation within WMO, providing assistance to members through cooperative efforts. The VCP is maintained by voluntary contributions received from Members in the form of offers of equipment and services and/or financial payments. A current VCP project for the Pacific region is the “Upgrading of Satellite Receiving Equipment in Small Developing States to Access Meteorological Images in Low Rate Information Transmission Format”. The proposed project titled “Finland Government SIDS-Pacific” is under the Trust Funds arrangement. The WMO Emergency Assistance Fund enable the Secretariat to response to requests from members affected by disasters. It also enables WMO and the member concerned to mobilize and leverage further resources.
- e. Upgrading of Satellite Receiving Equipment in Small Island Developing States to Access Meteorological Satellite Images in Low Rate Information Transmission Format. The project will enable Island Developing States in the Pacific to receive meteorological satellite information in LRIT format via Low Rate User Stations (LRUS). Geographically the project will cover the following countries: American Samoa, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu. The project will enable the participating countries to access meteorological satellite information to monitor track, and predict weather patterns including tropical cyclones. Funds have been transferred to the WMO Secretariat from the US NOAA NWS for the implementation of the project
- f. WMO and Finland Government Initiative. WMO and the Government of Finland have completed developing a project proposal titled “Preparedness to Climate Variability, Natural Hazards and Global Change in Small Developing States, Pacific Region”. WMO submitted the proposal to the Government of Finland through the Ministry of Foreign Affairs, in June 2006 for further consideration for supporting its implementation.
- g. WMO Information System (WIS). In the aftermath of the December 2004 tsunami catastrophe, relevant international organizations and Governments emphasized the importance of the WIS (and its current precursor, the WMO’s Global Telecommunication System, GTS), and has been identified as the 24/7 operational backbone network for the exchange of information in support of multi-hazard, multi-purpose natural disaster early warning systems. The Fifty-seventh session of the WMO Executive Council (EC-LVII) agreed to expedite the development of key components of the WIS with a view to beginning implementation, at least in some countries, in 2006, instead of 2008, as originally planned. It is crucial for WMO to prepare and support the developing countries in a timely way to enable them to use the WIS. The Fourteenth Session of Regional Association V (South-West Pacific) (XIV-RA V, May 2006) re-established the Working Group on Planning and Implementation of WWW in Region V and its Subgroup on Regional Aspect of Information Systems and Services (ISS). In conclusion, in view of the WMO Executive Council decision to accelerated development and implementation of the WMO Information System, concerted efforts are necessary to build and progress WIS on the basis of the requirements of all WMO Programmes and other relevant user

communities. Coordination involves all WMO Secretariat Departments and Offices, Technical Commissions and Regional Associations.

- h. WMO Regional Meteorological Training Center (RMTC) in the Philippines. In responding to past RMSD meeting requests for information on available training courses offered by RMTC, WMO provided and made the information available to the participants of the 11RMSD. Furthermore, WMO strongly encourage WMO Members to make maximum use of fellowships available through WMO, as well as the training courses available at the RMTC-Philippines.

## 20. NOAA/NIWA Data Rescue Activities

Dr Jim Salinger (NIWA) and Mr Howard Diamond (NOAA) provided an update on the joint US/NZ Climate Data Rescue project. This session was an update on what was reported at the 10th RMSD meeting in Niue. The presentation detailed efforts underway at NIWA, with collaboration from NOAA, to digitize various climate data holdings that NIWA has in paper form from countries across the region and which represents over 600 years of data combined. The current project is a 5-year effort from 2004-2008, and details on the exact data digitized to date from Niue, Tokelau, and Kiribati; with plans to start addressing data from Tuvalu, Cook Islands, Pitcairn Island, Samoa, and Tonga. The ability to rescue, digitize, and make fully available the historic climate data in the Pacific is important, and the true economic value of the data is not in the data itself, but rather in the benefits to all countries in the region who benefit from improved local synoptic climatologies. A key precept of GCOS is for the full and open access and exchange of climate data, and as more historic climate data is made available in the various global climate databases, this will be a benefit to all.

This data rescue project is an excellent example of a successful regional GCOS effort that has great potential for aiding improved climate forecasting for the region. Examples of some products with temperature and precipitation trends were presented in order to show what potential this rescued data will have for countries. The NIWA guidelines for this project are consistent with WMO Resolution 40, and access to data via the Internet are provided free of charge to the countries' data residing in NIWA's climate database. Any request that NIWA receives for climate data from sites in a specific country are referred to the NMHS of that country for resolution as the data from any country has collected from its own area (regardless of where it resides) is the property of that country. Access information to the climate information in NIWA's system (e.g., a username and password) will be provided individually to each country. In accordance with WMO Resolution 40, the World Data Center A for Meteorology will remain recognized as the long-term steward of climate data sets in the context of their role as the WMO designated GCOS Lead Data Center. In this capacity as a World Data Center, it is incumbent upon them to ensure that any data rescue activities that it supports include provisions for access to and long-term stewardship of the resulting climate data sets. This joint US NOAA/NZ NIWA data rescue project was recognized as being valuable for climate prediction purposes in the region. The meeting expressed its appreciation and endorsed the project's continued activities.

## 21. Training in the Region

- a. US International Pacific Desk Training Internship - Honolulu. Since the last RMSD Meeting in April 2005, the US Pacific International Desk has trained 7 additional students from 7 different WMO RA V countries. In this 6 weeks one-on-one training course, trainees are taught operational weather forecasting using the tools and resources

which are available to them at the home office. This training opportunity began in March 2001 and by the end of 2006 will have trained 32 people from 14 countries. The RMSDs strongly endorsed this programme and requested the US to continue to offer this valuable training.

- b. Since 2004, Australia has provided Post-Graduate Meteorologist Training for 2 individuals (one each from Tonga and Samoa) and conducted a WMO Southern Hemisphere Tropical Cyclone Course for 3 students from the Cook Islands; 1 from Vanuatu, 1 from Kiribati, 1 from Tonga, 1 from Samoa, 1 from Fiji, 1 from Solomon Islands, 1 from New Caledonia, 1 from French Polynesia, and 2 from PNG. The RMSDs expressed their sincere appreciation to Australia for providing this training and requested that they continue to provide this type of critically needed, capacity building training.
- c. The Fiji Meteorological Service (FMS) completed its first 5 years of international training in meteorology under the JICA 3rd Country Training Programme in 2005. Over 60 participants from ten Pacific Island Countries (PICs) completed meteorology courses targeted at basic to intermediate levels during the period. A proposal to continue this training programme for another 5 years at a more advanced level has been submitted to JICA and it is hoped that funding will be available soon. FMS has also been encouraging short-term training attachments to RSMC Nadi-TCC as a valuable means of transferring technological expertise and skills especially to forecasters from PICs.





# Annexes

## Annex I: Specific Recommendations

Note 1: Unless otherwise noted, timeline for completion is estimated to be 18 months which is approximately the next date of the RMSDs meeting.

Note 2: The recommendations with 4 asterisks are the 6 highest priority recommendations (also see Executive Summary).

1. Strategic Plan
  - a. Action: Set up a task team of 3-4 Members, under the lead of SPREP, to review and help on as-needed basis to develop guidelines/template for national strategic planning which would include incorporation of Millennium Development Goals, WMO Long Term Plan, and other regional/international strategies and frameworks. Recommendations for team membership to be PI-GCOS officer, WMO sub-regional office, and 1-2 nearby Met directors.
  - b. Action: Set up a task team, under the leadership of SPREP and in collaboration with other CROP agencies, to prepare a plan for updating the Needs Analysis, including identifying funding. \*\*\*\*
  - c. Action: Where appropriate and possible, NMS will work with their National governments to develop and draft legislation defining the roles, responsibilities, and mandates of the NMS.
  
2. Equipment Issues
  - a. Action: Request the development and communication of plans for regional instrument calibration and make more effective use of the WMO RA V Regional Instrument Centre.
  - b. Action: NMS, on an as-needed basis, will inventory their observational equipment, and with the help of regional instrument centres, identify outdated equipment and required spares and submit requests to WMO and other possible donors for replacements. \*\*\*\*
  - c. Action: Request WMO to conduct a workshop on merits (e.g., cost benefit analysis) and capabilities of the use of AWS for various locations and countries
  
3. RMSD Meeting
  - a. Action: At 12<sup>th</sup> RMSD meeting, SPREP in consultation with directors will invite selected south Pacific “experts” to meetings to give information and additional advice (e.g., communications group). Consultations will be done as a part of the RMSD meeting.
  
4. Coordination/Collaboration
  - a. Action: Improve coordination/collaboration between meteorology and hydrology by conducting joint planning sessions, joint projects, joint meetings, exchange of data and information, and through joint involvement and input for the national aspects of the PI-HyCOS.
  - b. Action: NMS Directors, in collaboration with National hydrologic services, should develop proposals to take advantage of opportunities provided by PI-HyCOS.
  - c. Action: Request all of the organizations and projects involving collection and maintenance of surface observations (e.g., PI-CPP, PI-

GCOS, PI-GOOS, PI-HyCOS, SPSLCMP, regional technical facility, regional instrument centre, regional organizations, etc.) continue to improve their coordination of activities to avoid duplication.

5. Training
  - a. Action: Request WMO to organize an operational meteorological training on new data sources, use of improved numerical weather prediction models, and new data display software.
  - b. Action: PI-GCOS and others will continue to conduct training on the basics of web page development and maintenance.
  - c. Action: Request WMO, in collaboration with other appropriate agencies (perhaps Meteo France), to organize an operational marine forecasting training to develop national capacity.
  - d. Action: Request USAID and/or AusAID funding to conduct on-site training for local technicians to perform basic maintenance and repair on RANET, EMWIN, IT, and observational systems.
  - e. Action: SPREP/SOPAC/others (?) will develop a professional development program for management training for senior staff of NMSs.
  - f. Action: Request organization of a workshop on climate extreme weather events, climate variability, and climate change and the development of applications and products for various sectors.
  - g. Action: Request BoM/AusAID to organize a workshop on tsunami early warning systems based on the planned capacity building needs analysis project which will be implemented through AusAID funding during 2006/7.
  - h. Action: Request WMO and ICAO, along with relevant CAA representatives, to conduct a workshop on the enhancement of aviation support. \*\*\*\*
  - i. Action: NMSs to utilize training fellowships available through WMO. For countries that are not members of WMO, those NMSs should take advantage of other bi-lateral agreements and other sources of fellowships/funding for training.
  - j. Action: Request Meteo France to explore possibility of continuing a variety of training on a semi-regular basis
  - k. Action: Request FMS, with the support of other NMSs, to continue to seek assistance from JICA for next level of training under the Third Country Training Program of the latter
6. Emergency Response (integrated multi-hazards approach)
  - a. Action: Request SOPAC to assist in the development of emergency/disaster response, preparedness, risk management, mitigation, and recovery plans, as needed.
7. International Participation/Coordination
  - a. Action: NMS directors should recommend that their Governments support an increased involvement in international programmes, frameworks, convention, and strategies such as WMO commissions, IOC, UNFCCC, etc.
  - b. Action: Encourage and support Pacific Island non-members of WMO and IOC to become members.

8. Aviation
  - a. Action: Establish a task team to investigate/explore NMSs gaps in services to aviation (e.g. Annex 3 and QMF, etc.), and to keep all RMSD informed of requirements and developments in this area. Australia is willing to take a lead role, with assistance from Tonga, Fiji, Samoa, and French Polynesia.
  
9. Observations
  - a. Action: Request NMSs to coordinate with their national government in the appointment of a national focal point for PI-GOOS.
  - b. Action: Update and finalize the PI-GCOS Implementation Plan in consultation with RMSDs.
  - c. Action: Request BOM to make sea level data available in near real-time (in-house and via Internet), and provide training for its effective use, to national meteorological services.
  - d. Action: Request WMO to assist, where needed, NMSs in meeting reporting (RBSN - Regional Basic Surface Network and RBCN - Regional Basic Climatological Network) and other requirements for adequate national and regional climate and weather services. \*\*\*\*
  - e. Action: Establish a task team on AWSs. Their terms of reference would be to research available studies and information on AWS currently available applicable to small island nations, areas which could be standardized (e.g., data format, sensor specifications), etc. (Proposed task team: Tonga (chair), American Samoa, French Polynesia, New Zealand) \*\*\*\*
  - d. Action: Request SPREP, through WMO RA V Working Group on Climate Matters, to investigate the issues, and develop policy guidelines, on climate data ownership/exchange.
  - e. Action: NMS will inventory and document metadata for their observational sites, and make this information readily available, consistent with existing WMO policy
  - f. Action: Request BoM to assist in reviewing data management software, particularly the use of CLIMSOFT under the Australian-funded project Building a Robust Infrastructure.
  
10. Management
  - a. Request SPREP and WMO to review ways of strengthening, and advocating use of RMSD as a forum for reporting to governments, agencies, etc. to better enhance visibility of the Met Services as a regional entity\*\*\*\*
  - b. Consider changing name of forum from “Regional” MSD to better reflect the membership and importance of the forum.

## Annex II: List of participants

### American Samoa

Mr Alan Olson Meteorologist-in-Charge National Weather Service Office PO Box 789 Pago Pago American Samoa	Tel: +684 699 9130 Fax: +684 699 1550 E-mail: alan.olson@noaa.gov
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### Australia

Mr Gary Foley Deputy Director (Services & Systems)	Tel: +613 9669 4217 Fax: +613 9669 4548 E-mail: g.foley@bom.gov.au
Mr Ram Krishna Supervisor, International Affairs	Tel: +613 9669 4553 Fax: +613 9669 4473 E-mail: r.Krishna@bom.gov.au
Mr Michael Coughlan Superintendent National Climate Center	Tel: +613 9669 4086 Fax: E-mail: m.coughlan@bom.gov.au
Ms Janita Pahalad Project Team Leader Pacific Islands - Climate Prediction Project National Climate Centre	Tel: +613 9669 4781 Mob: +61 0417 315 609 Fax: +613 9669 4678 E-mail: j.pahalad@bom.gov.au
Mr Bryan Hodge Senior Information Technology Officer Australia Bureau of Meteorology GPO Box 1289 Melbourne Vic. 3001 Australia	Tel: +613 9669 4858 Fax: +613 9669 4128 E-mail: b.hodge@bom.gov.au
Mr Philip Hall Project Manager South Pacific Sea Level Climate Monitoring Project Bureau of Meteorology PO Box 4580 Kingston ACT 2604 Australia	Tel: +61 (0) 417 595 501 Fax: N/A E-mail: Philip@faerberhall.com

### Cook Islands

Mr Arona Ngari President WMO RA V Director Cook Islands Meteorological Service PO Box 127 Rarotonga Cook Islands	Tel: +682 20 603 / 25 920 Fax: +682 21 603 E-mail: angari@met.gov.ck
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### Federated States of Micronesia

Mr David Aranug Meteorologist-In-Charge Yap National Weather Service PO Box 10 Yap State FSM 96943	Tel: +691 350 2194 Fax: +691 350 2446 E-mail: david.aranug@noaa.gov
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**Fiji**

Mr Rajendra Prasad Director Fiji Meteorological Service Private Mail Bag Nadi Airport Fiji Islands	Tel: +679 672 4888 Fax: +679 672 0430 E-mail: Rajendra.Prasad@met.gov.fj
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**France**

M. Pierre_Etienne Bisch M. Jean-Pierre Mac Veigh M. Jean Carle Meteo France 42, Avenue Gaspard Coriolis 31057 Toulouse Cedex 01	Tel: +33 6 9833 8070 Fax: +33 5 6107 8509 E-mail: jean.carle@meteo.fr
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**French Polynesia**

Mr Yves Gregoris Director Meteo France BP 6005 98702 Faaa-Tahiti French Polynesia	Tel: +689 803 302 Fax: +689 803 309 E-mail: yves.gregoris@meteo.fr
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**Kiribati**

Mr Moreti Tibiriano Acting Director Kiribati Meteorological Service PO Box 486 Betio, Tarawa Kiribati	Tel: +686 26 511 Fax: +686 26 089 E-mail: kiritmet@tskl.net.ki
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**Marshall Islands**

Mr Reginald White Meteorologist in Charge Weather Service Office Amata Kabua Boulevard PO Box 78 Majuro Republic of Marshall Islands 96960	Tel: +692 625 5705 / 3214 Fax: +692 625 3078 E-mail: Reginald.white@noaa.gov
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**New Zealand**

Mr Garry R. Clarke International Operations Manger The Meteorological Service of NZ Ltd PO Box 722 Wellington 6015 New Zealand	Tel: +64 4 4700 774 Fax: +64 4 473 5231 E-mail: garry.clarke@metSERVICE.com
Dr Jim Salinger Principal Scientist National Institute of Water Atmospheric Research (NIWA) PO Box 109-695 New Market Auckland New Zealand	Tel: +649 375 2053 Fax: +649 375 2051 E-mail: j.salinger@niwa.co.nz

### New Caledonia

M. Nicolas Beriot, Directeur M. Sébastien Chêne, Deputy Directeur M. Georges Naturel, Head of Communication Department M. Benoit Broucke, Head of Forecast Department Mme Valérie Deschamps M. Michel Argent Meteo France PO Box 151 98845 Noumea Cedex New Caledonia	Tel: +687 27 93 00 Fax: +687 27 93 27 E-mail: nicolas.beriot@meteo.fr sebastien.chene@meteo.fr george.naturel@meteo.fr benoit.broucke@meteo.fr valerie.deschamps@meteo.fr michel.argent@meteo.fr
Dr Yves Lafoy Chargé de Mission Government of New Caledonia Cellule le coop BP M2 Noumea Cedex New Caledonia	Tel: +687 27 02 37 Fax: +687 27 23 45 E-mail: yves.lafog@gouv.nc

### Niue

Mr Sionetasi Pulehetoa Director Niue Meteorological Service and Climate Change PO Box 82 Alofi, Niue	Tel: +683 4600 Fax: +683 4602 E-mail: sionetasi.pulehetoa@mail.gov.nu
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### Papua New Guinea

Mr Samuel Maiha Acting Director PNG National Weather Service PO Box 1240 Boroko N.C.D. Papua New Guinea	Tel: +675 324 4589 Mobile: +675 691 2347 Fax: +675 325 5201 E-mail: smaiha@pngmet.gov.pg
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### Samoa

Mr Mulipola Ausetalia Titimaea Assistant Chief Executive Officer Head, Meteorology Division Ministry of Natural Resources, Environment and Meteorology PO Box 3020 Apia, Samoa	Tel: +685 20 855 / 20 856 Fax: +685 20 857 E-mail: aussie@meteorology.gov.ws
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### Tonga

Mr 'Ofa Fa'anunu, Director of Meteorology Tonga Meteorology Service Ministry of Civil Aviation PO Box 845 Nuku'alofa Tonga	Tel: +676 35 355 Fax: +676 35 123 E-mail: ofaanunu@mca.gov.to
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### Tuvalu

Mr Tauala Katea, Scientific Officer Tuvalu Meteorological Service Vaiaku, Funafuti Tuvalu	Tel: +688 20 736 / 20 090 Fax: +688 20 090 E-mail: tauala_k@yahoo.com / tuvmet@tuvalu.tv
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**Vanuatu**

Mr Jotham Napat Principal Delegate Vanuatu Meteorological Services PMB 9054 Port Vila, Vanuatu	Tel: +678 22 331 Fax: +678 22 310 E-mail: jnapat@meteo.gov.vu
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**Wallis et Futuna**

M. Paul Xelot Chief Service Meteo France / Dir NC Airport Hihifo BP 2 Mata Utu Wallis et Futuna	Tel: Fax: E-mail: paul.xelot@meteo.fr / paul.xelot@gmail.com
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**AusAID**

Ms Vandana Naidu Regional Activity Manager Development Cooperation Section Australian High Commission PO Box 214 Suva Fiji	Tel: +679 338 8275 Fax: +679 338 2695 E-mail: vandana.naidu@dfat.gov.au
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**SOPAC**

Ms Mary Power, Manager, Ocean & Island Program Ms Sarah Grimes, PI-GOOS Coordinator Ms Linda Yuen, Project Officer, Water Resources SOPAC Private Mail Bag GPO, Suva Fiji	Tel: +679 3381 377 Fax: +679 337 0040 E-mail: mary@sopac.org sarahg@sopac.org linda@sopac.org
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**United States of America**

Mr Jim Weyman Director / Meteorologist in Charge RSMC Honolulu / Weather Forecast Office NOAA/NWS/WFO 2525 Correa Road Suite 250 Honolulu Hawaii USA 96822-2219	Tel: + 808 973 5272 Fax: + 808 973 5271 E-mail: james.veyman@noaa.gov
Mr Edward Young Deputy Director Pacific Regional National Weather Service 737 Bishop Street Suite 2200 Honolulu Hawaii	Tel: +808 532 6412 Fax: +808 532 5569 E-mail: Edward.Young@noaa.gov
Mr Howard Diamond US GCOS Program Manager NOAA/NCD 1335 East-West High, Rm 7214 Silver Spring, Mainland USA 20910	Tel: +1 301 713 1283 Fax: +1 301 713 0819 E-mail: howard.diamond@noaa.gov



### University of Oklahoma

Prof. Mark Morrissy Teacher/Researcher University of Oklahoma EVAC 3200 Marshall ave Suite 150 Norman, OK 73072 United States of America	Tel: +405 447 8412 Fax: +405 447 8455 E-mail: mmorriss@ou.edu
Dr Susan Postawko University of Oklahoma Evac 3200 Marshall Ave Suite 150 Norman, OK 73072 United States of America	Tel: + 405 447 8412 Fax: +405 447 8455 E-mail: spostawk@ou.edu

### World Meteorology Organization (WMO)

Dr Tokoyoshi Toya Regional Director for Asia and the South West-Pacific WMO Regional Director for Asia & the South- West Pacific 7 bis avenue de la Pax Case Postale 2300 CH 1211 Genève 2 Suisse	Tel: +41 22 730 8252 Fax: +41 22 730 8118 E-mail: ttoya@wmo.int
Mr Henry Taiki WMO Sub-regional Office for the South-West Pacific PO Box 3044 Apia Samoa	Tel: 685 25 706 Fax: +685 25 771 E-mail: htaiki@wmo.int

### Secretariat of the Pacific Regional Environment Programme (SPREP)

Mr Bruce Chapman, Programme Manager, Pacific Futures Programme Mr Dean Solofa, PIGCOS Officer Ms Saunoa Mata'u, Programme Assistant, Pacific Futures Programme PO Box 240 Apia Samoa	Tel: +685 21929 Fax: +685 20231 E-mail: brucec@sprep.org deans@sprep.org saunoam@sprep.org sprep@sprep.org Website: www.sprep.org
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### SPREP Meteorology Communications Consultant

Mr Colin Schulz Telecommunication Advisor 65 Kocho Road Nambour QLD Australia	Tel: 61 7 5441 1381 Fax: E-mail: cschulz@squirrel.com.au
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## Annex III: Workshop Agenda

Monday, 10 <sup>th</sup> July 2006		
8.30 - 9.00am	PARTICIPANT REGISTRATION	
9.00 - 9.45am	OFFICIAL OPENING CEREMONY Opening prayer High Commissioner of the France National Government Representative of the President of the Government of New Caledonia The Mayor of Noumea WMO Representative The President of Meteo France SPREP Introduction and Welcome Remarks Group Photo	Mr Jotham Napat Mr Michel Mathieu Mr Gérald Cortot Mr Jean Lèques Dr Tokiyoshi Toya Mr Pierre-Etienne Bisch Mr Bruce Chapman
9.45 - 10.30am	<i>Morning Tea</i>	At SPC venue
10.30 - 12.00pm	Meeting arrangements (10 minutes) Appointment of Chair Appointment of Vice-Chair Appointment of Drafting Committee Secretariat arrangements and housekeeping 11RMSD PLENARY SESSION METEOROLOGICAL SERVICE DIRECTORS <i>Meteorological Directors Presentations on Topics of Concern for Pacific Islands Meteorological services.</i> Opening Directors Greetings Report on the Institutional Strengthening of Pacific Meteorological Services Review of the Strategic Action Plan for the development of Meteorological Services in the Pacific region: Samoa Perspective RSMC Service and technological developments, and Fiji Met Service developments Communications Systems, Vanuatu and Pacific region experience and perspective	Co-chaired by: Dean Solofa (SPREP) Arona Ngari - President WMO RA V (South-West Pacific), Director Cook Islands Met Service Mulipola Ausetalia Titimaea, Director Samoa Meteorology Division Rajendra Prasad, Director Fiji Met Service Jotham Napat, Director Vanuatu Meteorological Service
12.00 - 1.30pm	<i>Lunch</i>	<i>At SPC venue</i>
1.30 - 3.30	11RMSD PLENARY SESSION Cont'd METEOROLOGICAL SERVICE DIRECTORS REPORTS <i>Meteorological Directors Presentations on Topics of Concern for Pacific Islands Meteorological services.</i> Weather and Climate Data Enhancement of Aviation Services in the Pacific New Zealand report Kiribati report American Samoa report French Polynesia report	Sionetasi Pulehetoa, Director Niue Met Service Ofa Faanunu, Director Tonga Met Service Garry Clarke, International Operations Manager NZ MetService Moreti Tibiriano, Acting Director Kiribati Met Service Alan Olson, Meteorologist-In-Charge National Weather Service American Samoa Yves Gregoris, Director Meteo France French Polynesia
3.00 - 3.30pm	<i>Afternoon Tea</i>	<i>At SPC venue</i>

3.30 - 6.00pm	11RMSD PLENARY SESSION Cont'd METEOROLOGICAL SERVICE DIRECTORS Australia report PNG report Effective Communication Systems in Tuvalu FSM report	Garry Foley, Deputy Director Australia Bureau of Meteorology Samuel Maiha, Acting Director Papua New Guinea National Weather Service Tauala Katea, Acting Director Tuvalu Met Service David Aranug, Acting Meteorologist-In-Charge, National Weather Service Federated States of Micronesia
7.00pm	<i>Ice Breaker Function</i>	<i>Hosted by Meteo France</i>

Tuesday, 11 <sup>th</sup> July 2006		
8.30 - 10.30am	PI-GCOS MEETING Presentation of PI-GCOS Action Plan and update of Implementation Plan status, and report on activities 2005-2006. CLIPAC and PI-GCOS/SPREP work update NOAA IDEA Center and climate activities update SPaRCE Update	Mr Dean Solofa (SPREP) Mr Howard Diamond (NOAA US-GCOS Coordinator) Dean Solofa (SPREP) Mr Howard Diamond (US-GCOS)/ Mr James Weyman (NOAA NWS) Dr Susan Postawko (University of Oklahoma) Co-chaired by: Mr Jotham Napat
10.30 - 10.45am	<i>Morning Tea</i>	At SPC venue
10.45 - 12.30pm	AUTOMATIC WEATHER/CLIMATE STATION MEETING FORMAT: 10 Minute talks; 5 minute for questions + Ending Discussion Opening remarks, Purpose of meeting (Mark Morrissey) and Comments by the Co-Chair (Arona Ngari) Mark Morrissey (PI-GCOS Raingauge test project) Garry Clarke (New Zealand Meteorological Service) 'Ofa Faanunu (Tongan Meteorological Service) Sionetasi Pulehetoa (Niue Meteorological Service) Jotham Napat (Vanuatu Met Service) 12:00 - 12:30pm Discussion to determine next steps	Prof. Mark Morrissey (University of Oklahoma) Co-chaired by: Mr Arona Ngari
12.30 - 1.30pm	<i>Lunch</i>	At SPC venue
1.30 - 2.30pm	TELECOMMUNICATIONS MEETING Summary of telecommunications side-meeting of experts.	Mr Edward Young (NOAA) Co-chaired by: Mr Tauala Katea
2.30pm - 3.00pm	<i>Afternoon Tea</i>	At SPC venue

3.00 - 5.30 pm	New Caledonia report CLIMATE ACTIVITIES BoM Seasonal Forecasting AusAID Enhanced Applications of Climate Predictions Project: Phase I: Activities Undertaken (10mins) Phase I: Review (10mins) Phase II :Planning (10mins) Roundtable Discussion (50mins) Island Climate Update (ICU) update (20mins) Pacific Islands Data Rescue Project (20mins ) BOM	Nicolas Beriot, Director Meteo France New Caledonia Janita Pahalad (BoM) Vandana Naidu (AusAID, Suva) Janita Pahalad (BoM) Dr Jim Salinger (NIWA) Janita Pahalad/Mike Coughlin (BoM) Co-chair: Mr Mike Coughlan (BoM)
6.00 pm	<i>(Transfer by bus to the Town Hall and) Cocktail</i>	Hosted by the Mayor of Noumea In the Town Hall of Noumea

Wednesday, 12 <sup>th</sup> July 2006		
8.30 - 10.30am	SOPAC SESSION ON RELATED ACTIVITIES Regional Disaster Risk Reduction & Disaster Management Framework Presentation of PI-GOOS Work Programme, and report on activities 2005-2006 Pacific-HYCOS project update and work programme presentation Flood forecasting report and work programme presentation	Mary Power (SOPAC) Sarah Grimes(SOPAC) Linda Yuen (SOPAC) Linda Yuen Co-chaired by: 'Ofa Faanunu
10.30 - 10.45am	<i>Morning Tea</i>	At SPC venue
10.45 - 12.00pm 12.00 - 12.30pm	WMO Update on Programmes and activities in RA V Follow Up on NOAA/NIWA Data Rescue Effort in the Pacific	Dr Tokiyoshi Toya (WMO) Mr Henry Taiki (WMO) Mr Howard Diamond (US GCOS) Dr Jim Salinger (NIWA) Co-chaired by: Moreti Tibiriano
12.30 - 1.30pm	<i>Lunch</i>	At SPC venue
1.30 - 3.30pm	Tropical Cyclone Climatology (20mins ) BOM South Pacific Sea-level and Climate Monitoring Project: AUS/BOM (20mins ) Tsunami EWS report (20mins )	Mr Howard Diamond (NOAA US GCOS National Coordinator) Mr Philip Hall, Project Manager SPSLCMP Mr Garry Foley, Deputy Director, (BoM) Co-chaired by: Rajendra Prasad
3.30pm - 4.00pm	<i>Afternoon Tea</i>	At SPC venue
4.00 - 5.30pm	11RMSD PLENARY SESSION Cont'd Consideration of items noted from previous sessions Plenary discussion Recommendations and resolutions to be undertaken	Chaired by: Arona Ngari

6.00pm	<i>(Transfer by bus and) Dinner</i>	Hosted by the Government of New Caledonia, in the Museum of New Caledonia
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Thursday, 13 <sup>th</sup> July 2006		
8.30 - 10.00am	Side Meetings <i>Pacific Island Met Services</i> <i>CLIPAC ICU Update</i> <i>Drafting Committee meeting</i>	
10.00 - 10.30am	<i>Morning Tea</i>	At SPC venue
10.30 - 12.30pm	11RMSD PLENARY SESSION Final Cont'd Consideration of items noted from previous sessions Plenary discussion Recommendations and resolutions to be undertaken	Chaired by: Arona Ngari
12.30 - 1.30pm	<i>Lunch</i>	At SPC venue
1.30 - 3.30pm	DRAFTING COMMITTEE SESSION Finalization of 11RMSD documents and draft report of 11RMSD meeting	DRAFTING COMMITTEE
3.30pm - 4.00pm	<i>Afternoon Tea</i>	At SPC venue
4.00 - 6.00pm	CLOSING CEREMONY Vote of thanks Summary and official closing remarks Official close	Arona Ngari Nicolas Beriot SPREP
6.00pm	<i>SPREP sponsored cocktail</i>	At SPC Venue

Friday, 14 <sup>th</sup> July 2006		
8.30 - 5.00pm	BASTILLE DAY (France National Day) Activities arranged for RMSD participants by Meteo-France ( <i>programme attached</i> )	METEO France New Caledonia

Secretariat

METEO France :  
M. Georges Naturel  
Mme. Valerie Deschamps  
SPREP:  
Ms Saunoa Matau  
Mr Dean Solofa