AUSTRALIAN BUREAU OF METEOROLOGY - COUNTRY REPORT

Reporting on activities supporting National Priority Actions of the Pacific Islands Meteorological Strategy (PIMS) 2012-2021

Robert Vertessy
(Director of Meteorology)

Contents

AUSTRALIAN COUNTRY REPORT PREPARED FOR THE THIRD PACIFIC METEOROLOGICAL COUNCL MEETING

1. Summary

This paper outlines activities, in which the Bureau of Meteorology (the Bureau) is engaged in the Pacific Island Countries and Territories (PICTs), including:

- Aid-funded activities supported by the Australian Department of Foreign Affairs and Trade;
- Training activities carried out by the Bureau of Meteorology Training Centre;
- Information on the Australian contribution, through the Bureau, of guidance products from the Bureau National Operations Centre and the Darwin RSMC;
- The Bureau's role in hosting the WMO Regional Instrument Centre; and
- Activities the Bureau has supported directly through its core funding allocation and activities conducted under part cost-recovery arrangements.

2. Aid-funded activities supported by the Australian Department of Foreign Affairs and Trade

2.1 Climate and Oceans Support Program in the Pacific – July 2012 to June 2016 (*Covered in detail under another agenda item*). (PKO 6, 8)

The Climate and Oceans Support Program in the Pacific (COSPPac) is a component of Australia's contribution to minimising the impacts of climate variability and change in the Pacific and to meeting the Australian Government's climate change aid objectives. COSPPac is managed by the Australian Bureau of Meteorology. It has a total budget of approximately $33.3M for five years. The timeline of the program is 1 July 2012 to 30 June 2017. Initially the project had a budget of $A31.5M over four years. In early 2015 DFAT extended the project by one year allowing a 2-year transition of COSPPac products and activities to relevant regional agencies.

The Program is structured around a Management team, two service focused units (Climate and Ocean Monitoring and Prediction, Pacific Sea Level Monitoring), a cross-cutting Capacity Development and Communication unit and an IT Support Unit.

The higher level shared development outcome that COSPPac is intended to contribute to is:

- Pacific Island countries have skills and information to adapt to climate variability and change contributing to sustainable livelihood.

The specific outcome for COSPPac is:

- Pacific Island NMSs and other relevant in-country agencies understand and use climate, ocean and sea level products for the benefit of island communities and governments.

The work of COSPPac is structured (with accompanying activities) within three areas (sub-projects):

- Capacity Development and Communications (CD&C)
- Climate and Ocean Monitoring and Prediction (COMP) and
- Pacific Sea Level Monitoring (PSLM)

As part of the Australian Government's performance assessment process, an Independent Progress Review (IPR) was commissioned in early 2014, the mid-point of the Program. The IPR has two purposes: to assess the progress of COSPPac against its design, including any modifications agreed to by its partners through Annual Work plans; and to consider how Australia can best support Pacific NMSs after 2016. The Review stated that "The Program is highly effective in many different ways across 14 partner countries" and "The key Program stakeholders, Pacific Island NMSs, consistently identified positive and substantial benefits in all areas of programming." It recommended that COSPPac products and services be transferred to regional partners where appropriate. During the COSPPac Planning Meeting and the Sixth COSPPac Steering Committee meeting from 4 – 6 May 2015 in Apia, Samoa, the members endorsed the COSPPac Transition Strategy and the draft Work Plan for 2015 - 2016. A successful transitioning of COSPPac products and services to relevant regional agencies was the key focus and recommendation of the meeting.

The Climate Data for the Environment (CliDE) software program developed for the Pacific Islands under the Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP) became part of the suite of COSPPac IT products and services from 1 July 2015. BoM will ensure that CliDE is transferred to a suitable regional or national organisation/s based in the Pacific for ongoing management by 30 June 2017.

For further information contact Janita Pahalad: (j.pahald@bom.gov.au).

3. Activities under the Pacific Public Sector Linkages Program (PPSLP) and the Government Partnership for Development (GPFD) of AusAID

The PPSLP was replaced by the Government Partnership for Development (GPFD) Facility)[1] in 2012/13. Three projects which continued to be implemented by the Bureau under the PPSLP framework are described in Sections 3.3.1, 3.3.2 and 3.3.3 and related Attachments at Annex I.

3.1 Capacity building in tsunami inundation mapping project (*addresses PIMS PKO 4)*

The objective of this activity has been to reduce tsunami risk for Pacific Island Countries.

Under the project, two courses have been held as follows:

- Sydney, Australia at the University of New South Wales, February 2012.
- Nuku'alofa, Tonga at Loumaile Lodge, April 2013.

31 officers have been trained in total, providing a community of Community Model Interface for Tsunami (ComMIT) users in the region.

Refer Annex I, Attachment A for details.

3.2 Quality management system for aviation weather services project (a*ddresses PIMS PKO 1, 11)*

The Objective of this project was to assist Pacific Island National Meteorological Services to achieve certification to the International Organization for Standardization (ISO) 9001:2008 Quality Management Standard (ISO 9001) through a sustainable national internal audit regime for aviation weather services.

[1] The GPFD is a new funding facility (http://dfat.gov.au/about-us/grants-tenders-funding/funding-schemes/Pages/government-partnerships-for-development-gpfd.aspx) that has been developed following a comprehensive review of the effectiveness of Australia's aid program. It replaces the former PPSLP and offers funding for projects.

The project assisted counterpart organisations (PICTs) to develop a quality management system (QMS) so that they meet the requirements of the International Civil Aviation Organization (ICAO) *Annex 3 to the Convention on International Civil Aviation, Meteorological Services for International Air Navigation* to deliver aviation weather services in conformity with the (ISO) 9000 series of quality assurance standards and in particular, the international AS/NZS ISO 9001:2008 Quality Management Standard (ISO 9001). (See Annex I, Attachment B for further details)

3.3 Training and implementing systems for participation by Pacific Island countries in open international exchange of meteorological information (a*ddresses All PIMS PKOs)*

The key objective of the activity was to assist counterpart organisations to develop the capacity for full participation in WMO systems for transmitting and handling the weather, climate and environmental information that are vital for the sustainable economic development and mitigation of severe weather and natural disasters. (Refer Annex I, attachment C for further details).

4. Contributions from the Bureau's core budgeted funds and through cost-recovery activities

The following contributions were made by the Bureau through its core budget, including providing staff time to carry out WMO and DFAT funded activities in the region:

- Diploma in Meteorology Training - at the Bureau of Meteorology Training Centre (tuition fees for 1 student from Samoa in 2013, 2 in 2014 (1 from Vanuatu and 1 from Solomon Islands) and 1 student from Vanuatu (PKO 11)
- PNG Mini-diagnostic Study - A Bureau officer was part of a team which prepared a mini-diagnostic study of the PNG National Weather Service. The study was part of a broader diagnostic activity involving a strategic analysis of the Papua New Guinea National Weather Service to identify strengths, weaknesses and potential opportunities for service improvement, and gaps specifically in the provision of meteorological service for international air navigation. The report is intended to assist with the implementation of standards and recommended practices that promote safety, regularity and efficiency of the international air transport system. The activity was designed as a stand-alone activity that would also inform a broader diagnostic of the PNG Department of Transport. Funding for the activity was provided by the Australian Department of Foreign Affairs and Trade. (All PKOs)
- At WMO's request, the Bureau provided services of 2 experts to participate in an assessment mission to Vanuatu in late April 2015. The purpose of the mission was to consolidate lessons from Severe Tropical Cyclone Pam from hazard monitoring and early warning perspectives and make

recommendations on the way forward. The assessment covered hazards monitoring and early warning systems (policies, intuitional coordination and operational aspects before, during and after the event), processes, products, and outreach. The recommendations, intended for VMS, relevant Vanuatu authorities as well as their partners, focus on measures needed to further improve hazard monitoring, early warning, and understanding the impact of tropical cyclones on the population, in order to reduce death, injury, damage and losses from future natural disasters (PKO 4).

4.1 Other externally funded activities under part cost recovery arrangements

A. Implementation of WMO Information System/ Table Driven Code Form (WIS/TDCF)

The project was aimed at assisting National Meteorological Services to be informed of what needs to be done to implement WIS/TDCF. A WIS Implementation Plan has been developed for WMO RA V countries, including the counterpart countries for this project. This plan is aimed at guiding RA V Members to implement WIS functionality in their identified data exchange centres and to become effective WIS users in a timely and harmonized manner, in order to participate in open international exchange of meteorological information (PKO 7)

The following activities were carried out under this project:

- **Planning for the Implementation of WIS/TDCF in the counterpart countries –**
    - May/Jun 2013: Analysing the current operations of the partner countries in terms of their meteorological data exchange, utilization and requirement
    - Jul-Sep 2013: assisting counterpart organisations to make detailed plans for the implementation of WIS/TDCF.

- **Country visits - on-site training on TDCF/WIS**

From Nov 2013 - Oct 2014, in-country visits have been carried out to:

- Provide further training on WIS/TDCF;
- Assess the impact of the migration to Table Driven Code Form (TDCF) and find solutions to mitigate the adverse impacts;
- Help and prepare the country to become (being certified as) a National Centre (NC) under the WIS framework;

On-site training was provided to Samoa, Tuvalu, Solomon Islands, Fiji, Niue, Papua New Guinea, Vanuatu, Cook Islands, Kiribati, and Tonga. The training to Tokelau officers was conducted by New Zealand MetService.

The above activities were a follow-up to the 5 day WIS/TDCF workshop held in Melbourne in April 2013.

B) Update on Fiji Integrated Meteorological Forecast System (FIMS) Upgrade (PKO 10)

The Bureau has provided FIMS (an adaptation of the Australian Integrated Forecast System) emergency support in the past. Detailed project planning for the FIMS upgrade was completed in 2014, with an agreement between the Fiji Meteorological Service and the Bureau signed in May 2015. Work is due to commence in late 2015 and complete in early 2016.

5. Support under the WMO World Weather Watch framework

5.1 Guidance products

The Bureau's guidance products for the Pacific consist of a mixture of manual and NWP products, provided through public and Registered User web pages, by direct availability of model data where this has been organised, and also provided directly to the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project web site. These are provided by the Bureau National Operations Centre, Melbourne and RSMC Darwin. (See Attachment E for more detail). (Addresses PIMS PKO 1, 2, 3, 4, 5, 6)

5.2 Melbourne WMO Regional Instrument Centre (RIC) (Addresses PKO 7)

The Melbourne RIC is a measurement and instrumentation laboratory. It maintains international traceable reference standards in Temperature, Humidity, Pressure, Solar Radiation, Rainfall and Ozone. The RIC regularly calibrates reference instruments for the Bureau and RA V members. The RIC has provided technical advice, inter-comparisons and calibrations to RA V. This service has been utilised by Fiji and the Solomon Islands in the last 2 years. The RIC also hosts an annual visit by staff of BMKG Indonesia staff to the laboratory which provides them with upskilling of their experts, reference calibrations and the opportunity to strengthen ties in the region.

The RIC has also provided metrology (measurement) training for RA V members and other government staff. Additionally, it provides instrument selection and siting advice and in the last 2 years has provided such advice to the Cook Islands, Fiji, Hong Kong, Indonesia and the Philippines. Bureau staff visited BMKG's laboratories in Indonesia in September 2014.

The greatest difficulty reported by most countries that wish to access the RIC calibration service but have not done so is the cost of shipping their instruments to Melbourne. For example, in April 2013, the RIC located the Niue transport standard kit that the Bureau had supplied in Niue. The NMS staff stated that it was too expensive to ship the instruments back to Melbourne for calibration. This set of instruments has not been calibrated by the RIC for over 5 years.

Contact for issues on calibration, instrument siting, metrology training, etc.:
Dr Jane Warne; email: j.warne@bom.gov.au

6. Bureau of Meteorology training activities (Addresses PKO 11)

6.1 Onsite and online training activities carried out at the Bureau of Meteorology Training Centre

Activity	Details (just numbers & dates needed not names)
Pacific Island graduates on Graduate Diploma in Meteorology course (40 weeks, Jan-Nov)	2013 -1 student (Samoa) 2014 -3 students (1 from each of Tonga, Vanuatu, Solomon Islands) 2015 -1 student (Vanuatu)
Online training event: Science Week (part of the 2 week Advanced Forecaster course)	2013 –Solomon Islands (2 remote attendees) 2014 –Fiji Meteorological Service (1 remote attendee) *Note: remote attendee refers to the number of 'work stations' that were logged in*
Contribute to building the capacity of SW Pacific Weather Observations programs	Co-developed Training Syllabus for Observer refresher training and mentored Fiji Observer trainer. 7 April – 6 May 2014
Provided 26 days of training (over an 8 week period) to forecasters in Fiji, Samoa, Vanuatu, Solomon Islands and Tonga in August- September 2010 (as part of the AusAID funded campaign: Building Capacity in South Pacific National Meteorological Services). This also included implementing a range of analysis & forecasting standards as well as updating real-time web-page links to incorporate and make use of the most update information from a range of international centres).	Fiji: 2-22 August, 22 September (8 forecasters trained) Samoa: 20-27 August (6 staff , including 4 forecasters) Vanuatu: 30 August – 6 September (10 staff, including 7 forecasters) Solomon Islands: 7-10 September (5 forecasters) Tonga 13-20: September 10 staff (3 forecasters)

BMTC conducted WMO Southern Hemisphere Tropical Cyclone and Public Weather workshop in Nadi Fiji.	Held 23 September - 4 October 2013. Fiji (8), and 1 each from Vanuatu, Solomon Islands, American Samoa, Kiribati, Tuvalu, Samoa, PNG, Tonga, Micronesia, Cook Is, French Polynesia.
BMTC hosted a 2 day training course in association with the Asia Oceania Meteorological Satellite Users Conference	7-8 October 2013 4 attendees (1 from each of Fiji, Vanuatu, PNG, Samoa)
BMTC conducts monthly online "Regional Focus Group" meetings for RA-V as part of our activities as a Centre of Excellence in WMO-CGMS Virtual Laboratory in Satellite Meteorology, Education and Training program.	2013 -3 attendees over 2 meetings: Fiji (1), Vanuatu (2) 2014 -22 attendees over 12 meetings: Fiji (2), Vanuatu (9), Solomon Islands (5), Tonga (5), Tuvalu (1) 2015 -6 attendees over 6 meetings: Vanuatu (4), Solomon Islands (2)
Delivered Radar training (calibration and maintenance techniques) for New Caledonia Technicians.	4 attendees, held 2-6 Dec 2013
South Pacific Region 'Training Needs Review' meeting hosted by FMS on 19 February 2015	WMO, US NWS, COMET, FMS and Bureau stakeholders

ANNEX I - Attachments to Australian Country Paper to PMC-3

Capacity Building in Tsunami Inundation Mapping project -ANNEX I Attachment A

The objective of this activity has been: to reduce tsunami risk for Pacific Island Countries

Status of implementation

Under the regional project, two courses have been held as follows:

- Sydney, Australia at the University of New South Wales, February 2012.
- Nuku'alofa, Tonga at Loumaile Lodge, April 2013.

31 officers have been trained in total, providing a community of Community Model Interface for Tsunami (ComMIT) users in the region.
The goal of training at least 2 participants from each PICT is expected to be achieved on completion of the Cook Islands Course. Nauru and Tokelau have not participated in the courses to date.

SOPAC contribution in the Tonga course through a modeller with access to bathymetry data sets for many countries in addition to skills in grid development added considerably to the value of the project.

Issues and proposed way forward

- Many countries still need projects to collect high resolution bathymetry and topography data – however, the situation is improving with recent large data collection projects for Tonga, Vanuatu etc.
- There is a dedicated Cook Islands training course planned for August 2013 and a third (and final) regional course planned for the second quarter of 2014 (location TBD).

Given that the goal of training at least 2 people from each country has almost been achieved, consideration is being given to running the third regional course as an "advanced" course for participants who have already completed previous courses.

Quality Management System for aviation weather services project ANNEX I Attachment B

Objective: Achieving certification to the ISO 9001:2008 Quality Management Standard (ISO 9001) through a sustainable national internal audit regime for aviation weather services.

Brief description of project

The aim of the project was to assist counterpart organisations (PICs) to develop a quality management system (QMS) to meet the International Civil Aviation Organization (ICAO) *Annex 3 to the Convention on International Civil Aviation, Meteorological Services for International Air Navigation,* requirements to deliver their aviation weather services in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and in particular, the international AS/NZS ISO 9001:2008 Quality Management Standard (ISO 9001).

The project had three stages. It commenced in November 2012 with an "in-region" five day internal auditor training course with two participants from each PIC, in Port Vila, Vanuatu. Participants who successfully completed the course were provided with an internationally recognised qualification as an internal Quality Management (QM) auditor.

The second stage involved inviting 20 PIC participants who had successfully completed the auditor training course (stage 1) to participate in real-time audits with the Bureau's experienced QM Section auditors. The participants were placed in 6 teams of 3 participants all from different Met Services and one team of two from Fiji with one of the officers already a qualified auditor. The mixed team approach enhanced the QM network throughout the SW Pacific and was a strategy to assist in ensuring the sustainability of QMSs throughout the Region. It also provided an ideal opportunity to consolidate their Stage 1 workshop training in a practical environment and benchmark their audit techniques and performance as well as provide face-to-face guidance on issues they may be facing in developing and implementing their own QMS.

The third phase involved the selection of 12 participants who successfully completed Phases 1 and 2 to be provided with the opportunity to undertake Lead Auditor training. The training was conducted in Nadi, Fiji, by Gray Management Systems Pty Ltd, an Australian Registered Training Organisation and the Bureau. The Lead Auditor course is approved by the International Register of Certified Auditors (IRCA) and has a written examination with a 70% pass mark. All 12 participants successfully passed and have been awarded an internationally recognised Lead Auditor qualification – of note is that one achieved 100% and three others achieved between 95 – 99% which is excellent testament to the commitment of the participants and the high standard of training provided.

Status of implementation to date and achievements

Stage 1 workshop has been completed and was very successful – this was supported by the very positive and extensive feedback from participants.

Stage 2 has commenced and two teams had participated in real-time audits within the Bureau by mid-May. Participant feedback has been very positive and endorses the approach adopted.

Issues and proposed way forward

The timely issue of visas and organising flights to and from some of the remote islands has been a constraint. This emphasises the need for early action on visas and scheduling of events.

Training and implementing systems for participation by Pacific countries in open international exchange of meteorological information

19 countries participated in the training workshop, 29 April – 3 May 2013, including 12 Pacific partner countries and 7 other Member countries of WMO in the South-West Pacific region. Experts from Global Information System Centres (GISC) in Australia, China, Japan, Korea, WMO Secretariat and the Association of Hydro-Meteorological Equipment Industry (HMEI) contributed to the workshop by delivering speeches and lectures.

The aim of the activity is to assist counterpart organisations to fully participate in WMO systems for transmitting and handling the weather, climate and environmental information. This activity prepares partner countries to 1) adopt the new arrangements for the future free and open international exchange of weather and climate information and products through a more comprehensive information service known as the WMO Information System (WIS); and 2) to adopt the new data formats required to participate in the World Meteorological Organisation (WMO) coordinated international exchange of weather and climate related information, i.e. to migrate to Table Driven Code Form (TDCF) for the exchange of observed and predicted weather data and products.

To achieve this aim, a two-stage approach was adopted. In the first stage, a training workshop on WIS/TDCF was conducted in Melbourne to convey the concept and preparedness for WIS and TDCF in the counterpart organisations. In the second stage, an implementation plan was developed for each partner country in consultation with the counterpart organisation. On-site assistance was provided by the Applicant to implement the plan, so that the partner countries can take advantage of the services provided by the WIS, will be able to submit necessary metadata, to exchange their weather data in TDCF under the framework of the WMO WIS Core Network, and to receive and fully utilise the data made available in WIS. The free exchange of essential weather data supports the mitigation of severe weather events and natural disasters such as tropical cyclones, drought, storm surge and tsunami.

Support and upgrade of Fiji Integrated Meteorological Forecast System FIMS ANNEX I Attachment D

In March 2012 two IT staff visited Fiji Met Service to conduct a health check on their operational FIMS AIFS system, to discuss the timetable for migrating this system to a new hardware and operating system platform and to outline the Bureau's plans for replacing its AIFS data visualisation tools with the integrated IBL Visual Weather System. FMS plans to implement a disaster recovery site in Suva, primarily for aviation services, were also discussed at some length during the visit and we have made some suggestions for technology in this regard.
Following this visit, the Bureau has followed up on AIFS operational issues, provided further technical advice and supplied cost estimates for migrating AIFS to new hardware early in 2015. During the visit, the Bureau also recommended that two FMS staff (one IT, one senior forecaster) attend a demonstration of Visual Weather when they visited in April for the WIS workshop and Climate conference, and this demonstration was scheduled and conducted by the Bureau's Visual Weather project manager in Melbourne, in late April 2013. Since then the Bureau has assisted FMS by advising on possible approaches to a staged implementation of Visual Weather in Fiji, with the help of IBL.

Over the next year the Bureau plans to provide FMS with hardware specifications for the new AIFS platform, and a detailed project plan and Statement of Work. Any work related to the disaster recovery site in Suva has not been planned at this stage.

Bureau's contribution of guidance products to PIC NMSs ANNEX I Attachment E

Manual Analysis

A key product produced by RSMC Darwin is a suite of broad scale tropical analyses generated manually by forecasters. Streamline analyses at gradient level and 200hPa are performed each day at 00UTC and 12UTC, supplemented by a MSLP analysis at 00UTC.

The Bureau and RSMC Darwin continued to contribute regional NWP guidance and tropical climate monitoring products during the full demonstration phase of the SWFDDP in 2013, 2014 and 2015. Charts and NWP products are available on the RSMC Darwin web site, and a selection of regional NWP products is available directly to SWFDDP participating countries on the MetConnect Pacific web page, hosted by MetService NZ.

An upgrade in the Bureau's ACCESS model suite (APS2) was implemented in the first half of 2015, which delivered improved horizontal resolution (grid size decreased from 40km to 25km), improved assimilation of satellite data and improved model physics in the Bureau's global NWP model, ACCESS-G. Charts and forecast tracks are available from the Bureau's high-resolution ACCESS-TC model on the RSMC Darwin web page and work is in hand to allow access to ACCESS-TC track maps and bulletins via the Met Connect Pacific web site. Track bulletins from ACCESS-TC are sent directly to several south Pacific meteorological services to ingest into Bureau-developed forecasting software (TC Module) for use in tropical cyclone warning centre operations.

Apart from the above, the Bureau supported the SWFDDP through the provision of a Darwin RSMC representative on the Regional Subproject Management Team, representation on the RAV Tropical Cyclone Committee (Chair, Mike Begin) and also on the overall SWFDP Steering Group.

Climate Diagnostics

RSMC Darwin provides a range of climate diagnostic information to stakeholders in the region, focused on key climate drivers in the tropics such as the El Nino-Southern Oscillation, Madden-Julian Oscillation, Indian Ocean Dipole and significant tropical waves. As well as a wealth of information on the Bureau of Meteorology website, RSMC Darwin climatologists produce a 'Weekly Tropical Climate Note' which discusses the current state of the climate as well as expectations for the medium term. The 'Tropical Diagnostic Statement' gives a review of the climate conditions over the previous month as well as key events such as tropical cyclones.

Numerical Weather Prediction

A wide range of Numerical Weather Prediction (NWP) products are provided to countries in the region from the ACCESS suite of models. Model fields are made available as GRIB2-format gridded products that can be ingested into local software systems or as pre-generated charts over the domain of interest. In August 2013 the limited area tropical model ACCESS-T was replaced with an upgraded 40km-resolution version of the global model ACCESS-G. This has

provided significant benefits, including a simpler product set for stakeholders that were receiving both models as well as the extension of most products generated by ACCESS-T out to 7 days. A limited set of 12km-resolution gridded products from the regional ACCESS-R model is available over a SW Pacific subdomain (-30°S to -10°S, 152°E to 184°E) out to 3days. Another key area of NWP guidance is tropical cyclone modelling from ACCESS-TC. This system is a relocatable nested model that is triggered by an analysis fix on a tropical cyclone by a forecaster and provides a 72 hour forecast track. Due to the 'bogussing' of analysis fixes into the model for 24 hours up until the base time of the model, the structure of the vortex represented in the model should be improved, particularly early in the model run.

The Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP)

RSMC Darwin is actively involved in the SWFDDP, which aims to improve the ability of National Meteorological and Hydrological Services (NMHS) to forecast severe weather events as well as to improve guidance to NMHSs through feedback to modelling agencies and RSMCs. The current phase of the project is focused on the southwest Pacific, including Fiji, New Zealand, Samoa, Vanuatu and the Solomon Islands.

Currently, RSMC Darwin is providing wide range of charts and NWP output to NMHSs participating in the project, as well as to the 'Metconnect Pacific' (Meteorological Service of New Zealand) web page which acts as a hub for guidance material being used in the region.

Support to Volcanic Ash Advisory Services

Products from by RSMC Darwin are used within VAAC Darwin to provide broad scale guidance on the state of the atmosphere in the event of the volcanic eruption the in region. The ash transport models used by VAAC Darwin are also nested within model guidance generated by RSMC Darwin. VAAC Darwin covers a very volcanically active area, including part of the Pacific 'Ring of Fire' which encompasses Indonesia, the Philippines and the Solomon Islands.