

**SEVERE WEATHER FORECASTING AND DISASTER RISK
REDUCTION FULL DEMONSTRATION PROJECT (SWFDDP)
REGIONAL SUBPROJECT RA V**

**PROGRESS REPORT N° 1
For the period 1 Oct 2010 – 28 Feb 2011**

17 May 2011



Part of SWFDDP website banner

1 Overview:

1.1 Introduction:

The meeting of the Regional Subproject Management Team (RSMT) of the RA V Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP) for the planning of the expansion of the Regional Subproject to include nine South Pacific Islands was held from 1 to 4 November 2010, in Wellington, New Zealand. The meeting report can be found at:

[Meeting of the Regional Subproject Management Team \(RSMT\) of the SWFDDP - South Pacific Islands](#), Wellington, New-Zealand, 1-4 November 2010

Based on the success of the Pilot phase of the SWFDDP (1 November 2009 to 31 October 2010), it was concluded that the RSMT will implement a full Demonstration Phase with expanded participation, from November 2010 to October 2012.

The Regional Subproject Implementation Plan (RSIP) can be found at:

[Regional Subproject Implementation Plan \(RSIP\) for the full phase of the SWFDDP - South Pacific Islands](#) (pdf)

The principles and the goals of the Project were well outlined in section 1.1 of the plan. The Cascading Forecasting Process of global centres providing products through a lead RSMC to NMHSs is described in section 1.2. The overall framework of the Project in RA V is presented in section 1.3.

Full demonstration phase participants:

A Pilot phase involving a group of 4 participating countries in 2009/10 (Samoa, Vanuatu, Solomon Islands, and Fiji) was completed on 31 October 2010. It is followed by a full Demonstration phase in 2010/12 which includes the 4 Pilot phase NMHSs plus the following five NMHSs: Cook Islands, Niue, Kiribati, Tonga and Tuvalu.

The Regional centres include: RSMC Wellington as lead RSMC for this Subproject (having responsibility for the development and management of a dedicated project Portal), RSMC Darwin (Geographic), and RSMC Nadi (Activity – Tropical Cyclone Centre (TCC)). Fiji also participates in the project as a NMHS.

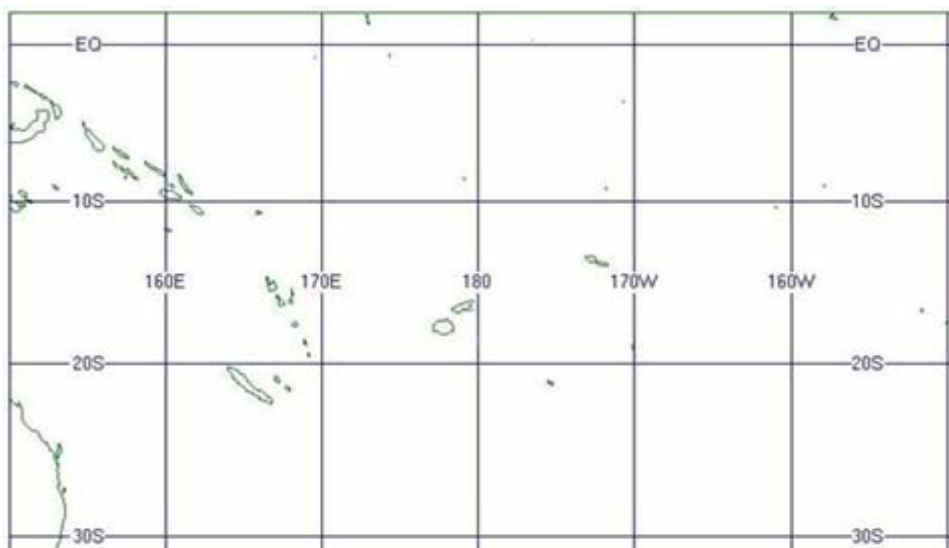
The Global centres (ECMWF and the Met Office UK) will continue to participate actively. The Met Office has tailor made products for the area 150E – 120W, 10N – 40S, which is larger than the 'South Pacific window' - 150E - 150W, 2N -30S of the RSMC Wellington Guidance product (see below).

In this phase, Japan (JMA) has initiated its contribution to this Subproject by providing (through dedicated web sites) NWP/deterministic outputs and MTSAT products. JMA EPS products will be provided at a later stage. USA (NCEP and Honolulu) and France (Météo-France in French Polynesia and New Caledonia) are expected to participate in this phase of the project.

South Pacific Ocean Map (showing location of participating countries)



SWFDDP 'South Pacific Window' (subset of the above map)



This first Progress Report of the full Demonstration Project spans the period 1 October 2010 to 28 February 2011. The month of October was not included in the third Progress report of the Pilot phase. The Period of 1 November 2010 to 28 February 2011 comprises the first 4 months of the full Demonstration project. This progress report compiles and assesses the feedback received from the RSMCs and the NMHSs in order to determine the quality of the guidance provided by RSMC Wellington as well as the quality and applicability of the global and regional products available. The feedback will also be used in

order to ascertain the pertinence and the quality of the warnings issued and improvement of the warning services the NMHSs delivered to the Disaster Management and Civil Protection Authorities – “DMCPA”. The evaluation table is used to identify all severe weather events in the reporting period (1 October 2010 – 28 February 2011).

| Reports and feedback received from participating RSMCs and NMHSs for the period 1 – October 2010 – 28 February 2011 (Boldface : Pilot participants also reported for October 2010) | | | | |
|--|---------------------------|-------------------------------|--------------------------|---------------------------|
| Centre/Country | Event report (Appendix H) | Evaluation table (Appendix I) | Verification of warnings | Case studies ³ |
| RSMC Wellington | x | n/a | 1 | |
| RSMC Darwin | x | n/a | n/a | |
| RSMC Nadi | X ⁰ | n/a | n/a | |
| NMHS Samoa | x | missing | 2 | |
| NMHS Solomon Is. | x | x | 2 | |
| NMHS Vanuatu | x | x | 2 | |
| NMHS Fiji/Nadi | X ⁰ | x | 2 | |
| NMHS Cook Is. | x | x | 2 | |
| NMHS Kiribati | missing | missing | 2 | |
| NMHS Niue | missing | x | 2 | |
| NMHS Tonga | x | missing | 2 | |
| NMHS Tuvalu | x | x | 2 | |

X⁰ NMHS Fiji sent in a progress report that referred to some RSMC activities.

¹ RSMC Wellington has begun verification of the South Pacific Guidance as outlined in this report

² No NMHS has presented formal verifications of their warnings yet

³ No NMHS has presented a case study for the period

2. Input from RSMCs and Global centres:

2.1 RSMC Wellington:

As the lead RSMC for this project, Wellington continued to provide a platform (MetConnect Pacific at www.swfddp.metservice.com) for the SWFDDP products. This web site also provides helpful background material and links to global centres, other RSMCs and the NMHSs. Twice daily the RSMC staff produces the RSMC Daily Severe Weather Forecasting Guidance Products, referred to as the “South Pacific Guidance (SPG)” charts.

As agreed to in the Implementation Plan, as of 1 December 2010 the threshold criteria used to generate the SPGs were changed. The new criteria provide more realistic thresholds in terms of what ranks as a severe weather event and taking into account the vulnerabilities of low-lying islands. The criteria thresholds for rain, wind and waves were raised to: rain \geq 100mm/24hrs, winds \geq 30 knots and waves \geq 2.5m north of 15S, and \geq 3.5m at and south of 15S.

From 1 December 2010 to 28 February 2011, under the new thresholds' criteria, a total of 900 South Pacific Guidance charts were produced by RSMC Wellington meteorologists and posted on MetConnect Pacific. 546 (about 61%) of these charts contained guidance. 418 of them were for heavy rain (nearly 77%), followed closely by large

waves 392 (nearly 72%). 354 charts (about 39%) displayed “NIL SIG”, which indicated no thresholds were expected to be exceeded.

MetConnect Pacific

After a number of coding problems, the SWFDDP website, MetConnect Pacific, version 2 was finally released on 15 December 2010. At the same time, access to the RSMC Darwin page was restored with the old TXLAPS products being replaced by ones from the ACCESS-T model running at a higher resolution of 0.375° (~37.5km). There were no interruptions to the availability of MetConnect Pacific but the RSMC Darwin page was out of action from 19 August 2010 to 15 December 2010 until the new release of MetConnect Pacific.

2.2 RSMC Darwin:

The supply of charts, from the Australian Bureau of Meteorology’s new tropical NWP system, ACCESS-T, to the MetConnect Pacific web site started up from 15 December 2010.

ACCESS-TC, the moveable-domain high-resolution tropical cyclone model which will replace TC-LAPS is not yet available. Unfortunately the development of this new model will now be postponed until later in 2011 due to limited availability of key personnel. Additionally, the implementation of automated vortex tracking within the tropical ACCESS NWP models and the development of new RSMC Darwin products tailored for severe weather forecasting in the south Pacific region will also be delayed.

Operational NWP products from ACCESS-T have been developed for the Pacific region and are currently available directly from the RSMC Darwin web page (the link and password are available under the RSMC Darwin tab on the MetConnect Pacific site). Unfortunately, these charts are not yet available on the MetConnect Pacific site but work is currently underway to enable the ftp transfer of ACCESS-T products directly to the site.

2.3 RSMC Nadi

RSMC Nadi (TCC) continued to provide access to its web site through MetConnect Pacific.

2.4 Products from global centres:

ECMWF: As outlined in the previous progress reports of the Pilot phase and in the Implementation Plan, the ECMWF products continued without interruption through this time period and were well received by the forecasters.

Met Office UK: As outlined in the previous progress reports of the Pilot phase and in the Implementation Plan, the Met Office’s products continued without interruption through this time period.

JMA: It started contributing to SWFDDP back in November 2010 with the addition of deterministic model data on MetConnect Pacific. JMA has been developing a rainfall

product derived from MTSAT for this project, including a catalogue describing the product. The satellite imagery with heavy rainfall potential area has become available on the JMA/MSC Web site at:

http://mscweb.kishou.go.jp/RA-V/sat_img.htm.

JMA/MSC seeks feedback on the usefulness of this product.

Other centres:

RSMC Wellington is working closely with the USA about their input into SWFDDP. During a visit to Honolulu in April 2011, Ray Tanabe, Acting Director of the Central Pacific Hurricane Center told Steve Ready that progress had been held up by "security issues". There has not been correspondence with Météo-France (French Polynesia, New Caledonia).

3. Summary of the severe weather events 1 October 2010 to 28 November 2011

3.1 Severe Weather Events reported by RSMC Wellington:

Tropical cyclones

There have been 4 named tropical cyclones (TC) during this period: Vania, Wilma, Yasi and Atu. They had varying impacts on the participating countries.

Vania tracked south-westwards between Erromanga and Tanna (southern Vanuatu) on 12 January 2011 and recurved southwards over New Caledonia on 14th after passing through the Loyalty Islands where it reached maximum intensity of 65kt (Category 3).

Wilma was named on 22 January 2011 before moving slowly southeast to the south of Samoa and American Samoa before recurving southwest on 24th January and moving southwest over Tonga on the 25th.

Yasi was named on 30 January 2011 northeast of Vanuatu then moved westward between the Solomon Islands and northern Vanuatu into the Coral Sea. Yasi eventually became a Category 5 cyclone and made landfall midway between Cairns and Townsville on 2 February.

Located east of Vanuatu, Atu was named on 19 February 2011. The cyclone moved south-southeast, passing the southern islands of Vanuatu, before entering the Tasman Sea and passing west of Raoul Island.

Other weather systems

The most significant non-tropical cyclone related heavy rainfall events in a 24-hour period were:

Hanan Airport, Niue, recorded 202 mm on 2-3 November 2010;

Hendersen Airport, Solomon Islands, 225 mm on 16-17 November 2010 and

Sola (Vanua Lava), Vanuatu, 237 mm on 4-5 December 2010.

3.2 Solomon Islands:

As mentioned above Henderson Airport, Solomon Islands, 225mm on 16-17 November 2010. No warnings were issued.

TC Yasi caused heavy rainfall, flooding and high winds from 29 January 2011. Rainfall (24h) of 56mm was observed at Lata at 0000 UTC on 30 January. TC warnings were issued.

TC Atu caused heavy rainfall, flooding and high winds from 17-22 February 2011. 132.7mm was recorded at Lata, Santa Cruz in 24h to 0000 UTC on 21 February. TC warnings were issued.

3.3 Vanuatu:

An active surface trough affected the northern Islands on 3-4 December 2010. Rainfall (24h) of 237 mm was observed at Sola at 2100 UTC on 4 December. Warnings were issued.

Another active surface trough affected the southern islands on 8-9 December 2010. Rainfall (24h) of 158 mm was recorded at Aneityum at 2100 UTC on 8 December. Heavy rainfall warnings were issued.

TC Vania affected Shefa and Tafea province from 11-to 14 January 2011. Rainfall (24h) of 279 was recorded at Aneityum at 2100 UTC on 12 January. Winds 80 km/h with gusts to 90 km/h were recorded at Port Vila at 1500 UTC on 12 January. Warnings were issued.

TC Yasi was the second tropical cyclone to affect Vanuatu, mostly the northern islands, from 29-to 31 January 2011. Rainfall (24h) of 45 mm was recorded at Torba at 2100 UTC on 29 January. Warnings were issued. Winds of 60km/h were observed at Saratamata on 29 and 30 January. There was some damages to houses and crops over Central Southern Islands.

TC Atu was the third cyclone to affect Vanuatu, mostly over the central and southern part, from 18 to 22 February 2011. Winds of 130km/h were recorded at Aneityum at 2100 UTC on 21 February. There were damage reports to houses and gardens over the southern islands. The island of Aneityum, Futuma and Aniwa received considerable damage.

3.4 Fiji:

a. Active Trough over Fiji caused heavy rainfall from 7-8 October 2010. Rainfall (24h) of 264 mm was recorded at Laucala Bay Suva at 2100 UTC on 7 October. Heavy rainfall warnings were issued.

b. Active Trough over Fiji caused heavy rainfall from 12-15 October 2010. Rainfall (24h) of 112 mm was recorded at Yasawa Island at 2100 UTC on 13 October. Heavy rainfall warnings were issued.

c. Active Trough over Fiji caused heavy rainfall from 24-26 October 2010. Rainfall (24h) of 119 mm was recorded at Laucala Bay at 1600 UTC on 25 October. Heavy rainfall warnings were issued.

d. Active Trough over Fiji caused heavy rainfall from 13-15 November 2010.

Rainfall (24h) of 106 mm was recorded at Rotuma Island at 2100 UTC on 14 November. Heavy rainfall warnings were issued.

e. Troughs to the north and west caused heavy rainfall on 22-23 November 2010. Rainfall (24h) of 139 mm was recorded at Monasavu Dam at 2100 UTC on 22 November. Heavy rainfall warnings were issued.

f. Active Trough over Fiji caused heavy rainfall from 26-29 November 2010. Rainfall (24h) of 177 mm was recorded at Savusavu at 2100 UTC on 26 November. Heavy rainfall warnings were issued.

g. A trough to the west of Fiji caused heavy rain and isolated heavy falls from 4-9 January 2011. Rainfall (24h) of 103 mm was recorded at Vanua Levu at 2100 UTC on 5 January. Heavy rainfall warnings were issued.

h. A moist easterly wind flow caused afternoon heavy rainfall on 12 January 2011. Rainfall (24h) of 166 mm was recorded at Vatukoula at 2100 on 12 January. Four other stations recorded over 100mm. No warnings were issued.

i. Heavy rain and strong winds from TC Wilma on 27 January 2011. Winds of 90km/h were recorded at Nadi at 0600 UTC. TC warnings were issued.

j. Heavy rain and strong winds from TD 09F later become TC Yasi on 29 January 2011. Rainfall (24h) of 124 mm was recorded at Nadi at 2100 UTC. Heavy rainfall warnings were issued.

k. A trough over the eastern parts of the group in coincidence with the outer rain bands from TD 11F to the west of Fiji on 16-17 February 2011 brought heavy rain and strong winds over the country. Rainfall (24h) of <100 mm was recorded. Heavy rainfall warnings were issued.

3.5 Samoa

Samoa endured high winds and heavy precipitation due 21-23 November 2010. 288.1 mm (24h) was recorded at 1200 UTC on 21 November at Apia and winds of 27 m/s were recorded at Fiamoe at 1700 UTC on 23 November. In addition, 4-8 m high surf was observed. There were a few of casualties due to flooding by the heavy rains and at least one death and some destruction of coastal homes due to the high surf.

TC warnings were issued on 20 January, 2011 well in advance of Wilma. Apia recorded 288mm as of 21 January 1200UTC. Surf of 4-8m was observed on the 23.

3.6 Cook Islands:

No severe weather was reported nor any severe weather warning issued.

3.6 Tuvalu:

Strong winds were observed from 23-30 January 2011. Max gust to 35 knots was observed at Funafuti at 0100UTC on 25 January. 2.5 m swell were observed. Warnings were issued. These winds were associated with tropical depression development and passage (which were later named TCs Wilma and Yasi).

3.7 Tonga

Fua'amotu recorded 146 mm (24h) at 0000 UTC on 13 January 2011. Nuku'alofa recorded 116 mm (24h) ending 2100 UTC on 12 January. Some flooding was reported. Warnings for heavy rains were issued on 9 January.

3.8 Niue: Heavy precipitation was recorded on 2 November 2010 (202mm/24H) and on 09 December 2010 (113mm/24H). No warnings were issued.

3.9 Kiribati: No progress report was submitted.

4. Comments about the SPG and the NWP products.

RSMC Wellington:

The UKMO and ECMWF precipitation probability charts continue to give a weak signal at 100 mm over 24 hours, but a good signal for 50 mm. In light of the raised threshold criteria, Wellington forecasters continue to refer to both these products, together with pattern recognition, to help determine the heavy rainfall guidance of 100 mm or more over 24 hours. Acknowledging that in-situ observations are sparse over this vast oceanic region, forecasters are encouraged to use the newly added satellite based estimate for potential heavy rainfall provided by JMA.

The change in winds threshold criteria now better matches the guidance produced by UKMO and ECMWF, hence the number of over-forecasted strong wind areas has reduced markedly. Forecasters continue to rely on local observations to determine the extent of the area which is reaching 30 kt, also helping to prevent over-forecasting in the short term.

Wave guidance continues to appear on the charts in high frequency, but has reduced slightly over the last 3 months with the change in threshold criteria. Forecasters continue to access ECMWF wave data specifying each half metre, allowing easy determination of waves from 2.5 m and above north of 15S, and from 3.5 m and above at and south of 15S. The model guidance has proved to be very reliable.

Fiji:

For the items above, the SPG was useful in the sense that it highlights an area of concern, and an indication of what is expected out of it. For events g and h, no indication of rain above 100 mm forecasted by SPG whereas areas mentioned received rainfall above 100 mm. For all of the items above except for h, NWP products were also useful.

Samoa: For TC Wilma the SPG was considered very useful and helped to trigger a warning.

Vanuatu:

Both the SPG and the TC Outlook products were very useful. They gave Vanuatu a good lead time and confidence in the issuing of the warnings.

SIMS:

The November 2010 convective event was a short lived development. SIMS thought it was only an afternoon non severe formation. There was no indication on the SPG for this event. Perhaps the SPG could also give flash flooding guidance in the future?

Tuvalu: The SPG and the TC Outlook are very useful and handy in guidance in the 3 days outlook. Tuvalu still relies on other models (NOAA) to pinpoint strong winds. The principle reason is that Tuvalu's national strong wind warning threshold is 20 knots compared to the SPG strong winds threshold of 30 knots. Tuvalu frequently uses UKMO in determine rainfall and wind speed for the 3 days outlook.

Tonga: For the event reported above, SPG was considered very useful and helped to trigger a warning.

5. Project evaluation against SWFDDP goals:

5.1 To improve the ability of NMHSs to forecast severe weather events

All NMHSs agreed that the SWFDDP products and, in particular, the SPG charts have increased the NMHSs' ability to issue warnings and strengthen the forecasters' confidence in doing so.

5.2 To improve the lead time of alerting these events

All NMHSs agreed that the SWFDDP products allowed them to improve the lead time. Vanuatu indicated that they have issued a warning for non tropical cyclone heavy rainfall 3-6 hours before the event whereas they wouldn't have done so before.

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

All NMHSs (with completed evaluation reports Appendix I) agreed that the SWFDDP products allowed them to improve links with their national DMCPA. Fiji had no interaction in the period.

5.4 To identify gaps and areas for improvements

The main exception was a "flash" convection in November 2010 as reported by SIMS. Perhaps criteria for non-tropical cyclone convection criteria could be developed and linked to flash flooding. Fiji still needs to build up the experience of its forecasters.

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

As mentioned in the previous progress reports, RSMC Wellington noted that there have been many instances when the SPG charts show waves of 2.5m or more. This resulted in RSMC Wellington gaining approval for a higher threshold for large waves south of 15°South at the RSMT meeting, in November 2010.

RSMC Wellington finds that the UKMO and ECMWF ensemble data are very useful in helping to pick heavy rainfall in the range of 50 to 100 mm in 24 hours. For amounts in excess of 100 mm, the forecaster is usually left to decide how poorly the models have unresolved higher rainfalls.

6. Evaluation of the weather warnings:

6.1 Feedback from the public

The appendix below has an evaluation of the SPGs performance for TC Wilma and Vania.

Non-tropical cyclone events

The following rainfalls were probably very localised but represent the most significant rainfalls observed during the period. The impact of these rainfalls is unknown.

NIUE

Total rainfall at Hanan Airport = 202 mm in 24 hours.

Although heavy rain was forecast on all 5 days, the amounts were underestimated.

| Niue 0000 UTC 2-3 November UTC | Day of event | One day prior | Two days prior | Three days prior | Four days prior |
|--------------------------------|--------------|---------------|----------------|------------------|-----------------|
| Guidance Forecast for Niue | 100-150mm | 50-100mm | 50-100mm | 50-100mm | 50-100mm |

SOLOMON ISLANDS

Total rainfall at Henderson Airport, Honiara = 225 mm in 24 hours. Heavy rain wasn't forecast on any day.

| 160000-170000 UTC November | Day of event | One day prior | Two days prior | Three days prior | Four days prior |
|---------------------------------------|--------------|---------------|----------------|------------------|-----------------|
| Guidance Forecast for Solomon Islands | Nil Rain | Nil Rain | Nil Rain | Nil Rain | Nil Rain |

VANUATU

Total rainfall at Sola, Vanua Lava = 299 mm in 24 hours. Heavy rain wasn't forecast on any day.

| 040000-050000 UTC December | Day of event | One day prior | Two days prior | Three days prior | Four days prior |
|-------------------------------|--------------|---------------|----------------|------------------|-----------------|
| Guidance Forecast for Vanuatu | Nil Rain | Nil Rain | Nil Rain | Nil Rain | Nil Rain |

7. Case studies:

No formal case study has been prepared. Many cases were identified in section 3 of this report. Participating NMHSs are encouraged to carry out at least one case study per reporting period, choosing from successfully predicted, or missed, or false alarm cases. Case studies should address the end-to-end story from monitoring, to forecasting, to warnings, to services to and feedback from the general public, media, and disaster management sectors. A template to help write up such a case study will be circulated prior to preparation of the next progress report.

8. Conclusions:

One NHMS did not send in any report and many were very late in submitting their reports. Three other NHMSs sent in incomplete reports. Two of these produced Appendix H or (F) for a severe event(s) but didn't file their country's progress report containing the summary evaluation table (Appendix G or I) while the other NMHS completed Appendix G or (I) but not Appendix H or (F). The weather situation was benign across the Cook Islands during this period (symptomatic of a strong La Nina episode) so no severe event was either observed or forecast. The remaining four sent in complete reports.

With the exception of very brief mentions from Vanuatu and SIMS on the feedback from media and DMCPA and public (Vanuatu) no other indication exists on the value of the improved (as claimed by NMHSs in the earlier part of the report) forecasts and warnings and no objective conclusions can be made on this crucial aspect of the project. It is suggested that the reporting process be reviewed to include real cases of feedback by the main target groups (as discussed in Wellington) to demonstrate the real value of the SWFDDP to the South Pacific islands.

RSMC Wellington's recommendations for changes to the rain, wind and wave thresholds' criteria for producing the South Pacific Guidance charts were adopted at the RSMT meeting in November 2010 and started up and available on 1 December 2010.

Since the start of the Full Demonstration phase, RSMC Wellington has been providing additional information on rain/wind/waves when a TC Outlook has been in force on day 1 and day 2 but no tropical cyclone has existed or been named. This is designed to help fill the shortfall in specifics about heavy rain/strong winds/large waves when a simple TC Outlook envelope replaced a combined set of rain, wind and wave envelopes.

RSMC Wellington has found it challenging to provide heavy rainfall guidance at the new 100 mm threshold especially when the NWP guidance has often been inconclusive for this and higher amounts. In many cases, *the confidence is assigned as "low" to reflect the forecaster's uncertainty for near threshold totals.*

The wind guidance from both the ECMWF and UKMO has proved very reliable now that the SPG wind threshold has been raised to 30 kt.

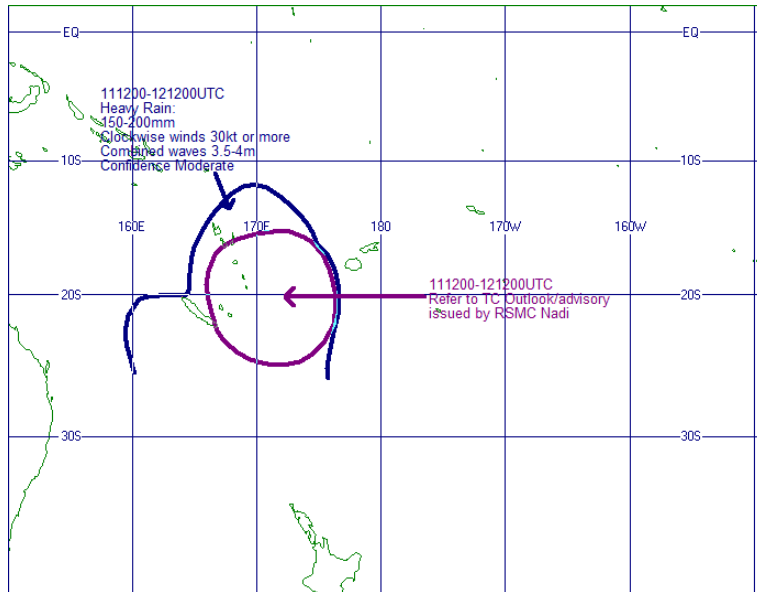
In the appendix below, there are charts and tables covering the 4 days leading up to the naming of tropical cyclones Vania and Wilma. The South Pacific guidance charts provided useful guidance 3 and 4 days out when there was no mention in the TC Outlook.

The most significant observed non-tropical cyclone rainfalls during the period occurred in November and December 2010 but they were very localized as the broader-scale South Pacific Guidance failed to assign any significant rain for two of the countries.

Appendix: Tropical cyclone events

1. Vania: (Named 1800 UTC on 11Jan-2011)

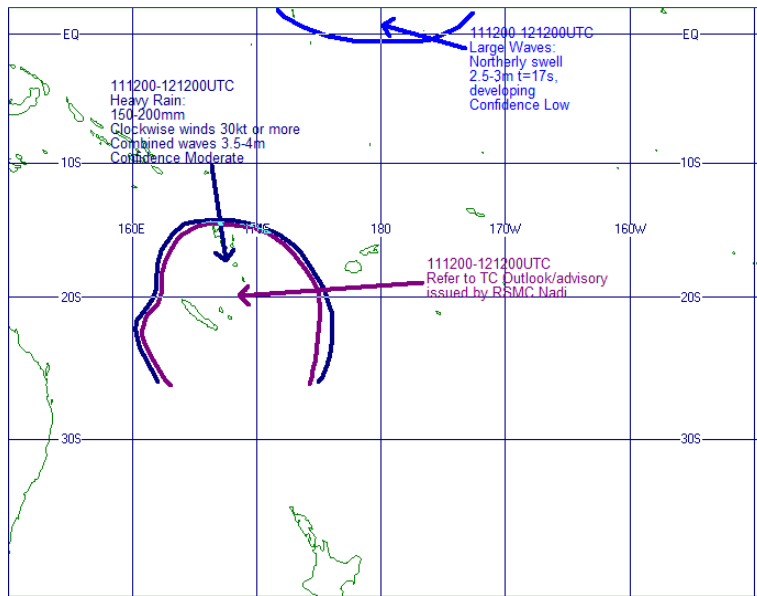
SPG chart issued 1 day before naming of Vania



Summary of details for Vanuatu

| | | |
|------------|-----------|-----|
| Vanuatu | | |
| TC Outlook | Yes | |
| Rain | 150-200mm | Mod |
| Wind | 30kt+ | Mod |
| Waves | 3.5-4m | Mod |

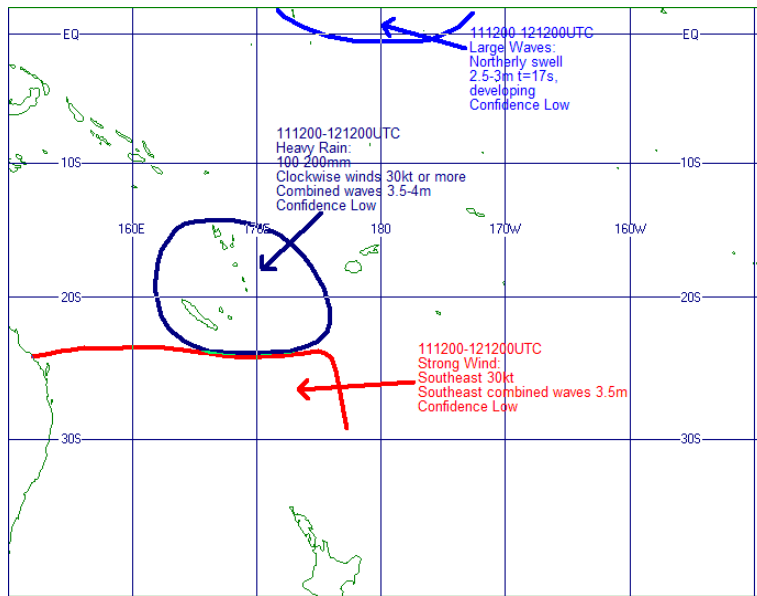
SPG chart issued 2 days before naming of Vania



Summary of details for Vanuatu

| | | |
|------------|-----------|-----|
| Vanuatu | | |
| TC Outlook | Yes | |
| Rain | 150-200mm | Mod |
| Wind | 30kt+ | Mod |
| Waves | 3.5-4m | Mod |

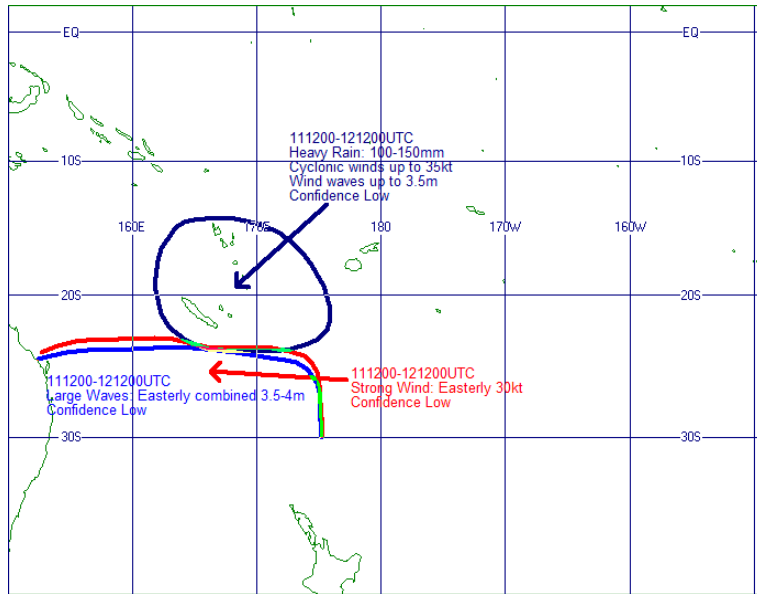
SPG chart issued 3 days before naming of Vania



Summary of details for Vanuatu

| | | |
|------------|-----------|-----|
| Vanuatu | | |
| TC Outlook | No | |
| Rain | 150-200mm | Low |
| Wind | 30kt+ | Low |
| Waves | 3.5-4m | Low |

SPG chart issued 4 days before naming of Vania

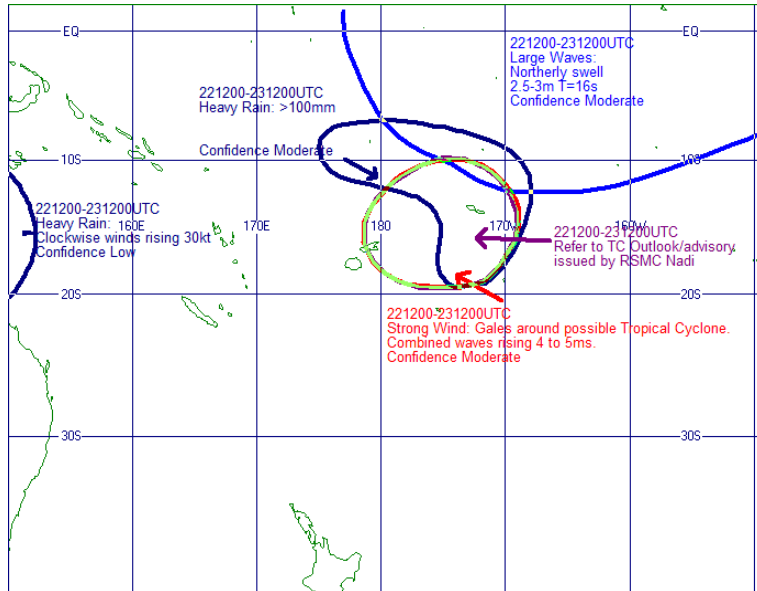


Summary of details for Vanuatu

| | | |
|------------|------------|-----|
| Vanuatu | | |
| TC Outlook | No | |
| Rain | 100-150mm | Low |
| Wind | Up to 35kt | Low |
| Waves | Up to 3.5m | Low |

2. Wilma: (Named 1200 UTC on 22-Jan-2011)

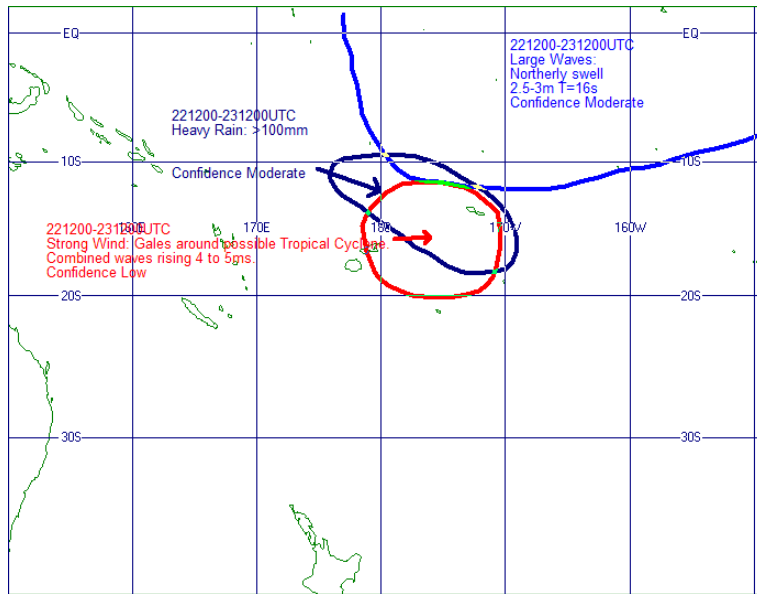
SPG chart issued 1 day before naming of Wilma



Summary of details for Fiji, Samoa and Tonga

| | | | | | |
|------------|------------|-----|------|-------|---------|
| TC Outlook | Yes | | Fiji | Samoa | N Tonga |
| Rain | 100mm+ | Mod | | Samoa | N Tonga |
| Wind | Gales poss | Mod | Fiji | Samoa | N Tonga |
| Waves | 4-5m | Mod | Fiji | Samoa | N Tonga |

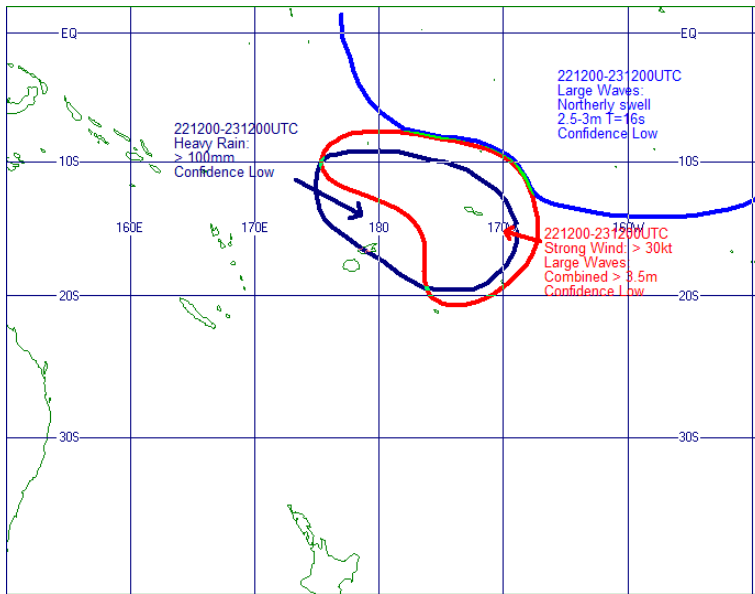
SPG chart issued 2 days before naming of Wilma



Summary of details for Fiji, Samoa and Tonga

| | | | | | |
|------------|----------------|-----|------|-------|---------|
| TC Outlook | No | | | | |
| Rain | 100mm+ | Low | | Samoa | N Tonga |
| Wind | Gales possible | Low | Fiji | Samoa | N Tonga |
| Waves | 4-5m | Low | Fiji | Samoa | N Tonga |

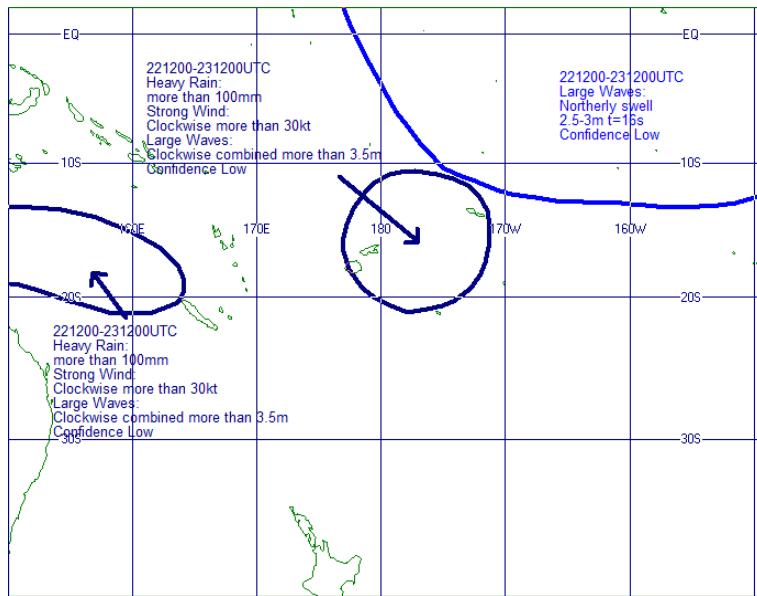
SPG chart issued 3 days before naming of Wilma



Summary of details for Fiji, Samoa and Tonga

| | | | | | |
|------------|-------|-----|------|-------|---------|
| TC Outlook | No | | | | |
| Rain | 100m+ | Low | Fiji | Samoa | N Tonga |
| Wind | 30kt+ | Low | | Samoa | Tonga |
| Waves | 3.5m+ | Low | | Samoa | Tonga |

SPG chart issued 4 days before naming of Wilma



Summary of details for Fiji, Samoa and Tonga

| | | | | | |
|------------|-------|-----|------|-------|-------|
| TC Outlook | No | | | | |
| Rain | 100m+ | Low | Fiji | Samoa | Tonga |
| Wind | 30kt+ | Low | Fiji | Samoa | Tonga |
| Waves | 3.5m+ | Low | Fiji | Samoa | Tonga |