W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N
T E C H N I C A L D O C U M E N T

WMO-TD N° 292

TROPICAL
CYCLONE PROGRAMME

Report No. TCP-24

TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN

2014 Edition

SECRETARIAT OF THE WORLD METEOROLOGICAL ORGANIZATION
GENEVA - SWITZERLAND

2014 Edition

Chairperson, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03
Fax: +41 (0) 22 730 80 40
E-mail: Publications@wmo.int

NOTE

The designations employed in WMO publications and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of WMO concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or products does not imply that they are endorsed or recommended by WMO in preference to others of a similar nature which are not mentioned or advertised.

The findings, interpretations and conclusions expressed in WMO publications with named authors are those of the authors alone and do not necessarily reflect those of WMO or its Members.

This publication has been issued without formal editing.

2014 Edition

CONTENTS

CHAPTER 1

GENERAL

1.1 Objective

The objective of this Plan is to provide for effective co-ordination and cooperative efforts amongst Members* in the South Pacific and South-East Indian Ocean in order to improve the warning systems for the protection of lives and the reduction of human suffering and property damage caused by tropical cyclones and associated storm surges, floods and landslides.

1.2 Status of the document

The Plan was formulated by the RA V Tropical Cyclone Committee for the South Pacific (RA V/TCC) at the request of the WMO Regional Association V (South-West Pacific) (RA V), within the framework of the Tropical Cyclone Programme of WMO.

The Plan was adopted under Resolution 10 (X-RA V) by Regional Association V at its tenth session (Singapore, November 1989), which was kept in force by Resolution 4.5 (XIV-RA V) adopted in 2010. It is in compliance with the spirit of Resolution 23 (Cg-XVI) - Tropical Cyclone Programme, Resolution 36 (Cg-XVI) - WMO Strategic Plan (2012-2015) and in the context of the International Strategy for Disaster Reduction (ISDR).

1.3 Scope

The Plan describes the existing internationally coordinated systems and arrangements agreed upon by the RA V/TCC with a view to making the best use of the existing resources and facilities towards providing the most effective tropical cyclone warning system for the Region. It describes the warning systems and defines the international tropical cyclone forecasting and warning responsibilities of all Members concerned. It also sets out agreed arrangements for:

(a) units and terminology
(b) exchange of information and advisories
(c) operational procedures

The Plan also describes existing arrangements in the Region for:

(a) the provision of observational data; and

(b) telecommunications for the exchange of data and processed information on tropical cyclones.

It describes national practices and procedures which are of international and regional significance. The Plan also serves as a source of information for the operational services.

1.4 Structure of the document

The document is divided into text and attachments to the text.

1.4.1 Text

The text contains information on regionally agreed upon obligations and practices of Members regarding sharing of warning responsibilities, standardization of regional operational procedures and the efficient exchange of information and advices, including terminology. Changes to these will be subject to the consideration of the RA V/TCC.

---

* In this Plan the term Members refers to those Members of Regional Association V invited by Resolution 7 (XV-RA V) to nominate members of the RA V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean and to those countries and territories in the Region invited by the Resolution to participate in the work of the Committee.

1.4.2 Attachments

The attachments contain additional reference information on various aspects of the Tropical Cyclone Programme in the South Pacific and Southeast Indian Ocean.

1.5 Arrangements for updating

The Operational Plan is implicitly evolutionary in nature. It will be updated from time to time to accommodate changed circumstances.

The RA V/TCC shall review the Plan at each of its sessions and amendments to the text of the plan are subject to the approval of the President of RA V. Amendments to the Attachments to the Plan are to be notified to WMO through the Chairman of the Committee. WMO issues new editions when appropriate.

1.6 Operational terminology used in the South Pacific

1.6.1 Equivalent terms

1.6.1.1 Weather disturbance classification

	English		French
	Classification of weather Disturbances		**Classification des perturbations météorologiques**
	Tropical depression	< 34 knots	Dépression tropicale faible
34 knots ≤	Tropical cyclone (gale)	< 48 knots	Dépression tropicale modérée
48 knots ≤	Tropical cyclone (storm)	< 64 knots	Dépression tropicale forte
64 knots ≤	Tropical cyclone (hurricane) Severe tropical cyclone		Cyclone tropical Cyclone tropical intense[+]

1.6.1.2 Cyclone related terms

	English	French
	Cyclone characteristics	**Caractéristiques d'un cyclone**
(a)	Eye	Oeil
(b)	Centre	Centre
(c)	Centre fix	Position du centre
(d)	Confidence in the centre position	Confiance sur la position du centre
(e)	Direction of movement	Direction du déplacement
(f)	Average wind speed	Vitesse du vent moyen/ Vitesse moyenne du vent
(g)	Maximum wind speed in a tropical depression	Vitesse maximale du vent dans une dépression tropicale
(h)	Maximum wind speed in a tropical cyclone	Vitesse maximale du vent dans un cyclone

[+] In French Polynesia, ≥ 96 knots

(i)	Gust	Rafales
(j)	Storm surge	Onde de tempête
(k)	Storm tide	Marée de tempête

1.6.1.3 Warning system related terms

	English	French
(a)	Tropical cyclone season	Saison cyclonique
(b)	Tropical cyclone advisory	Bulletin météorologique pour un phénomène tropical (dépression ou cyclone)
(c)	Tropical cyclone alert*	
(d)	Tropical disturbance advisory*	
(e)	Tropical disturbance summary*	
(f)	Tropical cyclone watch**	
(g)	Special advisory+	
(h)	Special weather bulletin	
(i)	Weather bulletin*	
(j)	Tropical disturbance bulletin***	

1.6.1.4 Warnings related terms

	English	French
(a)	Warnings	Avis
(b)	Gale Warning	Avis de coup de vent
(c)	Storm Warning	Avis de tempête
(d)	Hurricane warning	Avis de cyclone tropicale
(e)	Tropical cyclone warning	

---

* Used by Fiji

** Used by Australia, Papua New Guinea, American Samoa, and Samoa + Used by Australia and Fiji

*** Used by Australia

1.6.2 Meanings of terms used for regional exchange

Advice: See Tropical cyclone advice.

Alert: See Tropical cyclone alert.

Average wind speed: Speed of the wind averaged over the previous 1**** or 10 minutes.

Central pressure: Pressure at the centre of the tropical cyclone as measured or estimated.

Centre of the tropical cyclone: The estimated position of the surface centre.

Confidence in the centre position: Degree of confidence in the centre position of a tropical cyclone expressed as the radius of the smallest circle within which the centre may be located by the analysts. "Position good" implies a radius of less than 30 nautical miles (55 kilometres), "Position fair", a radius of 30 to 60 nautical miles (55 to 110 km) and "Position poor", a radius of greater than 60 nautical miles (110 km).

Convergence zone (or zone of convergence): A zone where air streams of different directions or speeds merge.

Cyclone: See Tropical cyclone.

Cyclone Category: Category of cyclones based on the Saffir-Simpson category will be included in all the SWB bulletins and other bulletins where appropriate.

Tropical cyclone season: The typical period of the year with tropical cyclone occurrences. In the South Pacific and South-East Indian Ocean, it is the period from 1 November to 30 April. (Note: cyclones occasionally occur outside of this period.)

Tropical cyclone year: 1 July to 30 June.

Depression: A synoptic low pressure area with extra-tropical characteristics where the average wind speed may exceed 33 knots (63 km per hour) or Beaufort Force 7.

Direction of movement of the tropical cyclone: The direction towards which the centre of the tropical cyclone is moving.

Eye of the tropical cyclone: The relatively clear and calm area inside the circular, convective wall clouds.

Gale force wind: Average surface wind speed of 34 to 47 knots (63 to 87 km per hour or wind force of 8 or 9 in the Beaufort Scale).

Gale warning: Meteorological message intended to warn those concerned of the occurrence or expected occurrence of gale force winds.

Gust: Sudden, brief increase of the wind speed over its average value.

Hurricane or severe tropical cyclone: A tropical cyclone with hurricane force winds.

Hurricane force wind: Average surface wind of 64 knots (118 km per hour, Beaufort Force 12) or more.

Hurricane warning: Meteorological message intended to warn those concerned of the impact of a tropical cyclone with hurricane force winds.

**** Used by FSM and USA (American Samoa)

Intertropical Convergence Zone (ITCZ): A relatively narrow zone where the trade winds from both the Northern Hemisphere and the Southern Hemisphere merge.

Mean wind speed: See Average wind speed.

Monsoon depression = monsoon low: A tropical depression (or tropical low) embedded in the monsoon trough.

Monsoon low = monsoon depression.

Monsoon trough: A shear zone with westerly monsoon winds on the equatorial side and easterly trade winds on the poleward side.

Naming a Tropical Cyclone: A non-frontal low pressure system of synoptic scale developing over warm waters will be named whenever observations and/or Dvorak intensity analysis indicate the presence of gale force or stronger winds near the centre which are likely to continue.

South Pacific Convergence Zone (SPCZ): A semi-permanent convergence zone found in the tropical South Pacific marked by the boundary between the usually cooler and stronger southeast trade wind flow and warmer and lighter east or northeast winds, or northwesterly winds when the SPCZ is active.

Special Advisory: A message to a National Meteorological Centre giving information on a tropical disturbance or a tropical cyclone.

Special Weather Bulletin: Bulletins issued, whenever the need arises, to put the community on alert, to give progress reports on developments or to give specific warnings of tropical cyclones or other disturbances.

Speed of movement of the cyclone: Speed of movement of the centre of the tropical cyclone.

Storm force wind: Average surface wind of 48 to 63 knots (88 to 117 kilometres per hour or Beaufort Force 10 or 11).

Storm surge: The difference between the actual sea level under the influence of a weather disturbance (storm tide) and the normal astronomical tide.

Storm tide: The actual sea level as influenced by a weather disturbance. The storm tide consists of the normal astronomical tide, storm surge and wave setup.

Storm warning:* Meteorological message intended to warn those concerned of the impact of storm force winds.

Sustained wind speed: See Average wind speed.

Tropical cyclone: A non-frontal low pressure system of synoptic scale developing over warm waters and having a definite organized wind circulation with a maximum 10-minute average wind speed of 34 knots (63 km per hour, i.e. gale force) or greater near the centre.

Tropical cyclone advice: A tropical cyclone watch and/or a tropical cyclone warning.

Tropical cyclone alert: A special weather bulletin providing information on the progress of a cyclone still some distance away and with a significant probability of giving gales or stronger winds to a community in the next 24 to 48 hours.

Tropical cyclone warning: A warning of gales or stronger winds associated with a tropical cyclone expected to occur within 24 hours.

---

* Storm warning: Papua New Guinea uses the term for all events with storm force or stronger winds.

Tropical cyclone watch: A forecast message of gales or stronger winds associated with a tropical cyclone occurring after 24 hours and before 48 hours.

Tropical depression = tropical low: A tropical disturbance with a clearly defined cyclonic wind circulation in which the central position can be estimated, and the maximum 10-minute average wind speed is less than 34 knots (63 km per hour i.e. gale force) near the centre. There may be gale force or stronger winds in one or more quadrants but not near the centre.

Tropical disturbance: A non-frontal system of synoptic scale originating over the tropics with persistent enhanced convection and/or some indications of cyclonic wind circulation.

Tropical Disturbance Advisory/Bulletin/Summary: A message for exchanging information, internationally, on a range of disturbances including tropical depressions and tropical cyclones.

Tropical low = tropical depression

Tropical storm: A tropical cyclone with gale or storm force winds.

Trough or trough of low pressure: An elongated zone of low pressure, V-shaped in the easterlies in the Southern Hemisphere and an inverted V-shape in the westerlies. The axis of a trough is known as the trough line.

Watch: See Tropical Cyclone Watch.

Wave setup: Localised increase in the still-water sea level produced by breaking waves close to the shore.

Weather Bulletin: A bulletin issued at regular times to give weather information and forecasts to the general public or marine interests.

Criteria for numbering TDs!!

The Summaries will commence on a TD once the relevant classification criteria is satisfied, has a potential to develop into a tropical cyclone or persist to cause significant impact to life and property in RSMC Nadi AOR and persistently analysed on the MSL charts for the last consecutive 24 hours. When these conditions are met, each TD will be assigned a number (xF), where x is 01, 02, ….etc. The numbering will revert to 01 at the beginning of the new TC Season. The Summaries are issued daily at 2300 UTC and reviewed at 0900 UTC.

1.7 Units and indicators used for regional exchange

1.7.1 Marine

The following units/indicators are used for marine purposes:

(a) Distance in nautical miles, the unit (nm) being stated;

(b) Location (position) by degrees and where possible tenths of degrees of latitude and longitude preferably expressed in words, or repeated if expressed in figures;

e.g. "TWELVE DECIMAL TWO SOUTH, ONE SIXTY EIGHT DECIMAL FOUR EAST"

or "12.2 SOUTH, 168.4 EAST, REPEAT 12.2 SOUTH 168.4 EAST"

(c) Direction of motion to the nearest sixteen points of the compass or in degrees to the nearest ten, given in figures;

e.g. "SOUTHSOUTHEAST" or "160 DEGREES"

(d) Speed (wind speed and direction of movement of tropical cyclones) in knots, the unit (kt) being stated;

(e) Pressure in hectopascals (hPa), the unit being stated;

(f) Confidence in the centre position expressed as "GOOD", "FAIR" or "POOR";

(g) Time in Universal Time Co-ordinated (UTC), the unit being stated.

1.7.2 Non-marine

The following units/indicators are used in non-coded segments of exchanges, other than marine bulletins:

(a) Distance in nautical miles (nm) or kilometres (km), the units being stated;

(b) Direction in sixteen points of compass given in words e.g. SOUTHEAST;

(c) Location (position) in latitude and longitude by degrees and tenths of degrees (in figures) and/or bearing on the sixteen point compass and distances from well-known places;

(d) Speed (wind speed and speed of movement of system) in knots (kt) or kilometres per hour (km per hour) the unit being stated;

(e) Confidence in the centre position in kilometres (km) or nautical miles (nm);

(f) Time in UTC or local time, the unit being stated.

1.8 Identification of tropical cyclones

For unambiguous identification of tropical cyclones, each tropical cyclone within the region covered by this plan is given a name (Chapter 2, Section 2.2.1.1, provides further information on the naming system).

CHAPTER 2

RESPONSIBILITIES OF MEMBERS

2.1 Area of responsibility

2.1.1 Forecasts and warnings for the general population

In the southern hemisphere portion of RA V, the responsibilities for preparing and issuing warnings on tropical cyclones and related hazardous weather phenomena for the general population are as follows:

Australia	The coastal waters and land areas of Australia including Christmas Island (Indian Ocean), Cocos Island, Lord Howe Island and Norfolk Island.
Fiji	The coastal waters and land areas of Cook Islands, Fiji, Kiribati, Nauru, Niue, Tokelau, Tonga and Tuvalu.
French Polynesia	The coastal waters and land areas of French Polynesia and Pitcairn Islands.
Indonesia	The coastal waters and land areas of Indonesia.
New Caledonia	The coastal waters and land areas of New Caledonia and Wallis and Futuna.
New Zealand	The coastal waters and land areas of New Zealand.
Papua New Guinea	The coastal waters and land areas of Papua New Guinea.
Samoa	The coastal waters and land areas of the Independent State of Samoa.
Solomon Islands	The coastal waters and land areas of Solomon Islands.
Timor Leste	The coastal waters and land areas of Timor Leste.
USA (American Samoa)	The coastal waters and land areas of American Samoa.
Vanuatu	The coastal waters and land areas of Vanuatu.

2.1.1.1 Special Advisories for National Meteorological Centres

Brisbane Tropical Cyclone Warning Centre (TCWC) is responsible for providing special advisory messages for use by National Meteorological Centre in Solomon Islands in the preparation of warnings and advisories.

2.1.2 Forecasts and warnings for the open sea

In accordance with Annex VI of WMO Technical Regulations (WMO Manual on Marine Meteorological Services), the responsibility for the preparation of marine tropical cyclone forecasts and warnings in the South Pacific and South-east Indian Ocean is shared amongst Members as follows:

Warning centre with prime responsibility	Boundary of area
Brisbane TCWC	05S 160E, 08S 155E, 12S 155E, 12S 147E, 09S 144E, 10S 141E, 14S 138E, 32S 138E, 32S 160E, 05S 160E.
Darwin TCWC	15S 125E, 15S 129E, 32S 129E, 32S 138E, 14S 138E, 10S 141E, 09S 141E, 09S 128E, 11S 128E, 11S 125E, 15S 125E.
RSMC Nadi	25S 160E, 25S 120W, EQ 120W, EQ 60E, 25S 160E.
Perth TCWC	10S 090E, 36S 090E, 36S 129E, 15S 129E, 15S 125E, 10S 125E, 10S 090E.
Port Moresby TCWC	EQ 141E, 10S 141E, 09S 144E, 12S 147E, 12S 155E, 08S 155E, 05S 160E, EQ 160E, EQ 141E.
Wellington TCWC	25S 160E, 25S 120W, 40S 120W, 40S 160E, 25S 160E.
Jakarta TCWC	EQ 090ºE, 10S 090ºE, 10S 120ºE, 11S 1 20ºE, 11S 128ºE, 09S 128ºE, 09S 141ºE, EQ 141ºE.

TCWC = Tropical Cyclone Warning Centre

The areas of responsibility for warnings for the open seas are shown in the map in Figure 1.

2.1.2.1 One comprehensive marine warning per cyclone

Warning centres without prime responsibility but affected by a tropical cyclone are requested to consult with the primary tropical cyclone warning centre *one hour or more before the next warning issue time* whenever a tropical cyclone is likely to have a greater influence than the current warning would suggest so that all the relevant information pertaining to that tropical cyclone is incorporated into one bulletin. This should alleviate the need for the centre without prime responsibility to add on a separate zone of gale force or stronger winds when issuing a copy of the tropical cyclone warning.

2.1.3 Warnings and advisories for aviation

In accordance with the International Civil Aviation Organization (ICAO) Annex 3 - *Meteorological Service for International Air Navigation*/ WMO Technical Regulations [C.3.1], tropical cyclone warnings, required for the international air navigation, are issued by designated meteorological watch offices (MWO) as SIGMET messages*, including an outlook, giving information for up to 24 hours ahead concerning the expected positions of the centre of the tropical cyclone. Each MWO provides information for one or more specified flight information regions (FIRs) or upper information regions (UIRs). The boundaries of the FIRs/UIRs are defined in ICAO Air Navigation Plan (ANP) for the Asia and Pacific Regions.

* SIGMETs for tropical cyclones are only issued for those tropical cyclones having a 10-minute mean surface wind speed of 63 km/h (34 kt) or more.

The content and order of elements in a SIGMET message for tropical cyclone shall be in accordance with WMO Technical Regulations [C.3.1]. The data type designator to be included in the WMO abbreviated header of such messages shall be T_1T_2 = WC (WMO-No. 386, Manual on GTS refers).

The designated Tropical Cyclone Advisory Centres (TCAC) Darwin and Nadi shall monitor the development of tropical cyclones in their areas of responsibility, as determined in the ICAO ANP for the Asia and Pacific Regions and issue advisory information concerning the position of the cyclone centre, its direction and speed of movement, central pressure and maximum surface wind near the centre. These advisories will be made available in text and graphical format (TCAC Darwin only as Nadi is still working on making graphical format available). These advisories shall be disseminated to the MWOs by TCAC Darwin and TCAC Nadi in their respective areas of responsibility, to be used in the preparation of the outlook, to be appended to SIGMET messages for tropical cyclones. In addition, the tropical cyclone advisories shall be disseminated to the other TCACs, whose areas of responsibility may be affected, to the world area forecast centers (WAFC) London and Washington and international OPMET data banks, and centres operating the satellite distribution systems (SADIS and ISCS).

The format of the tropical cyclone advisories shall be in accordance with the Technical Regulations [C.3.1]. The data type designator to be included in the WMO abbreviated header of such messages shall be T_1T_2 = FK (WMO-No. 386, Manual on GTS, refers).

TCAC Darwin and TCAC Nadi shall issue updated advisory information in their area of responsibility, for each tropical cyclone, as necessary, but at least every six hours.

2.2 Procedural responsibility

2.2.1 Responsibilities of tropical cyclone warning centres

Within the South Pacific and South-east Indian Ocean areas covered by this plan, there are seven specially equipped warning centres (RSMC Nadi, and TCWCs Brisbane, Darwin, Perth, Jakarta, Port Moresby, and Wellington) which are responsible for the continuous monitoring of tropical cyclones.

The area of prime responsibility for each of these centres is indicated in 2.1.2 above and shown in Figure 1.

Each tropical cyclone warning centre issues and ensures prompt dissemination of all tropical cyclone forecasts, warnings, advisories and bulletins to the general population and for international marine and aviation requirements according to the area responsibilities defined in Sections 2.1.1, 2.1.2 and 2.1.3. Details of the forecast information provided by the warning centres in the region are provided in Chapter 3.

Tropical cyclone warning centres maintain close liaison with each other and provide mutual support where necessary. Whenever a centre has observational data that conflict with the warning issued by another centre, that data is sent immediately to the warning centre which issued the warning.

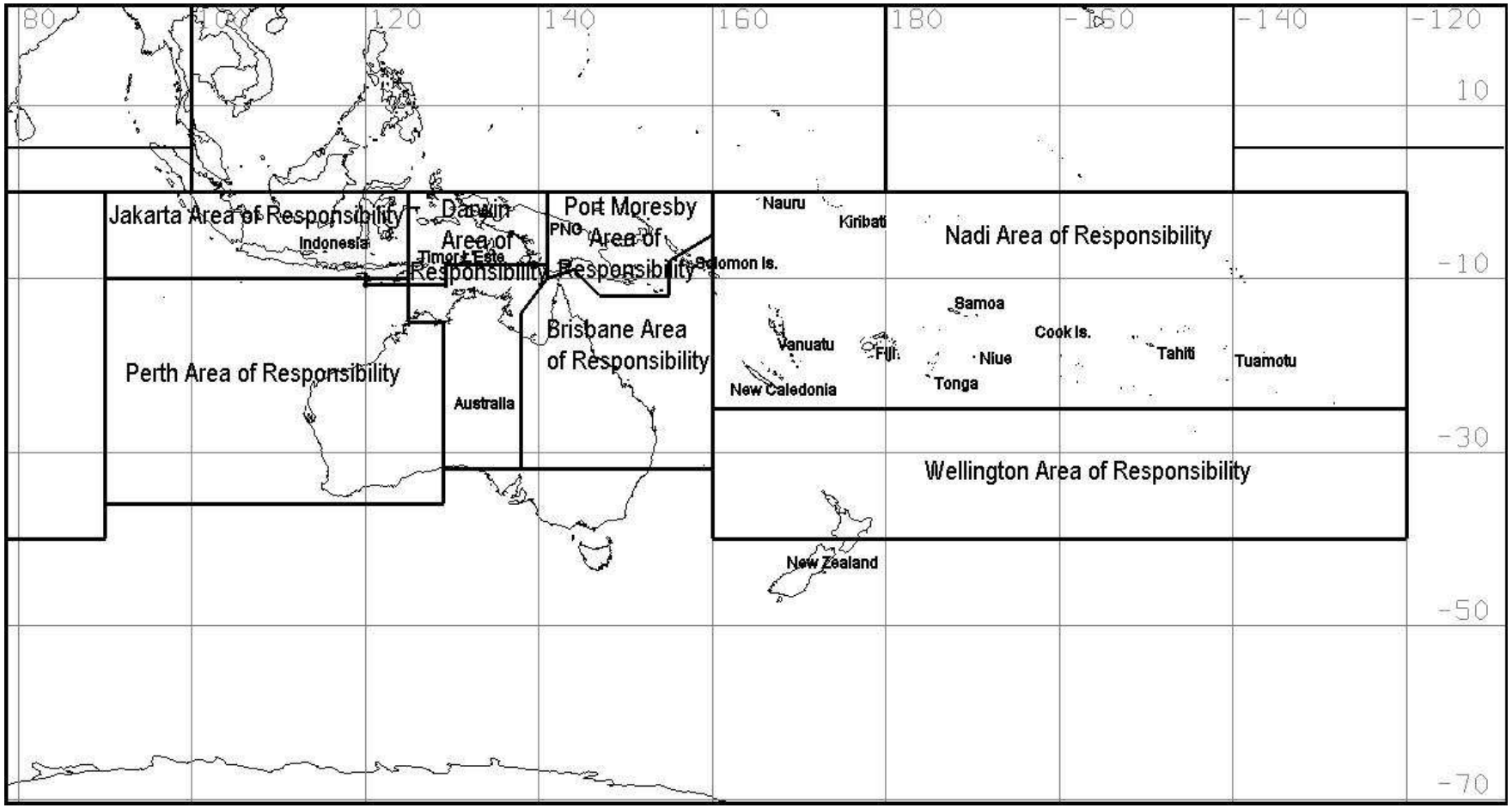


Figure 1. Tropical cyclone warning centres' areas of prime oceanic responsibility south of the equator. TCWC Jakarta extended its area of responsibility as from 2010/2011 season.

2.2.1.1 Naming tropical cyclones

For unambiguous identification of tropical cyclones, a system of naming has been adopted by the RA V Tropical Cyclone Committee.

A tropical depression will be named as a tropical cyclone whenever observations and/or Dvorak intensity analysis indicate the presence of gale force winds near the centre that are likely to continue. It can include systems that satisfy these criteria but have a non-classical appearance in the satellite imagery and/or originate further south than the normal formation areas. The name is taken from a list allocated to that warning centre as set out in Table 1.

If a tropical depression becomes a tropical cyclone in the Wellington TCWC area of responsibility, Wellington TCWC in consultation with RSMC Nadi, will name the cyclone by using the next name from RSMC Nadi's list.

The name selected follows that used for the most recent cyclone named by the warning centre. When the list is exhausted the sequence is repeated.

Once named, a tropical cyclone retains the same name for its entire lifetime.

Declassifying a Tropical Cyclone: A tropical cyclone will be declassified whenever observations and/or Dvorak intensity analysis indicate that the system has less than gale force winds near the centre or the system has transformed into an extra-tropical cyclone structure. Reference to the cyclone’s name is usually dropped a short while after declassification.

Retiring a cyclone name: If the impact of a cyclone on a country or territory causes loss of life and/or significant damage and disruption to the way of life of a community then the name assigned to that cyclone is retired from the list. However, in regard to Port Moresby, once a name is used, it is retired from the list. Refer to Attachment 2B for a list of retired names. The Committee will replace a retired name with another name starting with the same letter.

TABLE 1

TROPICAL CYCLONE NAMES

1. TROPICAL CYCLONE NAMES: AUSTRALIAN REGION

Commencing with the 2008/09 season, Australia will be using a single list of 104 names for tropical cyclones in the Australian Region. This list will replace the individual lists of names previously managed by the three Australian Bureau of Meteorology Tropical Cyclone Warning Centres.

The name of a new tropical cyclone is selected from this list of names. If a named cyclone moves into the Australian region from another country's zone of responsibility, the name assigned by that other country will be retained. The names are normally chosen in sequence, when the list is exhausted, we return to the start of the list.

In the event of significant cyclones, the name will be retired, and replaced in the next RA V TCC session

A	Anika	Anthony	Alessia	Alfred	Ann
B	Billy	Bianca	Bruce	Blanche	Blake
C	Charlotte	Courtney	Catherine	Caleb	Claudia
D	Dominic	Dianne	Dylan	Debbie	Damien
E	Ellie	Errol	Edna	Ernie	Esther
F	Freddy	Fina	Fletcher	Frances	Ferdinand (Feng or Folkert?)
G	Gabrielle	Grant	Gillian	Greg	Gretel
H	Herman	Hayley	Hadi	Hilda	Harold
I	Ilsa	Iggy	Ivana	Ilsobel	Imogen
J	Jasper	Jenna	Jack	Joyce	Joshua
K	Kirrily	Koji	Kate	Kelvin	Kimi
L	Lincoln	Luana	Lam	Linda	Lucas
M	Megan	Mitchell	Marcia	Marcus	Marian
N	Neville	Narelle	Nathan	Nora	Noah
O	Olga	Osamu	Olwyn	Owen	Odette
PQ	Paul	Peta	Quang***	Penny	Paddy
R	Robyn	Rubina	Raquel	Riley	Ruby
S	Sean	Sandra	Stan	Savannah	Seth
T	Tasha	Tim	Tatiana	Trevor	Tiffany
UV	Vince	Victoria	Uriah	Veronica	Vernon
WXYZ	Zelia (Zee or Zhu)	Zane	Yvette	Wallace	

First name used for the 2008/2009 season is Anika, then Billy, etc.

TABLE 1 (Cont'd)

2. RSMC NADI'S AREA OF RESPONSIBILITY

The name of a new cyclone is determined by sequentially cycling through lists A, B, C and D, then starting list A again. Names from the standby list E are used as replacements when necessary.

LIST A	LIST B	LIST C	LIST D	LIST E (Standby)
Ana	Arthur	Alvin	Amos	Aru
Bina	Becky	Bune	Bart	Bela
Cody	Chip	Cyril	Colin	Cook
Dovi	Denia	Daphne	Donna	Dean
Eva	Elisa	Eden	Ella	
Fili	Fotu	Florin	Frank	
Gina	Glen	Garry	Gita	Garth
Hagar	Hettie	Haley	Hali	Hart
Irene	Innis	Isa	Iris	
Judy	Joni	June	Jo	Julie
Kerry	Ken	Kofi	Kala	Kevin
Lola	Lin	Louise	Leo	
Mal	Mick	Mike	Mona	Moses
Nat	Nisha	Nute***Niko	Neil	
Olo	Oli	Odile***Opeti	Oma	
Pita	Pearl	Pam	Pami	Pearl
Rae	Rene	Reuben	Rita	Rex
Sheila	Sarah	Solo	Sarai	Suki
Tam	Tomas	Tuni	Tino	Troy
Urmil		Ula		
Vaianu	Vanessa	Victor	Vicky	Velma
Wati	Wano	Winston	Wiki	Wanita
Xavier	Yvonne	Yalo	Yolanda	Yates
Yani	Zaka	Zena	Zazu	Zidane
Zita				

3. PORT MORESBY'S AREA OF RESPONSIBILITY

The name of a new cyclone is determined by sequentially cycling through list A. Standby list B is used to replace retired names in List A and any replacement name will be added to the bottom of list A to maintain the alphabetical order.

LIST A	LIST B (Standby)
Alu	Nou
Buri	Obaha
Dodo	Paia
Emau	Ranu
Fere	Sabi
Hibu	Tau
Ila	Ume
Kama	Vali
Lobu	Wau
Maila	Auram

4. JAKARTA TCWC AREA OF RESPONSIBILITY

NB: Jakarta TCWC - The name of a new tropical cyclone is determined by sequential cycling through List A. Standby List B is used to replace retired names in List A and any replacement will be added to the bottom of List A to maintain the alphabetical order.

LIST A	**LIST B (Stand by)**
1. Anggrek	1. Anggur
2. Bakung	2. Belimbing
3. Cempaka	3. Duku
4. Dahlia	4. Jambu
5. Flamboyan	5. Lengkeng
6. Kenanga	6. Melati
7. Lili	7. Nangka
8. Mangga	8. Pisang
9. Seroja	9. Rambuta
10. Teratai	10. Sawo

2.2.1.2 Warnings near common boundaries

Whenever a tropical cyclone is within ten degrees of a common boundary, the other tropical cyclone warning centre sharing that boundary, receives all the Gale, Storm and Hurricane Warnings for that tropical cyclone which are issued by the tropical cyclone warning centre with prime responsibility for the area (see Section 2.1.2).

When a cyclone is located or is expected to be located such that two or more tropical cyclone warning centres are involved, every attempt is made to resolve any differences of opinion on the cyclone and its expected behaviour through discussions. After discussion, the decision of the warning centre with prime responsibility prevails.

The warning centre with prime responsibility for the cyclone issues the warning for that cyclone. The warning includes all regions affected by the tropical cyclone, even when these extend into another centre's area of responsibility (refer to 2.1.2.1).

Any other centre which issues concurrent warnings for that tropical cyclone ensures that its warnings and advisories are compatible with those issued by the centre with prime responsibility. The underlying principle is that users do not get conflicting information.

2.2.1.3 Transfer of warning responsibilities

When a tropical cyclone is about to move from one centre's area of responsibility into another's, the former centre requests that the latter accept prime responsibility for the issue of subsequent warnings on the tropical cyclone.

Once the latter centre has accepted responsibility, the relinquishing centre notifies all previous addressees of the transfer of responsibility. A separate message is then issued, and a reference is inserted in the next international marine warning.

If, before the next warning is due to be issued, the tropical cyclone does not move from one centre's area of responsibility into another's as anticipated, the centre which has accepted prime responsibility for the issue of warnings, nevertheless, issues the warning as agreed.

2.2.1.4 Contingency arrangements

When it is not possible for a tropical cyclone warning centre to carry out all or some of its responsibilities, another designated tropical cyclone warning centre temporarily assumes some or all these responsibilities in accordance with the current Contingency Plans as given in Chapter 6.

2.2.1.5 Non-operational responsibilities

Tropical cyclone warning centres serve as regional information centres for tropical cyclones in their area of prime responsibility (see Section 2.1.2), preparing reports on tropical cyclones as soon as possible after the event and maintaining forecast performance statistics (see Chapter 7).

2.2.2 Responsibilities of all Members

2.2.2.1 Internal dissemination of warnings

The dissemination of tropical cyclone warnings in each country or territory is the responsibility of the country or territory concerned.

2.2.2.2 Provision of observational data

For the stations and observing schedules comprising the regional basic synoptic network (RBSN) in the regular programme of the WWW Plan for the area of RA V covered by this Operational Plan, refer to Attachment 2A.

(a) Surface observations

In addition to routine observations in the regular programme of the WWW Plan, during the cyclone season, Members provide additional surface observations from manually operated stations normally when a cyclone is within 200 km of a station or upon request by the responsible RSMC or TCWC.

(b) Upper-air observations

During the cyclone season Members provide, as far as is possible, additional upper-air observations on request by the responsible tropical cyclone warning centre, normally whenever a cyclone is within 500 km of a station.

(c) Reports from voluntary observing stations

Members make every effort to provide to the responsible tropical cyclone warning centre, observations made by voluntary observing stations as soon as possible, if necessary as plain language reports, using normal communication channels. Such reports include, preferably, the coordinates of the observing station or other accurate measure of location.

(d) Radar observations

Members make every effort to collect and distribute speedily and, as far as possible in a standard format, radar observations of tropical cyclones, particularly eye fixes.

2.2.2.3 Collection and exchange of other observational data

(a) Ships weather reports

Members operating Coastal Radio Stations make prompt arrangements for specific requests for ship reports from any area of current cyclone activity and for the speedy collection and dissemination of such reports, even if some of these are to be transmitted in plain language.

(b) Aircraft weather reports

Members collect and disseminate all aircraft observational reports received from within their respective areas of responsibility under the ICAO Air Navigation Plan.

2.2.2.4 Communications

Members disseminate forecasts, warnings and observations in accordance with Aeronautical Fixed Telecommunications Network (AFTN) procedures and/or with Global Telecommunications System (GTS) procedures as appropriate (see Chapter 5).

ATTACHMENT 2A

STATIONS AND OBSERVATIONAL PROGRAMMES COMPRISING THE BASIC SYNOPTIC NETWORK FOR TROPICAL CYCLONE FORECASTING IN THE SOUTH-EAST INDIAN OCEAN AND THE SOUTH PACIFIC

Refer to WMO-No. 9 (Volume A – Observing Stations) for an up-to-date list of stations and observational programmes. The WMO RA V Tropical Cyclone Committee (September, 2000) decided it is better to find the latest data in the original documents than to rely on outdated listings which were previously included in this Plan.

ATTACHMENT 2B

LIST OF TROPICAL CYCLONE NAMES WITHDRAWN FROM USE DUE TO A CYCLONE'S NEGATIVE IMPACT ON ONE OR MORE COUNTRIES

TROPICAL CYCLONE NAMES RETIRED FROM THE AUSTRALIAN REGION

Western Region (Perth TCWC)

Name	*Year*
Alby	1978
Annette	1994
Bobby	1995
Chloe	1984
Connie	1987
Chris	2002
Daphne	1982
Elaine	1999
Elsie	1987
Fifi	1983
Frank	1984
Gertie	1995
Graham	2003
Gwenda	1999
Herbie	1988
Ian	1992
Ilona	1988
Inigo	2003
Jane	1983
Joan	1975
John	1999
Kirsty	1996
Lena	1984
Lindsay	1986
Margot	1985
Monty	2004
Naomi	1994
Ned	1990
Orson	1989
Pearl	1994
Pedro	1989
Quenton	1983
Rhonda	1997
Rosita	2000
Sam	2000
Sharon	1994
Tina	1992
Trixie	1975
Heidi	2011
Lua	2011

Northern Region (Darwin TCWC)

Name	*Year*
Fay	2004
Jason	1988
Olivia	1996
Rachel	1997
Sandy	1985
Sid	1988
Thelma	1998
Tracy	1974
Vance	1999
Carlos	2011

Australian Region (National list for Perth, Darwin and Brisbane TCWCs)

Name	*Year*
Oswald	2012
Rusty	2012
Ita	2013

(Note: additional names will be inserted)

Eastern Region (Brisbane TCWC)

Name	*Year*	
Abigail	2001	
Ada	1970	
Agnes	1995	
Aivu	1989	Named by PNG
Althea	1971	
Audrey	1964	
Barry	1996	
Beth	1976	
Betsy	1992	
Charlie	1987	
Celeste	1996	
Cliff	1981	
Daisy	1972	
David	1976	
Delilah	1988	
Dinah	1967	
Dora	1971	
Dominic	1982	
Elinor	1983	
Emily	1972	
Erica	2003	
Ethel	1996	
Felicity	1989	
Fergus	1996	
Fiona	1971	
Flora	1964	
Fran	1992	
Gertie	1971	
Ivor	1990	
Jason	1988	
Joy	1990	
Justin	1997	
Katrina	1998	
Kathy	1984	
Kerry	1979	
Lance	1984	
Madge	1973	
Mark	1992	
Nina	1992	
Nigel	1985	
Oliver	1993	
Rewa	1994	Named by Fiji
Roger	1993	
Rona	1999	
Sandy	1985	
Steve	2000	
Sid	1998	
Simon	1980	
Ted	1976	
Tessi	2001	
Violet	1995	
Warren	1995	
Wanda	1974	
Winifred	1986	
Jasmine	2012	

Port Moresby's Area of responsibility

Name	*Year*
Adel	1993
Agi	1988
Aivu	1989
Epi	2003
Manu	1986
Upia	2002
Guba	2008

Jakarta TCWC area of responsibility

Name	**Year**
Mawar	2012

(Note: ddditional names will be inserted)

RSMC Nadi's responsibility

Name	*Year*
Agatha	1971/72
Alison	1974/75
Ami	2002/03
Anne	1987/88
Bebe	1972/73
Beni	2002/03
Beti	1995/96
Betsy	1991/92
Bob	1977/78
Bola	1987/88
Carlotta	1971/72
Charles	1977/78
Cilla	2002/03
Cliff	2006/07
Cora	1998/99
Daman	2007/08
Dani	1998/99
Diana	1977/78
Drena	1996/97
Eddie	1980/81
Elsa	1975/76
Eric	1984/85
Erica	2002/03
Esau	1991/92
Fay	1978/79
Flora	1974/75
Fran	1991/92
Frank	1998/99
Funa	2007/08
Gavin	1996/97
Gordon	1978/79
Gene	2007/08
Gyan	1981/82
Hal	1977/78
Harry	1988/89
Helene	currently on Darwin list
Heta	2003/04
Hina	1996/97
Ima	1985/86
Isaac	1981/82
Ivy	2003/04
Joni	1992/93
Joti	1982/83
Juliette	
Keli	1996/97
Kim	1999/2000
Kina	1992/93
Koko	
Lili	1988/89
Lisa	1982/83
Lottie	1973/74
Marion	1976/77

RSMC Nadi's responsibility (cont'd)

Name	*Year*
Mark	1982/83
Martin	1997/98
Meli	1978/79
Meena	2004/05
Mick	2009/10
Namu	1985/86
Nancy	2004/05
Nigel	1984/85
Nina	1992/93
Ofa	1989/90
Olaf	2004/05
Oli	2009/10
Oscar	1982/83
Osea	1997/98
Paula	2000/01
Pat	2009/10
Pate	2009/10
Peni	1989/90
Percy	2004/05
Polly	1992/93
Prema	1992/93
Raja	1986/87
Rewa	1993/94
Robert	1976/77
Ron	1997/98
Rosie	1970/71
Sally	1986/87
Sina	1990/91
Sose	2000/01
Susan	1997/98
Tahmar	1980/81
Theodore	1993/94
Tia	1991/92
Tina	1973/74
Tomas	2009/10
Trina	2001/02
Tui	1997/98
Tusi	1997/98
Ului	2009/10
Uma	1986/87
Ursula	1997/98
Val	1991/92
Veena	1982/83
Veli	1997/98
Vivienne	1971/72
Waka	2001/02
Wally	1979/80
Wasa	1991/92
Watorea	1975/76
Wendy	1971/72
William	1994/95
Zoe	2002/03

RSMC Nadi's responsibility (cont'd)

Name	Year
Vania	2010/11
Wilma	2010/11
Yasi	2010/11
Atu	2010/11
Evan	2012/13
Freda	2012/13
Ian	2012/13
Pat	2012/13

CHAPTER 3

TROPICAL CYCLONE INFORMATION AVAILABLE IN THE REGION

3.1 Introduction

This chapter describes and documents the forecasts, warnings and observational data that are available to Members in the Region. It includes warning criteria and formats, frequencies and times of issue and current international addressees.

3.2 Forecast information provided by Meteorological Centres within the region

Since RSMC Nadi provides forecasts and warnings to the general population of Banaba, Kiribati, Niue, Tolelau, Tonga, Tuvalu and Cook Islands including Fiji, the tropical cyclone forecast and warning information provided by RSMC Nadi is covered in more detail than for the other seven tropical cyclone warning centres given below.

3.2.1 RSMC Nadi

3.2.1.1 Special weather bulletins

(a) Purpose

Special weather bulletins are intended to:

(1) alert a community to the developing threat of a tropical cyclone, or
(2) provide warnings of tropical cyclones or other disturbances, or
(3) cancel “Alert” or “Warning”

(b) Overview

Special Weather Bulletins either contain or cancel a TROPICAL CYCLONE ALERT or a TROPICAL CYCLONE WARNING (GALE, STORM or HURRICANE WARNING). Details of TROPICAL CYCLONE ALERT BULLETINS are provided in Section 3.2.1.2 below and of GALE, STORM and HURRICANE WARNINGS are provided in Section 3.2.1.3 below.

The importance of providing the population with adequate prior warning is the highest priority, even though, at times, this may result in false alarms and the need to issue subsequent intermediate bulletins based on more precise information.

All intermediate bulletins will be prefixed by the word FLASH.

(c) Criteria for first issue

These depend on the type of Special Weather Bulletin and are detailed below in the description of the specific bulletin.

(d) Frequency and times of subsequent issues

These vary with the type of Special Weather Bulletin and are detailed below in the description of the specific bulletin.

(e) Review

All Special Weather Bulletins are kept under constant review but due to the periodic nature of synoptic data, substantial review is only possible at three hourly intervals.

(f) Amendment criteria

When new information indicates a significant change in the situation and invalidating the current Special Weather Bulletin, an intermediate bulletin is issued as soon as possible to advise

recipients of the new situation. Such a Special Weather Bulletin is brief and issued without delay. It includes essential information on the position and movement of the cyclone, the new areas expected to be affected and the time, and it states that a full bulletin will follow as soon as possible. Intermediate bulletins are included in the numbered sequence of Special Weather Bulletins.

(g) Recipients

Special Weather Bulletins are issued to the following islands or groups of islands:

Cook Islands
Fiji
Kiribati
Nauru
Niue
Tokelau
Tonga
will
issue
their
own
SWB
starting
from
2015/1
6 TC
season
and
onward
sTuvalu

Copies of all Special Weather Bulletins are sent to Wellington TCWC.

(h) Format

Special Weather Bulletins are self contained to the extent that they do not refer to information in other advisories or bulletins.

Special Weather Bulletins are written in simple, unambiguous English that can be translated into local languages with a minimum of risk of misinterpretation. Sentences are short and as far as possible technical terms are avoided.

A continuous sequence of Special Weather Bulletins for a particular island group is numbered sequentially from BULLETIN NO.1 for the first issue.

If a Special Weather Bulletin sequence ends for a time and is then resumed for the same cyclone and for the same island group, the Bulletin number sequence resumes.

The Bulletin identification includes the Bulletin sequence number, the appropriate ALERT or WARNING designation, the originating office and time and date of issue (UTC).

Example:

"SPECIAL WEATHER BULLETIN NUMBER SIX FOR TONGA
ON TROPICAL CYCLONE YALO ISSUED FROM RSMC NADI
AT 0800 UTC ON 8 DECEMBER 1987.

TROPICAL CYCLONE ALERT/ WARNING.....

A HURRICANE WARNING IS IN FORCE.....

A STORM WARNING IS IN FORCE.....
.

A GALE WARNING IS IN FORCE.....

A TROPICAL CYCLONE ALERT IS IN FORCE....."

The end of the first Special Weather Bulletin (BULLETIN NO.1) includes a request for it to be acknowledged, e.g. "PLEASE ACKNOWLEDGE RECEIPT OF THIS BULLETIN". It is acknowledged by the addressee on receipt

(i) Termination of special weather bulletins

When the threat to an island group ceases or the danger has passed a cancellation message will be sent to the addressees of the original Alerts or Warnings. The message includes explanatory text, e.g.

"TROPICAL CYCLONE ALICE HAS NOW
WEAKENED AND MOVED AWAY TO THE SOUTH.
ALL WARNINGS FOR TUVALU ARE NOW CANCELLED."

or

"TROPICAL CYCLONE CAROL HAS TURNED AWAY
SOUTHWESTWARD AND NO LONGER THREATENS FIJI. THE
TROPICAL CYCLONE ALERT FOR FIJI IS CANCELLED".

Alerts or Warnings are cancelled only when there is a high degree of confidence that they are no longer required.

(j) Response from user States

Receipt of the BULLETIN NO.1 is promptly acknowledged. Whenever subsequent scheduled bulletins are not received, RSMC Nadi is notified within half an hour of expected issue time. If an acknowledgement message is not received at RSMC Nadi it will seek, by all means possible, to ascertain if special weather bulletins have been correctly received.

RSMC Nadi is also notified of the receipt of all intermediate Special Weather Bulletins, prefixed FLASH.

3.2.1.2 Tropical cyclone alert

(a) Purpose

A Tropical Cyclone Alert bulletin gives information on the development of an incipient cyclone or the progress of a cyclone still some distance away, if there is a significant probability that winds may later reach gale force or more. It is intended to give members of the community time to check their preparedness and to put them on the alert for possible warnings to follow.

(b) Time of issue of the first alert

The issue of the first Alert is timed, as far as possible, in relation to normal activities, daylight, broadcasting hours, etc., to ensure it reaches the greatest number of people. It is normally 24 to 48 hours before the onset of gale force or stronger winds.

(c) Time and frequency of subsequent Alerts

The time of the next scheduled Alert is included in the current Alert although it may be necessary to issue an Alert at an intermediate time. They are issued at least six hourly.

(d) Content

Tropical Cyclone Alerts are expressed in rather general terms and normally apply to a whole island group such as Fiji, Tonga, or the Southern Cook Group.

Examples of TROPICAL CYCLONE ALERTS

Example 1.

"***SPECIAL WEATHER BULLETIN*** NUMBER ONE FOR THE SOUTHERN COOKS ON TROPICAL CYCLONE PAM ISSUED FROM RSMC NADI AT 1700 UTC ON 6 DECEMBER

TROPICAL CYCLONE ALERT

A TROPICAL CYCLONE ALERT IS NOW IN FORCE FOR SOUTHERN COOKS.

TROPICAL CYCLONE PAM (995hPa) WAS LOCATED NEAR 11.9 DEGREES SOUTH 162.6 DEGREES WEST OR ABOUT 360 NAUTICAL MILES NORTH OF PALMERSTON ISLAND AT 061500 UTC. PAM IS INTENSIFYING AND CURRENTLY SLOW-MOVING BUT IS EXPECTED TO MOVE SOUTHWARDS LATER.

ON THIS FORECAST TRACK, THE CYCLONE MAY BRING GALE FORCE WINDS OVER PALMERSTON ISLAND AND OTHER NORTHERN PARTS OF THE SOUTHERN COOKS IN THE NEXT 24 TO 48 HOURS.

FOR PALMERSTON ISLAND: SOUTHEAST WINDS 25 KNOTS WITH GUSTS TO 35 KNOTS. CLOUDY WITH OCCASIONAL RAIN DEVELOPING. SEAS ROUGH WITH A MODERATE TO HEAVY SWELL.

FOR THE REMAINING ISLANDS OF THE SOUTHERN COOKS:STRONG AND GUSTY SOUTHEAST WINDS. CLOUDY, WITH SHOWERS BECOMING MORE FREQUENT LATER TODAY. SEAS ROUGH WITH A MODERATE SWELL.

THE NEXT SPECIAL WEATHER BULLETIN FOR THE SOUTHERN COOKS WILL BE ISSUED AROUND 062300 UTC OR EARLIER.

PLEASE ACKNOWLEDGE RECEIPT OF THIS BULLETIN."

Example 2.

"***SPECIAL WEATHER BULLETIN*** NUMBER THREE FOR NIUE ISSUED FROM RSMC NADI AT 0200 UTC ON 6 JANUARY.

TROPICAL CYCLONE ALERT

A TROPICAL CYCLONE ALERT IS IN FORCE FOR NIUE.

THE WEATHER IS DISTURBED IN THE AREA BETWEEN NORTHERN PARTS OF TONGA AND NIUE AND THERE IS A CHANCE THAT A TROPICAL CYCLONE MAY DEVELOP CLOSE TO NIUE DURING THE NEXT 24 TO 36 HOURS. IF IT DOES SO,

GALE FORCE WINDS MAY BE EXPERIENCED OVER NIUE LATE
TOMORROW. FORECAST FOR NIUE UNTIL 071200 UTC:
EXPECT EASTERLY WINDS 20 TO 25 KNOTS POSSIBLY RISING TO 35 KNOTS LATE TOMMORROW. RAIN AT TIMES. SEA POSSIBLY BECOMING VERY ROUGH, WITH A MODERATE TO HEAVY EASTERLY SWELL.

THE NEXT BULLETIN WILL BE ISSUED AT 060800 UTC."

Example 3.

"***SPECIAL WEATHER BULLETIN*** NUMBER SEVEN FOR TUVALU ON TROPICAL CYCLONE PAM ISSUED FROM RSMC NADI AT 1600 UTC ON 22 DECEMBER UTC

A TROPICAL CYCLONE ALERT PREVIOUSLY IN FORCE FOR TUVALU IS NOW CANCELLED.

TROPICAL CYCLONE PAM WAS LOCATED ABOUT 250 NAUTICAL MILES SOUTHEAST OF NIULAKITA AT 061500 UTC AND IS NOW MOVING STEADILY SOUTHEASTWARDS. AS A RESULT, GALE FORCE WINDS ARE NO LONGER EXPECTED OVER TUVALU.

FORECAST FOR TUVALU UNTIL 231200 UTC:
WESTERLY WINDS 20 TO 25 KNOTS AND SQUALLY IN A FEW HEAVY SHOWERS AND THUNDERSTORMS. ROUGH SEAS WITH A MODERATE NORTHWEST SWELL.

THIS WILL BE THE FINAL SPECIAL WEATHER BULLETIN FOR TUVALU UNLESS THE SITUATION CHANGES. THE NEXT BULLETIN WILL BE THE ROUTINE ISSUE AT 230230 UTC."

3.2.1.3 **Tropical cyclone warnings**

(a) Criteria for first issue

Tropical cyclone warnings for a population are issued in Special Weather Bulletins as soon as it is apparent that gale, storm or hurricane force winds respectively are expected within 24 hours.

(b) Time of first issue

As far as possible, warnings are issued to reach the public in time to allow several hours of daylight in which action will be taken such as to dock boats safely and to take other protective measures against severe conditions.

To achieve this, every effort is made to issue warnings:

(a) approximately 24 hours ahead of dangerous conditions

(b) at times when the warnings can most readily reach the greatest proportion of the community, e.g. early in the working day or during the normal hours of the local broadcasting station.

(c) Frequency of issue of subsequent warnings

Subsequent warnings are normally issued at three-hour intervals unless it is necessary to issue a revised warning in an intermediate Special Weather Bulletin.

(d) Format

Special Weather Bulletins relating to tropical cyclones issued as Warnings follow the general WMO format for marine warnings. However, as far as possible they are expressed in non-technical language and normally include:

(i) Identification of disturbance e.g. TROPICAL CYCLONE HELEN.

(ii) Location of disturbance with reference to well known landmarks, with bearing expressed in compass points and distances in nautical miles, e.g. "TROPICAL CYCLONE SUSAN WAS CENTRED ABOUT 100 NAUTICAL MILES WEST OF NADI OR NEAR 18 SOUTH 176 EAST AT 6AM".

(iii) Intensity expressed in terms of wind force with an indication of the potential for damage. It is desirable, especially when very strong winds are expected, to supplement the descriptive term with the average wind speed in knots, together with an estimate of the highest gusts, e.g. "WITHIN 30 NAUTICAL MILES OF ITS CENTRE TROPICAL CYCLONE VICTOR HAS WINDS OF DESTRUCTIVE STORM FORCE UP TO ABOUT 55 KNOTS WITH GUSTS TO ABOUT 80 KNOTS ..."

or

"..... WITH VERY DESTRUCTIVE HURRICANE FORCE WINDS NEAR THE CENTRE PROBABLY REACHING ABOUT 70 KNOTS WITH GUSTS TO ABOUT 100 KNOTS ...."

or

".... WITH GALES UP TO ABOUT 45 KNOTS AND GUSTS TO ABOUT 65 KNOTS ...."

(iv) Expected movement, with speed in knots.

(v) Forecast position, at some convenient time, expressed with reference to well known landmarks, e.g.

"THE CYCLONE IS EXPECTED TO MOVE SOUTHEASTWARD ACROSS VANUA LEVU TONIGHT AND BE CLOSE TO TAVEUNU AROUND 6 AM TOMORROW MORNING".

(vi) Specific islands or districts likely to experience hurricane force winds or storm force winds. Most listeners are unable to identify the expected path immediately on a map but listen for mention of damaging winds in their own island or district, e.g.

"....DESTRUCTIVE STORM FORCE WINDS WITH AVERAGE SPEEDS UP TO 60 KNOTS AND GUSTS TO 80 KNOTS ARE EXPECTED OVER NAMENA, KORO, CICIA, NAYAU, VANUA MASI, MOALA, KABARA, FULAGA, AND NEARBY SMALLER ISLANDS FOR A BRIEF TIME TONIGHT OR EARLY IN THE MORNING".

It is not always possible to be so specific, e.g.

".....REACHING STORM FORCE OVER THE YASAWA AND MAMANUCA GROUPS AND THE WESTERN HALF OF VITI LEVU".

(vii) Indication of rainfall intensity, given in qualitative terms with a general indication of the chances of flooding, e.g. "THE CYCLONE IS VERY SLOW MOVING AND RAINFALL IS EXPECTED TO BE VERY HEAVY AND PROLONGED OVER ----- AND MAJOR FLOODING IS LIKELY."

(viii) Likelihood of storm surge, given in qualitative terms and non-technical language, e.g.:

"MODERATE (OR SEVERE) RAPID FLOODING FROM THE SEA POSSIBLE IN NORTHERN COASTAL AREAS OF VITI LEVU A FEW HOURS BEFORE THE CENTRE PASSES BY."

(ix) Indications of damaging swell and waves in coastal areas, e.g."HIGHLY DAMAGING SWELL AND HIGH WAVES ARE EXPECTED IN THE NORTHERN COASTAL AREAS."

(x) Supplementary Information for Domestic Marine Interests.

(i) extent of area affected, usually expressed as radius to which hurricane, storm, or gale force winds are expected to extend, and

(ii) the sea conditions, e.g.

"..... EXPECT WINDS OF STORM FORCE WITH VERY HIGH SEAS WITHIN ABOUT 50 NAUTICAL MILES OF CENTRE AND GALE FORCE WITH VERY ROUGH TO HIGH SEAS OUT TO ABOUT 150 NAUTICAL MILES ....."

or

".... WITH GALES AND VERY ROUGH TO HIGH SEAS OUT TO ABOUT 200 NAUTICAL MILES ...."

3.2.1.4 Tropical disturbance summaries

(a) Purpose

Tropical disturbance summaries are designed to give advance information of the possibility of a tropical cyclone forming out of an existing tropical disturbance.

(b) General description

The summaries describe each significant tropical disturbance and the potential for development into a tropical cyclone in the area Equator to 25°S, 160°E to 120°W.

(c) Time and frequency of issue

The summaries are issued daily at 2300 UTC and reviewed at 0900 UTC. Bulletins may also be issued outside period 1 November to 30 April in the event of a tropical disturbance showing signs of possible development into a tropical cyclone.

(d) Contents

The message contains the following as essential information:

(i) bulletin heading WWPS21 NFFN YYGGgg;

(ii) identification of the message-issuing office (Nadi), date and time of issue (UTC);

(iiii) the analysis and the nature of the data it is based on;

(iv) the potential for development of the disturbance into a tropical cyclone (LOW, MODERATE, HIGH) during the next ... hours;

(v) SIGNIFICANT TROPICAL DISTURBANCES ANALYSED OR FORECAST IN THE AREA".

3.2.1.5 Tropical disturbance advisory

(a) Purpose

The information is provided as guidance for use in:

(i) the preparation of forecasts, warnings and SIGMET messages where necessary;

(ii) situation interpretations to national organizations dealing with cyclone emergencies;

(iii) background briefing material.

(b) General description

This Advisory describes each significant tropical disturbance in the area EQUATOR to 25S, 160E to 120W. Separate distinctly identifiable messages are disseminated on each disturbance if more than one exist at any one time.

(c) Criterion for first issue

The first message is issued immediately there is reasonable evidence of a tropical disturbance or a depression developing into a tropical cyclone within the next 48 hours.

(d) Time and frequency of subsequent advisories

Subsequent issues are made six hourly close to 0200, 0800, 1400 and 2000 UTC. However, if any rapid or unexpected changes occur in movement or development, intermediate advisories are issued.

(e) Contents

The message contains information regarding:

(i) identification of the message (disturbance serial number, issuing office (NADI), date/time (UTC));

(ii) the analysis and the nature of the data it is based on;

(iii) the confidence in the analysis;

(iv) the prognosis of location and intensity from 12 to 48 hours.

(v) time of next issue.

A separate Tropical Disturbance Advisory is issued for each tropical disturbance and carries a serial number preceded by an alphabetical letter "A" for the first disturbance, "B" for the second, etc. (the letter being retained through the entire life of the disturbance).

Example 1.

"TROPICAL DISTURBANCE ADVISORY NO A2 ISSUED BY RSMC NADI AT 170750 UTC DECEMBER 1986.

SHALLOW TROPICAL DEPRESSION CENTRE POORLY DEFINED ESTIMATED WITHIN 100 NAUTICAL MILES OF 12S 165W AT 170600 UTC. WINDS UP TO 25 KNOTS, STRONGEST IN THE SOUTHERN SEMICIRCLE. ANALYSIS BASED ON POOR SATELLITE PICTURES AND PERIPHERAL SURFACE OBSERVATIONS.

A GRADUAL WESTSOUTHWEST DRIFT EXPECTED WITH MODERATELY RAPID DEEPENING IN THE NEXT 24 TO 36 HOURS. WEAK VERTICAL WIND SHEAR ABOVE SYSTEM AND A REASONABLE SOUTHEASTERLY EQUATORWARD OUTFLOW SUGGESTS STEADY DEEPENING. TREND OF PAST MOVEMENT NOT WELL KNOWN DUE TO LACK OF RELIABLE PAST ANALYSIS AND DEFINITION. SYSTEM EXPECTED TO BE STEERED MAINLY BY THE LOWER TROPOSPHERIC EASTERLIES NORTH OF THE SUBTROPICAL RIDGE. THE SYSTEM POSES AN IMMEDIATE THREAT TO AMERICAN SAMOA AND INDEPENDENT SAMOA AND LATER TO NORTHERN TONGA AND WALLIS/FUTUNA ISLANDS.

THE NEXT ADVISORY ON THIS DISTURBANCE WILL BE ISSUED AT 171945 UTC.

Example 2.

TROPICAL DISTURBANCE ADVISORY NO B3 ISSUED BY RSMC NADI AT 290745 UTC JANUARY 1986.

HURRICANE ZENA CENTRED WITHIN 60 NAUTICAL MILES OF 11S 162E AT 290600 UTC. MAXIMUM SUSTAINED WIND SPEED ABOUT 65 KNOTS. ANALYSIS BASED ON PERIPHERAL SURFACE OBSERVATIONS AND INTENSITY ESTIMATED USING DVORAK TECHNIQUE.
CONFIDENCE IN POSITION OF CENTRE FAIR BASED ON CLEAR EYE VISIBLE IN SATPIX.

SYSTEM EXPECTED TO MOVE SOUTHEAST AT 12 KNOTS AT FIRST BUT ACCELERATING TEMPORARILY LATER TO ABOUT 17 KNOTS AFTER 12 HOURS. APPEARS TO BE STEERED LARGELY BY NORTHWESTERLY STEERING FIELD ABOVE SYSTEM. VERTICAL SHEAR ABOVE SYSTEM EXPECTED TO INCREASE SLOWLY AND FURTHER INTENSIFICATION UNLIKELY.

THE NEXT ADVISORY ON THIS DISTURBANCE WILL BE ISSUED AT 291945 UTC.

Example 3.

TROPICAL DISTURBANCE ADVISORY NO C2 ISSUED BY RSMC NADI AT 030745 UTC FEBRUARY 1986.

TROPICAL CYCLONE AMI HAS DEVELOPED NEAR 10S 178E. MAXIMUM SUSTAINED WINDS ESTIMATED AT 40 KNOTS AT 030600Z. CIRCULATION WELL DEFINED BASED ON GOOD SURFACE DATA AND HIGH RESOLUTION SATELLITE DATA.
POSITION ACCURATE WITHIN 60 NAUTICAL MILES.
THE LOW LATITUDE LOCATION OF THE SYSTEM, SMALL VERTICAL SHEAR AND STRONG UPPER TROPOSPHERIC OUTFLOW SUGGEST GOOD PROSPECTS FOR EXPLOSIVE DEVELOPMENT. MAXIMUM SUSTAINED WINDS EXPECTED TO INCREASE TO 65 KNOTS AFTER 12 HOURS. FUTURE MOVEMENT BASED MAINLY ON EXTRAPOLATION AND CLIMATOLOGY EXPECTED TO BE 8 KNOTS WESTWARDS TURNING SOUTHWESTWARDS AFTER 24 HOURS.

THE NEXT ADVISORY ON THIS DISTURBANCE WILL BE ISSUED AT 031945 UTC.

3.2.1.6 Marine gale, storm and hurricane warnings

(a) Criterion for first issue

The first of a series of warnings is issued as soon as gale, storm or hurricane force winds are expected in the area of responsibility within 24 hours.

(b) Frequency of subsequent issues

Subsequent issues are six hourly unless a major amendment is necessary at an intermediate time.

(c) Format and content of warnings

The form and content of Marine Weather Bulletins (including Gale, Storm and Hurricane Warnings) are governed by international agreement. Details concerning these based on WMO Manual on Marine Meteorological Services (Annex VI of WMO Technical Regulations) and as applied by RSMC Nadi are given in Attachment 3A.

3.2.1.7 Tropical cyclone advisories for aviation in accordance with para. 2.1.3.

(a) Purpose

The Advisories are required for the issuance of SIGMET messages by designated meteorological watch offices (MWO) for the purpose of international air navigation in the

RSMC Nadi Tropical Cyclone Advisory area of responsibility from Equator to 40°S, 160°E to 120°W.

(b) General description

The Advisories describe the current locations, intensities (central pressure and maximum surface winds), speed and direction of movement of a tropical cyclone as well as its 6-hourly forecast positions and intensities out to 24 hours.

(c) Time and frequency of issue

The Advisories are issued every 6 hours for as long as a system remains a tropical cyclone.

(c) Contents

The message contains the following as essential information:

(i) bulletin heading FKPS01 NFFN YYGGgg;

(ii) identification of the message, date and time of issue in UTC time, issuing office (TCAC Nadi);

(iii) name of cyclone;

(iv) number of advisory;

(v) position of cyclone centre in degrees and minutes;

(vi) direction and speed of movement;

(vii) central pressure in hPa;

(viii) maximum 10-minute average surface wind;

(ix) forecast positions together with maximum 10-minute surface winds at 6-hourly intervals out to 24 hours;

(x) plain language remarks;

(xi) next issue time in YYYYMMDD/GGggZ.

Example 1.

TC ADVISORY
DTG: 20100315/1200Z
TCAC: NFFN
TC: TOMAS
NR: 14
PSN: S1642 W17936
MOV: S 06KT
C: 930HPA
MAX WIND: 95KT
FCST PSN +6 HR: 15/1800Z S1718 W17936
FCST MAX WIND +6 HR: 100KT
FCST PSN +12 HR: 16/0000Z S1800 W17948
FCST MAX WIND +12 HR: 100KT
FCST PSN +18 HR: 16/0600Z S1854 W17948
FCST MAX WIND +18 HR: 105KT
FCST PSN +24 HR: 16/1200Z S1954 E17942
FCST MAX WIND +24 HR: 105KT
RMK: NIL

NXT MSG: 20100315/1800Z

3.2.1.8 Tropical Cyclone Outlook

(a) Purpose

3-day TC Outlooks are designed to give advance information of existing tropical cyclones and the potential of a tropical cyclone forming out of an existing tropical disturbance as well as the genesis of a totally new cyclone inside the area Equator to 25°S, 160°E to 120°W in the next 3 days.

(b) General description

The Outlooks describe the existence of a tropical cyclone and the potential of each existing significant tropical disturbance developing into a tropical cyclone as well as the genesis of a totally new cyclone in the area Equator to 25°S, 160°E to 120°W in the next 3 days.

(c) Time and frequency of issue

The Outlooks are issued daily at 0400 UTC during the tropical cyclone season. Bulletins may also be issued outside period 1 November to 30 April in the event of a tropical disturbance showing signs of possible development into a tropical cyclone.

(d) Contents

The message contains the following as essential information:

(i) bulletin heading FKPS20 NFFN YYGGgg;

(ii) identification of the message-issuing office (Nadi), date and time of issue (UTC);

(iii) existing tropical cyclones

(iv) the potential (LOW, MODERATE, HIGH) for formation of a tropical cyclone from an existing tropical disturbance in the next 3 days;

(v) the potential (LOW,MODERATE, HIGH) for genesis of a new tropical cyclone in the next 3 days;

(vi) the next issue time.

Example 1.

FKPS20 NFFN 270400 UTC
TROPICAL CYCLONE 3-DAY OUTLOOK FOR AREA : EQUATOR TO 25S
BETWEEN 160E AND 120W ISSUED BY RSMC NADI AT 0400UTC 27TH APRIL 2010.

EXISTING TROPICAL CYCLONE:
NIL.

POTENTIAL FOR NEW TROPICAL CYCLONE FORMATION
TO 1200 UTC FRIDAY 30TH APRIL 2010:

WEDNESDAY 28/04 – LOW
THURSDAY 29/04 - LOW
FRIDAY 30/04 – LOW

THE NEXT BULLETIN WILL BE ISSUED BY 0400 UTC WEDNESDAY
28TH APRIL 2010.

3.2.2 Brisbane TCWC

3.2.2.1 Special Advisories for Solomon Islands

(a) Purpose

Special Advisories are prepared for the specific use of the National Meteorological Centre of the Solomon Islands.

(b) Recipients

Special Advisories are issued for Solomon Islands.

(d) Criterion for first issue

The first Special Advisory of a series is issued as soon as there appears a significant possibility that winds associated with a tropical disturbance or tropical cyclone may reach gale force or stronger within the next 36 hours in the island community concerned.

(d) Frequency of subsequent issues

Subsequent Special Advisories are issued at least every six hours, at 0200, 0800, 1400 and 2000 UTC. The frequency may be increased to three-hourly on request, whenever a tropical cyclone is considered likely to cause gales on the coast or at island communities within the Solomon Islands within 24 hours.

(e) Contents

The message contains the following essential information:

(i) bulletin header;

(ii) issuing office, time and date of issue, sequential message number;

(iii) disturbance type and name of system, if applicable;

(iv) time of analysis;

(v) position in degrees Latitude and Longitude at analysis time;

(vi) direction and speed of movement;

(vii) central pressure, maximum 10-minute wind speed and maximum wind gust;

(viii) expected intensity trend;

(ix) radii of 34 and 48-knot winds in four sectors and radius of 64-knot winds

(x) summary of areas which can expect gales within the next 24 to 48 hours;

(xi) summary of expected developments; an assessment of accuracy of current fix and explanation. Reference is made to the type of threat and the geography of the country/territory concerned. General comments on the expectation of storm surge, wind/swell waves and heavy rainfall, causing flooding and landslides may also be added.

(xii) 12-hour forecast position;

(xiii) remarks describing analysis details and forecast policy;

(xiv) next issue time.

3.2.2.2 Tropical Cyclone Technical Bulletin Eastern Region

(a) Purpose

The Tropical Cyclone Technical Bulletin provides analysis details and forecast position, uncertainty and intensity forecasts at six-hour intervals to +120 hours for tropical cyclones and developing tropical depressions in the Brisbane TCWC area of responsibility (see Chapter 2, Section 2.1.2).

(b) Criterion for first issue

The first issue is prepared whenever a tropical cyclone is in the area of responsibility, or whenever a tropical disturbance reaches a Dvorak T-number of 2.0 or greater.

(c) Frequency and time of subsequent issues

Tropical Cyclone Technical Bulletins are issued by Brisbane TCWC at 0100, 0700, 1300 and 1900 UTC.

(d) Distribution

International distribution is:

North of 20 South	Port Moresby
North of 15 South, East of 150 East	Honiara
North of 25 South, East of 155 East	RSMC Nadi

(e) Content

The message contains the following essential information:

i. bulletin header;

ii. issuing office, time and date of issue;

iii. name of system and Australian identifier code;

iv. time of analysis;

v. position in degrees Latitude and Longitude at analysis time and position uncertainty in nautical miles and kilometers;

vi. direction and speed of movement;

vii. maximum 10-minute wind and central pressure;

viii. radii of 34 and 48-knot winds in four sectors and radius of 64-knot winds;

ix. forecast position, accuracy, maximum wind speed and central pressure at 12-hour intervals to +120 hours;

x. remarks describing analysis details and forecast policy;

xi. next issue time.

See example of Tropical Cyclone Technical Bulletin issued by Darwin TCWC in Section 3.2.3.2 (d).

3.2.2.3 Satellite Analysis Bulletin

(a) Purpose

The Satellite Analysis Bulletin provides information on tropical cyclones and tropical disturbances in the South Pacific Ocean east of the Brisbane area of responsibility, using available satellite data such as GMS and GOES. It includes name of cyclone, data and time of satellite image (UTC) satellite name and image type, latitude error detection sum, longitude error detection sum, direction and speed of movement, Dvorak intensity code, date time of the next advice to be issued and remarks relating to past movement, intensity, supporting data etc.

The satellite bulletin is not a forecast and does not include forecast information.

(b) Criterion for first issue

The first issue is prepared whenever a tropical cyclone is located in the area or whenever a tropical disturbance reaches a Dvorak T-number of 2.0 or greater, or when a disturbance with a Dvorak T-number of 1.5 is expected to continue developing.

(c) Frequency of issue

Satellite Analysis Bulletins are issued at 0030 and 0630 UTC, but may be increased to six-hourly upon activation of Brisbane TCWC for a system with the potential to move into the Eastern Region and/or initiate Special Advisories for the Solomon Islands.

3.2.2.4 Ocean gale, storm and hurricane warnings

These are issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

(a) Criterion for first issue

The first of a series is issued as soon as winds of at least gale force or storm force winds are expected in the area of responsibility within 24 hours.

(b) Frequency and time of subsequent issues

Subsequent issues are six-hourly at 0100, 0700, 1300 and 1900 UTC unless a major amendment is necessary at an intermediate time.

3.2.2.5 Tropical Cyclone Outlook, Eastern Region

(a) Purpose

Tropical Cyclone Outlooks for the Eastern Region provide a probability forecast for potential tropical cyclone development during the next 7 days for the Coral Sea west of 160E.

(b) General description

The outlooks describe the existence of a tropical cyclone and the probability of each existing tropical disturbance developing into a tropical cyclone in the Eastern Region during the next three days. Additional text may be added to describe in general terms the risk of a cyclone developing or moving into the region during the 4-7 day forecast period.

(c) Time and frequency of issue

The outlooks are issued daily around 0400 UTC during the tropical cyclone season, between 1 November and 30 April, and at other times if a tropical disturbance shows signs of development into a tropical cyclone.

(d) Contents

The message contains the following essential information:

(i) bulletin header;

(ii) issuing office, the time, day and date of issue and validity period;

(iii) details of existing tropical cyclones;

(iv) the likelihood (Low, Moderate or High) of each existing tropical disturbance developing into a tropical cyclone during the next 3 days or a statement that no tropical cyclones are expected to develop during the period;

(v) a statement describing in general terms the risk of a tropical cyclone developing or moving into the region during the 4-7 day period.

(vi) definitions of probability ranges and area of validity.

3.2.3 Darwin TCWC

3.2.3.1 Special Advisories for Indonesia and Timor-Leste

Darwin TCWC provides Special Advisories for Indonesia and Timor-Leste for the specific use of the Indonesian BMKG and the Timor-Leste meteorological department to warn the Indonesian and Timor-Leste public. Special Advisories are issued whenever a tropical cyclone threat exists within eastern parts of the Jakarta AoR or within adjacent parts of the Darwin AoR.

Special Advisories for Indonesia and Timor-Leste contain the same information as the Tropical Cyclone Technical Bulletin for the Northern Region (see 3.2.3.2 (d)), with additional descriptions of the potential threat to Indonesia and Timor-Leste.

3.2.3.2 Tropical Cyclone Technical Bulletin Northern Region

(a) Purpose

Same as Brisbane TCWC (see Section 3.2.2.2 (a), except for the area of responsibility of Darwin TCWC).

(b) Criterion for first issue

Same as Brisbane TCWC (see Section 3.2.2.2 (b)).

(c) Frequency and time of subsequent issues

Tropical Cyclone Technical Bulletins for the Northern Region are issued at 0130, 0730, 1330 and 1930 UTC.

(d) Contents

Same as Brisbane TCWC (see Section 3.2.2.2 (e)).

Example:

IDD20021
TROPICAL CYCLONE TECHNICAL BULLETIN: AUSTRALIA - NORTHERN REGION
Issued by DARWIN TROPICAL CYCLONE WARNING CENTRE
at: 1936 UTC 14/03/2014
Name: Tropical Cyclone Gillian
Identifier: 14U
Data At: 1800 UTC
Latitude: 12.8S
Longitude: 139.7E
Location Accuracy: within 35 nm [65 km]

Movement Towards: north northwest [327 deg]
Speed of Movement: 4 knots [7 km/h]
Maximum 10-Minute Wind: 35 knots [65 km/h]
Maximum 3-Second Wind Gust: 50 knots [95 km/h]
Central Pressure: 999 hPa
Radius of 34-knot winds NE quadrant: 50 nm [95 km]
Radius of 34-knot winds SE quadrant: 50 nm [95 km]
Radius of 34-knot winds SW quadrant: 50 nm [95 km]
Radius of 34-knot winds NW quadrant: 50 nm [95 km]
Radius of 48-knot winds NE quadrant:
Radius of 48-knot winds SE quadrant:
Radius of 48-knot winds SW quadrant:
Radius of 48-knot winds NW quadrant:
Radius of 64-knot winds:
Radius of Maximum Winds: 20 nm [35 km]
Dvorak Intensity Code: T2.5/3.0/D0.5/24HRS
Pressure of outermost isobar: 1008 hPa
Radius of outermost closed isobar: 90 nm [165 km]
FORECAST DATA

Date/Time [UTC]	: Location : degrees	: Loc. Accuracy: nm [km]	: Max Wind : knots[km/h]	: Central Pressure : hPa
+06: 15/0000:	12.5S 139.4E:	045 [085]:	040 [075]:	997
+12: 15/0600:	12.2S 138.9E:	060 [110]:	040 [075]:	997
+18: 15/1200:	12.1S 138.4E:	070 [135]:	040 [075]:	997
+24: 15/1800:	11.7S 137.8E:	085 [155]:	040 [075]:	998
+36: 16/0600:	11.2S 136.8E:	105 [195]:	040 [075]:	998
+48: 16/1800:	10.9S 134.9E:	125 [230]:	040 [075]:	998
+60: 17/0600:	10.7S 132.7E:	145 [265]:	040 [075]:	999
+72: 17/1800:	10.4S 129.7E:	160 [300]:	045 [085]:	997
+96: 18/1800:	10.7S 122.7E:	205 [380]:	040 [075]:	1000
+120: 19/1800:	11.1S 114.9E:	295 [545]:	050 [095]:	994

REMARKS:

Position is based on 1617Z AMSU-B microwave image. TC Gillian remains located beneath the upper level ridge allowing outflow both poleward and equatorward outflow. CIMSS wind shear analysis at 1200Z indicated 10-15 knot SE wind shear.

Following a period of rapid intensification about 24 hours ago, convection appears to have lost some of its organisation in the last 6-12 hours. Dvorak analysis with curved band of 0.3 to 0.4 wrap gives a DT to 2.0. MET is 2.5, but pattern is adjusted to 3.0. FT is based on PT. ADT is indicating a CI of 3.1.

The low level centre has been slowly moving NNE over the last 12 hours in response to the mid/upper trough moving just south of the system, but is expected to turn to the NW during Saturday as a short wave trough moves across SE Australia and allows the mid level ridge becomes the dominant steering mechanism.

The system may intensify slightly over the next 6-12 hours as we enter the diurnal maximum, but further development will be restricted as the system moves gradually north of the upper level ridge, by increasing S/SE wind shear and mid level dry air entrainment due to the building ridge to the south and west. In the longer term, the system is expected to move into the Timor Sea but continued shear is expected to significantly slow further intensification.

Most models are in agreement with the cyclone tracking west along the north coast of the Top End, NT. However there is significant variation in model intensity guidance.
Copyright Commonwealth of Australia
==
The next bulletin for this system will be issued by: 15/0130 UTC by Darwin TCWC.

3.2.3.3 Ocean gale, storm and hurricane warnings

These are issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

(a) Criterion for first issue

Same as Brisbane TCWC (see Section 3.2.2.2(a)).

(b) Time and frequency of subsequent issues

Same as Brisbane TCWC (see Section 3.2.2.2(b)).

3.2.3.4 Tropical cyclone advisories for aviation

In accordance with para. 2.1.3.

3.2.3.5 Tropical Cyclone Outlook, Northern Region

(a) Purpose

Same as Brisbane TCWC (see Section 3.2.2.5 (a), except for the area of responsibility of Darwin TCWC).

(b) Criterion for first issue

Same as Brisbane TCWC (see Section 3.2.2.5 (b)).

(c) Frequency and time of subsequent issues

Same as Brisbane TCWC (see Section 3.2.2.5 (c)).

(d) Contents

Same as Brisbane TCWC (see Section 3.2.2.5 (d)).

Example:

IDD10610
Australian Government Bureau of Meteorology
Northern Territory
Darwin Regional Forecasting Centre

Tropical Cyclone Outlook for Northern Region, including the Gulf of Carpentaria

Issued by the BUREAU OF METEOROLOGY, DARWIN at 2:15 pm CST Sunday 11 March 2012
Valid until the end of Wednesday.

Existing Cyclones in the Northern Region and Gulf of Carpentaria:
Nil.

Potential Cyclones:

A weak tropical low is located in the Arafura Sea north of Cobourg Peninsula. The low is expected to slowly deepen as it moves west or southwest towards the Timor Sea, and may take a more southerly track from Tuesday. There is a moderate risk of a tropical cyclone forming in the Timor Sea around the middle of the week.

Likelihood of a tropical cyclone being in the Northern Region on:
Monday: Low.
Tuesday: Moderate.
Wednesday: Moderate.

NOTE: The likelihood is an estimate of the chance of each system being a tropical cyclone in the Region for each day...
Very low: less than 5%, Low: 5% to 20%, Moderate: 20% to 50%, High: Over 50%.

The area of coverage for this outlook is the Ocean area south of 9S, between 125E and 142E, including the Gulf of Carpentaria, but excluding the area around Timor [northwest of 11S 125E, 11S 128E, 9S 128E].

Further information on Tropical Cyclones is available at:
http://www.bom.gov.au/cyclone

DARWIN Regional Forecasting Centre.

3.2.4 Perth TCWC

3.2.4.1 Special Advisories for Indonesia

Perth TCWC provides Special Advisories for Indonesia for the specific use of the Indonesia BMKG to warn the Indonesian public, whenever a tropical cyclone threat exists within the Perth area of responsibility affecting Indonesia as shown in figure 1. Special Advisories for Indonesia contain the same information as the Tropical Cyclone Technical Bulletin for the Northern Region (see 3.2.3.2 (e)), with additional descriptions of the potential threat to Indonesia.

3.2.4.2 Satellite bulletin

(a) Purpose

The Perth satellite bulletin covers the area within 80° to 90°E and 10°to 30°S and provides name of cyclone, date and time of satellite image (UTC), satellite name and image type, latitude/error detection sum, longitude/error detection sum, direction and speed of movement of the cyclone, Dvorak intensity code, date time of the next advice to be issued and remarks relating to past movement, intensity, supporting data etc.

(b) Criterion for first issue

The first issue is prepared whenever a tropical disturbance or tropical cyclone is first located in the area.

(c) Frequency and time of subsequent issues

They are prepared every six hours (or as data are available).

3.2.4.3 Ocean gale, storm and hurricane warnings

These are issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

Subsequent issues are six hourly (at 0500, 1100, 1700 and 2300 UTC) unless a major amendment is necessary at an intermediate time.

3.2.4.4 Tropical Cyclone Technical Bulletin Western Region

(a) Purpose

Same as Brisbane TCWC (see Section 3.2.2.2 (a), except for the area of responsibility of Perth TCWC).

(b) Criterion for first issue

Same as Brisbane TCWC (see Section 3.2.2.2 (b)).

(c) Frequency and time of subsequent issues

Tropical Cyclone Technical Bulletins for the Western Region are issued at 0130, 0730, 1330 and 1930 UTC.

(d) Contents

Same as Brisbane TCWC (see Section 3.2.2.2 (e)).

3.2.4.5 Tropical Cyclone Outlook, Western Region

(a) Purpose

Same as Brisbane TCWC (see Section 3.2.2.5 (a), except for the area of responsibility of Perth TCWC).

(b) Criterion for first issue

Same as Brisbane TCWC (see Section 3.2.2.5 (b)).

(c) Frequency and time of subsequent issues

The outlooks are issued daily around 0400 UTC throughout the year.

(d) Contents

Same as Brisbane TCWC (see Section 3.2.2.5 (d)).

3.2.5 Port Moresby TCWC

3.2.5.1 Ocean gale, storm and hurricane warnings

These are issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

(a) Criterion for first issue

The first of a series is issued as soon as gale force or storm force winds are expected in the area of responsibility within 24 hours.

(b) Time and frequency of subsequent issues

Subsequent issues are six hourly (at 0130, 0730, 1330 and 1930 UTC) unless a major amendment is necessary at an intermediate time.

3.2.6 Wellington TCWC

3.2.6.1 Ocean gale, storm and hurricane warnings

These are numbered sequentially and issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

(a) Criterion for first issue

The first of a series is issued as soon as gale force, storm force winds or hurricane force winds are expected in the area of responsibility within 24 hours.

(b) Time and frequency of subsequent issues

Subsequent issues are six hourly (at approximately 0130, 0730, 1330 and 1930 UTC) unless a major amendment is necessary at an intermediate time.

3.2.6.2 Whenever there is a Tropical Cyclone south of 25S and between 160E and 120W, the input for the Aviation tropical cyclone advisory issued by RSMC-Nadi under 3.2.1.7 is provided by Wellington.

3.2.7 Jakarta TCWC

3.2.7.1 Ocean Gale and Storm Warning

These are issued in accordance with standard international procedures and WMO format for marine warnings (see Attachment 3A).

(a) Criterion for first issue

The first of a series is issued as soon as gale force or storm force winds are expected in the area of responsibility with 24 hours

(b) Time and frequency of subsequent issues are six hourly (at 0130, 0730, 1330 and 1930 UTC) unless a major amendment is necessary at an intermediate time.

3.2.8 New Caledonia Meteorological Service, Nouméa

(i) Avis de coup de vent (Gale warning)

(ii) Avis de Tempête (Storm Warning)

(iii) Avis de cyclone tropical (Hurricane Warning)

Purpose

To warn the population and shipping local to New Caledonia of gale, storm and hurricane force winds respectively.

3.2.9 French Polynesia Meteorological Service, Tahiti

(i) Avis de coup de vent (Gale warning)

(ii) Avis de Tempête (Storm Warning)

(iii) Avis de cyclone tropical (Hurricane Warning)

Purpose

To warn the population and shipping local to French Polynesia and Pitcairn Islands???to be confirmed of gale, storm and hurricane force winds respectively.

ATTACHMENT 3A

FORMAT AND CONTENT OF OCEAN WATERS GALE, STORM AND HURRICANE WARNINGS ISSUED TO SHIPPING BY TROPICAL CYCLONE WARNING CENTRES IN THE REGION

3.A.1 Format and Content

The format and content of these warnings as issued by RSMC Nadi is given here. The minor variations that occur in corresponding warnings issued by the other tropical cyclone warning centres in the Region is indicated. The RSMC Nadi warning format is:

(i) Bulletin heading and identification code (e.g. pan pan)
(ii) Type of warning (GALE, STORM, HURRICANE)
(iii) Numbering of Warnings
(iv) Office issuing warning (NADI)
(v) Date and time of reference (UTC)
(vi) Type of disturbance (TROPICAL CYCLONE) and any name
(vii) Central pressure
(viii) Location of disturbance (latitude and longitude)
(ix) Location confidence estimate (GOOD/FAIR/POOR)
(x) Forecast direction (in compass points) and speed of movement in knots of the tropical cyclone
(xi) Intensity (maximum 10-minute average winds)
(xii) (Expected location at 12 and 24 hours hence
(xiii) Extent of affected area
(xiv) Wind speed (knots) in various sections of affected area
(xv) Sea and Swell conditions in the area affected
(xvi) Further intensity changes if any
(xvii) Request to shipping for three hourly weather and Radar rain reports
(xviii) Office issuing the next warning if handing over responsibility.
(xix) Cancellation

3.A.2 Regional Variations

The following regional variations to the above format occur:

- In (ii) above

  (i) Port Moresby does not issue HURRICANE warnings unless the situation arises.

- In (vi) above Australia and Port Moresby:

  (i) use the term SEVERE TROPICAL CYCLONE in lieu of HURRICANE;

  (ii) indicate estimated central pressure (hPa)

- Australia and Port Moresby warnings present (vii) and (viii) above in the reverse order to RSMC Nadi. Australia includes 12 and 24 hour forecast positions in (xvi) above.

- In (ix) above

ATTACHMENT 3B

FORECAST INFORMATION PROVIDED BY METEOROLOGICAL CENTRES OUTSIDE THE REGION*

3.B.1 RSMC Honolulu - Hurricane Centre

3.B.1.1 Tropical Cyclone Warnings

These sequentially numbered warnings for gales, sotrms and hurricanes are issued 6 hourly at 0300, 0900, 1500 and 2100 UTC for the area covered by the Central North Pacific from 140W - 180 degrees longitude.

3.B.2 NWS Honolulu

3.B.2.1 Southern Hemisphere Tropical Cyclone Summary more information needed…examples

These summaries are issued for the area covered by the Operational Plan that is east of 160 East. They contain:

(a) analysed position and expected movement;
(b) analysed maximum winds;
(c) description of cyclone and expected changes.

---

* It should be noted that the definition of some terms used in this attachment may differ from those of the South Pacific and South-East Indian Ocean regions.

ATTACHMENT 3C attachments can be updated at any time!!

TROPICAL CYCLONE ADVISORY HEADINGS

Centre	*WMO Abbreviated Headings*	*Type of Bulletin*
BRISBANE	AXAU21 ABRF	TROPICAL CYCLONE BULLETIN
	WOAU01 ABRF	GALE WARNING (MARINE)
	WOAU02 ABRF	GALE WARNING (MARINE)
	WHAU01 ABRF	SEVERE TROPICAL CYCLONE WARNING
	WHAU02 ABRF	SEVERE TROPICAL CYCLONE WARNING
	WTAU01 ABRF,	TROPICAL CYCLONE WARNING
	WTAU02 ABRF,	TROPICAL CYCLONE WARNING
	WWPS22 ABRF	TROPICAL DISTURBANCE ADVISORY
	WWSO21 ABRF	TROPICAL DISTURBANCE ADVISORY BULLETIN for SOLOMON ISLANDS
DARWIN	AXAU01 ADRM	TROPICAL CYCLONE BULLETIN
	AXAU40 ADRM	TROPICAL ANALYSIS BULLETIN for BRACKNELL
	WOAU03 ADRM	GALE WARNING (MARINE)
	WOAU04 ADRM	GALE WARNING (MARINE)
	WTAU03 ADRM	TROPICAL CYCLONE WARNING
	WTAU04 ADRM	TROPICAL CYCLONE WARNING
	WTAU10 ADRM	TROPICAL CYCLONE WARNING
	WTAU11 ADRM	TROPICAL CYCLONE WARNING
	WTAU12 ADRM	TROPICAL CYCLONE WARNING
	WTAU13 ADRM	TROPICAL CYCLONE WARNING
	FKAU ADRM	TROPICAL CYCLONE AVIATION ADVISORIES
	WCAU ADRM	SIGMET
PERTH	AXAU01 APRF	TROPICAL CYCLONE BULLETIN
	AXAU02 APRF	TROPICAL CYCLONE BULLETIN
	AXAU03 APRF	TROPICAL CYCLONE BULLETIN
	TPIO24 APRF	TROPICAL CYCLONE ADVISORY BULLETIN FOR RA I
	WOAU05 APRF	GALE WARNING (MARINE)
	WOAU06 APRF	GALE WARNING (MARINE)
	WTAU05 APRF	TROPICAL CYCLONE WARNING
	WTAU06 APRF	TROPICAL CYCLONE WARNING
	WTAU07 APRF	TROPICAL CYCLONE WARNING
PORT MORESBY		
	WCNG01 AYPY	SIGMET
	WHNG01 AYPY	SEVERE TROPICAL CYCLONE WARNING
	WONG01 AYPY	GALE WARNING (MARINE)
	WONG02 AYPY	GALE WARNING (MARINE)
	WONG20 AYPY	GALE WARNING (MARINE)
	WONG21 AYPA	GALE WARNING (MARINE)
	WSNG21 AYPY	SIGMET
	WSNG31 AYPY	SIGMET
	WTNG01 AYPY	TROPICAL CYCLONE WARNING
	WTNG02 AYPY	TROPICAL CYCLONE WARNING

Centre	*WMO Abbreviated Headings*	*Type of Bulletin*
NADI	WOPS01 NFFN	NIL WARNING or NON-TROPICAL CYCLONE WARNING
		Add headers for new products
	WTPS01 NFFN	MARINE GALE/STORM WARNING
	WHPS01 NFFN	MARINE HURRICANE WARNING
	WWFJ40 NFFN	SPECIAL WEATHER BULLETIN for FIJI
	WWFJ41 NFFN	SPECIAL WEATHER BULLETIN for FIJI
	WWKU40 NFFN	SPECIAL WEATHER BULLETIN for COOK ISLANDS
	WWKU41 NFFN	SPECIAL WEATHER BULLETIN for COOK ISLANDS
	WWKB40 NFFN	SPECIAL WEATHER BULLETIN for KIRIBATI
	WWNE40 NFFN	SPECIAL WEATHER BULLETIN for NIUE
	WWTK40 NFFN	SPECIAL WEATHER BULLETIN for TOKELAU
	WWTO40 NFFN	SPECIAL WEATHER BULLETIN for TONGA
	WWTV40 NFFN	SPECIAL WEATHER BULLETIN for TUVALU
	WCFJ01 NFFN	SIGMET
	WWPS21 NFFN	*TROPICAL DISTURBANCE SUMMARY*
	WTPS11 NFFN	*TROPICAL DISTURBANCE ADVISORY*
	FKPS01-03 NFFN	TROPICAL CYCLONE AVIATION ADVISORIES
Jakarta TCWC		
	WTID01 WIIX	Ocean Gale and Storm Warning
	WTID02 WIIX	Ocean Gale and Storm Warning
	WCID01 WIIX	SIGMET
	WCID02 WIIX	SIGMET
SAMOA	*WWZM40 NSAP*	SPECIAL WEATHER BULLETIN (based on ADVISORY from FIJI
NEW CALEDONIA		
	WWNC01 NWBB	SPECIAL MARINE BULLETIN GALE WARNING IN FRENCH
	WWNC02 NWBB	SPECIAL MARINE BULLETIN GALE WARNING IN ENGLISH
	WTNC01 NWBB	SPECIAL MARINE BULLETIN STORM WARNING IN FRENCH
	WTNC02 NWBB	SPECIAL MARINE BULLETIN STORM WARNING IN ENGLISH
	WHNC01 NWBB	SPECIAL MARINE BULLETIN HURRICANE WARNING IN FRENCH
	WHNC02 NWBB	SPECIAL MARINE BULLETIN HURRICANE WARNING IN ENGLISH
	WONC01 NWBB	SPECIAL PUBLIC BULLETIN IN FRENCH

Centre	*WMO Abbreviated Headings*	*Type of Bulletin*
TAHITI	WCPF20 NTAA	SIGMET DE CYCLONE TROPICAL
	WOPF01 NTAA	AVIS DE COUP DE VENT: Gale warning
	WOPF20 NTAA	BULLETIN METEOROLOGIQUE SPECIAL MARINE
	WTPF01 NTAA	AVIS DE TEMPETE: Storm warning
	WHPF01 NTAA	AVIS DE CYCLONE: Hurricane warning
RSMC/WFO HONOLULU		
	FZPS40 PHFO	HIGH SEAS FORECAST SOUTH PACIFIC
	WHPS50 PHFO	AMENDED HIGH SEAS FORECAST SOUTH PACIFIC
	TXPS40 PHFO	TROPICAL CYCLONE FIXES SOUTH PACIFIC aka SOUTHERN HEMISPHERE TROPICAL CYCLONE SUMMARY

PRODUCTS ISSUED BY JTWC FOR USA MILITARY AND USA NATIONAL INTERESTS IN THE SOUTH-EAST INDIAN OCEAN

Centre	*WMO Abbreviated Headings*	*Type of Bulletin*
	ABIO10 PGTW	SIGNIFICANT TROPICAL WEATHER ADVISORY FOR THE INDIAN OCEAN (NORTH AND SOUTH OF THE EQUATOR AND WEST OF 135 E)
	WTXS21-25 PGTW	TROPICAL CYCLONE FORMATION ALERT FOR THE SOUTH INDIAN OCEAN (WEST OF 135 E TO THE COAST OF AFRICA)
	WTXS31-35 PGTW	SOUTH INDIAN OCEAN TROPICAL CYCLONE WARNINGS (WEST OF 135 E TO THE COAST OF AFRICA)
	TPXS10 XXXX	SOUTH INDIAN OCEAN TROPICAL CYCLONE POSITION REPORTS BASED ON METEOROLOGICAL SATELLITE DATA.

Centre	*WMO Abbreviated Headings*	*Type of Bulletin*
	XXXX =	PGTW = 17TH OPERATIONAL WEATHER SQUADRON (OWS), SATELLITE OPERATIONS (CO-LOCATED WITH THE JTWC). FJDG = U. S. NAVY DIEGO GARCIA SITE.

PRODUCTS ISSUED BY JTWC FOR USA MILITARY AND USA NATIONAL INTERESTS IN THE SOUTH PACIFIC

	ABPW10 PGTW	SIGNIFICANT TROPICAL WEATHER ADVISORY FOR THE WESTERN PACIFIC OCEAN BETWEEN 135 E AND 180 E.
	WTPS21-25 PHNC	TROPICAL CYCLONE FORMATION ALERT FOR THE SOUTHEAST PACIFIC (EAST OF 180)
	WTPS31-35 PHNC	TROPICAL CYCLONE WARNINGS FOR THE SOUTHEAST PACIFIC (EAST OF 180)
	WTPS21-25 PGTW	TROPICAL CYCLONE FORMATION ALERT FOR THE SOUTHWEST PACIFIC (WEST OF 180 AND EAST OF 135E)
	WTPS31-35 PGTW	TROPICAL CYCLONE WARNING FOR THE SOUTHWEST PACIFIC (WEST OF 180 AND EAST OF 135E)
	TPPS10 XXXX	SOUTH PACIFIC OCEAN TROPICAL CYCLONE POSITION REPORTS BASED ON METEOROLOGICAL SATELLITE DATA
	XXXX =	PGTW or KGWC

NOAA/NESDIS PRODUCTS FOR THE SOUTH PACIFIC AND SOUTHEAST INDIAN OCEAN

TCIO10 KWBC	INDIAN OCEAN TROPICAL CYCLONE POSITION REPORT BASED ON METEOROLOGICAL SATELLITE DATA DATA ISSUED THE BY THE US NESDIS, SUITLAND, MD.
WWPS10 KWBC	SOUTH PACIFIC TROPICAL CYCLONE POSITION REPORT BASED ON METEOROLOGICAL SATELLITE DATA ISSUED THE BY THE US NESDIS, SUITLAND, MD.

WELLINGTON

WTNZ41 NZKL	GALE / STORM WARNING (MARINE)
WHNZ41 NZKL	HURRICANE WARNING (MARINE)

(EMWIN LISTING TO BE INSERTED)

CHAPTER 4

BROADCASTING OF TROPICAL CYCLONE INFORMATION TO THE PUBLIC

4.1 Introduction

This chapter provides details of the route by which tropical cyclone forecasts and warnings are relayed to the public after they have been issued by RSMC Nadi, a TCWC or an NMC. Wellington and Melbourne receive Special Weather Bulletins prepared by RSMC Nadi for relaying to Radio New Zealand International (RNZI) and Radio Australia. Other Members responsible for preparing their own tropical cyclone bulletins disseminate them in a more direct way to Radio Australia and RNZI.

Details are given in the Attachment 4A about broadcast frequencies (only if it is appropriate), the regularity of broadcasts upon receipt of an alert or warning and the hours of transmission of any radio and television stations during the passage of a tropical cyclone.

4.2 Broadcasts

4.2.1 Radio New Zealand International and Radio Australia

Radio New Zealand International (RNZI) and Radio Australia are able to broadcast, upon receipt and at regular intervals, forecasts and warnings for South Pacific countries. Forecasts and warnings to be broadcast by Radio Australia are sent via GTS to Melbourne where they are transferred from the Bureau of Meteorology to the Radio Australia BASYS communication system. The same products are also sent to Wellington on the GTS for relay from Meteorological Service of New Zealand ("MetService") to RNZI by e-mail. The unique WMO Abbreviated Heading in each bulletin automatically triggers the transfer to Radio Australia and RNZI.

Copies of the warnings are also relayed to the New Zealand Ministry of Foreign Affairs and Trade (MFAT) and the Ministry of Defence. MFAT (co-ordinator of New Zealand's cyclone relief programme in the South Pacific) keeps a close watch on tropical cyclone activity in the South Pacific to enable it to launch a speedy response if required.

Both Radio Australia and RNZI remain continuously on air. Normally the office and studio of RNZI are *only staffed* during the following hours: 1700-2400/0001-1000 UTC Monday to Friday and 1700-2300 UTC Saturday, except Easter Monday, Queen's birthday (1st Monday in June), Labour day (4th Monday in October) and from Christmas Day to the Sunday after January 2nd inclusive). Note that there is nobody in the office or studio on Sunday and much of Saturday (NZST/NZDT).

MetService will contact RNZI by telephone upon receipt of every first Special Weather Bulletin issued by RSMC Nadi. If other Members require RNZI to broadcast their tropical cyclone bulletins outside the above hours, either send the first bulletin via GTS or fax to Wellington TCWC with the comment "Attention: LEAD FORECASTER, PLEASE CONTACT RNZI", or contact Wellington TCWC by telephone. MetService will contact the standby person in RNZI.

4.2.2 Radio Samoa

Radio Samoa broadcasts Special Weather Bulletins for Tokelau in local languages.

4.2.3 Radio broadcasts for individual country, if necessary.

ATTACHMENT 4A

SHORTWAVE FREQUENCY SCHEDULES FOR RADIO NEW ZEALAND INTERNATIONAL (RNZI) AND RADIO AUSTRALIA

RADIO NEW ZEALAND INTERNATIONAL FREQUENCY SCHEDULE

All broadcasts done from a 100kW transmitter. Check the latest RNZI frequency schedule on website http://www.rnzi.com.

RADIO AUSTRALIA FREQUENCY SCHEDULE FOR SOUTH-WEST AND SOUTH-CENTRAL PACIFIC OCEAN

All broadcasts are done from a 100kW transmitter. Check the latest Radio Australia frequency schedule on website http://www.abc.net.au/ra/hear/shortwave.htm.

SHORTWAVE FREQUENCY SCHEDULES FOR PAPUA NEW GUINEA AND SOLOMON ISLANDS

Check the latest Radio Australia frequency schedule for broadcasts in English and in Tok Pisin (Pidgin) on website http://www.abc.net.au/ra/hear/shortwave.htm.

RADIO FAX FROM AUSTRALIA BUREAU OF METEOROLOGY AND RADIO VOICE BROADCASTS FROM US NOAA NWS HONOLULU RSMC/WFO

CHAPTER 5

COMMUNICATIONS

5.1 General

The Aeronautical Fixed Telecommunications Network (AFTN) and the Global Telecommunications System (GTS) are used for the interchange of forecasts, warnings and observations. Fax, the Emergency Managers Weather Information Network (EMWIN) and the Internet (Homepages and E-mail) are other means of disseminating forecasts and warnings and other tropical cyclone information between TCWCs/NMCs and users. AFTN/GTS links in the Regions are shown in Attachment 5A.

5.2 Contacts in National Meteorological Services**

A list containing the postal addresses, AFTN addresses, telephone, fax, Internet (E-mail + Homepage) of key officials of National Meteorological Services is given in Attachment 5B to facilitate correspondence, exchange of messages and discussions. Changes to these addresses are relayed to RSMC Nadi and TCWCs by 30 September each year or immediately if they occur during a cyclone season.

5.3 RSMC-Nadi Communication Centre outage

When the RSMC Nadi is not able to operate through communication equipment failure, storm damage, or any other reason, Members who normally pass weather observations to Nadi are to pass those observations on to Wellington TCWC by any means available (e.g. telephone +64-4-4700-700, Fax +64-4-471 2078 or E-mail: support@metservice.com, use the following format shown in the example below from Niue:

SUBJECT: PASSAFTN
RELAY TO AFTN
GG METEX
SAPS31 NIUE 302000
METAR NIUE 30200Z 05008KT 50KM SCT018 SCT030 BKN110 26/24 Q1011=

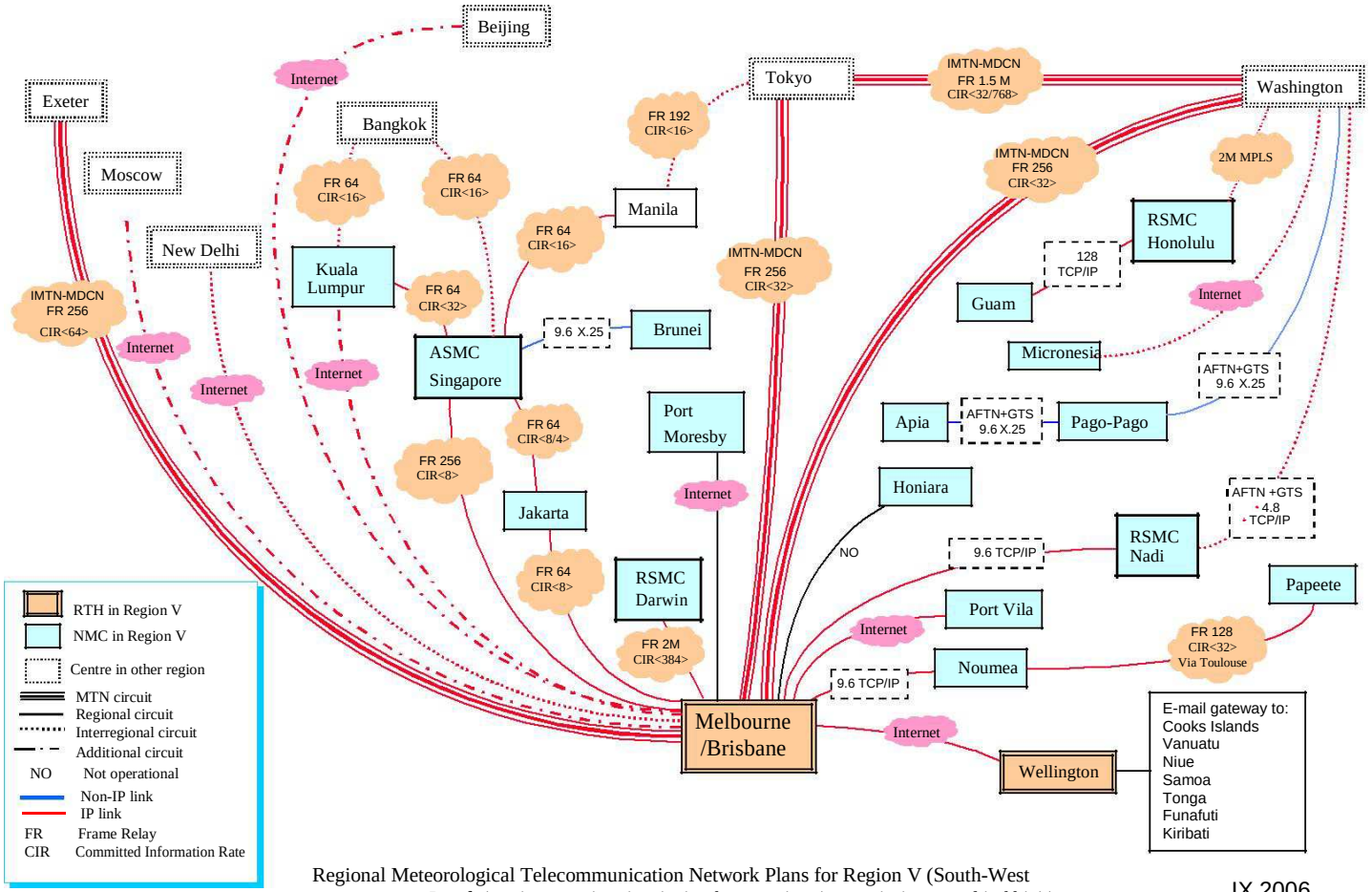
** See Attachment 5B.

ATTACHMENT 5A

AFTN/GTS TELECOMMUNICATION LINKS SERVING THE AREA COVERED BY THE PLAN

Refer to WMO-No. 386 - Manual on the Global Telecommunication System, Volume II - Regional Aspects, Region V - South-West Pacific, Part I, Figure 2 (see next page) for an up-to date list of these links. The WMO RA V Tropical Cyclone Committee (September, 2000) decided it is better to find the latest data in the original documents than to rely on outdated listings which were previously included in this Plan.

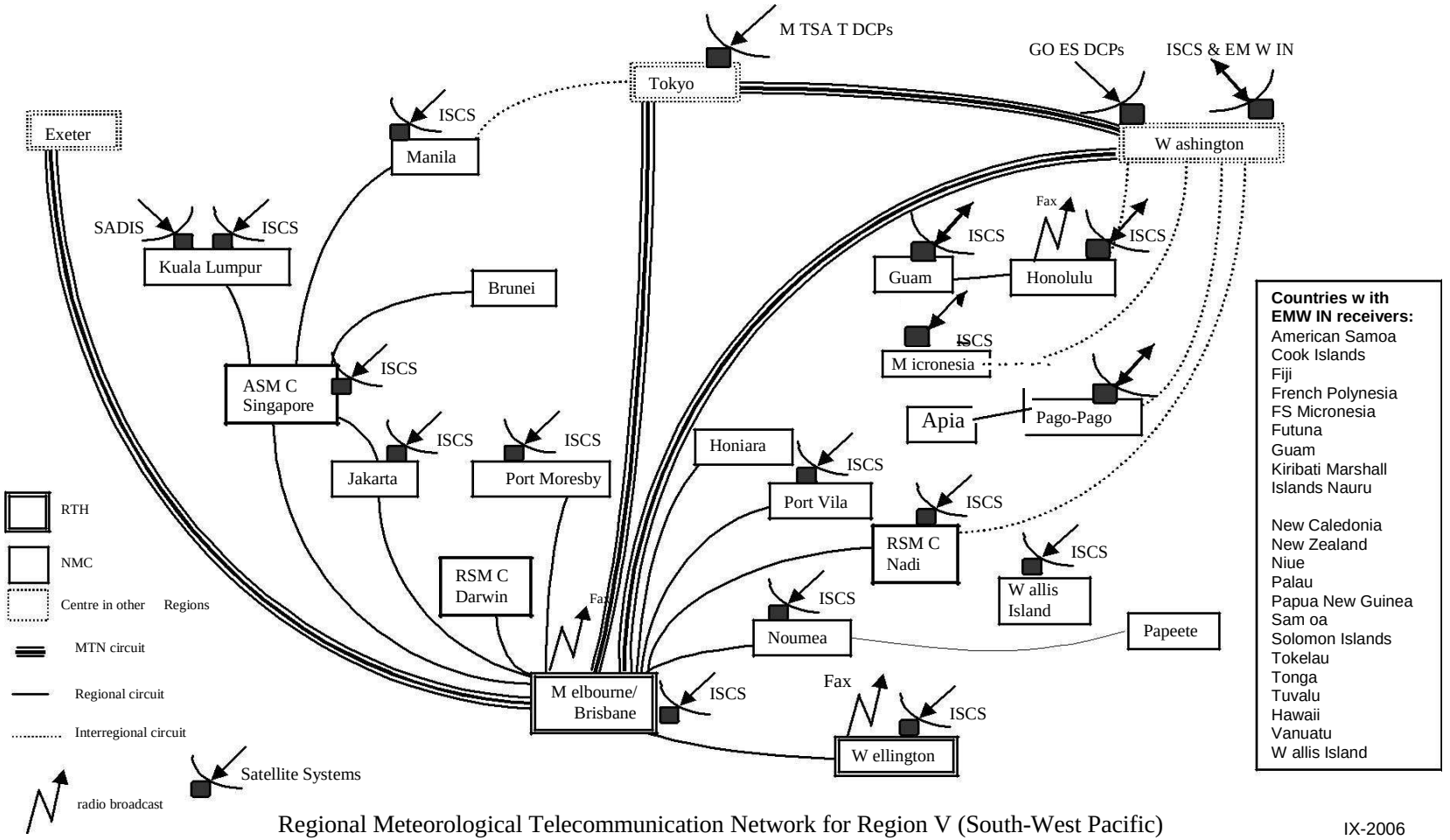
Figure 2



Regional Meteorological Telecommunication Network Plans for Region V (South-West Pacific) *point-to-point circuits implementation (transmission speed in kbit/s)*

IX.2006

Figure 3



Regional Meteorological Telecommunication Network for Region V (South-West Pacific)

Implementation of telecommunication systems via satellite and radiobroadcasts

IX-2006

ATTACHMENT 5B

OPERATIONAL ADDRESSES

(Limited Distribution)

CHAPTER 6

CONTINGENCY PLANS

6.1 Introduction

This Chapter specifies the operational procedures that are introduced to maintain tropical cyclone surveillance and issue of warnings whenever one of the Tropical Cyclone Warning Centres is, for any reason, unable to meet its responsibility.

The term full responsibility in this Chapter means responsibility for the issue of warnings to the general population, shipping and aviation.

6.2 Review of plans

Contingency plans are reviewed annually and Members concerned are advised of changes by 30 September.

6.3 Contingency arrangements

The following contingency arrangements are in place:

6.3.1 Failure or partial failure of RSMC Nadi

Wellington TCWC assumes full responsibility temporarily for the TCWC functions of RSMC Nadi-TCC. These arrangements are briefly referred to in Attachment 6A.

6.3.2 Failure or partial failure of Brisbane TCWC

(a) Darwin TCWC assumes full responsibility for tropical cyclones in the Eastern Region, except for special advisories for Solomon Islands. However, in special circumstances Perth TCWC may do so.

(b) RSMC Nadi assumes responsibility for provision of special advisories for Solomon Islands.

6.3.3 Failure or partial failure of Darwin TCWC

Brisbane TCWC assumes full responsibility. However, in special circumstances Perth TCWC may do so.

6.3.4 Failure or partial failure of Perth TCWC

Darwin TCWC assumes full responsibility. However, in special circumstances Brisbane TCWC may do so.

6.3.5 Failure or partial failure of Port Moresby TCWC

Brisbane TCWC assumes full responsibility. However, in special circumstances Darwin TCWC may do so.

6.3.6 Failure or partial failure of Wellington TCWC

Brisbane TCWC assumes full responsibility.

6.3.7 Failure or partial failure of Samoa Weather Forecasting Office.

RSMC Nadi assumes full responsibility. If RSMC Nadi is unable to then RSMC Honolulu.

6.3.8 Failure or partial failure of Vanuatu Meteorology and Geohazard Department's Forecasting Centre

RSMC Nadi assumes full responsibility.

Failure or partial failure of Tonga Meteorological Service;
RSMC-Nadi assumes full responsibility.t new section about failure of Tonga Met Division – Nadi backup

6.3.9 Failure of Jakarta TCWC

Perth TCWC assumes full responsibility. However, in special circumstances Darwin TCWC may do so.

6.3.10 Failure or partial failure of American Samoa

RSMC Honolulu assumes full responsibility.

6.3.11 Failure or partial failure of Vanuatu Tropical Cyclone Warning

Centre RSMC Nadi assumes full responsibility.

6.4 Responsibility of TCWCs with respect to contingency plans

TCWCs provide their back-up TCWCs with all warnings and bulletins covering the area for which back-up may be required.

TCWCs provide their back up TCWCs with the necessary current bulletin and warning address lists by 30 September each year and immediately advise of subsequent changes.

ATTACHMENT 6A

FIJI/NEW ZEALAND CONTINGENCY ARRANGEMENTS

Wellington TCWC will assume temporary responsibility for TCWC functions in RSMC Nadi's area of responsibility, as outlined below, whenever RSMC Nadi is temporarily unable to carry out this role through

i) Communication failure, or
ii) storm damage, or
iii) planned shut down of facilities for routine maintenance

For the purpose of this arrangement, these functions are:

- Special Weather Bulletin for Cook Islands, Fiji, Kiribati, Nauru, Niue, Tokelau, Tonga and Tuvalu.
- Tropical Disturbance Advisories
- SIGMETs for the Nadi FIR
- Aviation advisory information as required by an ICAO designated Tropical Cyclone Advisory Centre as documented in Annex 3 to the Convention on International Civil Aviation.

In addition to RSMC Nadi's TCWC responsibilities, Wellington TCWC will also provide temporary backup, under conditions stated above, for high seas forecasts and warnings for MetArea XIV and MetArea X for which RSMC Nadi has agreed to act as a "Preparation Service" and as documented in the WMO Manual of Marine Meteorological Services (No. 558)

CHAPTER 7

END OF SEASON PROCEDURES

7.1 Introduction

This Chapter describes:

(a) the arrangements for archival and documentation of information on tropical cyclones that have occurred in the region in the preceding season and

(b) the arrangements for verification of tropical cyclone forecasts and accuracy of operational tracks compared to post analysed best tracks.

7.2 Archival and documentation of information

Countries affected by tropical cyclones provide the TCWC responsible for their area with a Damage Report as soon as possible and not later than 31 May. The damage report includes:

- estimated and observed winds (sustained and maximum gusts) and central pressure
- rainfall totals (24 hours or less) and intensities
- storm surges/wave run-up or still water)
- flooding and landslides
- damage and casualties.

RSMC Nadi and Tropical Cyclone Warning Centres (TCWCs) maintain a tropical cyclone case history on each tropical cyclone in their areas of responsibility. Nadi RSMC will produce a seasonal cyclone summary for its area of responsibility and distribute to Members with a copy to WMO. A copy is also sent to Australia to be incorporated into a Regional Tropical Cyclone Summary for the South Pacific and South-East Indian Ocean.

Brisbane, Darwin and Perth TCWCs will contribute to the Regional Tropical Cyclone Summary for publication by the National Climate Centre..

7.3 Verification of Warnings and Operational Tracks

Tropical Cyclone Warning Centres maintain a data base of tropical cyclone operational position forecasts and post-analysed best tracks. This data base contains the following items where appropriate:

- Cyclone name
- Date time (UTC)
- Best track centre (Lat,Lon,Press)
- Operational centre (Lat,Lon,Press)
  - 12 hour forecast made then (Lat,Lon,Press)
  - 24 hour forecast made then (Lat,Lon,Press)
  - 36 hour forecast made then (Lat,Lon,Press)
  - 48 hour forecast made then (Lat,Lon,Press)

A similar data base may be maintained for objective forecasting techniques and for forecasts provided by centres outside the region.

To ensure a common format for the data base, RSMC Nadi and TCWCs enter the data using the Australian Bureau of Meteorology tropical cyclone verification software format.

Using the verification package, RSMC Nadi and each TCWC maintains its own verification statistics.

A copy of the database for the previous season is to be made available to the International Best Tracks Archive for Climate Stewardship (IBTrACS) team at the World Data Center for Meteorology. This data should be in a consistent format from year-to-year in either CSV or text format. This should be either sent via e-mail directly to the program at <IBTrACS.Team@noaa.gov>, and/or made available on a web or FTP site that the IBTrACS team can easily access

By 30 / September each year.

RSMC Nadi and the Australian TCWCs (Brisbane, Darwin and Perth) will put verification statistics on their homepages.

7.4 C.D.A.R. and Review of the Plan

At the end of each tropical cyclone season, each Member is to provide RSMC Nadi or the TCWC responsible for their area with a Cyclone Damage Assessment Report using the format in Attachment 7A, not later than 30 June.

With a view to obtaining their impression of how the Tropical Cyclone Operational Plan worked during the season, the Report should be a critical assessment of:

- Timeliness and clarity warnings
- Communications difficulties (external and internal)
- Suggestions for improvement.

ATTACHMENT 7A

PRO-FORMA FOR CYCLONE DAMAGE ASSESSMENT REPORT

CHAPTER 8

ARCHIVAL OF DATA

8.1 Necessity for data archival

Members will exchange information on a non-real-time basis as required for the establishment of tropical cyclone data files and information services nationally. The information will include available annual charts of cyclone tracks in the appropriate area, with the intensity of the cyclone at each position marked in accordance with WMO regulations and recommended practices. Also to be included are available classifications of cyclones by month, intensity and movement, as well as groupings over periods of years made in accordance with the standard periods stated in WMO regulations and recommended climatological practices. . In addition, best track data is to be made available to the IBTrACS team as delineated in section 7.3. IBTrACS is officially endorsed by the WMO TC Programme and serves as the global archive of all TC best tracks data from all RSMCs and TCWCs; see http://www.ncdc.noaa.gov/ibtracs/ to access IBTrACS data.

8.2 Tropical cyclone data set

The Australian Bureau of Meteorology, the Meteorological Service of New Zealand Ltd. and the RSMC Nadi, Fiji will archive information on cyclone tracks and intensities in accordance with the format given in Attachment 8-A and make it available electronically to the IBTrACS program at the World Data Center for Meteorology as delineated in section 7.3 as soon as the finalized track data become available, or no later than 30th September following the completion of the past TC season ending on 30th April.

8.3 Post-cyclone public survey

The National Meteorological Services and RSMC Nadi will make every effort to carry out the post-cyclone public survey in accordance with the format given in Attachment 8-B and mail it to the Chairman of the Committee.

8.4 Retrieval of tropical cyclone data

The Australian Bureau of Meteorology, the Meteorological Service of New Zealand Ltd and the RSMC Nadi, will make available the data from their databases free of charge to NMSs, upon request. All TC best tracks data are available from the IBTrACS website at http://www.ncdc.noaa.gov/ibtracs/.

ATTACHMENT 8A

GLOBAL TROPICAL CYCLONE TRACK AND INTENSITY DATA SET - REPORT FORMAT

Position	Content
1- 9	Cyclone identification code composed by 2 digit numbers in order within the cyclone season, area code and year code. 01SWI2000 shows the 1st system observed in South-West Indian Ocean basin during the 2000/2001 season. Area codes are as follows: ARB = Arabian Sea ATL = Atlantic Ocean AUB = Australian Region (Brisbane) AUD = Australian Region (Darwin) AUP = Australian Region (Perth) BOB = Bay of Bengal CNP = Central North Pacific Ocean ENP = Eastern North Pacific Ocean ZEA = New Zealand Region SWI = South-West Indian Ocean SWP = South-West Pacific Ocean WNP = Western North Pacific Ocean and South China Sea
10-19	Storm Name
20-23	Year
24-25	Month (01-12)
26-27	Day (01-31)
28-29	Hour- universal time (at least every 6 hourly position -00Z,06Z,12Z and 18Z)
	Latitude indicator: 1=North latitude; 2=South latitude
31-33	Latitude (degrees and tenths)
34-35	Check sum (sum of all digits in the latitude)
36	Longitude indicator: 1=West longitude; 2=East longitude
37-40	Longitude (degrees and tenths)
41-42	Check sum (sum of all digits in the longitude)
43	position confidence* 1 = good (<30nm; <55km) 2 = fair (30-60nm; 55-110 km) 3 = poor (>60nm; >110km) 9 = unknown
Note*	Confidence in the center position: Degree of confidence in the center position of a tropical cyclone expressed as the radius of the smallest circle within which the center may be located by the analysis. "position good" implies a radius of less than 30 nm, 55 km; "position fair", a radius of 30 to 60 nm, 55 to 110km; and "position poor", radius of greater than 60 nm, 110km.
44-45	Dvorak T-number (99 for no report)
46-47	Dvorak CI-number (99 for no report)
48-50	Maximum average wind speed (whole values) (999 for no report).
51	Units 1=kt, 2=m/s, 3=km per hour.
52-53	Time interval for averaging wind speed (minutes for measured or derived wind speed, 99 if unknown or estimated).
54-56	Maximum Wind Gust (999 for no report)
57	Gust Period (seconds, 9 for unknown)

58 Quality code for wind reports:
- 1=Aircraft or Dropsonde observation
- 2=Over water observation (e.g. buoy)
- 3=Over land observation
- 4=Dvorak estimate
- 5=Other

59-62 Central pressure (nearest hectopascal) (9999 if unknown or unavailable)

63 Quality code for pressure report (same code as for winds)

64 Units of length: 1=nm, 2=km

65-67 Radius of maximum winds (999 for no report)

68 Quality code for RMW:
- 1=Aircraft observation
- 2=Radar with well-defined eye
- 3=Satellite with well-defined eye
- 4=Radar or satellite, poorly-defined eye
- 5=Other estimate

69-71 Threshold value for wind speed (gale force preferred, 999 for no report)

72-75 Radius in Sector 1: 315^{o}-45^{o}

76-79 Radius in Sector 2: 45^{o}-135^{o}

80-83 Radius in Sector 3: 135^{o}-225^{o}

84-87 Radius in Sector 4: 225^{o}-315^{o}

88 Quality code for wind threshold
- 1=Aircraft observations
- 2=Surface observations
- 3=Estimate from outer closed isobar
- 4=Other estimate

89-91 Second threshold value for wind speed (999 for no report)

92-95 Radius in Sector 1: 315^{o}-45^{o}

96-99 Radius in Sector 2: 45^{o}-135^{o}

100-103 Radius in Sector 3: 135^{o}-225^{o}

104-107 Radius in Sector 4: 225^{o}-315^{o}

108 Quality code for wind threshold (code as for row 88)

109-110 Cyclone type:
- 01= tropics; disturbance (no closed isobars)
- 02= <34 knot winds, <17m/s winds and at least one closed isobar
- 03= 34-63 knots, 17-32m/s
- 04= >63 knots, >32m/s
- 05= extratropical
- 06= dissipating
- 07= subtropical cyclone (nonfrontal, low pressure system that comprises initially baroclinic circulation developing over subtropical water)
- 08= overland
- 09= unknown

111-112 Source code (2 - digit code to represent the country or organization that provided the data to NCDC USA. WMO Secretariat is authorized to assign number to additional participating centers, organizations)
- 01 RSMC Miami-Hurricane Center
- 02 RSMC Tokyo-Typhoon Center
- 03 RSMC-tropical cyclones New Delhi
- 04 RSMC La Reunion-Tropical Cyclone Centre
- 05 Australian Bureau of Meteorology
- 06 Meteorological Service of New Zealand Ltd.
- 07 RSMC Nadi-Tropical Cyclone Centre
- 08** Joint Typhoon Warning Center, Honolulu
- 09** Madagascar Meteorological Service
- 10** Mauritius Meteorological Service
- 11** Meteorological Service, New Caledonia
- 12 Central Pacific Hurricane Center, Honolulu

Note** no longer used

Headings	1-19	Cyclone identification code and name; 20-29 Date time group;
	30-43	Best track positions;
	44-110	Intensity, Size and Type;
	111-112	Source code.

ATTACHMENT 8B

POST-CYCLONE PUBLIC SURVEY FORM TO MONITOR THE PERFORMANCE OF THE TROPICAL CYCLONE WARNING SYSTEM (Useful for Pacific Island Countries providing feedback to RSMC Nadi)

Thank you for spending a few minutes of your time to fill in this survey. Your answers will help RSMC Nadi to check on the performance of the Tropical Cyclone Warning System and decide whether any changes need to be made.

Question 1. What was the name of the tropical cyclone?

Question 2. Where were you during the cyclone?
Give name of village and island and, if appropriate, name of actual town or city.

Question 3. Did you hear any information about the tropical cyclone during its passage?

If no, state why?

If yes, by what means:

Local radio station [ ]
Radio New Zealand International (shortwave) [ ]
Radio France Outre-mer [ ]
Other (e.g. friend, neighbour, work-mate, family member) [ ]

Question 4. If you listened to a radio, in what language did you hear the information?

English [ ]
French [ ]
Native tongue [ ]

Question 5. Do you think the information about the tropical cyclone was

Very easy to understand [ ]
Easy to understand [ ]
Difficult to understand [ ]
Very difficult to understand [ ]

If you ticked 'difficult to understand' or 'very difficult to understand', please state why it was difficult for you, e.g. message too long, too much detail, language too technical.

Question 6. Did the information about the tropical cyclone (e.g. its position and movement, the strength of the wind, flooding due to rain or sea, very heavy surf) give you all the information you wanted to know [yes/no]?

If 'no', what information was missing

Question 7. What action did you take in response to the information?

Waited for later information [ ]
Decided there was no need for any action [ ]
Did all I could to reduce the effects of the cyclone [ ]

Question 8. Overall, do you think the warning service given by RSMC Nadi or the Tropical Cyclone Warning Centre, was:

very good [ ]
good [ ]
fair [ ]
poor [ ]
very poor [ ]

If you answered 'fair', 'poor' or 'very poor' please explain why.

Question 9 (if applicable). In general, bulletins issued by warning centres DO NOT contain Preparedness Action Statements (e.g. take precautions, make preparations, seek shelter). Instead, such statements are made in separate radio messages.

Please tick your preference:

I am happy with this arrangement [ ]

I would like to see preparedness action
statements included in tropical cyclone bulletins [ ]

Question 10. Answer these questions about the WIND if you can.

What time did the strongest winds occur?

What direction (e.g. off the sea, off the land, northwest,
southeast, etc.) did the strongest winds come from?

How strong (gale, storm or hurricane) do you think the wind
got? Did the winds suddenly become light during the cyclone
before becoming strong again from another direction? [yes/no]

If 'yes', about what time did the winds go light and how
long did they stay light?

Question 11. During the fury of the tropical cyclone, did you experience a very high tide like you have never experienced before? [yes/no]

If 'yes', please say how high the tide was or how far inland the sea came

Question 12. Do you think the effect of this cyclone on your island was: (tick one only)

LESS than you expected from the information received [ ]

MORE than you expected from the information received [ ]

ABOUT WHAT you expected from the information received [ ]