

WORLD METEOROLOGICAL ORGANIZATION

**RA V TROPICAL CYCLONE COMMITTEE FOR THE
SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN**

NINTH SESSION

(MANILA, PHILIPPINES, 16 TO 20 MAY 2002)



FINAL REPORT

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. ORGANIZATION OF THE SESSION (Agenda item 1)

1.1 Opening of the session (agenda item 1.1)

1.1.1 At the kind invitation of the Government of the Philippines, the ninth session of Regional Association V Tropical Cyclone Committee (RA V/TCC) for the South Pacific and South-East Indian Ocean was held at the Discovery Suites Hotel, Manila, Philippines from 16 to 20 May 2002.

1.1.2 The session was opened at 10:00 a.m. on Thursday, 16 May 2002, with a warm welcome by Dr Leoncio A. Amadore, Permanent Representative of the Philippines with WMO and Director of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

1.1.3 Mr Eisa H. Al-Majed, Regional Director for Asia and the South-West Pacific, on behalf of Professor G.O.P. Obasi, the Secretary-General of the World Meteorological Organization (WMO), extended a warm welcome to the participants and expressed the sincere appreciation of WMO to the Government of the Philippines for hosting the ninth session of the Committee in Manila. He encouraged the Committee to take advantage of the scientific and technical development in strengthening the warning systems in the region and ultimately mitigate tropical cyclone disasters. He urged the National Meteorological Services to develop high standard of services including warning systems. He assured the session that WMO would continue to support the RA V/TCC and wished the Committee a successful session.

1.1.4 Mr Stephen C. Ready, Chairman of the RA V/TCC, extended his appreciation to the Director of PAGASA and to WMO for hosting and organizing the session, respectively. He encouraged Members to build on the foundation laid during the eighth session in Rarotonga and to take an active part in the current session's deliberations.

1.1.5 Mr Roman L. Kintanar, Coordinator of the Typhoon Committee Secretariat, provided highlights of the history of the Tropical Cyclone Programme and in particular the establishment of the Typhoon Committee. He encouraged the Members of RA V/TCC to work in promoting cooperation between the Pacific nations. He noted with praise the commendable progress of the Committee since its establishment in 1985. He opined that the public nowadays are more appreciative of the work being done by tropical cyclone forecasters and urged the Members to increase their interactions with the public which will work for the betterment of the weather and warning service.

1.1.6 Atty Lilian G. Angeles, Deputy Director for Administration and Field Services of PAGASA, congratulated the Committee on the commendable work it has done since its establishment which had resulted to wide-ranging benefits and contributed to the reduction of tropical cyclone damage in the region. She expressed her wish that the session will come up with measures to further minimize disasters and that the deliberations will trigger a chain reaction leading to a much greater awareness of the damaging effects of these natural weather systems and bring a new sense of urgency to reduce tropical cyclone damage.

1.1.7 The session was attended by 30 participants from 15 Members of WMO namely: Australia, Cook Islands, Fiji, French Polynesia, Indonesia, Micronesia, New Caledonia, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, USA and Vanuatu. It was also attended by representatives from three non-Members of WMO namely: Kiribati, Palau and Tokelau and observers from the International Civil Aviation Organization (ICAO), Typhoon Committee Secretariat (TCS) and United Nations Development Programme (UNDP). The list of participants in the session as well as the capacities in which they attended is given in Appendix I.

1.2 Adoption of the agenda (agenda item 1.2)

The Committee adopted the agenda for the session as given in Appendix II.

1.3 Election of vice-chairman (agenda item 1.3)

Mr Chanel Iroi (Solomon Islands) was unanimously elected as Vice-chairman of the ninth session of the Committee.

1.4 Working arrangements for the session (agenda item 1.4)

The Committee agreed that the working of the session be conducted in one committee as a whole, in English with whispered interpretation in French. A working group chaired by Mr Gary Foley (Australia) was established to review and update the Technical Plan drawn up by the eighth session (Rarotonga, 2000). The Committee also agreed on its working hours with breaks in the morning and afternoon sessions.

2. REPORT OF THE CHAIRMAN OF THE COMMITTEE (Agenda item 2)

2.1 The Chairman presented his report on the main activities and progress achieved since its eighth session (Rarotonga, Cook Islands, 5 to 12 September 2000) (see Appendix III).

2.2 The Chairman, during the intercessional period, issued two newsletters for RA V/TCC Members, one in December 2000 and another in August 2001.

2.3 The Committee paid tribute to Mr Dick Hagemeyer, who passed away on 25 October last year for his fatherly advice and tireless support for the work of the Committee.

2.4 The Committee was informed that French Polynesia had extended an invitation to electronic technicians from various Pacific Island meteorological services to visit Tahiti and familiarize themselves with the work done there on the maintenance of Automatic Weather Stations (AWS).

2.5 The Committee was very grateful to the Bureau of Meteorology (BOM), Australia for sponsoring the Mentor Training Programme which carried out two missions in 2001, one to Papua New Guinea and the other to Niue and Fiji. The Committee requested that BOM continue with this programme.

2.6 The Committee noted with appreciation the establishment of the International Pacific Training Desk Programme at the Central Pacific Hurricane Centre (CPHC, *now RSMC Honolulu - Hurricane Center/Weather Forecast Office (WFO)* Honolulu, Hawaii in March 2001. It offered a two-month fellowship to forecasters from NMSs of WMO RA V Members. Four forecasters from four RA V/TCC Members have so far benefited from this programme to which the Committee expressed sincere thanks. The representative of USA informed the Committee that these are still five (5) fellowships timetabled to the end of 2002.

2.7 The Committee was informed of the outcome of the 15th session of the RA I Tropical Cyclone Committee (RA I/TCC) (Moroni, Comoros, September 2001). It acknowledged the presence of the Chairman of RA I/TCC, ex-officio member of RA V/TCC, in this meeting whereby the Committee stressed the importance and need for enhanced cooperation between the two tropical cyclone regional bodies in the South Indian Ocean. The Committee noted the proposals discussed and the decisions made during the 15th session of the RA I/TCC. Mr Len Broadbridge (Australia) aside from representing the RA V/TCC in the said session, delivered a talk on a study of the climatology of tropical cyclones in the South Indian Ocean. The study showed that during the El Niño-cum-negative Southern Oscillation Index

(SOI), the number of tropical cyclone days decreased in the South-East Indian Ocean and increased in the South-West Indian Ocean.

2.8 The Committee expressed its gratitude to BOM, Australia for co-sponsoring with WMO the Fourth Southern Hemisphere Training Course (SHTC) on Tropical Cyclones in Melbourne from 16 to 27 October 2000 and noted with appreciation that the Fifth SHTC is scheduled to be held from 23 September to 4 October this year. It requested Australia and WMO to make every effort to continue with the series of this particularly highly beneficial training course.

2.9 The Committee noted with appreciation the information that Palau and Nauru are likely to become Members of the RA V/TCC in the near future.

2.10 The Chairman provided the Members with a comprehensive regional overview of the 2000/2001 and 2001/2002 cyclone seasons (Appendix IV).

2.11 The report of the Chairman for this session incorrectly stated that Tonga had completed the Mentor Training and that Niue sent a participant to the International Pacific Desk Training Programme in Honolulu.

3. COORDINATION WITHIN THE WMO TROPICAL CYCLONE PROGRAMME (Agenda item 3)

3.1 The Committee noted with satisfaction the achievements and progress made in both the general component and the regional component of the TCP since the eighth session of the Committee (Rarotonga, Cook Islands, September 2000).

3.2 The Committee was pleased to note the designation of CPHC, Honolulu (USA) as an RSMC with activity specialisation in tropical cyclones and was re-named as RSMC Honolulu-Hurricane Center with effect from July 2001.

3.3 The Committee was pleased to learn that the TCP has fostered and maintained close collaboration and fruitful coordination with regional bodies concerned with disaster preparedness, prevention and mitigation issues in the Pacific region, in particular, the Secretariat of the Pacific Community (SPC), South Pacific Applied Geoscience Commission (SOPAC) and the South Pacific Regional Environment Programme (SPREP).

3.4 The Committee was informed that an Expert Meeting on the formulation of TCP Sub-project No. 23 "Combined Effects of Storm Surges and River Floods in Low Lying Areas" is scheduled to be held in Nadi, Fiji (Part I: 30 November 2002 (a.m. only) and Part II: 7 December (p.m. only)) in Cairns, Australia.

3.5 The Committee, in recognizing the importance of strengthening the technical coordination among Tropical Cyclone (TC) Regional Specialized Meteorological Centres (RSMCs) and Tropical Cyclone Warning Centres (TCWCs) (Brisbane, Darwin, Perth, Port Moresby, Wellington) was gratified to learn that Fiji will host the fourth TC RSMCs Technical Coordination Meeting at the RSMC Nadi –Tropical Cyclone Centre from 26 to 29 November 2002. It was noted that the TCWCs will also be invited to this meeting.

3.6 The Committee noted with pleasure that the Tropical Cyclone Programme (TCP) home page on the WMO web page (<http://www.wmo.ch/web/www/TCP/trop-cyc.html>) is continuously being updated and that the web page of the RA V/TCC within the TCP home page will soon establish links to regional bodies and international agencies which are actively involved in the work of the Committee. It proposed that disaster preparedness, prevention, mitigation and training materials also be posted in the RA V/TCC web page.

3.7 In view of the fact that the International Workshops on Tropical Cyclones (IWTC) had served as an excellent forum for the interaction between forecasters and researchers and as envisioned had encouraged the application of research results to operational usage, the Committee was pleased to learn that the fifth of the series of these workshops will be held in Cairns, Australia from 3 to 12 December 2002. Members are encouraged to nominate meteorologists with a strong background on tropical cyclone forecasting.

3.8 The Committee was informed about the contingency plan of the Japanese Meteorological Agency (JMA) to use the GOES-9 Satellite to back-up GMS-5 in case it fails prior to the launch and operational capability of MTSAT in the summer of 2003. The representative of USA provided the session with copies of the press release by JMA on the establishment of the back-up of GMS-5 with GOES-9 and is given in Attachment V.

3.9 The Session recorded its appreciation to Mr Gary Foley for his presentation on "Progress in Remote Sensing Techniques for Monitoring Tropical Cyclones".

4. REVIEW OF THE 2000/2001 AND 2001/2002 CYCLONE SEASONS (Agenda item 4)

4.1 Tropical cyclone activity during the 2000/2001 Tropical Cyclone Season in the RSMC Nadi Area of Responsibility (AOR) was well below average with the occurrence of a total of only four tropical cyclones. This was a continuation of the downward trend since the record number of seventeen cyclones during the 1997-1998 cyclone season. Of the four tropical cyclones that formed, only one attained hurricane intensity. Interestingly, the first half of the season (November to January) was cyclone free. Records revealed that the last time this occurred was during the 1944/1945 cyclone season.

4.2 The representative of the RSMC Nadi presented the comprehensive reports on seasonal cyclone summary of the 2000/2001 and 2001/2002 tropical cyclone seasons. These reports are given in Appendices VI and VII.

4.3 The reports of the 2000/2001 and 2001/2002 tropical cyclone seasons from the other Members of the Committee are given in Appendix VIII.

4.4 The representative of Fiji informed the Committee on the issues that RSMC Nadi is currently faced with: the need for training of meteorological personnel in the region, reduced quality of observational data from some Members, and delay in the transmission to RSMC Nadi of damage assessment reports from Members.

4.5 The representative of Papua New Guinea expressed his thanks to BOM, Australia for the Mentor Training Course conducted by Mr Jeff Callaghan.

4.6 The representative of Solomon Island informed the Committee that they are experiencing regular outages with their telephone/internet connections. He expressed gratitude to RSMC Honolulu for granting fellowship to one of his staff at the Pacific Desk, to BOM, Australia for assistance in upgrading their forecasting computer system and to WMO for the provision of two personal computers complete with accessories.

4.7 The representative of Australia provided the Committee with a report of the past two cyclone seasons. He informed the Committee that they have noted a steady increase in the use of the Internet by the public to access meteorological information and the need for their service to establish increased capacity to cope with the demand.

4.8 The representative of New Caledonia informed the Committee that Météo-France in New Caledonia and Wallis and Fortuna publishes annually a "Cyclone Season" report. Aside from a printed report, it is also available on CD-ROM. It provides a description of all the tropical phenomena that occurred in their area of responsibility with emphasis on their

formation, evolution and best tracks. Also included in the report are observational data such as wind speed and rainfall. The CD-ROM contains more information than the printed version. It contains satellite images and when possible, with animation of time-sequential satellite images and a climatological study of the cyclone hazard in New Caledonia and some information related to security. Both versions are available in French and in English and will be distributed to the Members of the Committee.

4.9 The representative of Indonesia informed the Committee that heavy rainfall and floods resulting from the direct impact of tropical cyclone Chris persisted for several days along parts of Java, Bali and Nusatenggara islands. The Committee was also informed that no damage reports were received on tropical cyclone Bonnie from any stations in Indonesia except for the information they gathered from media reports and other sources.

4.10 The representative of USA provided the Committee with a summary of the past two cyclone seasons for American Samoa and the North Central Pacific area. He informed the Committee of the need for a coordination meeting between RSMC Honolulu, RSMC Nadi and the Samoas because of the difficulties that arose during tropical cyclone Waka. He also informed the session that a new building was being constructed for WSO Pago Pago, American Samoa and gave a progress report on the International Pacific Desk Training Programme. The Committee noted with regret the possible budget cut for the NMS of the Federated States of Micronesia.

4.11 The representative of Kiribati informed the Committee that they did not experience any cyclone during the last two seasons but noted that in some occasions such as during the 1997/1998 El Niño event, there were unofficial reports that high winds were experienced in their area as implied from a report of damage to a yacht's mast.

4.12 The Committee noted the importance of wave data and requested that more emphasis be given to find ways and means to access this information. In this regard, the representative of Samoa informed the Committee that a 10-year data base is available from SOPAC. These data was gathered during the conduct of a Norwegian funded project ten years ago.

4.13 The Chairman of the RA I/TCC noted with concern that their region is getting more intense tropical cyclones with abnormal tracks lately (with tropical cyclones moving from west to east and then south). The Committee was informed that tropical cyclone Eline was not only strong but also had a long life span of 29 days.

4.14 The representative of Cook Islands expressed concern about the 150 to 200 km discrepancies in the position given for tropical cyclone Trina by different forecasting centers in the region. He also wondered how the Committee might be able to address climate change and variability issues. He further stressed the need for more emphasis to be given to dealing adequately with weaker disturbances/systems. With regard to climate change, a copy of the paper "Tropical Cyclones and Global Climate Change: A post-IPCC Assessment" was distributed during the session.

4.15 The representative of French Polynesia informed the Committee that an unnamed disturbance at the end of November 2001 caused trees to be uprooted on Raivavae in the Austral Islands. He mentioned that it was difficult to manage this disturbance because of its very short life span.

4.16 The representative of Niue informed the Committee that although tropical cyclone Waka passed about 250 km southwest of Niue at its closest approach, gale force winds and high seas around Niue caused damage amounting to an estimated USD 10,000. Sea spray penetrated 100 meters inland from the west coast. He mentioned that almost all households in Niue are equipped with a cyclone tracking map.

4.17 The representative of Samoa stated that they received doubtful observations from the Savai'i AWS during the passage of tropical cyclone Waka. A very fast-developing and short-lived disturbance brought rainfall of about 200 mm in 5 hours (including 85 mm in two hours) causing severe flooding to the whole township of Apia on 15 April 2001. Damage, mainly to destroyed water utilities and two newly constructed bridges, was estimated at USD 300,000.

4.18 The representative of Tokelau informed the Committee that tropical cyclone Waka spent its formative stages in the vicinity of the Islands. The winds were sufficiently strong and the wind swell/waves caused flooding at schools and destroyed banana plants and shallow root crops. The Tokelau Meteorological Service is in the throes of becoming established and Ms Malia Daleb will be the first Director. She was unable to attend this meeting and so Mr Garry Clarke was deputized to represent Tokelau.

4.19 The representative of the Federated States of Micronesia informed the Committee that they were fortunate that during the last two cyclone seasons, damage and loss of life due to tropical cyclones was kept to a minimum. He expressed his thanks to RSMC Honolulu and Naval Pacific Meteorology and Oceanography/Joint Typhoon Warning Center for the timely and accurate forecast updates and other statement issuances.

4.20 The representative of Tonga made a presentation on the three tropical cyclones which affected his country during the past cyclone seasons. Included in his report are damage photos and assessment reports. He also mentioned that their service is currently facing difficulties caused by the lack of adequately trained personnel. During the passage of tropical cyclone Waka through Tonga, two forecasters, the only staff with the proper training and experience, had to remain on straight duty for 72 hours. Thus, there is an immediate need for additional trained staff to share the workload. He also said that insufficient emphasis was placed on unnamed tropical disturbances and was concerned when six fishermen were lost after the cancellation of Special Weather Bulletins for gale force winds.

4.21 The observer from Palau informed the Committee of the damage caused by Typhoon Utor and that her government had allotted USD 5 million for the rehabilitation of infrastructures damaged by the cyclone and assistance to cyclone victims.

4.22 Several Members noted in their reports the problems faced with marginal systems that did not qualify as tropical cyclones but caused significant damage and public concern. The Chairman of RA I/TCC also echoed his Committee's concern on the lack of information on marginal systems. The Committee called upon RSMCs and TCWCs concerned to enhance their capabilities to adequately deal with such systems. In accepting the challenge, the representative of RSMC Nadi reiterated the need for improved public education and awareness programmes to better understand and respond to such kind of weather systems.

5. REVIEW OF THE TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN (Agenda item 5)

5.1 The Committee examined in detail and discussed in-depth the proposed changes to the text of the Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean. It took into account experiences gained during the past cyclone seasons; implementation of items in the Committee's Technical Plan; and other relevant changes during the intersession. The main items for discussion were the proposed changes to the definitions of tropical cyclone and tropical depression and a modification to the criteria for the naming of tropical cyclones.

5.2 Members who receive Special Weather Bulletins from RSMC Nadi requested Nadi to post the information on its web site half an hour after issuance to enable sufficient time for local dissemination.

5.3 Australia confirmed that it will continue to provide International Marine Warnings in the Indonesian Area of Responsibility until the end of the 2004/2005 cyclone season while assisting Indonesia in further developing its tropical cyclone forecasting capability.

5.4 A new Attachment 2B has been added to the Operational Plan to keep a record of all the cyclone names that have been retired due to the cyclone's negative impact.

5.5 A new pro-forma damage assessment form for documenting cyclone assessment reports will be added to Chapter 7 as Attachment 7A. The form will be drafted by RSMC Nadi in coordination with the Members.

5.6 The observer from ICAO presented to the Committee the new requirements for tropical cyclone advisory and SIGMET messages for aviation as a result of Amendment 72 to ICAO Annex 3/WMO Technical Regulations [C.3.1], in view of their implementation in the area covered by the RA V/TCC. The changes proposed for WMO/TD-No. 292 aimed at strengthening the provisions related to aviation are shown in Appendix IX.

5.7 The Committee strongly urged ICAO to take necessary action for the addition of a +6 hours forecast position in every Tropical Cyclone Advisory issued to Meteorological Watch Offices (MWOs) since interpolation between the current and +12 hours forecast position may lead to significant errors.

5.8 The Committee recommended that the Acting President of RA V give his approval for amendments to the text of the Operational Plan. The President of RA V approved these amendments.

5.9 The Committee urged Members that any subsequent changes to the attachments to the Operational Plan should be submitted to the Chairman by mid-July for timely issuance by WMO of a new edition.

5.10 The Committee requested the Secretary-General of WMO to publish a new edition of the Tropical Cyclone Operational Plan in English and French versions as a WMO Technical Document (WMO/TD-No. 292) in the TCP series (TCP Report No. TCP-24), before the start of the 2002/2003 cyclone season.

6. FORMULATION OF THE TECHNICAL PLAN AND ITS IMPLEMENTATION PROGRAMME (2002–2004) (Agenda item 6)

6.1 Under this agenda item, the Committee established a working group under the chairmanship of Mr Gary Foley (Australia) to carry out, during the session, formulation of a new Technical Plan for future development of services for the period 2002 and 2004.

6.2 The Committee carried out a wide-ranging review of the plan and updated it with emphasis on meaningful targets and solutions without having to resort to high capital expenditure. The working group initially identified problem areas and used this as a basis for the formulation of the updated technical plan.

6.3 The following items were either achieved or discarded from the Technical Plan drawn up at the eighth session:

- WEB ACCESS TO WAVE MODEL INFORMATION – posted on the BOM sponsored South Pacific Tropical Cyclone web page
- AMDAR/ACARS – BOM provided the relevant information which was disseminated to Members in a Chairman's Newsletter
- Pacific-HYCOS – the Committee endorsed the project proposal drawn up by the RA V Working Group on Hydrology

- TRAINING THE TRAINERS – no longer required
- LIAISE WITH COUNCIL OF REGIONAL ORGANIZATIONS IN THE PACIFIC (CROP) AGENCIES (such as SOPAC and SPREP) – each NMS has appointed a public education officer to liaise with these agencies
- WMO Header on GTS Messages – mission accomplished for Vanuatu and Papua New Guinea
- SATELLITE TELEPHONES – unable to do anything further

The following items were added:

- WATCH/ALERT SURVEY
- LIST OF RETIRED TROPICAL CYCLONE NAMES
- EMPOWERING THE BUREAU OF METEOROLOGY AND GEOPHYSICS (BMG), INDONESIA TO RESUME RESPONSIBILITY FOR ITS INTERNATIONAL MARINE WARNING AREA

6.5 The Committee noted the publication of a Pacific GCOS Action Plan and the formation of an associated Implementation Group. The Committee expressed appreciation for this initiative and encouraged Members to work closely with the Implementation Group.

6.6 The Committee ultimately concurred with the Revised Technical Plan submitted by the Chairman of the Working Group. The Plan is given in Appendix X.

7. ASSISTANCE REQUIRED FOR THE IMPLEMENTATION OF THE PROGRAMME FOR THE DEVELOPMENT OF SERVICES (Agenda item 7)

7.1 The Committee took note of the information submitted by the Secretary-General on the support provided by WMO through its Voluntary Cooperation Programme (VCP). The Committee expressed its appreciation for the support provided by some of its Members through VCP activities. It noted further that VCP had played an effective role in the implementation of the programme activities of this Committee particularly those related to the World Weather Watch (WWW) programme and to the training of personnel through the provision of fellowships.

7.2 The Committee noted that some Members received assistance through bilateral and multilateral arrangements for the development and strengthening of their NMHSs. The Committee expressed its appreciation to those countries and organizations for their continued support.

7.3 The Committee noted that the EU-funded Cyclone Warning System Upgrade Project (REG 7709) had supported many areas related to the mitigation of tropical cyclone disasters. In this regard, the Committee requested WMO to develop a similar project taking into consideration the RA V/TCC Technical Plan. The Committee then requested WMO to coordinate with the Chairman of the Committee, the Members and the regional organizations.

7.4 The Committee noted that some donor agencies in the region had recently changed their policy from providing support through bilateral arrangements to regional assistance.

7.5 The Committee noted also that there were a number of initiatives and programmes established or being considered in the region. These programmes or projects have components related to meteorology, climatology and operational hydrology. The Committee encouraged its Members to work very closely with the national focal points concerned and the regional organizations such as SPREP and SOPAC.

7.6 The Committee noted that some of its Members are benefiting from the ongoing project Comprehensive Test Ban Treaty. Under this project, Papua New Guinea, Samoa and Cook Islands have established radio nuclear stations, seismological stations and AWSs.

7.7 The Committee was informed that Japan through the Japan International Cooperation Agency (JICA) is providing support to Fiji to conduct a five-year training programme in Meteorology for some Pacific Island countries. The Committee expressed its appreciation to Japan and encouraged Members concerned to coordinate their training requirements with Fiji. The Committee requested Fiji to provide detailed information on the training programme and coordinate with WMO on this aspect.

7.8 The Committee expressed its appreciation to WMO for the role of the WMO Subregional Office for the South-West Pacific in assisting the Members and encouraged the office to continue these pro-active activities especially in implementing the technical plan.

8. DATE AND PLACE OF THE TENTH SESSION (Agenda item 8)

8.1 The Committee expressed satisfaction with its achievements during the intersessional period and the need to continue its work. It proposed that the Committee be re-established as a Working Group by XIII-RA V (Manila, Philippines, 21 to 28 May 2002). It also expressed the desire that its tenth session be held before the 2004-2005 cyclone season, the precise dates to be determined later.

8.2 The representatives of Indonesia, New Zealand and Niue informed the Committee that their countries are willing to host the tenth session in 2004. The Committee welcomed these offers and requested the Secretary-General of WMO to take appropriate action, in consultation with the President of RA V and its Chairman, in deciding who will host the session and in making the necessary arrangements.

9. CLOSURE OF THE SESSION (Agenda item 9)

The report of the ninth session of the Committee was adopted at its final meeting on 20 May 2002.

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APPENDIX I

LIST OF PARTICIPANTS

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Ms Faina Pascual

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Mr Larry Roazul

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APPENDIX II

1. ORGANIZATION OF THE SESSION
 - 1.1 Opening of the session
 - 1.2 Adoption of the agenda
 - 1.3 Election of the vice-chairman
 - 1.4 Working arrangements of the session
 2. REPORT OF THE CHAIRMAN OF THE COMMITTEE
 3. COORDINATION WITHIN THE WMO TROPICAL CYCLONE PROGRAMME
 4. REVIEW OF THE 2000/2001 AND 2001/2002 CYCLONE SEASONS
 5. REVIEW OF THE TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN
 6. REVIEW OF THE TECHNICAL PLAN AND ITS IMPLEMENTATION PROGRAMME
 7. ASSISTANCE REQUIRED FOR THE IMPLEMENTATION OF THE PROGRAMME FOR THE DEVELOPMENT OF SERVICES
 8. DATE AND PLACE OF THE TENTH SESSION
 9. CLOSURE OF THE SESSION
-

APPENDIX III

REPORT OF THE CHAIRMAN OF THE COMMITTEE

INTRODUCTION

Since the 8th session of the WMO RA V Tropical Cyclone Committee (TCC) in Rarotonga, September 2000 I have issued two newsletters to TCC members, one in December, 2000 and another in August, 2001. Highlights from both these newsletters will be included in this report. In the short time since my last newsletter, so much has happened on the world stage stemming from the ghastly terror attacks on the USA and on a more personal level, the death of Dick Hagemeyer, a respected friend and member of this Committee on October 25th. We will remember Dick for his fatherly advice and tireless support for the work of this Committee and the way he was able to confront issues like the controversial one to do with the definitions of *tropical depression* and *tropical cyclone*.

I will also include a status report on the work going on under the umbrella of the Technical Plan for 2001/2002 together with some up-to-date information on the Emergency Managers Weather Information Network (EMWIN) and the Samoa Communications Upgrade Project. The mentoring project undertaken by the Bureau of Meteorology, Australia is having a break while the International Pacific Fellowship programme offered by the USA National Weather Service is mapped out until the end of 2002.

2000/2001 CYCLONE SEASONS

Twelve (12) tropical cyclones formed across the entire region (from the southeast Indian Ocean to the southeast Pacific Ocean) during the 2000/2001-cyclone representing 3 below the average. Sam, with maximum 10-minute average winds of 125 knots was the sole major hurricane while Paula, Walter, Abigail, Alistair and Sose rose to hurricane intensity of 90 knots or less. Three others - Terri, Vincent and Oma peaked at storm intensity while Winsome, Wylva and Rita reached gale intensity. On average, we can expect 15 tropical cyclones in a season from the southeast Indian Ocean to the southeast Pacific. The cyclones were named in four different areas of responsibility as follows - 4 in Perth, 2 in Darwin, 2 in Brisbane and 4 in Nadi. Over the Coral Sea and South Pacific area, the cyclone season didn't properly kick off until February 20th when Oma formed between Niue and the Southern Cook Islands. Climatological records reveal that it is 56 years since a tropical cyclone failed to be detected in this zone until the month of February.

During the season, the Southern Oscillation Index showed a small La Nina bias although the cold sea surface temperature anomalies in the Equatorial eastern Pacific continued to weaken. By the end of the season, the situation was neutral - neither La Nina nor El Nino. The Madden Julian or 30 to 60 days Oscillation appeared to play its part in stirring up cyclone activity during the season. There were peak phases (representing a flare-up in convection and strengthening in the monsoon trough and/or the South Pacific Convergence Zone) in early December, early to mid February and again in April.

TROPICAL CYCLONE OPERATIONAL PLAN

i) **TERMINOLOGY**

There is nothing like the real thing to show up errors, omissions, shortfalls and difficulties in striving to make something like the Tropical Cyclone Operational Plan a living document. It was foreseen that the changes to the definitions of "*Tropical Cyclone*" and "*Tropical Depression*" at the 8th session would put pressure on Tropical Cyclone Warning Centres to name a system as early as possible without waiting for a cyclone to stare forecasters in the face. During the 2000/2001 season, tropical disturbance activity was quieter than normal when you consider only

4 out of a possible 14 numbered disturbances in the Nadi area of responsibility were actually named. The new definition came into its own at the start of the 2001/2002 season when a disturbance over the Southern Cook Islands became tropical cyclone Trina with gales estimated in just one quadrant of its circulation. Under the old definition, RSMC Nadi would have delayed naming this system until gales were estimated to completely surround the centre. As it turned out, Trina never kicked on in its development so would probably never have been named under the pre-Rarotonga definition.

ii) MARINE WARNINGS

At the 8th session in Rarotonga, a new paragraph 2.1.2.1 "**One comprehensive marine warning per cyclone**" was added to the Tropical Cyclone Operational Plan. This was designed to encourage all wind warning information to be put into one bulletin ie the tropical cyclone warning without the need to issue separate warnings when a large area of gales occurred between the tropical cyclone and a subtropical high. This led to the drawing up of a set of procedures involving both RSMC Nadi and Wellington which were put to the test when tropical cyclone SOSE was centred in the RSMC Nadi area during 8-10 April 2001 and gales extended a long way into the Wellington area. Wellington produced a sketch map outlining gales in its area for RSMC Nadi forecasters to help with the wind distribution in the next international marine warning. After issuing 3 separate warnings to cover gales or stronger winds around SOSE and in the squash zone between SOSE and the subtropical ridge at 1800 UTC on 8th, all subsequent warnings were able to incorporate all the details into just one bulletin. In November 2001, New Zealand forecasters participated in a workshop to review the way they handled tropical cyclones near the Nadi/Wellington boundary.

THE COMMITTEE'S TECHNICAL PLAN for 2001/2002

For details of this Plan, I refer you to Appendix VII of the Final Report of the 8th Session of the RA V Tropical Cyclone Committee. What follows is a status review of the Technical Plan as in December 2001 with the numbers in the left-hand margin related to the Priority Rating number given in the Plan.

- 1 **Agreements on products and services between RSMC Nadi and Pacific Island Countries: No progress so far.**
- 2 **Automatic Weather Stations (AWS):** Just before his departure from Tahiti, Jacki Pilon extended an invitation to maintenance technicians from the various Pacific Island meteorological services to visit Tahiti and familiarise themselves with the maintenance work carried out there in the hope it will assist them back home. Anybody interested should contact Roger Watrin (Roger.Watrin@meteo.fr).
- 3 **Mentor Training:** I received overwhelming support for an invitation to join a Bureau of Meteorology (BOM), Australia sponsored mentoring programme. As a result, BOM carried out two missions - one by Jeff Callaghan to Papua New Guinea and another by Jim Davidson to Niue, Tonga and Fiji. A summary of these missions is available in the August 2001 Newsletter. Other visits are planned over the next year or so depending on the availability of trainers and funding.
- 4 **Research** (to better understand and improve forecasting of midget and rapidly developing tropical cyclones):
Ongoing. Refer to notes on 4th Southern Hemisphere Course on Tropical Cyclones.

- 5 **Attachment training:** The United States Weather Service started up the International Pacific Training Desk at the Central Pacific Hurricane Centre (CPHC)/Weather Forecast Office (WFO) Honolulu Hawaii in March 2001. Two-month fellowships are open to meteorologists from the National Meteorological Services (NMS) of WMO Regional Association V members. These fellowships introduce students to modern meteorological practices and data sets. Those who have benefited so far are Angeline Prasad, Fiji; Sagato Taufiso, Samoa; 'Ofa Fa'anunu, Tonga and Rossylynn Pulehetoa, Niue. There are another 5 fellowships timetabled for 2002.
- 6 **Marine meteorology workshop:** Unaware of any progress.
- 7 **Web access to information on wave models:** The data has been made available with the help of the team at the National Meteorology Operations Centre (NMOC) in Melbourne. It is also available via Emergency Managers Weather Information Network (EMWIN).
- 8 **Training the trainers:** To be addressed during the WMO/BOM sponsored 5th Southern Hemisphere Training Course on Tropical Cyclones in Melbourne in late 2002.
- 9 **AMDAR/ACARS:** In my December, 2000 Newsletter, I passed on information to Members provided by Bruce Gunn, BOM Australia on what steps to take in pushing for this technology to be installed on national carriers.
- 10 **Pacific-HYCOS:** Unaware of any progress.
- 11 **Naming of special breed of cyclone:** No progress has been made on this issue since the 8th session. I plan to restart dialogue between the BOM and MetService after the 2001/2002-cyclone season.
- 12 **5th International Workshop on Tropical Cyclones (IWTC-V), tentatively Cairns, Australia, December 2002:** Funding for interested participants will be addressed nearer the time of the workshop.
- 13 **WMO Publications (to keep tropical cyclone forecasters up-to-date on tropical cyclone and warning systems):** Ongoing.
- 14 **CROP agencies, SOPAC and SPREP liaison** (to improve public education and awareness): I am unsure how many NMHS have appointed an Education Officer to interact with these agencies.
- 15 **WMO header on GTS messages (to enable tropical cyclone warnings to be broadcasted on Radio New Zealand International and Radio Australia, and EMWIN systems):** Vanuatu have tried to set something up with the help of the BOM Australia but unsure of where things are at. No progress with Papua New Guinea so far.
- 16 **Satellite telephones:** This is a hangover from the European Union (EU) South Pacific Cyclone Warning Upgrade Project which ended in March 2000. Project funding didn't include the cost of installing these units or provide a card (apparently very expensive; in the order of a few hundred US\$) to operate them. I don't believe any progress has been made for something that was designed to provide a backup to normal telecommunications.

COURSES and MEETINGS

- **4th Southern Hemisphere Course on Tropical Cyclones in Melbourne from 16 to 27 October 2000**

This course catered for operational personnel and attracted ten participants from the South Pacific, East Africa and Indonesia. There were presentations by forecasters from the Perth, Brisbane and Darwin Tropical Cyclone Warning Centres. Rex Falls, an ex-member of this Committee spoke on warning strategies and liaison with counter disaster agencies. Dr Ray Zehr (Colorado State University) presented current knowledge on tropical cyclone formation. Catherine Bientz from Meteo France, La Reunion provided tuition on the Dvorak technique. Other topics included rapid developing tropical cyclones (*refer to priority 4 item in the New Technical Plan*), wave generation, radar interpretation, model predictions, land-falling cyclones, wind shear, public education, tropical cyclone workstation and tropical cyclone seasonal outlooks. There was some mathematical theory but the main emphasis was on operational forecasting and warning services.

- **15th session of RA 1 Tropical Cyclone Committee (TCC) for the South-West Indian Ocean, Moroni, Comoros Islands, 4 to 10 September 2001.**

Len Broadbridge attended this meeting as an observer for the RA V tropical Cyclone Committee. Under the agenda item of the Tropical Cyclone Operational Plan, the following proposals were discussed and the decisions appended to the end of the proposals:

- Our Committee requested the RA 1 TCC to consider keeping the same name for a tropical cyclone during its entire life (rejected).
- The start of the season to be moved from 1 August to 1 July (agreed).
- A tropical disturbance retains the initial name throughout its life in the South-West Indian Ocean (west of 90°East) (rejected).
- A single list of tropical cyclone names for the entire South Indian Ocean basin (rejected).
- A circular list of names be used (rejected)
- The boundary of the South-West Indian Ocean be moved from 90E to 95E (rejected)

2 In a study of the climatology of tropical cyclones in the South Indian Ocean, Len Broadbridge has identified an inter-seasonal "See-Saw" effect associated with the Southern Oscillation Index (SOI). The study showed that during El Nino-cum-negative SOI (La Nina-cum-positive SOI), the number of tropical cyclone days decreases (increases) in the South-East Indian Ocean and increases (decreases) in the South-West Indian Ocean. Len is preparing a paper for publication.

MILESTONES

i) *RSMC Honolulu_Hurricane Center*

The Central Pacific Hurricane Centre, Honolulu was confirmed as a RSMC at the 53rd session of WMO Executive Council in Geneva, in June 2001. The new RSMC will have activity specialization in tropical cyclones on the basis of requirements for cyclone forecasts and warnings in the North Central Pacific Ocean basin, north of the equator from 180°West to 140°West. The full title for the RSMC is presently under consideration but will probably be "RSMC Honolulu_Hurricane Center", similar to that of Miami "RSMC Miami_Hurricane Center".

The Director of RSMC Honolulu is Mr James Weyman, a member of our Committee. Congratulations, James!

ii) **NAURU METEOROLOGICAL SERVICE**

Nauru is well on the way to becoming the newest member of our Tropical Cyclone Committee. On October 4th 2000, the Fiji Meteorological Service started issuing routine public weather bulletins for Nauru including sea and swell information. This replaced a *Narrative Statement* of expected weather developments that NWS Honolulu had been issuing to Nauru for more than a year prior to that. During 2001, Kim Nitschke, Atmospheric Radiation Measurement (ARM) Project Coordinator for South Pacific Regional Programme (SPREP), Henry Taiki, Neville Koop and the Fiji Meteorological Service have all played a part in helping Nauru work towards its goal of becoming a fully fledged meteorological service.

MISCELLANEOUS

i) **SAMOA UPGRADE TELECOMMUNICATIONS PROJECT**

Ed Young, US National Weather Service, Honolulu has kept me informed about what is happening with this Project. The project results from the establishment of a new E-1 circuit that was funded by the US National Weather Service and the European Union, for use by the governments of Independent Samoa and American Samoa. Five channels have been reserved for improved meteorological and aviation communications between American Samoa and Independent Samoa, including a hotline between the meteorological offices in Apia and Pago Pago and the establishment of two AFTN/MET terminals for the Samoa Meteorological Service, one in Apia and the other at Faleolo Airport. Prior to Christmas 2001, a team of US National Weather Service and Federal Aviation Administration (FAA) technicians will visit Pago Pago and Apia to activate both the AFTN/MET circuit and the two voice circuits (hotlines). However, more diplomacy is required before the AFTN/MET circuit becomes live so the best we can hope for before Christmas is an active hotline between the Apia and Pago Pago meteorological offices.

ii) **EMWIN**

Ed Young has also kept me abreast of developments on the EMWIN front. The EMWIN data stream is now being up-linked experimentally to the PEACESAT (Pan-Pacific Education and Communication Experiments by Satellite) Satellite on GOES-7 (near 175°West). Colin Schulz, a SPREP consultant is developing a prototype, moveable-tracking system to enable PEACESAT to be followed when it describes a figure of eight path between 5°North and 5°South. This tracking system will be installed at the Weather Forecast Office on Guam in early 2002. Once testing of the tracking system has been successfully completed, it will be on sale for deployment at sites west of 145°West.

PERSONNEL

Deaths - I have already mentioned Dick Hagemeyer. It's a year since Mike Ariki, a former member of this Committee died in Australia in tragic circumstances.

Movements - Neville Koop has moved to Sunnyvale, California, USA for a job with Weather News Inc. (WNI). WNI is a private meteorological consulting company which provides information to the maritime community (principally ships at sea and offshore drilling platforms).

Comings and goings - Roger Watrin has replaced Jacki Pilon in Tahiti and Andree Letrocquer for Yves Bouteloup in New Caledonia.

Appointments - Jotham Napat is Acting Director of the Vanuatu Meteorological Service and Permanent Representative of Vanuatu with WMO in place of Wilson Vuti who resigned earlier in 2001. His e-mail address is:
Admin@meteo.vu.

I would like to thank both Katsuhiko Abe and Nanette Lomarda of WMO TCP for their continuing support of my chairmanship and to those of you who have helped me out with contributions to the newsletters.

Steve Ready
Chairman
WMO RAV Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean

APPENDIX IV

REGIONAL OVERVIEW OF THE 2000/2001 AND 2001/2002 CYCLONE SEASONS

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(hard copies only)

APPENDIX V

**PRESS RELEASE BY JMA ON THE ESTABLISHMENT
OF THE BACK-UP OF GMS-5 WITH GEOS-9**

(hard copy only)

APPENDIX VI

RSMC NADI – TROPICAL CYCLONE CENTRE

TROPICAL CYCLONE SUMMARY 2000-2001 Season

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APPENDIX VII

RSMC NADI – TROPICAL CYCLONE CENTRE

TROPICAL CYCLONE SUMMARY 2001-2002 Season

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APPENDIX VIII

Members' Cyclone Season (2000/2001 and 2001/2002) Reports

AUSTRALIAN REGION TROPICAL CYCLONE ACTIVITY

(Submitted by Australia)

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(available in French only)

SAISON CYCLONIQUE 2000/2001

(Soumis par la Nouvelle Calédonie)

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TROPICAL CYCLONE SEASON REPORT 2000-2001 AND 2001-2002

(Submitted by the Weather Service Office Pago Pago, Pago Pago, American Samoa)

Pre Season Awareness and Preparedness Activities:

1. The 2000-2001 season began with the two Samoa's joint Disaster Awareness Week Networking (DAWN). The DAWN was the coordinated efforts of the Independent State of Samoa, and the Territory of American Samoa to prepare and to make the public aware of natural and man-made disasters with special emphasis on tropical cyclones and earthquakes. The media from Pago Pago and Apia widely covered a multitude of activities which were conducted in both countries throughout the third week of October 2000.

2. The joint DAWN for 2001-2002 between the Independent State of Samoa and American Samoa was cancelled because of security reasons from the aftermath of the September 11, 2001 disaster. However, a full week of activities with presentation, live and pre-recorded talk show on TV and radio stations with various drills, sponsored by the Territorial Emergency Management Coordinating Office (TEMCO) and the Weather Service Office, and held in American Samoa in late October and early November 2002.

Continued Coordination:

3. The activities associated with annual DAWN program, and our joint efforts with TEMCO during our quarterly outreach program conducted throughout the territory, help kept the public abreast and informed of our disaster awareness and preparedness programs. Our assistance in coordination with Emergency Management Officials (EMO) have also extended to EMO Officials in Independent Samoa through the Samoa joint DAWN.

4. The Samoa Communication Project is near completion as numerous tests were conducted with most equipment already in place by the end of April, 2002. This project when completed will establish a dedicated voice circuit between the Apia Observatory and the Weather Service Office in Pago Pago, and will greatly enhance our ability to coordinate and communicate on a daily basis. Included in this project is the establishment of an AFTN/MET Terminal for the Apia Observatory, which will allow them to disseminate their meteorological products outside of the Independent State of Samoa. Once this capability has been established, then the Weather Service Office in Pago Pago can begin a dialogue with the Samoa Meteorological Service about possible backup scenarios to the meteorological products issued by the Apia Observatory, once a formal backup agreement has been reached.

5. The Samoa Agreement has now been in place for three years, and appears it needs to be revisited as some problems were noted during the onset of Tropical Cyclone Waka. The RSMC Nadi, the Central Pacific Hurricane Center in Honolulu, and both Samoas should get together as soon as possible to address some of the issues concerning formatting, terminologies and etc.

2000-2001 Season

6. An active trough of low pressure persisted north of Samoa during much of March 2001, and dumped a total of 18.24 inches of rainfall, which was 6.98 inches above normal. This trough also produced winds of 15 to 30 mph throughout the month with the highest peak gust of 43 mph recorded on March 2nd. The rest of the season was quiet.

2001-2002 Season

7. The season started slow for American Samoa but began to pick up in December when an active monsoon trough developed to the northwest of Samoa. This trough moved within 200-300 nautical miles to the north of Samoa, oriented from the northwest to southeast on the week of December 16-22, 2001. Various tropical systems developed within this trough with first of these tropical depression (TD No. 1) affecting American Samoa on Christmas Day, with showers and gusty winds. The showers increased through December 26, 2001, and thunderstorms and gusty winds occurred throughout the territory.

Total rainfall for TD No.1	3.61 inches
Highest peak gust Tafuna Airport 12/26/02 at 4:48 PM	30 knots

8. A second and more prominent tropical depression (TD No. 2) had already developed about 400-500 nautical miles northwest of Pago Pago on December 26, 2001 within the same trough where TD No. 1 had developed. It remained nearly stationary while it continued to intensify until it was named TC Waka on Friday evening, December 28, 2001. Tropical Depression No. 2 was showing excellent potential for intensification even as early as Wednesday, December 26, 2001.

9. Tropical Cyclone Waka, although never posing a direct threat to American Samoa, did produce high surf, heavy showers and gusty winds across the territory during the closing days of 2001.

10. A **Wind Advisory** for American Samoa was first issued at 6:00 AM Saturday, December 29, 2001, while a **High Surf Advisory** was first issued at 4PM Friday, December 29, 2001.

Total rainfall during TC Waka	2.24 inches
Highest peak gust at Tafuna Airport at 12/30/01 at 12:30 AM	56 mph

11. January and February 2002 provided no significant weather with March and April receiving more than average rainfall.

Rainfall Trend:

12. Rainfall totals for American Samoa in the last two years has been below average as the area has trended from a La Niña to more neutral ENSO condition. As we begin moving toward an El Niño, our rainfall in American Samoa has already become above normal in the last two months. We noted, however, that in the 1997-1998 strong El Niño, American Samoa experienced one of its worst drought. It is also noted that during a weak or moderate El Niño, the probability of tropical cyclones affecting Samoa increases.

Web Site for WSO Pago Pago

13. A non-published web site for the Weather Service Office in Pago Pago, American Samoa, had been existence for since 1999, and it had included satellite and model guidance data. It was designed specifically for WSO Pago Pago and the Apia Observatory, so that both offices would have a source of viewing these data over the Internet.

14. In March, 2002, the web site for WSO Pago Pago was enhanced to support its use by the general public, as well as to be more uniform with other National Weather Service web sites. This new web site can be viewed at <http://www.prh.noaa.gov/samoa/>

NESDIS Web Site for the South Pacific

15. In 2000, the US National Environmental Satellite, Data, and Information Service (NESDIS) developed a web site to display satellite imagery for the tropical northwestern Pacific, and the tropical South Pacific. This was in part developed to support the establishment and operation of the International Pacific Desk in Honolulu. The imagery contain high-resolution GOES and GMS satellite regional imagery and individual island group sectors, and can be viewed at the following web site: <http://www.goes.noaa.gov/sohemi/>

New Office for WSO Pago Pago

16. The US National Weather Service is constructing a new building for the Weather Service Office in Pago Pago, American Samoa. It will be a 2,600 square foot facility located on the same property as the existing facility, at the Pago Pago International Airport. It is expected to be occupied in November, 2002.

APPENDIX IX

CHANGES PROPOSED BY ICAO FOR WMO/TD-NO. 292

Chapter II. Responsibilities of Members

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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.

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 T₁T₂ = 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 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 T₁T₂ = FK (WMO-No. 386, Manual on GTS, refers).

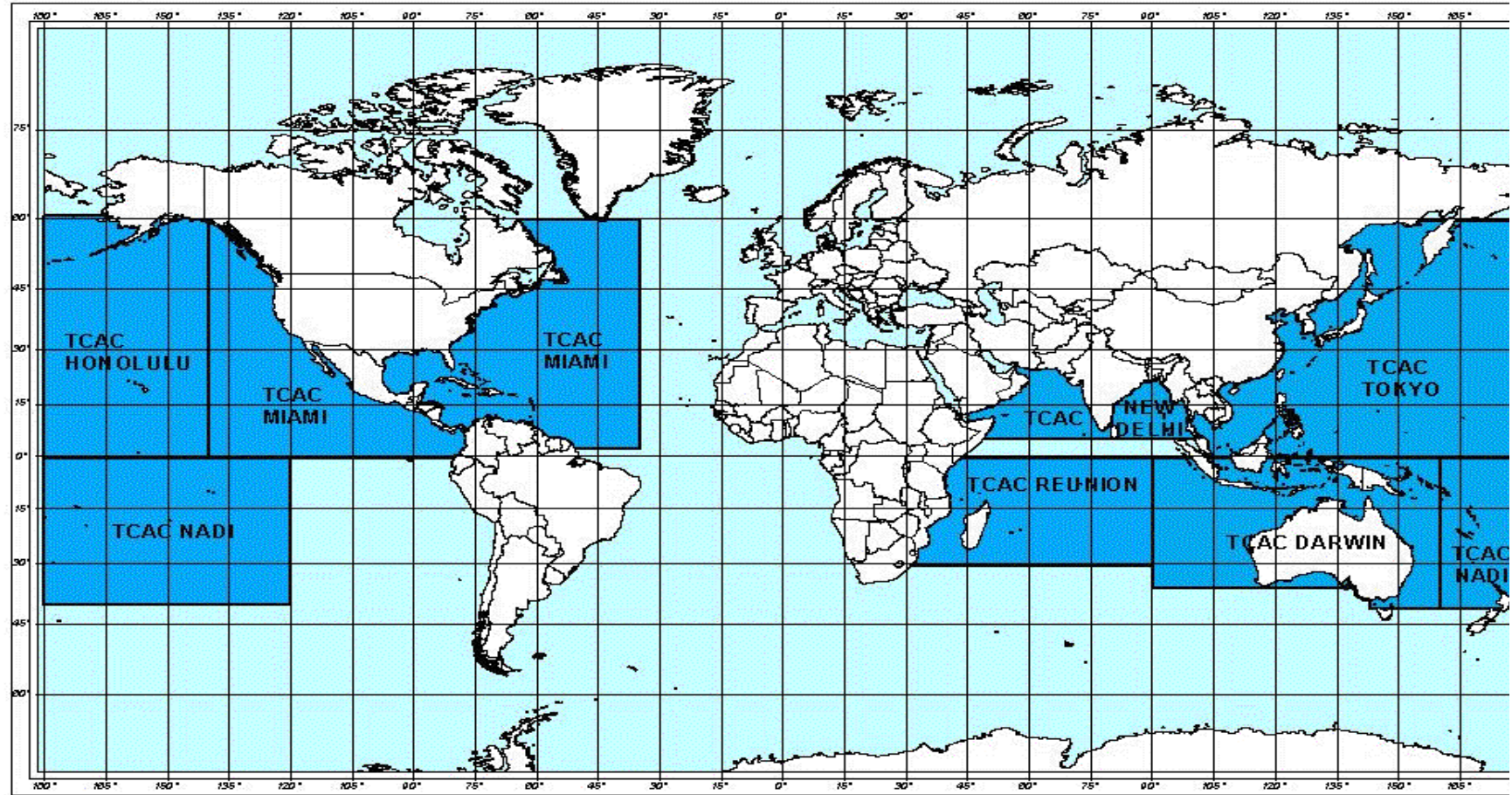
TCAC Darwin and TCAC Nadi shall issue updated advisory information in its area of responsibility, for each tropical cyclone, as necessary, but at least every six hours.

— END —

* 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.

CURRENT STATUS OF ICAO TROPICAL CYCLONE ADVISORY CENTRES (TCACs) - AREAS OF RESPONSIBILITY
SITUATION ACTUELLE DES CENTRES D'AVIS DE CYCLONES TROPICAUX (TCAC) OACI - ZONES DE RESPONSABILITE
SITUACIÓN ACTUAL DE LOS CENTROS DE AVISOS DE CICLONES TROPICALES, OACI (TCAC) - ZONAS DE RESPONSABILIDAD

FASID Chart/Mapa FASID MET 2



**TCACs and their areas of responsibility in the ICAO Asia and Pacific regions
(FASID Asia and Pacific Regions, TABLE MET 3A)**

TROPICAL CYCLONE ADVISORY CENTRE	AREA OF RESPONSIBILITY	TROPICAL CYCLONE SEASON	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT
Miami (United States)	Eastern Pacific N: 60°N S: 0°N W: 140°W E: Coastline	May - November	Guam Honolulu Kansas City Miami Tahiti
Honolulu (United States)	Central Pacific N: 60°N S: 0°N W: 180°W E: 140°W	May - November	Anchorage Guam Honolulu Kansas City Tahiti
New Delhi (India)	1) Bay of Bengal 2) Arabian Sea: N: Coastline S: 5°N W: 60°E E: 100°E	April - June October-December	Calcutta Chennai Colombo Dhaka Delhi Jakarta Karachi Kuala Lumpur Male Mumbai Tehran Yangon
Darwin (Australia)	1) South-East Indian Ocean N: 0°S S: 36°S W: 90°E E: 141°E 2) South-West Pacific Ocean N: 0°S S: 40°S W: 141°E E: 160°E	November - April	Adelaide Biak Brisbane Colombo Darwin Denpasar Hobart Honiara Jakarta Melbourne Perth Port Moresby Sydney Townsville Ujung Pandang

Attachment 2, p. 2

TROPICAL CYCLONE ADVISORY CENTRE	AREA OF RESPONSIBILITY	TROPICAL CYCLONE SEASON	MWOS TO WHICH ADVISORY INFORMATION IS TO BE SENT
Nadi (Fiji)	Southern Pacific N: 0°S S: 40°S W: 160°E E: 120°W	November - April	Brisbane Hobart Honiara Honolulu Melbourne Nadi Nauru Sydney Tahiti Townsville Wellington
Tokyo (Japan)	Western Pacific (including South China Sea) N: 6 0°N S: 0°N W: 100°E E: 180°E	January - December	Bangkok Biak Denpasar Guam Guangzhou Gia Lam Hong Kong Honolulu Jakarta Kansas City Kota Kinabalu Kuala Lumpur Manila Nadi Naha Nauru Phnom-Penh Pyongyang Shanghai Singapore Seoul Taibei Tokyo Ujung Pandang

1. Format of Tropical Cyclone Advisory according to ICAO Annex 3, XIV Edition, July 2001 (p. 3.7.2)

1. TC ADVISORY
2. DTG: Year, month, date (yyyymmdd)/time (in UTC) (using "Z") of issue
3. TCAC: Name of TCAC (location indicator or full name)
4. TC: Name of tropical cyclone
5. NR: Advisory number (starting with "01" for each cyclone)
6. PSN: Position of the centre in degrees and minutes ("Nnnnn" or "Snnnn", "Wnnnnn" or "Ennnnn")
7. MOV: Direction and speed of movement respectively to at least eight compass points ("N", "NE", "E", "SE", "S", "SW", "W", "NW") and in km/h (or kt)
8. C: Central pressure (in hPa)
9. MAX WIND: Maximum surface wind near the centre (mean over 10 minutes, in km/h (or kt))
- 10 FCST PSN
. +12 HR: Forecast of centre position for fixed valid time of ... UTC (12 hours after time of issuance of the advisory)
- 11 FCST MAX WIND
. +12 HR: Forecast of maximum surface wind for fixed valid time of ...UTC (12 hours after time of issuance of the advisory)
- 12 FCST PNS
. +18 HR: Forecast of centre position for fixed valid time of ... UTC (18 hours after time of issuance of the advisory)
- 13 FCST MAX WIND
. +18HR: Forecast of maximum surface wind for fixed valid time of ...UTC (18 hours after the issuance of the advisory)
- 14 FCST PSN
. +24HR: Forecast of centre position for fixed valid time of UTC (24 hours after issuance of the advisory)
- 15 FCST MAX WIND
. +24HR: Forecast of maximum surface wind for fixed valid time of...UTC (24 hours after the issuance of the advisory)
- 16 NXT MSG:
. Expected year month date (yyyymmdd)/time (in UTC) (using "Z") of issuance of next advisory (using "BFR", if applicable) or "NO MSG EXP"

Attachment 3, p. 2

2. Example of Tropical Cyclone advisory message

FKAU01 YPDM 180000
TC ADVISORY
DGT: 20020118/0000Z
TCAC: DARWIN
TC: GLORIA
NR: 01
PSN: N2706 W07306
MOV: NW 10KT
C: 965HPA
MAX WIND: 45KT
FCST PSN +12HR: 181200 N2830 W07430
FCST MAX WIND 45KT
+12HR:
FCST PSN +18HR: 181800 N2852 W07500
FCST MAX WIND 40KT
+18HR:
FCST PSN +24HR: 190000 N2912 W07530
FCST MAX WIND 45KT
+24HR:
NXT MSG: 20020118/0600Z

Example of Tropical Cyclone SIGMET

WCAU01 YMMM 180000
YBBB SIGMET 3 VALID 180000/180600 YMMM-
BRISBANE FIR TC GLORIA OBS N2706 W07306 AT 2330Z CB TOP FL500 WI 150NM OF
CENTRE MOV NW 10KT NC FCST 0600Z TC CENTRE N2740 W07345
OTLK TC CENTRE 181200 N2830 W07430 181800 N2852 W07500

APPENDIX X

**RA V TROPICAL CYCLONE COMMITTEE'S TECHNICAL PLAN AND ITS IMPLEMENTATION PROGRAMME
(2002-2004)**

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Mentor Training	1	To improve the tropical cyclone forecasting capability of members	Australia representative to explore the initiative with his Director	BOM, Australia, and some Members who have not yet benefited from the program	Australia	3 to 5 Members visited under the program 2002-2004		Priority list of Members already identified
Marine Meteorology workshop for operational forecasters	2	To improve knowledge of forecasters in operational forecasting for ocean areas	To conduct a workshop in 2004	All Members	WMO, ONR, JCOMM	Workshop held		Coordinated by WMO and SPREP
Attachment Training	3	To familiarize forecasters with RSMC Nadi, Brisbane and Honolulu tropical cyclone warning operations and procedures	To attach forecasters from Members to either RSMC Nadi, TCWC Brisbane or RSMC Honolulu and arrange reciprocal visits	All Members	WMO, SPREP, USA and Australia	3 visits and 2 reciprocal visits completed		Coordinated by WMO and SPREP

APPENDIX X, p. 2

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Research	4	To better understand and improve forecasting of midget and rapidly developing tropical cyclones and, to better understand the impact of climate variability/ climate change on tropical cyclones	<p>i) to raise in research communities via CAS/TMRP;</p> <p>ii) Jeff Callaghan to provide Members with his research results</p> <p>iii) an expert to provide briefing on latest findings</p>	All Members		Research findings distributed to Members especially to RSMC Nadi, New Caledonia and New Zealand		<p>i) Australia, New Zealand and USA to source available information;</p> <p>ii) Report to RA V/TCC's future meetings</p>
Agreements on products and services between RSMC Nadi and selected Pacific Island Countries	5	To establish formal agreements between RSMC Nadi and Samoa, Tonga & Vanuatu	To organize bilateral discussions between concerned met services	RSMC Nadi, Samoa, Tonga and Vanuatu		Formal agreement signed between RSMC Nadi & Samoa, Tonga & Vanuatu		<p>Coordinated by WMO and SPREP</p> <p>SPREP or SOPAC to act as facilitators</p>
Automatic Weather Stations	6	<p>To improve AWSs maintenance capability; and</p> <p>To expand AWS network in the Pacific Region</p>	<p>To organize an AWS maintenance course in French Polynesia</p> <p>To support Pacific GCOS program</p>	All Members, SPREP and SOPAC	<p>SPREP</p> <p>SOPAC</p>	Comparison of % AWS operating in Aug 2002 and Aug 2004		French Polynesia offered to host an AWS maintenance course

APPENDIX X, p. 3

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Naming of special breed of cyclones	7	To improve warning effectiveness	To determine criteria/means/suitable procedures for naming these "bomb" systems of tropical origin but subtropical intensification	Australia and New Zealand		Procedures either established or rejected		Coordinated by New Zealand
Fifth International Workshop on Tropical Cyclones (IWTC-V) Cairns, Australia, December 2002	8	To improve knowledge of forecasters on tropical cyclones	To secure funding for suitably qualified operational forecasters to attend the workshop	All Members		8 to 10 participants from Members to attend IWTC-V		<p>Coordinated by WMO, SPREP and Australia</p> <p>Participants to submit a brief report to the Chairman of what was achieved at the IWTC-V</p> <p>Chairman to present a synopsis of the reports to the next RA V/TCC session</p>

APPENDIX X, p. 4

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Web Information	9	To keep forecasters up-to-date on tropical cyclone warning systems	To create a South West Pacific Web Page to contain information about and in support of the Committee's activities	All Members		Operational Plan on website Direct link to information provided to Members by TCP SH course available on web site		

APPENDIX X, p. 5

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Watch/Alert Survey	10	To determine the preferred terminology (watch or alert) in the South Pacific area	<p>Chairman to prepare a questionnaire before Nov 2002</p> <p>80% of Members will conduct a representative sample of keystakeholders using the questionnaire developed</p> <p>Members to submit the data to the Chairman by end of July 2003</p> <p>Chairman to prepare an analysis report and then report back to the Committee before the 10th session</p>	All Members		Report prepared before the 10 th session of the RA V/TCC		
List of retired names	11	To prevent re-use of retired tropical cyclone names for the Pacific Region	Warning Centers to submit a list of retired tropical cyclone names to WMO for consolidation	All Members		List incorporated in Operational Plan		Database to be completed by December 2002

APPENDIX X, p. 6

Items	PR	Objectives	Strategies	Key Stakeholders	Funding Source/s	Critical Success Indicator	Focal Point	Remarks
Bilateral Cooperation between Indonesia and Australia	12	To upgrade Indonesia's forecasting and warning system to enable them to provide International Marine Warnings in their AOR	Australia to assist in improving the forecasting and warning system in Indonesia	Australia and Indonesia	Australia	Indonesia indicates willingness to assume responsibility for 2004/2005 season		

AOR – Area of Responsibility

AWS – Automatic Weather Station

JCOMM – Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology

ONR – Office of Naval Research

PR – Priority Rating

SOPAC – South Pacific Applied Geoscience Commission

SPREP – South Pacific Regional Environment Programme