

Typhoon Committee
Forty-Third session
Jeju, Republic of Korea
17 to 21 January 2011

ENGLISH ONLY

COORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME

(Item 7 of the Provisional Agenda)

Note by the WMO Secretariat

INTRODUCTION

This document provides information on the activities carried out under the WMO Tropical Cyclone Programme (TCP) during the inter-sessional period after the 42nd session to assist the Committee in its consideration of coordination within the TCP (see Annex I).

ACTION PROPOSED

The Committee is invited to:

- (a) Review the activities carried out within the TCP since the Forty-second session of the Typhoon Committee (Singapore, 25 to 29 January 2010) and offer the proposals for the future, which are indicated in Annex I to this document or otherwise reported to the session;
- (b) Consider what further measures, if any, may be taken to strengthen coordination between its own activities and those conducted under other parts of the TCP.

Annex 1: Activity Rreport on the Implementation of the WMO Tropical Cyclone Programme (31 December 2010)

Activity Report on the Implementation of the WMO Tropical Cyclone Programme

(31 December 2010)

1. INTRODUCTION

The WMO Tropical Cyclone Programme carries out its activities in accordance with Congress resolutions and Executive Council decisions based on the WMO Strategic Plan. Those resolutions and decisions with particular relevance to the Programme are highlighted in the following.

1.1 The WMO Executive Council, at its sixty-second session (EC-LXII, Geneva, June 2010) discussed implementation of the Tropical Cyclone Programme and provided guidance under the Expected Results (ERs) 1, 6 and 9 of the WMO Strategic Plan.

1.2 While recognizing that ensemble prediction techniques, including the multi-model consensus forecast, had added a valuable contribution to the accuracy in tropical cyclone track forecasting, the Council noted that there was an increasing need for including uncertainty information in the forecasts for more effective disaster risk assessment. It strongly encouraged Members to enhance the application of ensemble techniques and probabilistic forecasts in tropical cyclone forecasting and warning services. In this respect, the Council underlined the two recent projects which TCP and WWRP had jointly implemented in the Typhoon Committee region: the North Western Pacific Tropical Cyclones Ensemble Forecast Project and the Typhoon Landfall Forecast Demonstration Project, and recommended developing similar projects for other regional TC bodies.

1.3 The Council recognized that operational tropical cyclone forecasting, particularly intensity forecasting, was still a serious challenge to the tropical cyclone warning centres in all the basins. It noted that among other things, forecasting rapid changes in tropical cyclone intensity and movement in the proximity of a coast is critical, because the situation often represents an enormous threat to the public beyond expectation. To improve the forecasting of these situations, the Council recommended that R&D, and technology transfer to operational forecasting be pursued, as well as ensuring interactions between researchers and operational forecasters through international forums, such as the International Workshop on Tropical Cyclones (IWTC), the International Workshop on Tropical Cyclone Landfall Processes

1.4 The Council recognized that many Members benefited from space-based information for their operational services. It reiterated that such information was essential to NMHSs, particularly Small Island Developing States (SIDS), and should be continually provided. The Council thanked the satellite operating Members and EUMETSAT for their provision of the vital information and urged them to maintain and upgrade the service for the countries including those in the South-West Indian Ocean (SWIO). In this connection, the Council noted that Chinese satellites cover the central Indian Ocean and appreciated China's offer to provide their observations for the SIDS in that part of the ocean.

1.5 The Council noted various measures that support tropical cyclone forecasters had been undertaken by TCP targeting particularly those of developing countries. The Council also noted that the Global Guide to Tropical Cyclone Forecasting would be updated for a multi-hazard perspective, and would be provided on a web basis for cost saving and easier access, and closely linked to the WMO Tropical Cyclone Forecasters' Website. The Council therefore recommended TCP to complete the update of the Global Guide as early as possible and emphasized the need for establishing links with other WMO Websites containing related information, especially on flooding and storm surge.

1.6 The Council emphasized the importance of a comprehensive and integrated approach for marine multi-hazard forecasting and warning system, for improved coastal risk management, and:

- (i) Noted that development of Storm Surge Watch System (SSWS) would be a first step, noting with satisfaction activities of the Tropical Cyclone Programme (TCP) regional bodies for their respective regions such as preparation of distribution maps and time-series charts of storm surges to be provided by RSMC Tokyo for the Typhoon Committee Members and recommended strengthening of the capacity building in the operational storm surge forecasting through training courses and workshops;
- (ii) Stressed the importance of the implementation of the Coastal Inundation Forecast Demonstration Project (CIFDP), noting the importance of coupling between meteorological, oceanographic, hydrological and tropical cyclone forecasting models to result in an end-to-end comprehensive coastal inundation forecast and warning systems, in reference to existing guidelines such as the UNESCO/IOC on Hazard Awareness and Mitigation in Integrated Coastal Area

Management (ICAM). It reinforced the necessity for development of software with multi-disciplinary components for improved coastal inundation forecasting products and services in basins and delta regions;

- (iii) Noted the important role of the TCP regional bodies as platforms for developing regional cooperation in multi-hazard EWS through providing guidance for dissemination and exchange of information and warnings as well as a useful forum for the Members and relevant regional and international agencies to explore links among tsunami, tropical cyclone, storm surge and coastal inundation matters. Examples include the RA IV Hurricane Committee and the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS) and the WMO/ESCAP Panel on Tropical Cyclones and the Pacific and Indian Ocean Tsunami Warning and Mitigation Systems (ICG/PTWS and ICG/IOTWS).

1.7 With regard to the capacity-building, the Council recognized that the developing countries, especially Small Island Developing States (SIDS) and the Least Developed Countries (LDCs) continue to be in urgent need of capacity building in forecasting and warning of tropical cyclone and associated storm surge. In this respect, the Council noted that the joint training activities by the Tropical Cyclone Programme (TCP) and the Public Weather Services (PWS) Programme such as the RA IV Workshop on Hurricane Forecasting and Warnings and Public Weather Services, the Southern Hemisphere Training Course on Tropical Cyclones and Workshop on Public Weather Services, and the RA I Training Course on Tropical Cyclones and Public Weather Services have an increasing role to meet this requirement through their integrated approach to the improvement of service delivery. The Council encouraged Members to include national Disaster Risk Managers in their training programmes to ensure the country received full benefits from the training. It also underlined the practical effectiveness of the attachment training at TC RSMCs and the Indian Institute of Technology (IIT) for the forecasting of tropical cyclones and storm surges, respectively. In view of the maximum use of these opportunities by developing countries, the Council requested the Secretary-General to continue to support these training activities and to flexibly implement them by involving participants across the regions.

2. TCP EVENTS IN 2010

During the period from January to December 2010), the following events were organized or co-sponsored under the Programme:

- ESCAP/WMO Typhoon Committee, Forty-second Session (Singapore, 25-29 January 2010);
- Tropical Cyclone Operational Forecasting Training at RSMC New Delhi – Tropical Cyclone Centre (New Delhi, India, 1 – 12 February 2010);
- WMO/ESCAP Panel on Tropical Cyclones, Thirty-seventh Session (Phuket, Thailand, 15 – 19 February 2010);
- RA IV Hurricane Committee, Thirty-second Session (Bermuda, UK, 8-12 March 2010);
- RA IV Workshop on Hurricane Forecasting and Warning and Public Weather Services (Miami, Florida, USA, 15 – 26 March, 2010);
- RA V Tropical Cyclone Committee, 13th session (Bali, Indonesia, 19 – 22 April 2010);
- WMO TLFDP Training Workshop on Tropical Cyclone Forecasting (Shanghai, China, 24 to 28 May 2010);
- ESCAP/WMO Typhoon Committee Expert Meeting on Urban Flood Risk Management (Bangkok, Thailand, 19 – 20 July 2010);
- Attachment of Typhoon Forecasters from Hong Kong, China and Republic of Singapore for Typhoon Operational Forecasting Training at RSMC Tokyo-Typhoon Center (Tokyo, Japan, 21 to 30 July 2010);
- PTC Working Group on DPP (WG-DPP) Meeting to Finalize the Annual Operating Plan (AOP) 2010 and Training on Preparation of Disaster Management Drills and Observance of DDPM's National Crisis Management Drill 2010 (C-MEX 10) (Bangkok and Chantaburi Province, Thailand, 18 – 20 August, 2010);

- ESCAP/WMO Typhoon Committee Integrated Workshop on Urban Flood Risk Management in a Changing Climate: Sustainable and Adaptation Challenges (Macao, China, 6 – 10 September 2010);
- RA I Tropical Cyclone Committee, Nineteenth session (Nairobi, Kenya, 20 – 24 September 2010);
- The Third International Conference on Quantitative Precipitation Estimation (QPE) and Quantitative Precipitation Forecasting (QPF) and Hydrology (Nanjing, China, 18 – 22 October 2010);
- RA I Training Course on Tropical Cyclones (La Réunion, France, 2 – 13 November 2010);
- The Seventh International Workshop on Tropical Cyclones (La Réunion, France, 15 – 20 November 2010).

3. PROGRAMME IMPLEMENTATION

The TCP Programme comprises two components: a general component concerned with collective issues such as methodology and transfer of technology, and a regional component devoted to the activities of five regional tropical cyclone bodies. The updated list of Members of these bodies is shown in Appendix 1.

3.1 General component

3.1.1 The main activities in the year under review under the general component continued to be directed towards the publication of manuals and reports, which provide information and guidance to Members to assist them in the increased application of scientific knowledge and technology for the improvement of warning and disaster prevention and preparedness systems corresponding ERs I and VI on enhanced capabilities of forecasting and warning service delivery and disaster risk reduction. Under this component, attention was also given to the broader aspects of training under the TCP.

3.1.2 Priorities were given to capacity-building to address the issue of sustainable development with emphases particularly on attachments of forecasters from developing countries at the different Regional Specialized Meteorological Centres (RSMCs) during the

cyclone season and storm surge/wave experts at the Indian Institute of Technology in Kharagpur, India, a number of workshops and a joint training event in cooperation with the Public Weather Service Programme (PWSP), and a number of Working Group (Committee) sessions co-joint with Disaster Risk Reduction (DRR) Programme. These activities are in accordance with the Programme' s objective to facilitate the transfer of knowledge and technology to improve the institutional efficiency of the NMHSs leading to the provision of better tropical cyclone track and intensity forecasts and associated flood and storm surge forecasts, and coordinated actions towards tropical cyclone disaster risk reduction.

3.1.3 The TCP home page within the WMO Website: http://www.wmo.int/pages/prog/www/tcp/index_en.html . is continuously being updated. In addition, the TCP Forecaster' s Website has been updated to provide more information/materials in respect of workshop presentations and observing data and products for forecasters.

3.1.4 WMO has concluded with the Systems Engineering Australia Pty Ltd (SEA) on reviews and assessments that would lead to the recommendation of suitable conversion factors between the WMO 10-minute standard average wind and 1-minute, 2-minute and 3-minute “ sustained” winds. The outcome of the study, “ GUIDELINES FOR CONVERTING BETWEEN VARIOUS WIND AVERAGING PERIODS IN TROPICAL CYCLONE CONDITIONS,” which was endorsed by the group of experts during the Sixth Tropical Cyclone RSMCs/TCWCs Technical Coordination Meeting (Brisbane, Australia, 2-6 November 2009), with one page executive summary for the final review, has been published as WMO/TD-No.1555 and distributed to all the members of the five regional tropical cyclone bodies.

3.1.5 Tropical cyclone news for the WMO news website http://www.wmo.int/pages/mediacentre/news/index_en.html will be continuously provided for facilitating media outreach.

3.1.6 The Global Guide to Tropical Cyclone Forecasting has been undertaking updating, and is expected to have the web version before IWTC-VII to be held in La Reunion, France, in November 2010. After completion, it will be posted to the TCP Forecaster' s website for widespread access by forecasters and researchers around the globe. The printing version will be completed soon afterwards.

3.1.7 WMO TLFDP (Typhoon Landfall Forecast Demonstration Project) Training Workshop on Tropical Cyclone Forecasting was held in Shanghai, China, from 24 to 28 May 2010. This training workshop is part of the implementation programme of the WMO TLFDP.

3.1.8 The Third International Conference on Quantitative Precipitation Estimation (QPE) and Quantitative Precipitation Forecasting (QPF) and Hydrology was held in Nanjing, China, 18 – 22 October 2010.

3.1.9 The Seventh International Workshop on Tropical Cyclones (IWTC-VII) was held in La Réunion, France, from 15 to 20 November 2010. It was attended by about 135 forecasters and researchers from all the five regional tropical cyclone bodies.

3.2 Regional component

Regional component is carried out through close regional cooperation and coordination. Major emphasis was placed on improvement in the accuracy of the forecasts, provision of timely early warnings and on the establishment of necessary disaster preparedness measures. Each of the regional tropical cyclone bodies has in place a formally adopted tropical cyclone operational plan or manual, aimed at ensuring the most effective tropical cyclone forecasting and warning system with existing facilities, through cooperative agreement on sharing of responsibilities and on coordinated activities within the respective region. Each of these bodies was giving attention to the implementation of their technical plan/strategic plan for future development of services to meet regional needs for upgrading forecasting and warning facilities and services for tropical cyclones and associated floods and storm surges, as well as for related disaster risk reduction measures and supporting activities in training and research. The detailed activities of regional bodies are described as below.

3.2.1 ESCAP/WMO Typhoon Committee

3.2.1.1 The Forty-second Session of the Committee was held in Singapore, from 25 to 29 January 2010. Decisions by the ESCAP/WMO Typhoon Committee at its Forty-second Session can be found in its final report which will be available in WMO/TCP website.

3.2.1.2 ESCAP/WMO Typhoon Committee Expert Meeting on Urban Flood Risk Management was held in Bangkok, Thailand, 19 – 20 July 2010.

3.2.1.3 Attachment of two typhoon forecasters from Hong Kong, China and Republic of Singapore was hosted by RSMC Tokyo-Typhoon Center for Typhoon Operational Forecasting Training from 21 to 30 July 2010.

3.2.1.4 ESCAP/WMO Typhoon Committee Integrated Workshop on Urban Flood Risk Management in a Changing Climate: Sustainable and Adaptation Challenges (Macao, China, 6 – 10 September 2010)

3.2.2 WMO/ESCAP Panel on Tropical Cyclones

3.2.2.1 The Thirty-seventh Session of the WMO/ESCAP Panel on Tropical Cyclones was held in Phuket, Thailand, from 15 to 19 February 2010. Decisions by the WMO/ESCAP Panel on Tropical Cyclones at its Thirty-sixth Session can be found in its final report which is available in WMO/TCP website.

3.2.2.2 Also, attachment trainings for storm surge experts were organized in IIT, from 18 to 29 October 2010, at the IIT Delhi in the implementation and running of a PC-based high-resolution storm surge model.

3.2.2.3 Attachment of two forecasters from Myanmar and Sri Lanka was arranged by WMO and the RSMC New Delhi, India, from 1 to 12 February 2010, for the on-the-job training at the RSMC on operational analysis and forecasting of tropical cyclones.

3.2.2.4 PTC Working Group on DPP (WG-DPP) Meeting to Finalize the Annual Operating Plan (AOP) 2010 and Training on Preparation of Disaster Management Drills and Observance of DDPM' s National Crisis Management Drill 2010 (C-MEX 10) (Bangkok and Chantaburi Province, Thailand, 18 – 20 August, 2010)

3.2.3 RA I Tropical Cyclone Committee for the South-West Indian Ocean

3.2.3.1 The Nineteenth Session of the RA I Tropical Cyclone Committee was held in Nairobi, Kenya, from 20 to 24 September 2010. Decisions by the RA I Tropical Cyclone Committee at its Nineteenth Session can be found in its final report which will be available in WMO/TCP website.

3.2.3.2 RA I Training Course on Tropical Cyclones, including a component on SWFDP in Africa, was held in La Réunion, France, 2 – 13 November 2010. It was attended by 14 participants from the RA I Tropical Cyclone Committee Members plus one from Zambia.

3.2.4 RA IV Hurricane Committee

3.2.4.1 The Thirty-second Session of the Hurricane Committee was held in Bermuda, UK, from 8 to 12 March 2010. Decisions by the RA IV Hurricane Committee at its Thirty-second Session can be found in its final report which will be available in WMO/TCP website.

3.2.4.2 RA IV Workshop on Hurricane Forecasting and Warning, and Public Weather Services in Miami, Florida, USA, from 15 – 26 March 2010. The workshop was conducted in English with simultaneous interpretation into Spanish, and attended by 23 participants from nineteen Members of RA IV.

3.2.5 RA V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean

3.2.5.1 The Thirteenth session of the RA V Tropical Cyclone Committee was held in Bali, Indonesia, 19 – 22 April 2010. Decisions by the RA V Tropical Cyclone Committee at its 12th session can be found in its final report which is available in WMO/TCP website.

4. COOPERATION WITH OTHER ORGANIZATIONS

4.1 There has been close cooperation and collaboration with the Economic and Social Commission for Asia and the Pacific (ESCAP), the International Strategy for Disaster Reduction (ISDR) Secretariat, the Asian Disaster Reduction Center (ADRC), the International Federation of Red Cross and Red Crescent Societies (IFRC), the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), SOPAC and SPREP and other organizations, on a variety of matters of common concern. The main items include ESCAP's co-sponsorship of the Typhoon Committee and the Panel on Tropical Cyclones, as well as the ISDR Secretariat and the ADRC' s involvement in the disaster risk reduction component of the TCP, in particular in the context of the ISDR.

4.2 As part of the cooperation between WMO and the International Civil Aviation Organization (ICAO), TC RSMCs and one Tropical Cyclone Warning Centre (TCWC) are designated as ICAO Tropical Cyclone Advisory Centres (TCAC) by ICAO Regional Air

Navigation Agreements. Tropical cyclone (TC) advisories issued by TCACs play an important role for the safety and efficiency of international air navigation (para 8). There has been a growing demand from the aviation users to receive the TC advisories in a graphical format. At the 6th session of the TC RSMC/TCWC Technical Coordination Meeting held in October 2009, all the TCACs agreed to change the advisories from alpha numeric format to graphical format as early as possible. Cooperation has also been made to harmonize the information on tropical cyclones in the WAFS SIGWX forecasts and the TCAC advisories. The TCACs participated in a coordination session with World Area Forecast Centres (WAFCs) during the period from 2 to 31 March 2009. This session contributed not only to the reliability of WAFS products but also to the development of closer link between TCACs and WAFCs. Those TCACs listed below provide specialized tropical cyclone warning services for the aviation community:

| TCAC | Area(s) of responsibility |
|---------------------|---|
| Darwin (Australia) | South-eastern Indian Ocean, South-western Pacific Ocean |
| Honolulu (USA) | Central North Pacific |
| La Réunion (France) | South-western Indian Ocean |
| Miami (USA) | North Atlantic, Caribbean, Eastern North Pacific |
| Nadi (Fiji) | Southern Pacific |
| New Delhi (India) | Bay of Bengal and the Arabian Sea |
| Tokyo (Japan) | Western North Pacific, including the South China Sea |

4.3 A cooperative relationship was established with the National climate Data Center of NOAA for their project - International Best Tracks Archive for Data Stewardship (IBTrACS) to develop a global best track data base. TC RSMCs and TCWCs provide regional best track data and adequate guidance for integration of the regional data.

4.4 On a regional basis, WMO, through its Tropical Cyclone Programme, has fostered and maintained close collaboration and fruitful coordination with regional bodies concerned with disaster risk reduction issues, in particular with the Asian Disaster Preparedness Center (ADPC), the Asian Disaster Reduction Center (ADRC), the Caribbean Disaster Emergency Response Agency (CDERA), and the South Pacific Regional Environment Programme (SPREP), and UN-ISDR.

4.5 WMO also collaborated with JICA to organize a joint JICA-FMS workshop in FMS, Nadi, Fiji, from 1 to 5 February 2010. Ten Small Island States of the South Pacific benefited from the workshop.

5. PLANNED ACTIVITIES FOR 2011 AND BEYOND

5.1 The TCP covers a wide range of activities which are of a continuing and long-term nature. Preceding sections of this report contain an overview of the ongoing activities and, in some instances, indicate the plans for the period ahead. The main parts of the planned activities for 2011 and beyond are set out below in a summary form.

General component

- (a) Follow-up activities on the WMO Strategic Plan;
- (b) Updating of the TCP home page within the WMO Web site, and the Tropical Cyclone Forecaster web site which will serve as a source for tropical cyclone forecasters to obtain forecasting and analytical tools and techniques for tropical cyclone development, motion, intensification, and wind distribution, and so on;
- (c) Attachment of forecasters to all six TC RSMCs during the cyclone season;
- (d) Continued support and coordination to update the Global Guide on Tropical Cyclone Forecasting in response to recommendation from the IWTCs. The web version of the Guide is due to be completed early 2011;
- (e) Coordination of the services and activities of six TC RSMCs (Miami, Tokyo, Honolulu, New Delhi, La Réunion and Nadi) and TCWCs (Darwin, Perth, Brisbane, Wellington, Port Moresby and Jakarta) with a view to improving regional services of the centers. Review of the global standards in forecasting techniques and warning services including those for data exchange and forecasts verification.

- (f) Outreach to media and general public by posting tropical cyclone information to the WMO news website, and responding by email to inquiries related to tropical cyclones around the globe.
- (g) Development and establishment of a Storm Surge Watch Scheme in each of the regional tropical cyclone bodies.
- (h) Implementation of the Landfall Typhoon Forecast Demonstration Project in East China.
- (i) Implementation of the NW Pacific Tropical Cyclones Ensemble Forecast Project which was recommended at IWTCLP-II.
- (j) Organization of the International Workshop on Dvorak Analysis in Honolulu, USA from 13 to 16 April 2011.

Regional component

The planned meetings and training events under the regional component is given below.

- The Forty-third Session of the ESCAP/WMO Typhoon Committee (Incheon, Republic of Korea, from 17 to 21 January 2011)
- Storm Surge Workshop for RA IV Hurricane Committee Members (Santo Domingo, Dominican Republic, 21 – 25 February 2011);
- The Thirty-eighth Session of the WMO/ESCAP Panel on Tropical Cyclones (New Delhi, India, 21 – 25 February 2011);
- RA IV Hurricane Committee, Thirty-third Session (Cayman, 2-12 March 2011)
- RA IV Workshop on Hurricane Forecasting and Warning, and Public Weather Forecast (Miami, USA, 21 March – 1 April 2011);
- Training Workshop on Wave and Storm Surge Forecasting in RA II (Macao, China, dates to be determined);

- 9th Southern Hemisphere Training Course on Tropical Cyclones
- Training Workshop on Application of Superensemble Techniques into Typhoon Track Forecasting (dates and place to be determined), and,
- Forecaster Attachment Trainings in RSMC New Delhi, RSMC Nadi, RSMC Tokyo and Indian Institute of Technology Delhi (dates to be determined).

5.2 Other Important inter-sessional activities will include:

- As appropriate, preparation, editing, updating, publication and distribution of new editions or supplements to the Tropical Cyclone Operational Plans for the Bay of Bengal and Arabian Sea (English only), the South-West Indian Ocean (English and French), the South Pacific and the South-East Indian Ocean (English and French), the Hurricane Committee Region (English and Spanish) and the Operational Manual for the Typhoon Committee Area (English only)
- Distribution of updated technical plans for further development of the Regional Cooperation Programmes of the five regional tropical cyclone bodies;
- Publication in hardcopy with limited quantity and in web format with free access of the “ Global Guide to Tropical Cyclone Forecasting;”
- Preparation and publication of the Typhoon Committee Annual Review for 2010 and Newsletter of 2010
- Preparation and publication of Panel on Tropical Cyclones Annual Review for 2011 and Panel News.

5.3 In more general terms:

- Activities for the implementation of the Tropical Cyclone Programme section of the WMO Strategic Plan;
- Implementation of activities within the framework of the International Strategy for Disaster Reduction (ISDR);

- Continued activities for the implementation of the Regional Cooperation Programmes, Technical Plans and other work programmes of the regional tropical cyclone bodies;
 - Work of study groups, sub-groups and rapporteurs established by the regional tropical cyclone bodies, e.g. training and research activities in the meteorological component of the Typhoon Committee's programme under the leadership of the Coordinator, typhoon Training and Research Coordinating Group (TRCG), and the rapporteur on updating of the Typhoon Committee Operational Manual, the Working Group on the Panel on Tropical Cyclones Coordinated Technical Plan, the implementation of satellite based telecommunications regional networks, and on regional activities on storm surges;
 - Action on further proposals made by the Fifteenth WMO Congress (Cg-XV), the Executive Council, the Regional Associations concerned and the regional tropical cyclone bodies.
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REGIONAL TC BODIES

Appendix 1

| ESCAP/WMO TYPHOON COMMITTEE | WMO/ESCAP PANEL ON TROPICAL CYCLONES | RA I TROPICAL CYCLONE COMMITTEE FOR THE S.W. INDIAN OCEAN | RA IV HURRICANE COMMITTEE | RA V TROPICAL CYCLONE COMMITTEE FOR THE S. PACIFIC AND S.E. INDIAN OCEAN |
|---------------------------------|---|---|--------------------------------|--|
| (14 Members) | (8 Members) | (15 Members) | (26 Members) | (18 Members) |
| CAMBODIA | BANGLADESH | BOTSWANA | ANTIGUA & BARBUDA | AUSTRALIA |
| CHINA | INDIA@ | COMOROS | BAHAMAS | COOK ISLANDS |
| DEM. PEOPLE'S REP. OF KOREA | MALDIVES | FRANCE@ | BARBADOS | FIJI@ |
| HONG KONG, CHINA* | MYANMAR | KENYA | BELIZE | FRENCH POLYNESIA* |
| JAPAN@ | OMAN | LESOTHO | BRITISH CARIBBEAN TERRITORIES* | INDONESIA |
| LAO PDR | PAKISTAN | MADAGASCAR | CANADA | KIRIBATI |
| MACAO, CHINA* | SRI LANKA | MALAWI | COLOMBIA | MICRONESIA |
| MALAYSIA | THAILAND | MAURITIUS | COSTA RICA | NEW CALEDONIA* |
| PHILIPPINES | | MOZAMBIQUE | CUBA | NEW ZEALAND |
| REPUBLIC OF KOREA | | NAMIBIA | DOMINICA | NIUE |
| SINGAPORE | | REP. OF SOUTH AFRICA | DOMINICAN REPUBLIC | PAPUA NEW GUINEA |
| THAILAND | | SEYCHELLES | EL SALVADOR | SAMOA |
| USA | | SWAZILAND | FRANCE | SOLOMON ISLANDS |
| VIET NAM, SOCIALIST REPUBLIC OF | | UNITED REPUBLIC OF TANZANIA | GUATEMALA | TIMOR-LESTE |
| | | ZIMBABWE | HAITI | TONGA |
| | | | HONDURAS | UNITED KINGDOM |
| | | | JAMAICA | USA# |
| | | | MEXICO | VANUATU |
| | | | NETH. ANTILLES AND ARUBA* | |
| | | | NICARAGUA | Non-Members of WMO (6): |
| | | | PANAMA | - MARSHALL ISLANDS |
| | | | ST. LUCIA | - NAURU |
| | | | TRINIDAD AND TOBAGO | - PALAU |
| | | | UK | - TOKELAU |
| | | | USA@ | - TUVALU |
| | | | VENEZUELA | |
| @RSMC Tokyo | @RSMC New Delhi | @RSMC La Réunion | @RSMC Miami | @ RSMC Nadi |
| * Member Territory | | | | # RSMC Honolulu |