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**REVIEW OF ISSUES PERTINENT TO THE SUBSIDIARY STRUCTURE OF  
THE COMMISSION, INCLUDING THE PROGRAMME PERFORMANCE  
REPORT FOR THE BIENNIUM 2008-2009 AND THE WORK OF THE  
ESCAP REGIONAL INSTITUTIONS: DISASTER RISK REDUCTION**

(Item 3 (f) of the provisional agenda)

**REPORT OF THE TYPHOON COMMITTEE\***

*Note by the secretariat*

The secretariat transmits to the Commission an executive summary of the report of the forty-second session of the ESCAP/World Meteorological Organization Typhoon Committee, held in Singapore from 25 to 29 January 2010.

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\* The report has been reproduced without formal editing.

## **REPORT OF THE TYPHOON COMMITTEE**

### **INTRODUCTION**

The ESCAP/WMO Typhoon Committee (TC) is an inter-governmental body organized under the joint auspices of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the World Meteorological Organization (WMO) in 1968 in order to promote and coordinate the planning and implementation of measures required for minimizing the loss of life and material damage caused by typhoons in Asia and the Pacific. The TC develops activities under three substantive components: meteorology, hydrology, and disaster risk reduction, as well as in areas of training and research.

The forty-second session of the ESCAP/WMO Typhoon Committee, held in Singapore, from 25 to 29 January 2010, was attended by 78 participants from 12 out of 14 Members of the Typhoon Committee: Cambodia; China; Hong Kong, China; Japan; Macao, China; Malaysia; the Philippines; Republic of Korea (ROK); Singapore; Thailand; Viet Nam; and the United States of America (USA). The session was also attended by observers from the Tokyo Polytechnic University International Association for Wind Engineering; from the Asian Disaster Reduction Center; from the Indonesian Agency for Meteorology Climatology and Geophysics (BMKG); the Primorsky State Department of Hydrometeorology and Monitoring of Environment, Russian Federation; and the International Civil Aviation Organization (ICAO), and representatives from ESCAP, WMO and the Typhoon Committee Secretariat (TCS).

### **I. SUMMARY OF THE DECISIONS OF THE COMMITTEE**

The Committee at its forty-second session decided to:

1. Accept the generous offer of Macao, China to host the TCS for second 4-years period from 2011 to 2014.
2. Accept the generous offer of the Republic of Korea to host the forty-third session of the Typhoon Committee in January 2011.
3. Request TCS to conclude the Memorandum of Understanding (MoU) between WMO and TCS referring to Typhoon Committee Trust Fund (TCTF) Arrangement and request WMO to provide legal review on behalf of the Committee.
4. Request concerned Members to submit in the next session the replacement names for typhoons KETSANA, MORAKOT and PARMA in accordance with the Committee procedures.
5. Request the Advisory Working Group (AWG) to present, by 15 March 2010, a theme for the Integrated Workshop 2010 (IWS) based on suggested session themes.
6. Approve and implement the rules for the future TC publications under TC logo.
7. Approve the TC Annual Operating Plan 2010 submitted by the AWG.
8. Approve an increase to the annual TC Budget ceiling from US\$100,000 to US\$120,000.

9. Approve additional budget increases for exceptional requirements if the Committee determines necessary.
10. Approve the 2010 Budget totaling US\$ 129,000, including US\$9,000 from carry-over funds from 2009 Budget.
11. Request the AWG to ensure that “success indicators” reflect outcomes of action items in a way that clearly demonstrates how an action item benefits the Member(s).
12. Collaborate, together with the WMO/ESCAP Panel on Tropical Cyclones, in the elaboration of the chapter I of the ESCAP Asia-Pacific Disaster Report.
13. Acknowledge that the AWG will continue to support the Resource Mobilization Group and evaluate its current layout.
14. Produce a one-page report after every TC sponsored workshop.
15. Review the Strategic Plan and propose any modifications to the forty-third session for consideration.
16. Re-elect Mr. James Weyman as the Vice-Chair and Ms. Genevieve C. Miller as the Secretary of the AWG.

#### Meteorological Component

17. Confer the recognition letter to the expert team that produced the report on Assessment of Impacts of Climate Change on Tropical Cyclone frequency and intensity in the Typhoon Committee region.
18. Establish an expert team to continue the assessment on the impact of Climate Change with the focus on the tropical cyclone track and impact area.
19. Follow the progress that has been made by the Expert Panel on Tropical Cyclones and Climate Change.
20. Further develop the project “Typhoon Information Processing Systems (TIPS)” considering its importance in promoting the exchange of experiences among Members and improving TC forecast tools of all the Members.
21. Further improve quantitative precipitation estimation (QPE) and quantitative precipitation forecast (QPF) techniques of Members.
22. Produce the storm surge distribution map and report the evaluation in the forty-third session.
23. Facilitate the exchange of radar data among neighboring Members.
24. Enhance the interaction among the Working Groups of Meteorology (WGM), Hydrology (WGH) and disaster Risk Reduction (WGDRR) by promoting a project on urban flood risk management.
25. Facilitate Members’ active participation in the WMO Landfall Typhoon Forecast Demonstration Project so as to promote the implementation of the most advanced forecasting techniques for landfalling typhoon.

26. Continue the effort in improving the web-based forum.
27. Request Members concerned to take the necessary action to use Satellite Cloud Interpretations (SAREP) and Radar Observations (RADOB) in Binary Universal Form for the representation of meteorological data (BUFR) by the end of 2010 with software assistance by the Republic of Korea if necessary, and to request the Regional Specialized Meteorological Center (RSMC) Tokyo to continue to disseminate both BUFR and alphanumeric SAREP and RADOB to the end of 2010.
28. Request WGM and China Meteorological Administration (CMA) to prepare for launching the Committee science and technology journal "Tropical Cyclone Review", and to request TCS to apply its international ISSNs (including print and online).
29. Reappoint Mr. Kiichi Sasaki (Japan) as the TC Operational Manual - Meteorological Component (TOM) Rapporteur.
30. Request WMO to publish as early as possible the 2010 edition of TOM.
31. Request WMO to upload the updated TOM on the Tropical Cyclone Programme (TCP) Website and distribute the 2010 edition in CD ROM format to Members by March 2010.
32. Re-appoint Mr. Lei Xiaotu (China) as Chair of WGM, Mr. Nguyen Dai Khanh (Viet Nam) and Mr. Nathaniel Cruz (the Philippines) as Vice-Chairs of WGM.

#### Hydrological Component

33. Re-appoint Mr. Toshio Okazumi (Japan) as WGH Chair and Dr. Hong IlPyo (Republic of Korea) and Mr. Liu Zhiyu (China) as Vice Chairs of WGH.
34. Set up a special Task Force for Coordination Body to manage the implementation of the cross cutting project of Urban Flood Risk Management in order to coordinate its implementation efficiently.
35. Strengthen linkage with ESCAP and WMO to push forward the Urban Flood Risk Management project.
36. Consult with the Information and Communications and Disaster Risk Reduction Division of ESCAP regarding the possibility to organize a meeting in July or August 2010 to be funded by ESCAP to discuss the Urban Flood Risk Management project and the possibility of contracting consultants by ESCAP to push forward this cross cutting project.
37. Set up the channel of connection and communication with support base of Urban Flood Risk Management project, such as ESCAP, WMO, ISDR, WB, ADB, ICHARM, JICA, etc.

#### Disaster Risk Reduction Component

38. Appoint Dr. Waon-Ho Yi (Republic of Korea) and Mrs. Hilda Lam (Hong Kong, China) as Chair and Vice Chair of the WGDRR respectively.

39. Enhance the ongoing project on WEB-GIS based Typhoon Committee Disaster Information System (WGTCDIS) to serve as a portal for TC Members on DRR matters.
40. Extend WGTCDIS for Multi-Hazard Early Warning Systems in conjunction with other WGs to make a link with the WGTCDIS.
41. Change the name of the Working Group on Disaster Prevention and Preparedness to Working Group on Disaster Risk Reduction (WGDRR) in order to enhance TC's cooperation with the United Nations organizations specially WMO and reduce confusion by using different name.
42. Support the publications of typhoon brochure of TC Members and the organization of public education events to raise public awareness on DRR jointly with WMO DRR Program and UN/ISDR, as well as WGM and WGH.
43. Conduct a training workshop on the urban flood management considering climate change during the IWS in 2010.
44. Carry out trials involving more Members, as a result of success with Macao, China and Guam, USA for the real time transmission of severe warning using Severe Weather Information Center (SWIC) website.
45. Implement a pilot project of community weather stations to raise public awareness on climate change.
46. Increase interaction among WGM, WGH, and WGDRR members to extend and operate WGTCDIS effectively.

#### Training and Research Component

47. Re-establish the Training and Research Coordinating Group (TRCG) with the re-appointment of Mr. Edwin S.T. Lai (Hong Kong, China) and Mr. Mitsuru Ueno (Japan) as Chair and Vice Chair of TRCG, respectively.
48. Request Members to confirm their respective focal points as members of TRCG, and to update the list of resource persons as appropriate.
49. Request Members to release nominated TRCG members to travel to future TRCG-related meetings/activities as far as possible so that good continuity in TRCG work can be maintained.
50. Request Members to offer or take part in research fellowship projects focusing on TIPS, Ensemble Prediction System (EPS) and consensus forecasts; and
51. Endorse the proposed TRCG Annual Operation Plan (AOP) for 2010, including the organization of a roving seminar under the support of Typhoon Committee Trust Fund, with Thailand tentatively offering to host the seminar in 2010.

## **II. MAIN ACTIVITIES OF TC MEMBERS IN 2009**

### **A. Meteorological Component**

The Committee reviewed the activities of members for implementing the Typhoon Committee Strategic Plan 2007-2011 and the Annual Operating Plan in relation to Meteorological Component during 2009.

The Committee noted that a preliminary assessment report on the impact of climate change on tropical cyclone frequency and intensity variation was finished and is planned to be published under the name of Typhoon Committee in 2010.

The Committee expressed its gratitude to Japan, to the Regional Specialized Meteorological Center (RSMC) Tokyo - Typhoon Centre in particular, for the continued provision of tropical cyclone advisories/warnings as well as maintenance of the Numerical Typhoon Prediction Website and implementation of the annual on-the-job training for typhoon operation. The Committee was pleased to be informed that RSMC Tokyo conducted a questionnaire survey on the present status of Members in using storm surge models in June 2009 and made plan for the provision of storm surge model guidance based on the survey.

The Committee expressed its gratitude to Hong Kong, China for its continuous efforts in operating the Severe Weather Information Centre (SWIC) website for WMO, which continues to serve as a major channel for dissemination of real-time Typhoon Committee information worldwide. The Committee noted that a web-based application on automatic Dvorak analysis of tropical cyclones was developed in Hong Kong, China and is for trial use by forecasters.

The Committee noted the proposal for launching a Typhoon Committee science and technology journal "Tropical Cyclone Review" on the initiative of WGM and agreed that the journal can be an effective forum for broad exchange of new knowledge of typhoon research and latest technology of typhoon forecast.

The Committee was informed that JMA held the "International Workshop on Advancement of Typhoon Track Forecast Technique" in Tokyo, Japan from 30 November to 2 December 2009 as a follow up activity of The Observing System Research and Predictability Experiment (THORPEX) Pacific Asian Regional Campaign (T-PARC 2008).

The Committee was informed that the Cooperation Arrangement between Macao Meteorological and Geophysical Bureau (SMG) and Zhuhai Meteorological Bureau of CMA was signed on 6 June 2009, highlighting meteorological data exchange and co-weather-briefing especially during the passage of tropical cyclones.

The Committee noted with pleasure that the web-based typhoon forum was successfully set up in July 2009 by Shanghai Typhoon Institute (STI) of CMA and open to nominated members. This forum is intended to provide a real time communication platform for forecasters and researchers of the TC, improve the forecast ability of TC and reduce the damage of Typhoons.

The Committee was informed that CMA offered Typhoon Committee Research Fellowships to Ms. NGUYEN Thi Minh Phuong (National Hydrometeorological Service of Viet Nam) and Mr. Chatchai CHAIYASAEN (Thai Meteorological Department) for the study of typhoon vortex initialization scheme and typhoon ensemble forecast techniques.

The Committee was informed that Korea Meteorological Administration (KMA) carried out a survey to investigate the members' status of GTS communication and this project will be extended to end of 2010.

The Committee noted that KMA signed a Memorandum of Understanding (MOU) with National Hydro-Meteorological Service (NHMS) of Viet Nam on 7 December 2009 which aims to strengthen cooperation to exchange scientific knowledge on Meteorology and Hydrology of National Services, research and human resources development, to conduct joint studies and coordination of exchange of scientists, knowledge, materials and publications, to share and exchange information on programs of work, project, activities and publications which bring mutual interest and benefits and to make suitable arrangement for representatives of KMA and NHMS of Viet Nam to meet regularly to review the progress of cooperation activities and to discuss future cooperation.

The Committee was informed that KMA offered a course on Information and Communication Technologies (ICT) for Meteorological Services with support from the Korea International Cooperation Agency (KOICA), in Seoul on May 24 to June 27, 2009. Total 13 participants from 12 countries including TC members participated in this training course which was designed to improve the Information Technology (IT)-related job processing ability in meteorological services, and is used in WMO IT Programs. The Committee was informed that KMA held the International Workshop on Tropical Cyclone-Ocean Interaction in the Northwest Pacific (TCOI 2009) in Jeju, Republic of Korea, from April 27 to April 29, 2009. During the workshop, typhoon researcher, forecaster and physical oceanographer from Australia, China, Japan, Taiwan and USA participated, and intensively discussed the research results about the typhoon-ocean interaction phenomena, observation data utilization method, numerical model-based forecasting. The Committee was also informed that KMA held the Workshop on the Economic and Social Effects of Typhoon in Jeju, Republic of Korea, from August 21 to 22, 2009. The main theme was "Is typhoon always bad?" Over 50 experts from several fields such as economic and social sciences, engineering, journalism, and meteorology participated in presenting the typhoon-related disasters, social and economic effects in terms of negative and positive viewpoint.

The Committee was informed that KMA and CMA hosted the 2nd Joint Workshop on Tropical Cyclones in Shanghai, China, from Dec. 19-23, 2009. Total 26 papers were presented with subjects such as the typhoon-related disasters, climate and typhoon activity change, typhoon genesis, forecasting, and structure change. KMA and CMA agreed to have the third workshop in 2010 in Korea with more experts from other countries, and also to make efforts for the future cooperation in the typhoon research and forecast fields.

## **B. Hydrological Component**

The Committee reviewed the activities of the Members related to the implementation of the Typhoon Committee Strategic Plan 2007-2011 and its annual operating plan for the Hydrological Component during 2009.

The Committee was informed that WGH completed two projects in 2009 with another five projects continuing in 2010. The Committee was informed on the progress and future activities of the projects: (1) Urban Flood Risk Management (UFRM), led by China; (2) Assessment System of Socio-economic Impacts of Water-related Disasters for Infrastructure, led by ROK; (3) Hazard Mapping for Sediment

Disasters, led by Japan and (4) Establishment of Flood Disaster Preparedness Indices, led by Japan.

The Committee noted that the Urban Flood Risk Management (UFRM) project is a very important and meaningful cross cutting project in TC and it was proposed that AWG be given the responsibility of managing this project.

The Committee also noted with appreciation that the Information and Communications Technology and Disaster Risk Reduction Division of ESCAP expressed its willingness to explore the possibility to: (1) organize a meeting on UFRM in July or August 2010; (2) push forward this crosscutting project by contracting consultants and (3) contact donors for resources mobilization.

The Committee noted that the National Institute for Land and Infrastructure Management (NILIM) and the erosion and sediment control and landslide technical center (SABO Technical Center) take consideration to seek the possibility of organize training course on sediment disaster prediction and warning for Members in future years.

The Committee noted with appreciation that the River Bureau and the NILIM of MLIT, the Public Works Research Institute (PWRI) and Japan International Cooperation Agency (JICA) jointly conducted JICA Comprehensive Management of Rivers and Dams, including participants from Members.

The Committee noted with appreciation that the International Centre for Water Hazard and Risk Management (ICHARM) established a new training course on disaster management plans combined with flood hazard maps and flood forecasting/warning systems in November 2009 in collaboration with JICA which involved some Members. The Committee noted with appreciation that technical help desks on Flood Hazard Maps and Debris flow and landslides warning system with continuous technical consultation for TC Members are available in the website of ICHARM and Sabo Technical Center.

The Committee also noted with appreciation that International Flood Network (IFNet) (supported by IDI) and ICHARM ran the International Workshop on Application and Validation of Global Flood Alert System (GFAS) from 3 to 7 August 2009.

The Committee was informed that on 17 – 19 February 2009, the Philippines hosted the East and Southeast Asia Regional Flood Hazard Mapping Seminar. The seminar was sponsored by ICHARM, PWRI, JICA in coordination with the Government of the Philippines.

The Committee noted that the progress of related WMO activities being implemented under the WMO Flood Forecasting Initiative; the Associated Programme on Flood Management (APFM); and the World Hydrological Cycle Observation System (WHYCOS). The Flash Flood Guidance System is being implemented in the Mekong River Basin, with potential of other sub-regions in Asia to follow. Under the APFM, the HelpDesk has become operational (<http://www.FloodManagement.info>) with functions of materials and practical tools as well as advisory services for flood management.

The Committee noted the importance of the assessment on the impacts of extreme climate events will look into how the water resources sector will address the issues on climate variability and climate change to come up with appropriate coping



mechanisms for water supply, dam operation, irrigation and the power sector, among others.

The Committee noted with appreciation that the Ministry of Land, Transportation and Maritime Affairs (MLTM), Republic of Korea, showed strong intention to support UFRM Project through providing and sharing his experiences.

The Committee noted the importance to promote TC's visibility in the world by taking part in the events of the preparatory meeting of the Asia Pacific Minister Meeting will be held in Singapore in June, 2010.

The Committee was informed that WGH Chair has requested that China, in coordination with ROK, Japan and WGM, draft a proposal to enhance the flood forecasting and warning system using advanced radar observations.

The Committee also expressed its appreciation to WMO for supporting two publications in 2009.

The Committee was pleased to be noted that successful achievement has been observed for the on the job training (OJT) in Malaysia. The Committee requested Malaysian Government to be considered to extend 4th OJT in 2010.

The Committee noted with pleasure the cooperation between China and TCS in hosting the training course on operational Flood Forecasting System.

### **C. Disaster Risk Reduction (DRR) Component**

The Committee was informed of the activities of the WGDRR component as follows:

- WEB-GIS based Typhoon Committee Disaster Information System (WGTCDIS) project
- 4<sup>th</sup> Inter-Sessional WGDRR Workshop in Seoul, Republic of Korea during 28-29 April 2009
- Expert Missions conducted in Viet Nam from 12 to 19 May 2009
- Integrated Workshop on 14-18 September 2009 in Cebu, Philippines
- Publication of the report on WGTCDIS

The Committee was informed that eight representatives from Members and international organizations attended the 4<sup>th</sup> Inter-Sessional WGDRR Workshop held in Seoul in 28-29 April 2009. During the workshop the group finalized the design of WGTCDIS and agreed to provide inputs to the WGTCDIS by early September. The participants also discussed vision and future activities of WGTCDIS.

The Committee was informed that ESCAP organized the first session of the Committee on Disaster Risk Reduction (CDRR) in Bangkok from 25 to 27 March 2009. The CDRR was established to serve as the regional forum for discussions and the building of consensus on disaster risk reduction in Asia-Pacific region.

The Committee was informed that ESCAP would launch a publication - Asia-Pacific Disaster Report - focusing on good practices, trends and major events, economic and social analysis of the impacts of disasters, regional cooperation, among

others. In that connection, the TC study on the Typhoon trend in conjunction with climate change would provide background information for the Asia-Pacific Disaster Report.

The Committee noted two new DRR-related initiatives by ESCAP: the Asia-Pacific “gateway” on disaster risk reduction and development for information sharing and analysis, and the regional cooperative mechanisms for drought risk reduction in Asia-Pacific.

#### **D. Training and Research Coordinating Group (TRCG)**

The Committee noted the activities undertaken by the TRCG as summarized in the TRCG Annual Report 2009, in particular the recommendations made in the 1<sup>st</sup> TRCG Planning Meeting in Jeju, ROK and the effort made by TRCG in drafting a purposely planned 4-year work programme with continuity and sustainable development.

The Committee expressed its appreciation to KMA for hosting the 1<sup>st</sup> TRCG Technical Forum and Planning Meeting, jointly organized by TRCG and WGM, in Jeju, ROK in May 2009. The Committee also appreciated the support provided by WMO TCP in setting up the resource persons for the technical lectures. The success of the event was testified by the favorable feedback received from both the lecturers and participants through a post-event survey.

The Committee expressed its appreciation to CMA and WMO Nanjing Regional Training Center (RTC) for hosting the Roving Seminar in Nanjing University of Information Science and Technology in November 2009, and to WMO Public Weather Services Programme (PWSP) for actively supporting the event in providing the resource person for media skill training.

The Committee expressed its appreciation to China and Hong Kong, China for hosting research fellowship programmes in 2009.

The Committee took note of the successful training attachment of women forecasters from China and Malaysia to RSMC Tokyo in July 2009, and thanked JMA and WMO TCP for continuously supporting this capacity-building initiative.

#### **E. Activities of AWG**

##### **Advisory Working Group (AWG)**

The Committee was informed of the activities of the AWG in 2009.

- AWG Members attended the Integrated Workshop on “Building Sustainability in High Risk Areas of the Typhoon Committee” in Cebu, Philippines, 14-18 September 2009.
- Conducted a Small Meeting of Working Group Chairs in Macao, China, 16-17 December 2009.

The Committee noted important continue progress since the introduction of strategic planning and management approach to the regional cooperation program of the Committee and the instrumental role of the AWG, ESCAP, WMO and TCS in the establishment of a firm foundation for goal-oriented performance. In this context, it is

important that the Committee continues to benefit from the assistance and support of ESCAP and WMO as well as enhanced roles of TCS.

The Committee was informed of the status of the 2009 Typhoon Committee Annual Operating Plan (AOP), the proposed Annual Operating Plan for 2010 and the budget for 2010.

The Committee expressed its sincere appreciation to the AWG Chair, Vice-Chair, and AWG members for their work in formulating and coordinating the 2010 Annual Operating Plan and 2010 budget.

#### **F. Activities of Typhoon Committee Secretariat**

The Committee took note of the report of activities prepared by the Secretary of the Typhoon Committee.

The Committee thanked the Government of Macao, China for its continued support to provide headquarters and endowment fund for TCS operation and also for providing temporary facilities during the restoration of TCS headquarters which were seriously affected by the Typhoon Hagupit.

The Committee expressed its appreciation to Government of Macao, China for secondment of a meteorologist and its offer to continue that secondment until the end of the second four- year period that the TCS will remain in Macao, China.

The Committee expressed its appreciation to People's Republic of China for secondment of a hydrologist to TCS and encourages continued support for this position, until the end of the second four- year period that the TCS will remain in Macao, China.

The Committee thanked TCS for its efforts in support of the Committee.

The Committee expressed appreciation for the kind offer from the Philippines Typhoon Committee Foundation Inc., of providing financial support for Dr. Roman L. Kintanar in 2009 and beyond.

### **III. REVIEW OF THE 2009 TYPHOON SEASON**

The Committee took note with appreciation the review of the 2009 typhoon season provided by the RSMC Tokyo-Typhoon Center.

Over the western North Pacific and the South China Sea, 22 named tropical cyclones formed in 2009, 13 of which reached typhoon intensity. This total is less than the 30-year average frequency of 26.7. Although the formation of the first named tropical cyclone in 2009 was relatively late, the number of formation (21) from May to October was almost the same as the 30-year average frequency of 21.3. Only one tropical cyclone formed from November, which is slightly less than the 30-year average frequency of 3.7.

### **IV. PUBLICATIONS**

The Committee took note that the TCS published the 21<sup>st</sup> issue of the Typhoon Committee Newsletter in January 2010 and the 2008 Typhoon Committee

Annual Review (TCAR) in January 2010 disseminated to the Members, ESCAP and WMO in electronic (CD-ROM) format. The Committee appointed the Typhoon Committee Secretary as the Chief Editor.

The Committee noted with appreciation that the RSMC Tokyo – Typhoon Center published the “Technical Review No.11” in March 2009 and the “Annual Report on the Activities of the RSMC Tokyo – Typhoon Center in 2008” in December 2009. These are available on the Web page of JMA/RSMC Tokyo at <http://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/annualreport.html>.

## **V. COORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME**

The Committee was informed by the WMO Secretariat that the Executive Council, at its sixty-first session in June 2009, gave following guidance to the Tropical Cyclone Programme (TCP):

- To give high priority to the organization of training workshops for the best use of ensemble-based products.
- To enhance the support measures for operational forecasters through update of the Global Guide to Tropical Cyclone Forecasting and development of the Tropical Cyclone Forecaster’s Website.
- To promote the transfer from R&D to operational use through interactions between researchers and operational forecasters such the seventh International Workshop on Tropical Cyclones (IWTC-VII; La Reunion, 15-20 November 2010).
- To give high priority to development of the Storm Surge Watch Schemes with emphasis on capacity-building.

The Committee was pleased to note that TCP, in collaboration with World Weather Research Programme (WWRP) and Public Weather Services (PWS) Programme, has formulated “Landfall Typhoon Forecast Demonstration Project” on the initiative of Shanghai Meteorological Bureau. This project aims to demonstrate the performance of the most advanced forecasting techniques for landfalling typhoons and is expected to achieve development of techniques for evaluation & assessment of landfall forecast as well the forecast of landfalling typhoon including associated heavy rain. The project is targeted at the East China on its first phase for 2010-2012 and will develop to cover other regions in the future.

North Western Pacific Tropical Cyclones Ensemble Track Forecast Experiment is a 5-year WWRP’ Research Development Project (RDP) and another outcome of WTCLP-II. The main objective of this project is to demonstrate the effectiveness of the THORPEX Interactive Grand Global Ensemble (TIGGE) data to the operational typhoon forecasting. TIGGE typhoon track data will be provided to the Typhoon Committee Members on a real-time basis via a password protected web site which will be established in May 2010. Training for operational forecasters and evaluation of the utility of such data in operational forecast are also planned to be conducted under the project. Members were encouraged to exploit the use of the TIGGE data for their operational forecast of typhoons.

The Committee was informed that the 6th TC RSMC/TCWC Technical Coordination Meeting was held in Brisbane, Australia in November 2009, which

covered a broad range of subjects to improve the coordination in operational and technical aspects of the tropical cyclone warning services across the basins. It took note in particular that the WMO Wind Averaging Study to provide a technical guideline for wind averaging conversion factors was completed and the final report was adopted. It noted with pleasure that the report will soon be published by WMO/TCP and its summary will be included in the operational plans/manual of the tropical cyclone regional bodies. TCP also plans to incorporate the report in a new version of the “Global Guide to Tropical Cyclone Forecasting” and the “Tropical Cyclone Forecasters’ Website”.

The Committee noted that a new initiative building on a regional cooperation model and involving WMO, World Bank, ISDR and UNDP in the South East Asia has been launched by WMO Disaster Risk Reduction (DRR) Programme. Its goal is to develop end-to-end early warning system capacities of National Meteorological & Hydrological Services (NMHSs). The first step of the initiative started in July 2009 to conduct fact-finding missions in all the five countries (Cambodia, Indonesia, Lao People’s Democratic Republic, Philippines and Vietnam) for (i) detailed analysis of the capacities, gaps and needs of the NMHSs in supporting disaster risk management and early warning systems and (ii) evaluation of the needs and requirements of disaster risk management agencies and stakeholders for the NMHS products and services. The second step will be a regional meeting of all the involved countries and partners (2<sup>nd</sup> half of 2010) to review the results of the assessment missions and develop a road map to implement the projects in the selected countries.

## **VI. PROGRAMME FOR 2009 AND BEYOND**

The Committee noted with pleasure the attendance and participation of the representative of Indonesia and encourages continuing participation as well as membership in the Committee.

The Committee noted the submission of TCS on the proposal for Memorandum of Understanding (MoU) between World Meteorological Organization and Typhoon Committee Secretariat referring to Typhoon Committee Trust Fund Arrangement and the proposal to implement the future Typhoon Committee publications under TC logo.

The Committee decided to replace the names of the Tropical Cyclones MORAKOT, KETSANA and PARMA.

The Committee noted with appreciation the offer of Macao, China to host the Integrated Workshop in 2010. The date will be coordinated through the TCS and announced by March 2010.

## **VII. SUPPORT REQUIRED FOR THE COMMITTEE’S PROGRAMME**

### **Technical Cooperation**

The Committee was informed of the technical cooperation activities of WMO and ESCAP in support of the programmes of the Typhoon Committee carried out in 2009, including the WMO Voluntary Cooperation Programme (VCP), Emergency Assistance Fund scheme and Technical Cooperation among Developing Countries (TCDC) activities, and expressed its appreciation to WMO, ESCAP and collaborating partners for providing assistance to Members of the Typhoon Committee.

It also noted that, in 2009, China; Japan; and the Republic of Korea continued to provide cash contributions to the VCP(F), and China; Hong Kong, China; Japan; the Republic of Korea; and the USA provided equipment, expert services and fellowships. The VCP(F) support was provided to support Cambodia's participation in the forty-second session of the Committee. WMO is prepared to continue support to the LDCs to participate in the future Committee sessions. The Committee welcomed the offer of China for the upgrade of VCP- or bilaterally-supported FengYunCast receiving systems for 14 countries including six Members of the Committee. The Committee was also informed that bilateral assistance is being provided by Japan to Lao PDR to improve meteorological services.

Within the framework of the TCDC, China organized the WMO Symposium on Meteorological Services in support of Decision-making followed by the 2009 Study Tour in China from 13 to 22 October 2009 for 22 participants from 16 Members of WMO. The 2010 China Study Tour is planned for May 2010 to coincide with the opening of the MeteoWorld Pavilion in Shanghai Expo 2010.

The Committee further noted the recent emergency assistance provided under the Emergency Assistance Fund scheme to WMO Members affected by natural disasters, including DPRK, Myanmar and Pakistan, and a new request from Lao PDR for the restoration of damaged meteorological instruments and equipment at synoptic stations following TY Ketsana. Affected Members who need emergency assistance were advised to utilize this scheme, and all Members were requested to consider possible support to the affected NMHSs. With reference to the WMO assistance provided for short-term requirements of Myanmar, the TC Members were invited to give consideration of possible support, as appropriate, for key findings and recommendations of the WMO fact-finding mission in February 2009 concerning the medium- to long-term requirements.

In this regard, the Committee was informed that the ESCAP Tsunami Regional Trust Fund, established in late 2005 with contribution of US\$ 12.6 million for effective regional early warning systems for tsunamis, is planning to expand its scope in 2010 to include other hazards and climate preparedness. ESCAP also facilitated technical advisory services on disaster risk reduction to be provided upon request by Members. The TC Members were encouraged to utilize the above resource mechanisms to support the Committee's Programme.

The Committee noted with appreciation the offer of Macao, China to continue hosting the Secretariat for 4 more years from 2011 to 2014.

The Committee was informed that the Agreement between Macao, China and TC need to be reviewed.

### **Typhoon Committee Trust Fund (TCTF)**

The Committee reviewed the statement of account of TCTF for the period of 1 January to 31 December 2008 and the provisional statement for 1 January to 31 December 2009 submitted by the representative of the WMO Secretariat.

The Committee was informed that some Members contributions were not included in the provisional statement for 2009, owing to the complex accounting procedures.

### **VIII. SCIENTIFIC LECTURES**

Scientific lectures on subjects under the main three components of the Typhoon Committee were presented at the session. The Committee expressed its appreciation to the lecturers and requested the TCS to disseminate all the lecture papers and PowerPoint presentations and to include them in the Typhoon Committee Annual Review for 2009.

### **IX. DATE AND PLACE OF THE FORTY-THIRD SESSION**

The Committee noted with appreciation the offer of Republic of Korea in hosting the forty-third session in January 2011 in Jeju, Republic of Korea. The date will be coordinated through the TCS and announced by March 2010.

### **X. ACKNOWLEDGEMENT**

The delegates from the Members of the Typhoon Committee, representatives of ESCAP, WMO and TCS and observers expressed their thanks and appreciation to the National Environment Agency, Meteorological Services of Singapore for the successful hosting of the forty-second session of the Typhoon Committee. They also expressed gratitude to Mr. Foong Chee Leong, Director General of Meteorological Services and his staff for the warm hospitality and excellent arrangements made.

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