



ESCAP/WMO
Typhoon Committee



45th ESCAP/WMO Typhoon Committee Session Report



29 January-01 February 2013

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Forty-Fifth Session of Typhoon Committee

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**REPORT OF THE FORTY-FIFTH SESSION
OF TYPHOON COMMITTEE**

**Hong Kong, China
29 January-01 February 2013**

PART I – DECISIONS OF THE COMMITTEE

1. The Committee decided to:
 - a. Approve the Typhoon Committee Operational Manual (TOM) with the amendments provided in the Appendix VIII.
 - b. Approve the establishment of the Steering Committee, the Terms of Reference (ToR) of Task Force, the ToR of Project Manager/(Technical Advisor) and the Implementation Plan for the Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP) project in Appendix X.
 - c. Approve the recommendations submitted by Working Group on Meteorology (WGM) as expressed in **paragraph 45**.
 - d. Approve the recommendations submitted by Working Group on Hydrology (WGH) as expressed in **paragraph 70**.
 - e. Approve the recommendations submitted by Working Group on Disaster Risk Reduction (WGDRR) as expressed in **paragraph 75**.
 - f. Approve the recommendations submitted by Training and Research Coordination Group (TRCG) as expressed in **paragraph 84**.
 - g. Request the TCS, in consultation with Advisory Working Group (AWG) survey Typhoon related websites, and those under WG's projects, with the objective of integration for better use by Members, and report results and recommendations to the 46th Session.
 - h. Request AWG develop procedures to be used for urgent expert missions for the assessment of the damages caused by tropical cyclones, taking into consideration the Mission to the Philippines on Tropical Storm Washi.
 - i. Approve the recommendation submitted by the AWG as expressed in **paragraph 95**.
 - j. Approve the changes to the Rules of Procedure of TC; ToR of TC, Chair and Vice-Chair of TC, TCS, Secretary of TC, WGM, WGH, WGDRR, TRCG, AWG. And to request the TC Chair and the AWG to closely monitor the implementation of these changes.
 - k. Approve Mr. Edwin S. T. Lai from Hong Kong, China as the New Chair of AWG; Mr. Ray Tanabe from USA and Mr. Masashi Kunitsugu, from Japan to serve as vice-chairs of AWG.
 - l. Request the AWG provide an Executive Summary of the Session Report and Summary of Members Report for wide distribution by the TCS at the conclusion of the AWG post-meeting.
 - m. Request TCS solicit Members for inputs to the Strategic Plan, six months before the next IWS. Request AWG review the Strategic Plan and provide recommendations to the next Session.

- n. Request TCS issue the letter to Cambodia requesting the replacement names for Bopha in accordance with the Committee's procedure.
- o. Approve HATO as the replacement for WASHI in the list of the names of tropical cyclones.
- p. Request the AWG and TCS investigate further improvement of the format of in-kind contribution report.
- q. Approve the 2013 Budget as presented below (see Appendix XXIV for detail):

| By Group | 2013 |
|---|-------------------|
| | Proposed |
| TCS | 33,000.00 |
| TRCG | 4,000.00 |
| WGM | 32,000.00 |
| WGH | 28,000.00 |
| WGDRR | 27,000.00 |
| AWG | 7,000.00 |
| Total | 131,000.00 |
| Plus | |
| Special Request Budget (TRCG Forum) | 55,000.00 |
| Grand Total Budget with Special Request Budget | 186,000.00 |

- r. Accept the kind offer of Macao, China to host the 8th Integrated Workshop (IWS)/2nd TRCG Forum.
- s. Accept the kind offer of Thailand to host the 46th Session of TC in conjunction with the 41st Session of PTC, subject to confirmation by PTC.

PART II – PROCEEDINGS OF THE COMMITTEE

I. ORGANIZATION OF THE SESSION

2. The Forty-Fifth Session of the ESCAP/WMO Typhoon Committee (TC) was held at the YMCA Salisbury Hotel, Hong Kong, China, from 29 January to 1 February 2013.
3. The Session was attended by 83 participants from 12 of 14 Members of the Typhoon Committee, namely: Cambodia; China; Hong Kong, China; Japan; Lao PDR; Macao, China; Malaysia; Philippines; Republic of Korea; Thailand; the United States of America (USA); and the Socialist Republic of Viet Nam.
4. The Session was attended by four observers from International Civil Aviation Organization (ICAO), Panel on Tropical Cyclone (PTC), Asian Disaster Reduction Center (ADRC) and Asian Disaster Preparedness Center (ADPC). Seven representatives of the Philippines Typhoon Committee Foundation Incorporated attended the Opening Ceremony. Representatives of the Economic and Social Commission for Asia and the Pacific (ESCAP), WMO and Typhoon Committee Secretariat (TCS) also attended the Session. The list of participants is given in Appendix I.

Opening of the Session (agenda item 1)

5. The Session was declared open at 09:30 am on Tuesday, 29 January 2013 in Hong Kong, China in the presence of the Members' representatives. Mr. So Kam-leung, the Secretary for Commerce and Economic Development of the Hong Kong Special Administrative Region Government officiated the opening ceremony.
6. The following welcoming addresses were delivered at the opening ceremony by:
 - a. Ms. Jiao Meiyan, Deputy Administrator of the China Meteorological Administration, Chairperson of the Typhoon Committee.
 - b. Mr. Koji Kuroiwa, representative of the WMO Secretariat.
 - c. Dr. Shamika Sirimanne, Director of Information and Communications Technology and Disaster Risk Reduction Division, representative of ESCAP Secretariat.
 - d. Mr. Shun Chi-ming, Director of the Hong Kong Observatory (HKO), Permanent Representative of Hong Kong, China with WMO, Vice-chairperson of the Typhoon Committee.
 - e. Mr. Olavo Rasquinho, Secretary of the Typhoon Committee.
7. The above-mentioned statements are provided in Appendices II.a, II.b, II.c, II.d and II.e, respectively.
8. Dr. Roman L. KINTANAR Award for Typhoon related Disaster Mitigation was presented to the Government Flying Service of Hong Kong by Mr. So Kam-leung, the Secretary for Commerce and Economic Development and Congressman Angelo Palmones, Chairperson of the Philippines Typhoon Committee Foundation Incorporated.
9. Two community weather stations set up through the Hong Kong-led Co-WIN initiative were officially launched by Mr. So Kam-leung, the Secretary for Commerce and Economic Development; Ms. Jiao Meiyan, Deputy Administrator of the China

Meteorological Administration; Mr. Shun Chi-ming, Director of the Hong Kong Observatory; Mr. Olavo Rasquinho, the Secretary of the Typhoon Committee; Dr. Ong Chung Wo, Associate Professor of Department of Applied Physics of the Hong Kong Polytechnic University; Dr. Nathaniel Servando, Administrator of the Philippine Atmospheric, Geophysical and Astronomical Services Administration; and Mr. Jeff LaDouce, Regional Director of National Oceanic and Atmospheric Administration, USA.

II. TECHNICAL PRESENTATIONS (agenda item 2)

10. The technical lectures were presented as shown in Appendix III. The Committee expressed its appreciation to all the lecturers and requested the TCS to post all the lecture papers/PowerPoint presentations on the TC website.
11. The Committee took note with appreciation the review of the 2012 typhoon season provided by the RSMC Tokyo as provided in Appendix IV.
12. The Committee took note on the presentation by Shanghai Typhoon Institute of China Meteorological Administration on behalf of WGM on the Verification of Operational Tropical Cyclone Track Forecast in recent years (2010 – 2012).

III. ELECTION OF OFFICERS (agenda item 3)

13. Mr. Shun Chi-ming, Director of the Hong Kong Observatory (HKO), Hong Kong, China was elected Chairperson and Mr. Worapat Tiewthanom, Thai Meteorology Department (TMD) was elected Vice-Chairperson of the Committee. Mr. Jeff LaDouce, Regional Director National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Pacific Region was elected Chairperson of the Drafting Committee.

IV. ADOPTION OF THE AGENDA (agenda item 4)

14. The Committee adopted the agenda as shown in Appendix V.

V. OVERVIEW AND SUMMARY OF MEMBERS' REPORTS (agenda item 5)

15. The Committee took note of the major progress and issues in meteorology, hydrology, DRR and training and research aspects as reported by Members in 2012 (http://www.typhooncommittee.org/IWS_Nanjing/members.html).
16. The Committee reviewed the overview Summary of Members Report in Appendix VI, reflecting where applicable Members' experience in mitigating the hazardous impact caused by typhoons and raising Members' profile through their contribution of meteorological and hydrological input towards typhoon warning and disaster mitigation.
17. The Committee recommended that a finalized version of the Summary of Members Report, after further input from Members to AWG, be sent to: (a) Members' governments for reference particularly leveraging available resources and support in support of technology transfer and capacity-building through regional collaboration initiatives; and (b) collaborating or potential sponsoring agencies for coordinating and synergizing effort in the planning of projects and programmes and the channelling of resources and aids towards identified areas of gaps and needs.
18. The Committee noted with appreciation the proposal by Mr. Edwin Lai, on behalf of AWG for a new format for Members' reports, and decided that it be used from the next Members' reporting after review and finalization by the AWG.

19. The Committee discussed issuing an Executive Summary of the Session Report for wide distribution by TCS.

VI. REVIEW OF THE ACTIVITIES OF RSMC TOKYO AND AMENDMENTS OF TOM (agenda item 6)

6.1 Review of the activities of the Regional Specialized Meteorological Center (RSMC) Tokyo 2012 (Appendix VII)

20. The Committee was informed that RSMC Tokyo is currently developing objective tropical cyclone satellite analysis using MTSAT called "Cloud grid information objective Dvorak analysis (CLOUD)" and plans to introduce it into operation in 2013. Details on the methods and systems, including verification results, are to be published in the Technical Review in 2013 (<http://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/techrev.htm>).
21. The Committee was pleased that RSMC Tokyo has started provision of storm surge time series charts at one forecasting point for each Member upon request. In 2013, RSMC Tokyo plans to add 7 forecasting points (Thailand:1 and Republic of Korea:6), and expand the targeted region to include Guam, U.S.A. Members were requested to provide extended tidal data for RSMC Tokyo to verify the storm surge forecasts for the further improvement of its storm surge model. The Committee expressed its gratitude to RSMC Tokyo for provision of storm surge forecasts to the TC Members and sharing information on storm surges through the annual TC attachment training and the Technical Review published in March 2012.
22. The Committee was informed that the questionnaires by the WMO WWRP/TCP in 2011 and by GIFS-TIGGE WG in 2012 identified the user need for display of forecasts of surface wind speeds and precipitation on the North Western Pacific Tropical Cyclone Ensemble Forecast Project (NWP-TCEFP) webpage. Such products could be developed after investigation on further details on user needs, should EPS data products, including CXML, be extended to include corresponding meteorological elements and be provided on a real-time basis in the future with the support of the data providers. Further improvement of the website including addition of elements will be carried out based on the questionnaire survey by WMO on 14 December 2012. From 2013, the NWP-TCEFP plans to start development of tropical cyclogenesis prediction over the western North Pacific on medium-range timescales using the TIGGE data and on intraseasonal timescales using the JMA 1-month EPS. In 2013, it starts with the evaluation of tropical cyclogenesis prediction during the 2009 and 2010 seasons.
23. The Committee reaffirmed that the Center participates in a sub-regional project in Southeast Asia (SWFDP-SeA) as the Regional Center for Tropical Cyclone / Typhoon Forecasting Support. It provides typhoon related products, including NWP-TCEFP products at the NWP-TCEFP Home page. The Committee was informed that NMHSs participating in SWFDP-SeA will provide their feedback on the use of the NWP-TCEFP projects for their operation during the demonstration phase at the Training Workshop of SWFDP, now scheduled in 2013.
24. The Committee was informed that RSMC Tokyo started tropical cyclone satellite re-analysis in 2012 for the period from 1981 to confirm and improve the quality of the Current Intensity (CI) number in the satellite TC analysis.
25. The Committee was informed that RSMC Tokyo experimentally started provision of TC advisory in CAP format at the JMA website (http://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/RSMC_HP.htm) since 12 November 2012. The experimental CAP messages are served in an Atom feed (sometimes called as RSS), enabling recipient centers to retrieve updates by polling (periodically accessing) the feed at <http://www.data.jma.go.jp/fcd/yoho/cap-rsmctk/atom.xml>.

26. The Committee was pleased that RSMC Tokyo organized an attachment training course on radar composite techniques for TMD experts, from 19 to 22 November 2012, at the JMA Headquarters based on the TMD's progress report. It was recommended that TMD will work on development of techniques for creation of quality-assured radar echo intensity at the lowest level at one radar site in 2013.
27. The Committee was informed that based on the techniques utilizing the cloud grid information for the analysis of existing CB areas, TCAC Tokyo plans to provide graphical Tropical cyclone advisories (TCAs) according to MODEL TCG in the Appendix 1 of ICAO Annex 3 in a few years.
28. The Committee was pleased that RSMC Tokyo conducted the 12th Attachment Training from 18 to 27 July 2012 inviting two forecasters from Viet Nam and the Philippines.
29. The Committee was informed that JMA upgraded the supercomputer system and plans to upgrade its numerical weather prediction (NWP) system by increasing the number of vertical levels from 60(L60) to 100(L100) and the top level from 0.1 hPa to 0.01 hPa of the operational Global Spectral Model (GSM). JMA also plans to upgrade its Typhoon Ensemble Prediction System by enhancing the spatial resolution and the number of vertical levels from TL319L60 to TL479L10 as well as by increasing ensemble members from 11 to 25 to further improve the accuracy of its TC forecasting.

6.2 Typhoon Committee Operational Manual (TOM)

30. The Committee noted that the Typhoon Committee Operational Manual (TOM) rapporteur requests WMO publish and upload the 2013 edition of TOM on the Tropical Cyclone Programme (TCP) and TC Website as submitted by the Rapporteur, with the amendments given in Appendix VIII.
31. The Committee expressed its appreciation to the rapporteur for update of TOM.

VII. CROSS-CUTTING TC PROJECTS (agenda item 7)

7.1 Urban Flood Risk Management (UFRM) Project (Appendix IX)

32. The Committee noted with pleasure that, the UFRM project achieved the expected goal and provided the anticipated benefit to the Committee, including the aspects of technology and visibility.
33. The Committee noted with appreciation that, AWG member, WGM, WGH, WGDRR, TRCG and the Members of pilot cities made very close cooperation and very strong support for the implementation of the project, and Task Force Members, ESCAP and WMO provided constructive guidance and advice to the project.
34. The Committee requested the Task Force take into consideration the comments from end-users of pilot cities in the UFRM guidelines prior to final printing.

7.2. Project on Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP)

35. The Committee took note of the presentation on the project of Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP). (Appendix X)

36. The Committee discussed the proposals by the TC Secretary in setting up a Steering Committee and a Task Force and selection of Project Manager/(Technical Advisor) for planning and execution of the project and the need to produce an announcement in a short order.
37. The Committee noted the importance of this project being conducted in coordination with the PTC and ADRC and the short timeline to complete the project.

VIII. REPORTS OF TC WORKING GROUPS AND TRCG (agenda item 8)

38. Prior to the plenary session for the Committee, parallel sessions of the Working Groups on Meteorology, Hydrology and Disaster Risk Reduction were convened during the 7th IWS to review progress of work during the past year, identify priorities for cooperation and make recommendations to the Committee.
39. The outcomes of the parallel sessions of the three Working Groups were reported to the plenary session as given in the following sections.

8.1 Meteorological Component

40. The Committee took note of the outcomes of the parallel session of the WGM which met on 27-28 November 2012. (Appendix XI).
41. The Committee reviewed the activities of Members' in implementing the TC Strategic Plan and its annual operating plan in relation to Meteorological Component during the past year, details of which are presented in Appendix XV.
42. With the assistances of Tropical Cyclone Program (TCP) of WMO and Typhoon Committee Secretariat (TCS), and the strong support from all Members, WGM has successfully completed the AOPs in 2012 endorsed at the 44th Session. Experts from other working groups of TC as well as TCP/WMO, TCS, RSMC-Tokyo, JTWC have also provided assistances to accomplish the tasks of WGM over 2012. The WGM activities in 2012 are as reported in the Appendix A of the Appendix XI – Report of the WGM parallel session at the 7th IWS.
43. During the 7th IWS, the participants of the WGM parallel session had the opportunities to discuss the AOP for 2013 and the potential projects that can involve and enhance the cooperation of three WGs.
 - a. The members concurred with the proposal of the Chair of WGM to restructure the table of the AOPs, namely the inclusion of 2 additional tables, which are the Perennial Operating Projects (POPs) and the Preliminary Projects (PPs). POPs are now referring to the WGM activities that will be carried out repeatedly in the following years while the PPs referring to the projects of which preliminary studies needed to be undertaken by WGM.
 - b. As the results of the discussion and based on the comment expressed by the participants, the meeting concurred that the 2012 AOP items (2, 3, 4, 6, 7, 9, 10, 11 and 12) will be continued in 2013, while AOP items (5 and 8) will be moved to the POPs with the addition of a new POP item of Improvement of QPE/QPF and storm surge techniques for Members.
 - c. In response to the request to support the SSOP, the members concurred to establish a new AOP on this issue. Based on the follow up discussion after the meeting, it was concurred to establish the new AOP of "Contribution to SSOP" with the aim to support the implementation of SSOP project.

- d. Details of the proposed AOPs for 2013 and future planning is as reported in the Appendix A of the Appendix XI - Report of the WGM parallel session at the 7th IWS.

Conclusions of WGM:

44. On the basis of the information provided by Members and the respective coordinator of the AOPs and based on the discussion during the session, the following conclusions were reached:
 - a. Members made important progress in the implementation of the TC Strategic Plan during the year 2012.
 - b. Members made significant progress during 2012 in tropical cyclone monitoring and communication systems, data assimilation and numerical weather prediction systems, tropical cyclone forecast-aiding systems, and scientific understanding of tropical cyclone activities.
 - c. WGM successfully completed the AOPs in 2012.
 - d. Based on the outcome preliminary studies on the published papers on climate change, WGM will initiate third assessment report on the impact of climate change on tropical cyclone in TC region.
 - e. Improvement of storm watch scheme will further contribute to the early warning of storm surge in TC region.
 - f. Members need to continue to exchange the technology and knowledge of the Typhoon Information System.
 - g. WMO NWP-TCEFP Web page continues to promote the use of ensemble prediction products to improve tropical cyclone forecasts for effective warnings.
 - h. Based on the outcome of a survey carried out by WMO Typhoon Landfall Forecast Demonstration Project (WMO-TLFDP), more attention should be paid to the verification of probabilistic forecasts, and precipitation and high wind forecasts related to tropical cyclone.
 - i. The web-based typhoon forum is helpful in terms of providing a communication platform for both forecasters and researchers.
 - j. With the assistances provided by JMA, TMD has started to carry out the roadmap of the development of regional radar network.
 - k. The publication of the TC Journal Tropical Cyclone Research and Review (TCRR) plays an important role in providing an effective way to exchange the knowledge and latest progress in tropical cyclone research, forecasting technique and warning system as well as to enhance the visibility of TC.
 - l. The in-depth QPE/QPF training organized with the TC Research Fellowship Scheme was much appreciated by the participants from the UFRM pilot cities. Follow-on technical assistance to participating Members on the adaptation of the QPE/QPF technique is necessary.
 - m. Significant progress has been made on the construction of web-based portal system to aid typhoon seasonal prediction information.

- n. Significant progress has been made on the improvement of severe weather forecasting and interaction with the user communities of the participating Members through the implementation of the SWFDP-SeA portal web page hosted by National Hydro-Meteorological Service of Viet Nam.
- o. Reconnaissance flights undertaken by the Hong Kong Observatory and Government Flying Services of Hong Kong, China in the vicinity of Hong Kong to gather meteorological observations around tropical cyclones for operational reference and research studies provided useful information on tropical cyclone location and the wind distribution in the vicinity of tropical cyclone, for monitoring their development and assessment of impact of associated weather system.

Recommendations of WGM:

- 45. On the basis of the outcomes of the WGM parallel session at 7th IWS in Nanjing and subsequent discussion, the WGM made the following recommendations:
 - a. To carry out the preliminary studies on published papers and relevant documents on climate change with the aim to publish the third assessment report on impact of climate change on tropical cyclone in TC Region.
 - b. To encourage Members to collaborate with the SSOP project.
 - c. To request RSMC Tokyo develop the storm surge model for expansion of the region, provide storm surge time series charts at more than one point if so requested by Members, and conduct training on storm surges during the annual TC attachment training.
 - d. To request Members provide additional points and tidal data archive to RSMC Tokyo for verification and further improvement of the storm surge model.
 - e. To request RSMC Tokyo improve the WMO North Western Pacific Tropical Cyclone Ensemble Forecast (NWP-TCEFP) home page upon feedback from Members through WMO questionnaire and SWFDP-SeA.
 - f. To request KMA further improve the typhoon information processing system (TAPS of KMA) project including to upgrade the user-compatible version of the TAPS and to provide training for the typhoon forecasters on the use of TAPS upon Member's request.
 - g. To promote the web-based typhoon forum among Members and to request more forecasters and researchers from Members to register in the forum.
 - h. To request TMD make a progress report on radar composite map project based on the outcome of the training course at JMA in November 2012. To request JMA the assistance to provide attachment training to TMD radar expert or to dispatch an expert mission to TMD upon the receipt of the progress report.
 - i. To request STI/CMA carry out post-season verification and reliability analysis on the operational forecast of tropical cyclones and further improve the evaluation system for tropical cyclone forecast with special attention on probabilistic and genesis forecast.
 - j. To request TCS to promote the TC Journal TCRR as well as to encourage Members to send experts to the editorial office as visiting editors of the Journal.

- k. To request STI/CMA further improve the editorial procedures of the TC Journal TCRR.
- l. To further improve QPE/QPF techniques of Members and request RSMC Tokyo to conduct QPE/QPF training during annual TC attachment training.
- m. To collaborate with TC Fellowship Scheme to provide QPE/QPF training to Members participating in the UFRM pilot project upon request.
- n. To request CMA further improve the numerical prediction System TRAMS model of the project of Improvement of South China Sea Typhoon Forecast as well as to provide more related products through its website.
- o. To request KMA further develop the techniques of typhoon seasonal prediction as well as to establish the semi-operational web-based products of typhoon seasonal prediction to provide Members.
- p. To request National Hydro-Meteorological Service of Viet Nam to continue to play a central role as the Regional Forecasting Support Center, and to further improve the SWFDP-SeA portal web page to provide more products in real time and to investigate interpretation of EPS products as well as its NWP guidance.
- q. To continue the study on the methodology to compare the best track datasets based on the recommendation of the best track consolidation meeting with the consideration on the progress of digitization of CI numbers in hardcopy.
- r. To continue the work of the Taskforce on TC Intensity Analysis for upgrading TD.
- s. To retire the name of Typhoon Bopha considering the damages reports from the Philippines and request Cambodia provide a suggested replacement name in accordance with TC procedures.
- t. In conjunction with other WGs and TRCG, to take the lead in designing and formulating a tropical cyclone field experiment within the region, in particular by making use of the available opportunity in collaborating with the Southern China Monsoon Rainfall Experiment (SCMREX) planned by the WGTMR of WMO for implementation in 2013 (spin-up phase) and 2014 (field phase), and hold a small expert meeting to draft the proposal if necessary.
- u. To endorse the proposal of WGM AOPs (including POPs and PPs).
- v. To re-appoint Mr. Masashi Kunitsugu (Japan) as the TOM Rapporteur.
- w. To request WMO publish the 2013 edition of TOM and upload it on the Tropical Cyclone Programme (TCP) and Committee's website by March 2013.
- x. To request WMO and ESCAP to promote the TC Journal TCRR as well as encourage Members, WGs and TRCG to submit articles to the Journal.
- y. To re-appoint Dr. Lei Xiaotu (China) as Chairperson of WGM, Dr. Nathaniel Servando (the Philippines) and Ms. CheGayah Ismail (Malaysia) as Vice-Chairpersons of WGM.

8.2 Hydrological Component

46. The Committee reviewed the activities of the Members related to the implementation of the TC Strategic Plan and its annual operating plan for the hydrological component during the past year. Details can be found in the Appendix XII.
47. The Committee was informed that, the great efforts and progresses on effective flood early warning have been made in some Members in 2012, such as early warning issuing platform to public in China, two publications on landslide warning in Japan, automatic flood warning sirens in Malaysia, and updated flood warning protocols in Philippines and real-time inundation warning for Hanoi in Vietnam.
48. The Committee noted with pleasure that, the WGH successfully held its first working meeting with the theme of “Comprehensive Counterplan for Extra-Ordinary Flood” in Han River Flood Control Office (HRFCO) of Korea, Seoul from 7 to 10 October 2012 at the kind invitation of the Ministry of Land, Transport, and Maritime Affairs (MLTM), Korea with generous offering of financial support. The Committee expressed its appreciation to the Government of Republic of Korea to host working meeting of WGH annually starting from 2012.
49. The Committee was informed on the progresses and future activities of on-going projects:
 - a. Urban Flood Risk Management (UFRM) in TC region, led by China.
 - b. Assessment System of Flood Control Measures on Socio-economic Impacts (ASFCM), led by Republic of Korea.
 - c. Hazard Mapping for Sediment-related Disasters, led by Japan.
 - d. Establishment of Flood Disaster Preparedness Indices (FDPI), led by Japan.
 - e. Satellite-based information utilized on reducing water-related disaster risks, driven by ESCAP.
 - f. Development of comprehensive counterplan for extra-ordinary flood, led by Republic of Korea.
 - g. Project on estimation for socio-economic impact of sediment-related disaster, led by Japan.
50. The Committee was informed that the Cross-cutting project of UFRM will be finalized at 45th Session. The Committee noted with pleasure that the cross-cutting project of UFRM has made notable progress in 2012. The related activities implemented in 2012 include:
 - a. UFRM Guidelines drafting meeting, held in Nanjing WMO RTC, China.
 - b. UFRM training course, held in Guangzhou, China.
 - c. Workshop of UFRM under the ESCAP Workshop on Applications of Space Technology to Enhance the Activities of the Typhoon Committee, held in Macao, China.
 - d. UFRM Guidelines drafting.
51. The committee noted that the final version of UFRM guidelines is under discussion and last review and the guidelines will be published after the Session. The Committee expressed its appreciation to the Members of UFRM Task Force for their great

contribution to the UFRM guidelines as main drafters and China made its remarkable efforts as the leading country.

52. The Committee noted with appreciation that the Bureau of Hydrology (BOH) under the Ministry of Water Resources (MWR) of China conducted UFRM training course in Guangzhou, China from 24 to 26 September 2012 for the participants from five pilot cities, namely Hat Yai of Thailand, Metro Manila of Philippines, Hanoi of Vietnam, Kuala Lumpur of Malaysia and Guangzhou of China. The Committee noted the recommendations from the training course, including: (1) continually providing this kind of training for professional flood forecasters of Members, and (2) extending the application of Xin'anjiang model (flood forecasting model) of China in selected river basins of Members.
53. The Committee noted with pleasure the efforts made by SMG of Macao and TCS to advance the implementation of UFRM. The Committee expressed its gratitude to Science and Technology Development Foundation (STDF) of Macao, China to provide funding for developing the Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for Members. The Committee noted that Development and Application of OSUFFIM will be conducted as WGH AOP in next years.
54. The Committee noted that the Sun Yat-Sen University of China is willing to cooperate and provide the technique support for developing OSUFFIM for TC Members.
55. The Committee noted the application of Assessment System of Flood Control Measures on Socio-economic Impacts in Philippines and Thailand. The Committee also noted that this project will be extended for two more years up to 2014 as an AOP of WGH.
56. The Committee noted with pleasure that, the National Institute for Land and Infrastructure Management (NILIM), SABO Technical Center and ICHARM of Japan, in cooperation with TCS, published the reports for the project on Hazard Mapping for Sediment-related disasters and the project on Establishment of Flood Disaster Preparedness Indices as TC publications. These two projects will be finalized at 45th Session.
57. The Committee noted with pleasure that, MLTM of Korea, in cooperation with Korea Institute of Construction Technology (KICT) and K-water successfully conducted the survey and data collection in Philippines and Thailand for the project of Development of Comprehensive Counterplan for Extra-ordinary Flood from 5 to 15 June 2012. The Committee was informed that the title of the project was proposed to be changed to the 'Extreme Flood Forecasting System'. The Committee also noted that more activities on survey and data collection for the project were proposed to be conducted in 2013 in Members. The Committee was pleased to note that Lao PDR proposed Nam Ngum river basin as a case study of this project.
58. The Committee was pleased to note that, ESCAP conducted the Sentinel Asia Operational Training Workshop, with support and cooperation from the Japan Aerospace Exploration Agency (JAXA), SMG of Macao and TCS, for TC Members in Macao, China from 27 February to 2 March 2012 as the activity of the project of Satellite-based Information Utilized on Reducing Water-related Disaster Risks. The Committee was informed that the project will be finalized at 45th Session.
59. The Committee noted that Japan-side submitted the preliminary road map for the project on Estimation for Socio-economic Impact of Sediment-related for the period of 2013 to 2015.

60. The Committee was informed of the plan for four new proposed projects which will be launched in 2013 and beyond as new AOPs of WGH:
- a. Project on Development and Application of Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for TC Members.
 - This project will be jointly directed by SMG of Macao and TCS in the period from 2013 to 2016.
 - The objective is to develop a prototype real time OSUFFIM for TC Members to promote the capacity of early warning of urban flood and emergency response, particularly urban flood forecasting and inundation mapping.
 - Hat Yai of Thailand is selected as the pilot city for this project in 2013.
 - b. Project on Extending Application of Xin'anjiang Model in Selected River Basins in TC Members
 - This project will be led by China in the period from 2013 to 2016.
 - The objective is to promote the capacity of flood forecasting in TC Members through extend application of flood forecasting model (Xin'anjiang model of China) in selected river basins in TC Members in next years.
 - DID of Malaysia proposed Muar River basin as pilot study for Xin'anjiang model application in 2013.
 - c. Project on Guidelines for extreme flood risk management in TC region
 - This project will be led by Korea lasting from 2013 to 2015.
 - The objective of the project is to develop collaborative guidelines among the TC members on the extreme floods to be aware of that the occurrence frequency of the extreme flooding event has been increased in the TC region and the coordinated response among the members is needed.
 - d. Project on Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data
 - This project will be led by ICHARM of Japan and will be lasted from 2013 to 2017.
 - The objective of the project is to develop a system for prediction of sediment-related disaster's risk near real time without or few ground-based rainfall gauges.
61. The Committee noted with pleasure that, the members of WGH reaffirmed its commitment to contribute the project of SSOP, as cross-cutting project of TC.
62. The Committee was informed with great appreciation that Science and Technology Development Fund (STDF) of Macao Government provided the grant of USD 175,000 for development of OSUFFIM for Members. Also the Committee noted with gratitude that Sun Yat-Sen University of China is willing to contribute this activity based on its existing achievement on urban flood inundation mapping and is going to use their own potential budget to cover the shortage of the funding for development of OSUFFIM.
63. The Committee noted the comments of that, one of the innovations that the WGH must pursue is the use or application of satellite based information (SBT) for promoting the accuracy and extending the leading-time of flood forecasting.
64. The Committee noted the discussion on that, WGH should consider one AOP for dealing with addressing medium to long-term hydrological forecasts in conjunction with WMO's CHy and Climate and Water Programme.
65. The Committee noted with pleasure that WGH participants are willing to contribute to the journal TCRR.

66. The Committee noted with appreciation that MLTM of Republic of Korea provided funding to support two hydrologists to participate in the TC 7th IWS held in Nanjing, China.
67. The Committee was informed that Dr. Yang-su KIM, the vice chairperson of WGH will not take his position after the 45th Session. The Committee expressed its gratitude for his remarkable work during his term. The Committee also was informed that the director of River Information Center of Han River Flood Control Office (HRFCO) of MLTM Dr. Sang-Heon LEE will take the position of Vice Chairperson of WGH from 45th Session.
68. The Committee was informed that Dr. Zhiyu LIU, was selected as vice president of WMO's CHy. It should be very helpful for enhancing the linkage between TC and WMO. Considering his new service for WMO, Dr. Liu resigned his position of vice chairperson of WGH. The Committee expressed its gratitude for his wisdom and contribution to WGH and his willing to continue his cooperation. The Committee also was informed that a successor from BOH of China will be nominated to serve with TC-WGH.

Conclusions of WGH:

69. On the basis of the information of hydrological component provided by Members and findings of the TC 7th IWS held in Nanjing, China in November 2012, the following conclusions were reached:
 - a. The working meeting of WGH is very important to push hydrological activities. The meeting should be continued.
 - b. WGH will conduct activities focusing on improving the ability to forecast hydrological phenomena and provide measures for the effectiveness of the improvements.
 - c. The implementation of the SSOP is extremely valuable for the Committee.
 - d. As the subsequent activity of TC Cross-cutting project of UFRM, development and application of OSUFFIM would play very meaningful and important role for TC Members to promote the capacity on the technique of urban flood forecasting and warning. It is necessary to seek in-kind contribution for covering the shortage of funding.
 - e. Technique and skill of application of QPE/QPF products in hydrology for extending the leading time and promoting the accuracy of flood forecasting and early warning is essentially requested by Members. The research and cooperation on this aspect should be enhanced among TC Members.
 - f. Enhancement of the close collaboration with the WMO CHy, WMO RA II Working Group on Hydrological Forecasts and Assessments and RA V Working Group on Hydrological Services in several themes of common interest provides significant benefits to the Committee.

Recommendations of WGH:

70. On the basis of discussion and the outcomes of the WGH Parallel Session at 7th IWS held in Nanjing, China in November 2012, the WGH made the following recommendations:
 - a. To re-appoint Mr. Minoru KAMOTO, Japan as Chairperson of WGH; to appoint Dr. Sang Heon LEE, Republic of Korea as Vice Chairperson of WGH.

- b. To allocate US\$28,000 from TCTF in total for supporting overall WGH activities for 2013 calendar year.
- c. To consider allocation of TCTF for supporting WGH participants taking part in the TRCG Forum in 2013.
- d. To approve four new proposals as WGH AOPs for 2013 and beyond:
 - Development of Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for TC Members, by Macao, China and TCS.
 - Extension of Xin'anjiang Model Application in Selected River Basins in TC Members, by China.
 - Guidelines for extreme flood risk management in TC region, by Korea.
 - Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data, by Japan.
- e. To request Members continue providing the training and expertise on QPE/QPF, hydrological/hydraulic modelling, inundation mapping and flood disaster assessment for TC Members as in-kind contribution.
- f. To request Members of Pilot Cities exploring mobilization the self-funding support for the pilot studies of development and application of OSUFFIM and application of Xin'anjiang model in selected river basins.
- g. To request WGH conduct case study on real-time QPE/QPF application linked in with development and application of OSUFFIM, in cooperation with WGM.
- h. To request TRCG continue coordinating with WGH when planning related manners training and research.
- i. To request MLTM of Republic of Korea to host WGH second working meeting in appropriate time with funding support.
- j. To re-appoint the hydrologist of TCS Mr. Jinping LIU and, Ms. Hwi-Rin KIM, focal point of WGH from Republic of Korea as liaisons to WMO RA II and RA V WGHs for the Committee.
- k. To request WMO take further actions to facilitate involvement of WGH in the activity of WMO water and hydrology issues.
- l. To request WGH take the action on the closest linkages between the two working groups of WMO RAI and the Committee which were identified at the Committee 43rd Session as:
 - UFRM and flash flood/debris flow/landslide prediction/warning under the RA II theme of Disaster Mitigation – Implementation of the WMO Flood Forecasting Initiative including Flash Flood Forecasting Capabilities; and
 - Assessment of the variability of water resources in a changing climate under the RA II theme of Water Resources Assessment, Availability and Use (surface water and ground water).
- m. To support WGH activities continue focusing on improving the ability to forecast hydrological phenomena and provide measures for the effectiveness of the improvements.

8.3 Disaster Risk Reduction Component

71. The Committee took note of the report of the Parallel Session of the WGDRR, details of which are presented in Appendix XIII. In the report China; Hong Kong, China; Macao, China; Malaysia; Republic of Korea; Philippines; Thailand; USA presented their efforts on DRR.
72. The Committee reviewed the activities of the TC Members, ESCAP, WMO and other collaborating organizations, during the past year, details of which are presented in Appendix XV. Activities within the DRR component among the Members included the following:
 - a. Review of AOPs for 2012.
 - b. 2013 AOPs and budget of WGDRR.
 - c. New proposed project led by National Disaster Management Institute (NDMI).
 - d. Upgrade of WGTCDIS in 2013.
 - e. Proposed the budget for WGDRR in 2013.
 - f. Ideas for TRCG forum in 8th Integrated Workshop in 2013
 - g. The role of WGDRR in SSOP project.
 - h. 2013 expert mission plan.
73. The Committee was informed the WGDRR AOP are included as follows:
 - a. Extend the WEB GIS based Typhoon Committee Disaster Information System (WGTCDIS) for upgrading the search option for finding similar Typhoon and collecting disaster information from TC Members.
 - b. Provide the training program for disaster prevention policies and technologies such as Flash Flood Alert System (FFAS), Frequency Analysis for Rainfall Data (FARD), Application of radar for urban flood warning, and Soil Erosion Model for Mountainous Area (SEMMA) including WGTCDIS.
 - c. Promote the international cooperation research by dispatching the experts of NDMI and TCS to Philippines for installing the Flash Flood Alert System (FFAS) and Automated Rainfall Alert System.
 - d. Promote and extend the dissemination of warnings and alerts by Members through SWIC (Severe Weather Information Center).
 - e. Set up community weather stations for raising public awareness on climate change and extreme weather.
 - f. Benefit Evaluation of Typhoon Disaster Prevention and Preparedness.
 - g. The SSOP project related to disaster risk management.

Conclusions of WGDRR:

74. On the basis of the information provided by the Members and findings of the parallel session on WGDRR, the following conclusions were reached:

- a. The WGDRR recognized the necessity of continuous collection of disaster information from Member countries for WGTCDIS. Collection of disaster information from Member countries will be continued in 2013.
- b. NDMI will expand WGTCDIS in 2013. This work will include the upgrade of search option for finding similar Typhoon.
- c. Expert mission to four TC members namely Guam, Viet Nam, Lao PDR, and Thailand will be conducted in 2013 to provide training on the operation of WGTCDIS by NDMI and TCS. 2013 Expert Mission will also provide the training program for disaster prevention technologies and policies. The contents of the expert mission program will consist of Flash Flood Alert System (FFAS), Frequency Analysis for Rainfall Data (FARD), application of radar for urban flood warning, and Soil Erosion Model for Mountainous Area (SEMMA). Note : With reference to the contents of 2013 expert mission, Member countries can select and request the training program.
- d. Republic of Korea proposed new project led by NDMI for 2013 to promote the international cooperation research for disaster risk management. In 2013, NDMI and TCS will dispatch the experts of Republic of Korea and TCS to Philippines for installing the Automated Rainfall Alert System and Flash Flood Alert System (FFAS) in Cagayan de Oro, Mindanao Island in Philippines. Note: NDMI proposed to all TC members if they want to join this project similar to Philippines and suggested TC members who are interested in the project to submit their proposal before May 2013.
- e. Hong Kong, China installed the automated weather stations for the pilot project for Community Weather Station in Philippines and Guam in December, 2012. The community weather station project was presented in the Session.
- f. The project proposed by China “Benefit Evaluation of Typhoon Disaster Risk Reduction” in 44th TC session will be included in 2013 AOP of WGDRR.

Recommendations of WGDRR:

75. On the basis of the information provided by the Members and deliberations, the WGDRR made the following recommendations:
 - a. To allocate US\$27,000 budget of TCTF in 2013 for i) supporting WGDRR participating in next TC Integrated Workshop, ii) supporting community based weather station pilot project offering expert to visit interested members to install the weather stations and to provide technical documentation on installation, maintenance and data processing and display, iii) supporting TC Members for collecting typhoon disaster information to extend the WGTCDIS, and iv) supporting TCS, UNESCAP and WMO participating on WGDRR Expert Mission.
 - b. To collect the disaster information from TC Members for extending TCDIS, the continuity of such collection should be maintained and this project will be continued in 2013.
 - c. To send expert mission for WGTCDIS, disaster prevention technologies, and policies to 4 TC Members namely Guam, Lao PDR, Thailand, and Viet Nam in 2013.
 - d. To develop the urban disaster risk assessment system, the research results of urban disaster forecast and rainfall runoff reduction system will be introduced in 2013 expert mission.

- e. To organize the team with NDMI and TCS to visit Philippines for international cooperation research. The team will:
 - Perform the feasibility study to launch the project successfully.
 - Install Automated Rainfall Alert System and Flash Flood Alert System.
- f. To start new project namely “Benefit Evaluation of Typhoon Disaster Prevention and Preparedness” led by China to evaluate the different disaster prevention and preparedness measures and provide the result as the basis of decision making policy.
- g. To set up additional community based weather station project in the three interested Members in 2013.
- h. To hold the 8th WGDRR Workshop in Seoul, Republic of Korea on 29-30 May 2013 and to follow up on the Vice Chairperson appointment.
- i. To request the Committee to recognize Mrs. Hilda Lam from HKO, for the contribution to the Committee and to the work on the WGDRR.

8.4 Training and Research Coordination Group

76. The Committee took note of the report given in Appendix XIV prepared by the Chair of Training and Research Coordination Group (TRCG).
77. The Committee expressed its appreciation to NDMI for hosting the Roving Seminar in Seoul, Republic of Korea. The Committee also appreciated the support of resource persons provided by China; Hong Kong, China and Republic of Korea.
78. The Committee thanked China, Hong Kong, China and Republic of Korea for hosting research fellowship programmes in 2012.
79. The Committee took note of the successful RSMC Tokyo training attachment of forecasters from Philippines and Viet Nam in July 2012, and thanked JMA and WMO TCP for continuously supporting this capacity-building initiative.
80. The Committee was pleased to learn that an agreement for WMO Nanjing Regional Training Center (RTC) to become a training centre for the Committee has been duly signed during the 7th IWS, and looked forward to future collaboration opportunities with RTC in implementing the Committee’s training initiatives.

CONCLUSIONS of TRCG:

81. The 4-year work plan formulated in the 1st TRCG Planning Meeting in 2009 continued to provide a sound basis for implementing training and research activities of the Committee, and the AOP 2013 was drafted in accordance with the plan for implementation.
82. There is a need to start preparing for the drafting of the next 4-year work plan (2014 – 2017), including the sourcing of effective options for organizing the 2nd TRCG Planning Meeting in 2013.
83. TRCG will continue to link up or provide support to cross-cutting training and research activities, e.g. Southern China Monsoon Rainfall Experiment (SCMREX) and SSOP, and to encourage and facilitate the input of articles or papers for the publication of Tropical Cyclone Research and Review.

RECOMMENDATIONS of TRCG:

84. On the basis of the conclusions reached by the deliberation of Members, the TRCG made the following recommendations:
- a. To re-appoint Mr. Edwin S.T. LAI (Hong Kong, China) and Mr. Roger EDSON (USA) as Chairperson and Vice Chairperson of TRCG, respectively.
 - b. To request Members to confirm their respective focal points as members of TRCG, and to update the list of resource persons as appropriate.
 - c. To encourage Members to support the participation of TRCG members in TRCG-related meetings/activities as far as possible so that good continuity in TRCG work can be maintained.
 - d. To endorse the priority training and research areas as given in paragraph 5 of Appendix XIV.
 - e. To request Members to offer or take part in research fellowship programmes.
 - f. To endorse the proposed TRCG AOP for 2013 (Annex VIII of Appendix XIX), including the organization of a 2nd TRCG Planning Meeting and Forum in conjunction with the 8th IWS under the support of Typhoon Committee Trust Fund.
 - g. To endorse the revised TRCG Terms of Reference as proposed in Annex XI of Appendix XIV.

IX. REPORTS OF THE TCS AND AWG (agenda item 9)

9.1 Activities of Typhoon Committee Secretariat

85. The Committee took note of the activities report given in Appendix XVI prepared by the Secretary of the Typhoon Committee and appreciated the efforts of the TCS for executing the decisions of the TC and supporting its activities.
86. The Committee thanked the Government of Macao, China for continuing to provide headquarters and endowment fund for TCS operation.
87. The Committee discussed the need conduct a survey on typhoon related websites, with the objective of integration for better use by Members.

9.2 Activities of AWG

88. The Committee was informed of the activities of the AWG in 2012. (Appendix XVII).
89. The Committee was informed of the status of the 2012 Typhoon Committee Annual Operating Plan (AOP), the proposed AOP for 2013 (Appendices XVIII-XIX), and the budget for 2013. AWG, TCS and Working Group Chairpersons provided additional clarification on the 2012 AOP and the 2013 Budget for the Committee's consideration, upon requests by Members.
90. The Committee noted the revised amendments of the Basic Documents presented by AWG and submitted report at this Session in view to achieve the Committee's objectives in a more efficient and effective manner.

91. The Committee was informed that the AWG will hold a small meeting in 2013. It would tentatively be held in Bangkok on 18-19 March in conjunction with SSOP Workshop.
92. The Committee noted the procedure on hosting TCS and selection of secretary and that Members were informed the criteria and application procedure for TCS hosting.
93. The Committee noted with appreciation the signing of the MoU to jointly utilize RTC Nanjing as a TC training center at the 7th IWS in Nanjing, China.
94. The Committee expressed its sincere appreciation to the AWG members for their work in formulating and coordinating the annual operating plan and the budget.

Recommendations of the AWG

95. Based on the outcomes of the AWG meeting in Seoul and the AWG post-IWS meeting in Nanjing, AWG recommends the Committee:
 - a. Approve the amendments made on the TC basic documents as presented in the WRD/TC.45/10.
 - b. Adopt the use of decision and action based documents and consistent follow up of decisions and recommendations.
 - c. Request NDMI to further study effective way to reliably assess the death and economic impact of typhoon-related disasters for performance review under the Strategic Plan's KRAs.
 - d. Encourage Members' collaboration in providing the disaster information data to the Committee.
 - e. Request TCS continue to work with ESCAP and WMO through the formulation, implementation and update of the Strategic Plan, and align with the high objectives and policies of WMO.
 - f. Encourage Chairs of WGs to develop or adapt evaluation methods and procedures with reference to the TRCG's evaluation template on training course.
 - g. Hold the 2nd TRCG forum as part of the 8th IWS.
 - h. Approve the establishment of the Steering Committee, Task Force, Project Manager/(Technical Advisor) and the Implementation of SSOP Plan as presented in WRD/TC.45/7.2.
 - i. Endorse the AOPs of the WGs and TRCG.

X. TC EFFECTIVE GOVERNANCE (agenda item 10)

96. The Committee discussed revisions to Rules of Procedure of TC; Terms of Reference (ToR) of TC, Chair and Vice-Chair of TC, TCS, Secretary of TC, WGM, WGH, WGDRR, TRCG, AWG. (Appendix XX)
97. The Committee may establish a Credentials Committee immediately after the completion of the opening formalities and for the duration of the session. This committee shall examine the credentials of delegates and observers.

98. The Committee discussed the need to develop procedures to be used for urgent expert missions for the assessment of the damages caused by tropical cyclones, taking into consideration the Mission to the Philippines on Tropical Storm Washi.
99. The Committee discussed the terms of service of the AWG Chair and Vice-Chair and the importance of continuity in these positions.
100. The Committee discussed the merits of appointing, Mr. Edwin S.T. Lai from Hong Kong, China as Chair; Mr. Ray Tanabe from USA and Mr. Masashi Kunitsugu, from Japan to serve as Vice-Chairs of the AWG.

XI. PUBLICATIONS (agenda item 11)

101. The Committee noted with appreciation that the RSMC Tokyo - Typhoon Center published the “Technical Review No.14” in March 2012 and the “Annual Report on the Activities of the RSMC Tokyo - Typhoon Center in 2011” in December 2012. 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/RSMC_HP.htm.
102. The Committee discussed establishing a list of retired names and brief description as to why the name was retired, to be included on TC Newsletter or website.
103. The Committee took note of the coordination by STI/CMA and TCS in the publication of the TC Journal TCRR (Vol. 1. No. 1 -4).
104. The Committee expressed its appreciation to STI/CMA for supporting the establishment of the editorial office, online manuscript submission and review system, the great contribution on editing and publishing the Journal, and thanks to the visiting editor from KMA.

(a) Report of The Second Assessment Report on the Influence of Climate Change on Tropical Cyclones In the Typhoon Committee Region

105. The Committee took note of the coordination by TCS on the publication of “The Second Assessment Report on the Influence of Climate Change on Tropical Cyclones in the Typhoon Committee Region” (TC/TD 0004).
106. The Committee expressed its appreciation to the contributors for the 2nd Assessment Report and also urge Members to send contributions to the TCRR.

(b) Report of the Project on Establishment of Flood Disaster Preparedness Indices

107. The Committee took note of the coordination by TCS on the publication of the “Project on Establishment of Flood Disaster Preparedness Indices (FDPI)” (TC/TD 0005).
108. The Committee expressed its appreciation to International Centre for Water Hazard and Risk Management (ICHARM) under the auspices of UNESCO and the Public Works Research Institute (PWRI) for supporting establishment of the FDPI system and providing training and education.

(c) Report on the Project on Hazard Mapping for Sediment-Related Disasters

109. The Committee took note of the coordination by TCS on the publication of the, “Project on Hazard Mapping for Sediment-Related Disasters” (TC/TD 0006).
110. The Committee expressed its appreciation to National Institute for Land and Infrastructure Management (NILIM); to Ministry of Land, Infrastructure, Transport

and Tourism (MLIT); to Shizuoka City Office and SABO and Landslide Technical Center, STC in Japan.

(d) Report of Expert Mission to the Philippines: Assessment Report of the Damages caused by Tropical Storm Washi

111. The Committee took note of the coordination by TCS on the publication of the “Expert Mission to the Philippines: Assessment Report of the Damages caused by Tropical Storm Washi” (TC/TD 0007).
112. The Committee expressed its appreciation National Emergency Management Agency (NEMA) and National Disaster Management Institute (NDMI) of Republic of Korea for supporting the expert mission.

XII. PROGRAMME FOR 2013 AND BEYOND (agenda item 8)

12.1. Strategic Plan 2012-2016

113. The Committee noted with appreciation the booklet on the Strategic Plan 2012-2016 presented by TCS with KRAs, Strategic Goals and Associate Activities.
114. The Committee noted the importance of the need to review the Strategic Plan and to make a mid term update, keeping in mind the need to maintain continuity in the Plan.

12.2. Hosting TCS beyond 2015

115. The Committee discussed the hosting of TCS for the four-year period 2015-2018 and the document Criteria for Hosting the Typhoon Committee Secretariat after eventual amendments.
116. The Committee took note with appreciation from Macao, China for the continuous support in hosting TCS for the period of 2015-2018.

12.3. New names of the tropical cyclones as replacement of names removed from the list

117. The Committee noted the request from the WGM and the Philippines to retire the name of the tropical cyclone Bopha and request Cambodia for a name replacement in accordance with the Committee’s procedure.
118. The Committee noted the suggestion of JAPAN to replace the name WASHI with HATO as a follow up of the decision of the 44th Session.

XIII. COORDINATION WITH OTHER ACTIVITIES OF THE WMO TROPICAL CYCLONE PROGRAMME (agenda item 13)

119. The Committee noted that, at its 64th session (Geneva, June 2012), the WMO Executive Council gave following guidance to the Tropical Cyclone Programme (TCP):
 - a. Capacity development
 - Due consideration to developing countries, LDCs in particular.
 - b. Regional TC Committees and WMO Projects
 - Close linkage between TCP and other WMO Programmes through the relevant WMO projects such as SWFDP and CIFDP.

- c. Improvement of Operational TC Forecasting
 - Extended use of ensemble techniques including multi-model consensus forecasting and ensemble-based probabilistic guidance.
 - d. More objective TC analyses as recommended by IWSATC.
 - Establishment of TC Forecaster Website.
 - e. Standardization of the format in TC warnings
 - Implementation of Common Alerting Protocol (CAP) in TC warnings.
 - Change of the format of TCAC advisories for aviation from text to graphic format.
120. The Committee was informed that all the five regional tropical cyclone (TC) committees held their annual/biennial sessions during 2012 of which the outcomes are highlighted as follows:
- a. The 39th session of the PTC was held in Nay Pyi Taw, Myanmar from 5 to 9 March 2012. It formulated the 2012 action plans for the Working Groups on Meteorology, Hydrology and Disaster Prevention/Preparedness, which included the regional assessment of climate change and tropical cyclones.
 - b. The 20th session of the RA I Tropical Cyclone Committee (TCC) was held in Maputo, Mozambique from 3 to 7 September 2012. The Committee carried out a complete reformation of its Technical Plan to make it more strategic. It also reconfirmed the full implementation of the new storm-naming procedures.
 - c. The 34th session of the RA IV Hurricane Committee was held in Ponte Vedra Beach, Florida, USA from 11 to 15 April 2012. The Committee re-established the backup arrangements for warning between the Members and decided to conduct an experiment in forecasting of storms before formation.
 - d. The 14th session of the RA V Tropical Cyclone Committee was held in Apia, Samoa from the 16 to 20 July 2012 in conjunction with the 3rd Meeting of the ICG/PTWS Regional Working Group on Tsunami Warning and Mitigation in the South-West Pacific Region (14 July).
121. For the capacity development in TC forecasting, TCP held a number of workshops and training events, in cooperation with the partner Programmes of WMO, including the RA IV Workshop on Hurricane Forecasting and Warning, and Public Weather Services which was held at RSMC Miami, Florida, USA, from 12 to 23 March 2012. It also organized attachment trainings jointly with the RSMCs Tokyo and New Delhi which invited experts of Philippines/Viet Nam and Bangladesh/Myanmar/Oman, respectively.
122. Having the report on the attachment training at RSMC Tokyo, the Committee considered it might be time to review the target of the training. WMO Secretariat showed that the main objectives of this training are twofold; 1) to transfer up-to-date knowledge and techniques to the forecasters and 2) to strengthen the linkage between the Members and RSMC. WMO also suggested that, considering the widening gap between the developed and developing Members of the Committee in recent years, the Committee may put a higher priority to developing countries as the target of the training to reduce the gap. The Committee advised TRCG to discuss this matter and report the results to the Committee at the next session.
123. The Committee noted with pleasure that the TC Forecaster Website was launched in January 2013 with the support of Hong Kong, China as host. The Website is aimed to assist forecasters in their operational forecasting of tropical cyclones. It will function as a portal to various websites offering data/products of TC analyses and forecasts

and will also provide research outcomes and training materials, thus serving as a comprehensive source of information for TC forecasters. The Committee also noted that the Global Guide to Tropical Cyclone Forecasting has been updated with Mr Chip Guard of Guam, USA as Chief Editor. The new Guide will be mainly Web-based for widespread access by forecasters and is expected to achieve synergetic effect with the TC Forecaster Website.

124. As a major part of its collaborations with other WMO Programmes, TCP has been working closely with the Global Data Processing and Forecasting System (GDPPFS) for Severe Weather Forecasting Demonstration Project (SWFDP) in the regions of Africa and South Pacific. The Committee noted with pleasure that SWFDP for the South-east Asia is expected to be fully launched in 2013 with the SWFDP workshop for the Members of the Committee as well as the WMO/ESCAP Panel on Tropical Cyclones, which is planned to be held in Macao, China from 8-19 April 2013.
125. Responding to some Members who expressed their expectation for active participation in the SWFDP of the Committee region, WMO Secretariat clarified that it had already been agreed by the Committee and WMO to closely collaborate with each other and, accordingly, the project outcomes would be fully shared by all the Committee Members.
126. Concerning the IWTC-8 to be held in the Republic of Korea in late 2014, the Committee recognized that it is highly desirable to be actively involved in and to benefit from the Workshop. Noting that the next TRCG Forum is to be held in November 2013 in Macao, China in conjunction with the Integrated Workshop, the Committee recommended to make necessary arrangement to take the occasion to liaise closely with IWTC-8 and, for this purpose, to send some experts of the Committee in the IWTC-8 International Organizing Committee as its members and also to encourage the Committee Members to participate in this important Workshop.
127. The Committee noted that, among the priority actions of TCP for 2013 and beyond such as organization of regional workshops and TC committees' sessions, the Programme will give its special emphasis on 1) maximizing the synergies of Tropical Cyclone Forecaster Website and the TCP websites Global Guide on Tropical Cyclone Forecasting and 2) streamlining the training courses and workshops.

XIV. SUPPORT REQUIRED FOR THE COMMITTEE'S PROGRAMME (agenda item 14)

14.1. Technical Cooperation

128. The Committee was informed of the technical cooperation activities of WMO in support of the programmes of the Typhoon Committee carried out in 2012, including the WMO Voluntary Cooperation Programme (VCP), Emergency Assistance Fund scheme and South-South Cooperation activities, and expressed its appreciation to WMO and collaborating partners for providing assistance to Members of the Typhoon Committee.
129. The Committee noted that, in 2012, China, Japan and the Republic of Korea made cash contributions to the Voluntary Cooperation Fund (VCP(F)). China; Hong Kong, China; Japan; Republic of Korea; and USA provided equipment, expert services, training and fellowships within the framework of the VCP Equipment and Services (VCP(ES)) Programme. The VCP(F) support was provided to support the requests for expert services for Cambodia and DPRK.
130. Following the floods caused by monsoon rains in August 2012, the Philippines requested WMO for emergency assistance for the restoration of damaged meteorological instruments and equipment at synoptic meteorological stations.

Assistance will be provided with the Emergency Assistance Fund and with support from VCP donors. Affected Members who need emergency assistance are advised to utilize this scheme, and all Members are requested to consider possible support to the affected NMHSs.

131. Within the framework of the south-south cooperation (or Technical Cooperation among Developing Countries (TCDC)), China organized the 41st and 42nd China Study Tour and a Workshop on Human Resources Development for NMHSs in Developing Countries in Africa in May and August 2012, respectively.
132. The Committee noted that TCS, together with the Secretariat of the PTC, submitted to the 7th round of funding of the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and South East Asian Countries, the project SSOP. This project was one of the six approved by the Advisory Council of the Fund, in a total of sixty-eight proposals for this round. Following recommendation of the 44th TC Session held in Hangzhou, on 06-11 February 2012, the Letter of Agreement was signed between ESCAP and TC on the 1st August 2012.

14.2. In-kind Contributions

133. The Committee expressed appreciation for the in-kind contributions from some Members, namely China; Hong Kong, China; Japan; Macao, China; Republic of Korea and Thailand. The Philippines will submit a report of their in-kind contributions. The Committee also invited the other Members to report their in-kind contributions, quantifying the corresponding values assigned that have expended in actions related to TCTF projects. (Appendix XXI).
134. The Committee discussed the need for Members to report personnel contributions in unit of man-months, for the Members to report their in-kind contribution in the same and consistent format.

14.3. Typhoon Committee Trust Fund (TCTF)

135. The Committee reviewed the statement of account of TCTF for the period of 1 January to 31 December 2011 and the provisional statement for 1 January to 31 December 2012 submitted by the representative of the WMO Secretariat as shown in Appendix XXII.
136. The Committee encouraged Members to submit contributions in as timely a manner as possible.
137. The Committee was informed by TCS, the summary of income and expenditure from 1 January to 31 December 2010, 2011 and the provisional summary of income and expenditure for 2012 related to the execution of the Work Plan 2012 (Appendix XXIII).
138. The Committee was informed by WMO Secretariat that TCS reporting on the TCTF expenditures has been done in a timely and effective manner. WMO expressed its appreciation to TCS for its adequate execution and reporting of the TCTF.

14.4. Approval of Typhoon Committee Trust Fund (TCTF) 2013

139. The Committee discussed the budget proposal for 2013. (Appendix XXIV)

14.4.1 2nd TRCG Forum at 8th Integrated Workshop (IWS)

140. The Committee took note the proposals by TRCG Chair as summarized in the Appendix XXV.

141. The Committee discussed the additional funding request from TRCG in the amount of USD 55,000 (Section 4.2 of the Appendix XXV).

XV. DATE AND PLACE OF THE 8TH IWS (agenda 15)

142. The Committee noted the offer of Macao, China in hosting the 8th IWS and the 2nd TRCG Forum in late November 2013.

XVI. DATE AND PLACE OF THE FORTY-SIXTH SESSION (agenda 16)

143. The Committee discussed to have a Joint Session with PTC, and expressed the need to have an effective arrangement in organizing a Joint Session so that the enhancement of the effectiveness and efficiencies achieved in the 45th Session are sustained.
144. The Committee noted and appreciated the offer in principle of Thailand to host the Forty Sixth Session, including the possibility a Joint Session with PTC in January 2014. The final dates will be confirmed in due course by Thailand and later communicated to TCS.

XVII. OTHER BUSINESS (agenda item 17)

145. The Committee noted that no other business to discussed.

XVIII. ADOPTION OF THE REPORT (agenda item 18)

146. The Committee adopted the report of the session at 11:33am 01 February 2013.

XIX. CLOSURE OF THE SESSION

147. The delegates from the Members of the Typhoon Committee, representatives of ESCAP, WMO and TCS and observers expressed their thanks and appreciation to the HKO for the successful hosting for organizing the Forty Fifth session of the Typhoon Committee. They also expressed gratitude to Mr. C.M. Shun, Director of HKO and his staff for the warm hospitality and excellent arrangements made and also for organizing a technical visit to Government Flying Service and Drainage Services Department.
148. The Session was closed by the Chairperson at 12:04 am, 01 February 2013.