

MEMBER REPORT

ESCAP/WMO Typhoon Committee
45th Session

26 – 29 November 2012
Nanjing, China

(Macao, China)

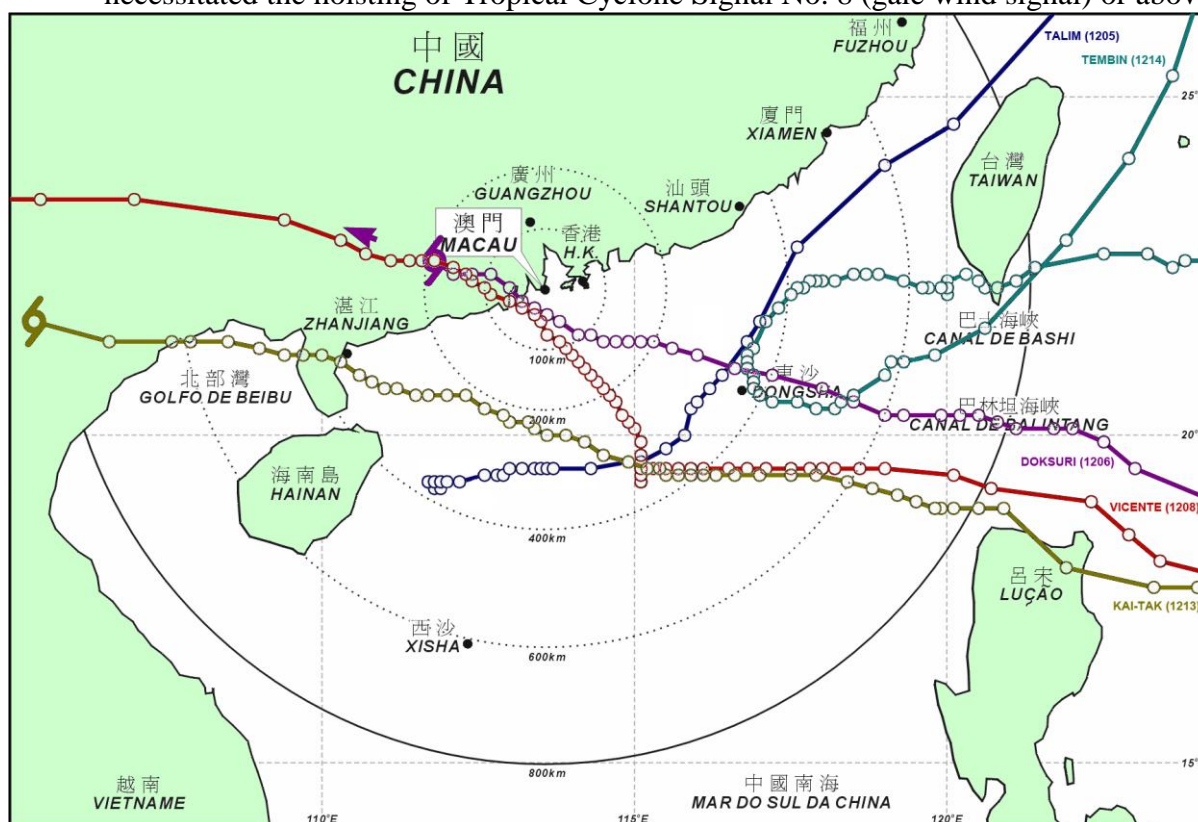
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I. Overview of tropical cyclones which have affected/impacted Member's area in 2012

1. Meteorological Assessment (highlighting forecasting issues/impacts)

Five tropical cyclones affected Macao in the calendar year of 2012, including Talim (1205), Doksuri (1206), Vicente (1208), Kai-tak (1213) and Tembin (1214) successively. This annual number of tropical cyclones was lower than the annual average of 6.0, while three of these tropical cyclones, Doksuri, Vicente and Kai-tak, necessitated the hoisting of Tropical Cyclone Signal No. 8 (gale wind signal) or above.



STS Talim(1205)

On 18 June 2012, a tropical depression intensified into a tropical storm to the east of the Hainan Province over the northern part of the South China Sea and was named Talim (1205). Talim moved eastwards steadily and was closest at about 300 km south of Macao at 04:00 L.T. on 19 June. On the same day, Talim intensified further into a severe tropical storm and turned gradually to move northeastwards towards Taiwan Strait. On 20 June, Talim weakened into a tropical storm. It crossed Taiwan Strait and entered the East China Sea in the early hours of 21 June. It then weakened into a tropical depression that morning. Finally, it weakened into an area of low pressure lately on the same day.

The highest signal being hoisted was No. 1 as moderate to fresh winds were recorded over Macao with strong winds on the bridges.

Date	Time*	Signal Hoisted
17/Jun	19:15	No.1
20/Jun	04:00	All signals lowered

TS Doksuri(1206)

On 27 June 2012, a tropical depression intensified into a tropical storm to the east of the Philippines over the Pacific Ocean and was named Doksuri (1206) moving west-northwestwards. After crossing the Balintang Channel on 28 June, Doksuri entered the 800km alert radius of Macao by 11 p.m. that night and moved west-northwestwards at around 30 km/h towards the Pearl River Delta. Doksuri was closest to Macao in the early hours of 30 June, passing by the waters around 35km south-southwest of Macao. Doksuri then made landfall near Zhuhai in the early morning. It weakened into a tropical depression and finally dissipated inland.

The highest signal being hoisted was No. 8 (gale wind signal) as strong to near gale winds were recorded over Macao with gale winds on the bridges.

The Yellow Storm Surge Warning Signal was effective at 22:00 L.T. on 29 June and was cancelled at 06:30 L.T. on 30 June.

Date	Time*	Signal Hoisted
28/Jun	23:00	No.1
29/Jun	22:00	No.3
30/Jun	03:30	No.8SE
30/Jun	06:30	No.3
30/Jun	09:00	All signals lowered

Typhoon Vicente (1208)

On 21 July 2012, a tropical depression intensified into a tropical storm over the northern part of the South China Sea and was named Vicente (1208) moving westwards. It then intensified into a severe tropical storm on 23 July. Vicente further intensified into a typhoon that afternoon, moving northwestwards at about 15 km/h steadily towards the western coast of Guangdong province. Vicente was closest to Macao at 3 a.m. on 24 July, passing by the waters at about 40km south-southwest of Macao. Vicente then made landfall near Taishan city at 5 a.m. the same day. It weakened into a tropical depression and finally dissipated inland.

The highest signal being hoisted was No. 9 as gale to strong gale winds were recorded over Macao with Violent storm winds on the bridges. The recorded hourly average wind speed related to Vicente is highest since 1999.

The Yellow Storm Surge Warning Signal was effective at 00:30 L.T. on 24 July. The Red Storm Surge Warning Signal was effective at 02:15 L.T. and was cancelled at 06:30 L.T. on the same day. Water level of 1.04 m above the pavement was recorded within the Porto Interior district.

Date	Time*	Signal Hoisted
21/Jul	18:00	No.1
23 /Jul	06:30	No.3
23 /Jul	19:00	No.8NE
24 /Jul	02:15	No.9
24 /Jul	05:00	No.8SE

24 /Jul	09:30	No.3
24 /Jul	16:20	All signals lowered

Typhoon Kai-Tak (1213)

On 13 August 2012, a tropical depression intensified into a tropical storm to the east of the Philippines over the Pacific Ocean and was named Kai-Tak (1213) moving west-northwestwards steadily towards Luzon Island.

After crossing the Luzon Island on 15 August, Kai-Tak entered the 800km alert radius of Macao by 7 p.m. the same day. It then intensified into a severe tropical storm that night. It further intensified into a typhoon on 16 August moving west-northwesterly at about 23 km/h steadily towards the western coast of Guangdong province. Kai-Tak was closest to Macao at 3 a.m. on 17 August, passing by the waters at about 220km south-southwest of Macao. After crossing Leizhou Peninsula late on the same day, Kai-Tak then made landfall near the coast of China-Vietnam border that night. It weakened into a tropical depression and finally dissipated inland.

The highest signal being hoisted was No. 8 as fresh to strong winds were recorded over Macao with gale winds on the bridges.

The Red Storm Surge Warning Signal was effective at 05:00 L.T. on 17 August. The Yellow Storm Surge Warning Signal was effective at 09:30 L.T. and was cancelled at 12:30 L.T. on the same day. Water level of 0.18 m above the pavement was recorded within the Porto Interior district.

Date	Time*	Signal Hoisted
15/Aug	21:20	No.1
16/ Aug	16:30	No.3
17/ Aug	00:30	No.8SE
17/ Aug	09:30	No.3
17/ Aug	21:45	All signals lowered

Typhoon Tembin (1214)

On 19 August, a tropical depression intensified into a tropical storm to the east of the Philippines over the Pacific Ocean. It was named Tembin (1214) and became nearly stationary. It then intensified into a severe tropical storm on 20 August moving northwards. It further intensified into a typhoon that morning. On 22 August, Tembin turned gradually and moved westwards towards Southern part of Taiwan.

After entering the 800km alert radius of Macao at 4 a.m. on 24 August, Tembin crossed through the Southern part of Taiwan lately on the same day and entered the South China Sea. On 26 August, Tembin turned gradually to move southwards. On 27 August it then turned east-northeastwards gradually towards Bashi Channel while moving away from Macao. After crossing the Bashi Channel on 28 August, Tembin turned gradually to move north-northeastwards. It then weakened into a severe tropical storm that night. It further entered the East China Sea towards Korean Peninsula on 29 August. Finally, Tembin made landfall to the south of Republic of Korea on 30 August. It then weakened and became an extratropical cyclone lately on the same day.

The highest signal being hoisted during its passage was No. 1 since Tembin was relatively far away from Macao.

Date	Time*	Signal Hoisted
24/Aug	22:30	No.1
27 /Aug	18:15	All signals lowered

*All time mentioned above is local time

2. Hydrological Assessment (highlighting water-related issues/impact)

Nil.

3. Socio-Economic Assessment (highlighting socio-economic and DPP issues/impacts)

Macao was affected by 5 tropical cyclones in 2012, and witnessed its first signal 9 typhoon since the establishment of the Macao Special Administrative Region (MSAR) in 1999.

Vicente slammed and slashed the city with fierce rains and ferocious winds, during which about 237 cases of serious flooding, falling objects, electricity supply disruption, as well as tottering bamboo scaffolding were reported. Meanwhile, several people were injured and a total of 52 people took refuge in typhoon shelters.

Comparing with Vicente, the other 4 tropical cyclones imposed relatively minor impacts on Macao.

Date/Time		Name	The Highest Signal Hoisted	Incidents (cases)							
Start	End			Flooding	Landslide	Felled Trees	Billboards/ Awnings/ Windows/ Walls (Collapsed/ Tottering)	Scaffoldings/ Fencings/ Crane (Collapsed/ Tottering)	Power cables/ Lampposts (Collapsed/ Tottering)	Death / Injuries	Others
17-06-12 19H15	20-06-12 04H00	TALIM (1205)	1	0	0	0	1	0	0	0	0
28-06-12 23H00	30-06-12 09H00	DOKSURI (1206)	8	0	0	0	0	0	0	0	0
21-07-12 18H00	24-07-12 16H20	VICENTE (1208)	9	10	0	65	109	18	14	3	18
15-08-12 21H20	17-08-12 21H45	KAI-TAK (1213)	8	0	0	0	3	0	0	0	2
24-08-12 22H30	27-08-12 18H15	TEMBIN (1214)	1	0	0	0	0	0	0	0	0

Table 1: Damages caused by tropical cyclones in Macao during 2012

Three rainstorm warnings were also issued in 2012. Referring to the damages demonstrated in Table 2, no serious damage was reported in Macao.

Date	Duration	Incidents (cases)									
		Flooding	Felled Trees	Buildings collapsed/Concrete spalling	Billboards collapsed or tottering	Scaffoldings collapsed or tottering	Windows collapsed or tottering	Awnings collapsed or tottering	Landslide	Deaths / Injuries	Others
16-04-12	18H20-20H00	0	1	0	0	0	0	0	0	0	1
25-07-12	03H10-05H00	2	1	0	0	0	0	0	1	0	2
10-08-12	14H30-15H15	1	0	0	0	0	0	0	0	0	0

Table 2: Damages caused by rainstorms during 2012

4. Regional Cooperation Assessment (highlighting regional cooperation successes and challenges)

Nil.

II. Summary of progress in Key Result Areas (For achievements/results which apply to more than one Key Result Area, please describe them under the most applicable Key Result Area. Then, at the end of the description, place in parentheses () the other applicable Key Result Areas)

1. Progress on Key Result Area 1: Reduced Loss of Life from Typhoon-related Disasters. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

- a. Meteorological Achievements/Results

For the World Meteorological Day 2012, roving lectures were held between March and May in many colleges in Macao and the topic covered the general knowledge of tropical cyclone. Over 9000 students from about 30 schools participated in these lectures. These roving lectures do not only help students understand more about meteorology and tropical cyclone, but also the effects induced by typhoon-related disasters.

- b. Hydrological Achievements/Results

Nil.

- c. Disaster Prevention and Preparedness Achievements/Results

According to Land, Public Works and Transport Bureau (DSSOPT), inspection of slopes was conducted ahead of rainy season. In 2012, the number of high risk slopes is reduced from 11 to 9. Although those slopes do not pose immediate danger to the public, the Bureau will continue to monitor them to ensure that they remain in stable condition.

Distribution of slopes in Macao according to the landslide risk level (last updated on 8 March 2012)

	High Risk	Medium Risk	Low Risk	Total
Macao Peninsula	3	25	50	78
Taipa	2	18	32	52
Coloane	4	21	35	60
Total	9	64	117	190

Meanwhile, DSSOPT has already completed reinforcement and related works on 17 slopes.



The Bureau is also responsible for the inspection of dilapidated buildings in Macao. Since January 2011, DSSOPT has dealt with a total of 26 cases of buildings which are in a state of poor maintenance or in danger of ruin. It also conducted a survey of 39 cases leading to a report to the owners of buildings, urging them to either demolish or to repair the building concerned.



Regarding the prevention of death and serious injury from falling trees and branches, Civic and Municipal Affairs Bureau (IACM) carries out regular inspection in order to detect the diseases affecting the trees and remove those which are deemed

dangerous. Moreover, the Bureau has developed the trees management and maintenance system aiming to register all the trees in Macao and integrate the data into the management of its daily works.

Aside from the removal of dangerous trees, the Bureau has also strengthened the control of illegal installation of business and advertising signs and removed over 2,600 signboards that were considered “potentially dangerous” since 2009. Moreover, the Bureau has appealed to the owners of commercial establishments to make sure their placards, screens and racks are placed with the necessary safety conditions.



d. Research, Training, and Other Achievements/Results

SMG participated in the APEC Typhoon Symposium (APTS) and ACTS Working Group (ACTSWG) Meeting from 4th to 7th June 2012 held in Taipei. The symposium encompasses three topics: Typhoon & Heavy Rain, Hazard and Disaster, and Social-Economic Impacts. The symposium offers a platform for dialogue and exchange of information among Meteorological experts from various countries, which helped the participants-widen their knowledge in facing typhoons and heavy rainfall, as well as other destructive impacts.

One forecaster participated in the International Training Course on Nowcasting held at WMO Regional Training Centre Beijing, China from 3rd to 14th September 2012, which is designed to help trainees-learn the nowcasting methods, improve the short-term and strong convective weather forecasting ability. During the course, a study about mini-supercells, or low-topped supercells inside the rainband of Hurricane Katrina was shown.

One forecaster participated in the TC Roving Seminar 2012 in South Korea from 30th Oct to 1st November 2012, focusing on the topics of landfall impact and damage assessment, early warning on landslides induced by typhoon heavy rainfall and utilization of NWP products for operational forecasting of tropical cyclone high impact weather.

e. Regional Cooperation Achievements/Results

Nil.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

2. Progress on Key Result Area 2: Minimized Typhoon-related Social and Economic Impacts. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

a. Meteorological Achievements/Results

While obtaining satisfactory results for the “SMS alerting service for flooding” in 2011, the Macao Meteorological and Geophysical Bureau (SMG) launched more detailed early warning information for typhoon to meet the public requirement in 2012.

Due to the improvement of tropical cyclone forecast technology and experience accumulation, the track forecast of tropical cyclone becomes more accurate. Therefore, detailed warning information for typhoon becomes possible. The new information, the possibility of typhoon signal change and relevant time will be released to public. This information will help the public arrange in advance their planning and minimize the typhoon-related social and economic impacts.

b. Hydrological Achievements/Results

Nil.

c. Disaster Prevention and Preparedness Achievements/Results

In order to solve the flooding problems in old districts and low-lying landscapes, IACM has not only strengthened the cleaning up of sewers, but also reconstructed the aging sewers and constructed pumping stations aiming to enhance the drainage capacity. Furthermore, IACM is doing preparatory work for the construction of an embankment in the Inner Harbour, where is one of the flooding blackspots in Macao. The Bureau believed that Macao’s flooding problem can be solved after all the said projects are completed.



Reconstructing the aging sewers

d. Research, Training, and Other Achievements/Results

Nil.

e. Regional Cooperation Achievements/Results

With the cooperation agreement signed between Zhuhai Meteorological Bureau (ZMB) and SMG, the construction of a new dual-polarization S-band Doppler weather radar station has begun since 28 September 2012 in Zhuhai, China. This new Doppler weather radar will provide high quality meteorological product to improve the ability of weather nowcasting.

On the other hand, the sharing of weather and radar data among Guangdong, Hong Kong and Macau will be carried on and enhanced in order to strengthen the development of numerical forecasting as well as the ability of weather nowcasting in the region.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

3. Progress on Key Result Area 3: Enhanced Beneficial Typhoon-related Effects for the Betterment of Quality of life. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

a. Meteorological Achievements/Results

Nil.

b. Hydrological Achievements/Results

Nil.

c. Disaster Prevention and Preparedness Achievements/Results

Nil

d. Research, Training, and Other Achievements/Results

Nil.

e. Regional Cooperation Achievements/Results

Nil.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

4. Progress on Key Result Area 4: Improved Typhoon-related Disaster Risk Management in Various Sectors. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

a. Meteorological Achievements/Results

Please refer to Key Result Area 2(a).

b. Hydrological Achievements/Results

Nil.

c. Disaster Prevention and Preparedness Achievements/Results

Macao Security Forces Coordination Office staged an annual typhoon drill at the Civil Defence Centre in April, shortly before the typhoon season begins in May. The drill which simulated the hoisting of typhoon signal No. 8 involved more than 1,501 participants from 27 public and private entities, aiming to test the Civil Protection System's coordination and communication.



A conference was then held to review the drill and seeks suggestions from members of Civil Protection System on how to sharpen the emergency response of the entire System as well as to update the General Plan of Civil Protection.



- d. Research, Training, and Other Achievements/Results
Nil.
- e. Regional Cooperation Achievements/Results
Nil.
- f. Identified Opportunities/Challenges for Future Achievements/Results
Nil.
- 5. Progress on Key Result Area 5: Strengthened Resilience of Communities to Typhoon-related Disasters. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)
 - a. Meteorological Achievements/Results
Nil.
 - b. Hydrological Achievements/Results
Nil.
 - c. Disaster Prevention and Preparedness Achievements/Results

Aside from holding regular meetings with the community groups to discuss options and exchange opinions on how to improve Macao's flooding problems, government departments like IACM also organised functions and promotion campaigns to introduce their upcoming flooding mitigation projects. Moreover, government officials and policy makers visited flood affected areas, providing an avenue for the community to air their grievances and sentiments.



d. Research, Training, and Other Achievements/Results

Nil.

e. Regional Cooperation Achievements/Results

Nil.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

6. Progress on Key Result Area 6: Improved Capacity to Generate and Provide Accurate, Timely, and understandable Information on Typhoon-related Threats. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

a. Meteorological Achievements/Results

Nil.

b. Hydrological Achievements/Results

The workshop on “Application of Space Technology to Enhance the Activities of Typhoon Committee” was held from 27 February to 2 March 2012 in Macao, organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the World Meteorological Organization (WMO) and the

ESCAP/WMO Typhoon Committee Secretariat (TCS). The workshop was financially supported by the Japan Space Exploration Agency (JAXA) and hosted by the Macao Meteorological and Geophysical Bureau.

The objective of the workshop is to enhance the capacity of water-related disaster management through a technical training on space applications. GIS-based disaster risk management tools, the progress of establishing the “disaster warning system” and other space application methods were introduced during the workshop, in addition to the revision of the progress and implementation of the comprehensive research project on Urban Flood Risk Management (UFRM).

c. Disaster Prevention and Preparedness Achievements/Results

Macao Security Forces Coordination Office has been keen on promoting public awareness on disaster prevention for the purpose of saving lives and reducing its impacts. Since the disaster prevention brochures as well as the video clips have been used for nearly a decade, hence the Office decided to redesign the whole series of brochures and video clips and planned to release the new series in 2013.



d. Research, Training, and Other Achievements/Results

Nil.

e. Regional Cooperation Achievements/Results

Please refer to Key Result Area 2(e).

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

7. Progress on Key Result Area 7: Enhanced Typhoon Committee’s Effectiveness and International Collaboration. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)

a. Meteorological Achievements/Results

Nil.

b. Hydrological Achievements/Results

Please refer to Key Result Area 6(b).

c. Disaster Prevention and Preparedness Achievements/Results

In 2012, Macao Security Forces Coordination Office continued to participate actively in the meetings organised by Typhoon Committee (TC) as well as the TC Working Groups. These include:

- 6 to 11 February 2012, 44th Session of Typhoon Committee
- 30 to 31 May 2012, 7th Meeting of WGDRR
- 26 to 30 November 2012, 7th Integrated Workshop



d. Research, Training, and Other Achievements/Results

Nil.

e. Regional Cooperation Achievements/Results

Nil.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil.

III. Resource Mobilization Activities

Nil.

IV. Others

Macao SAR Government continues contributing the Endowment Fund to support the operation of Typhoon Committee Secretary through 2014.

V. Update of Members' Working Groups representatives

1. Working Group on Meteorology

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5. Resource Mobilization Group

Nil.