Supplementary Forecast of Seasonal Tropical Cyclone Activity Northwest Pacific Ocean and South China Sea | June 2026

I. Forecasting Results

It is forecasted that in 2026, the genesis frequency of tropical storms (TS) over the Northwest Pacific and the South China Sea will below normal to near normal LTCA (Long-Term Climate Average), approximately 23–25 in total. The number of TS making landfall in China will be near the LTCA, approximately 6–8.

The frequency of TC that affecting China in 2026 is forecasted to be at the LTCA, approximately 12–14 in total. The frequency of TC affecting South China is normal to below normal than LTCA, approximately 7-9. The frequency of TC affecting East China are above normal to near normal than LTCA, approximately 9-11; while the frequency of TC affecting areas in the vicinity of Shanghai is close to the LTCA (approximately 2). Particular attention should be paid to the possibility of potential extreme TCs with compound hazards of wind, precipitation and storm surge.

Table 1. Seasonal forecast of TC activity in 2026

	Event Genesis	Landfall	TC Affecting China (see Notes 1-2)			
	(>=TS)	(>=TS)	Countrywide	South	East	Shanghai
1991-2020 EV ± SD	25±4.5	7±1.9	13.0±3.6	9.0±3.5	9.5±3.3	2.0±1.5
March 2026 Forecast	23-25	6-8	12-14	9-11	9-11	~2
June 2026 Forecast	23-25	6-8	12-14	7-9	9-11	~2

II. Basis for forecasting

1. Observed Tropical Cyclone Activity

As of the end of June 2026, eight TCs have formed over the water east of the Philippines (Figure 1), significantly exceeding the 1991–2020 LTCA of 4.3 TCs. In contrast, the number of TCs generated over the South China Sea has been below normal compares to the 1991-2020 LTCA at 1 TC per year. These are closely linked to the prevailing conditions in the tropical Pacific Ocean since the beginning of 2026.

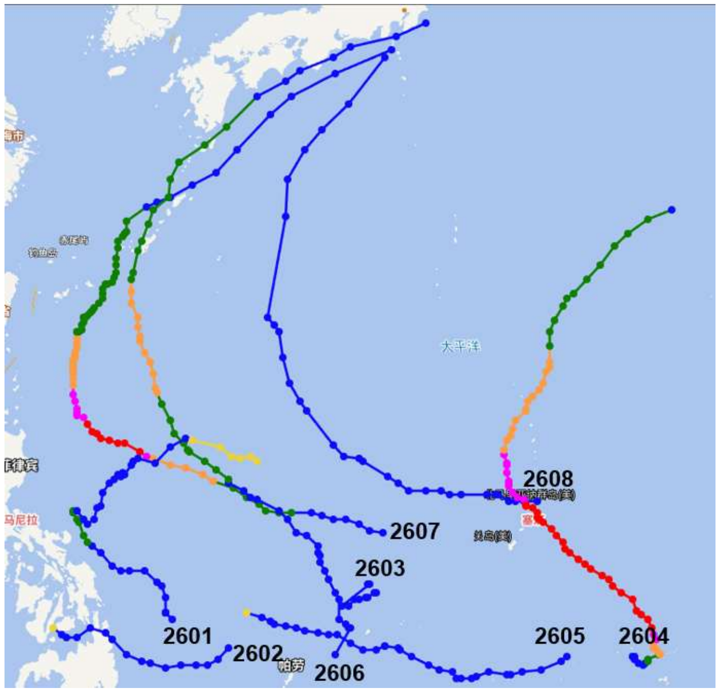

Figure 1. Eight Tropical Cyclones Formed over the Northwest Pacific as of June 2026

2. Ocean Atmosphere Conditions and Outlook

Monitoring indicates that the Niño 3.4 SST index has turned positive and exceeded +0.5°C in May. Positive SST anomalies extend across the central and eastern equatorial Pacific, while the tropical western Pacific exhibits only mild positive SST anomalies (Figure 2). Correspondingly, convective activity has been enhanced over the water eastern of the Philippines, while suppressed over the South China Sea and the Philippines (Figure 2). In terms of the regional circulation, a pronounced low-level cyclonic circulation anomaly has been observed over the eastern region of the Philippines (Figure 3), creating favorable conditions for TC genesis.

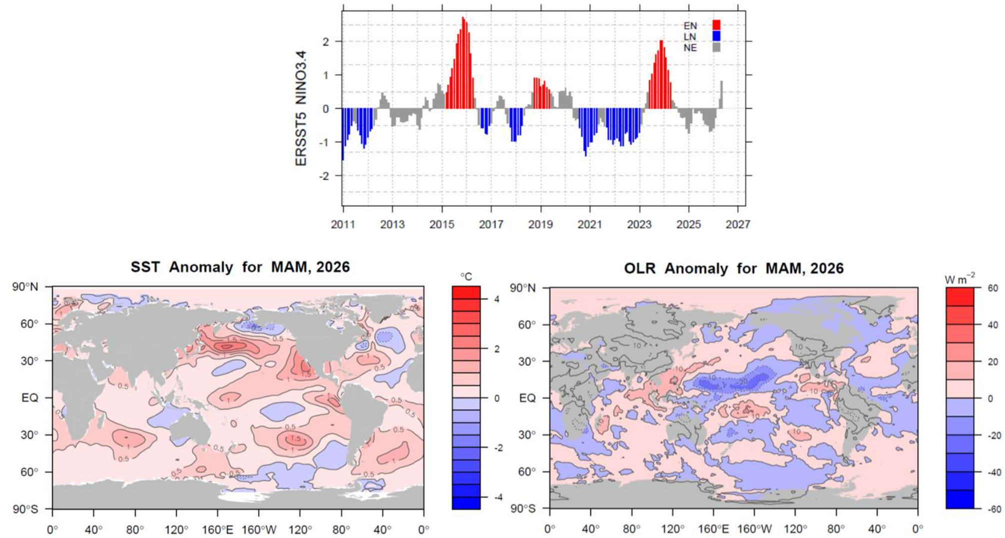

Figure 2. Evolution of the Niño 3.4 SST Index (top panel), and Distributions of SST Anomalies (bottom left) and OLR Anomalies (bottom right) during Spring (March–May, MAM) 2026

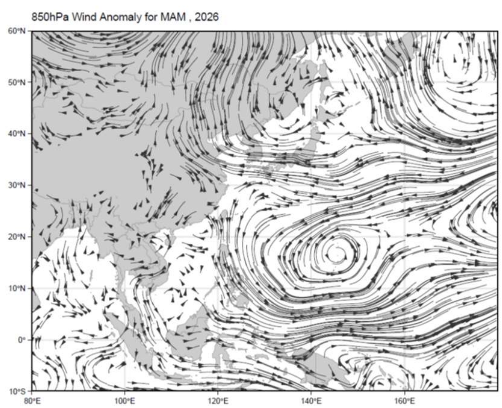

Figure 3. Distribution of 850-hPa Circulation Anomalies during Spring 2026

Forecasts from major domestic and international climate centres indicate that El Niño event is likely to continue develop and strengthen (Figure 4), potentially evolving into a moderate-to-strong El Niño event during the autumn and winter seasons. According to dynamic model forecasts from NCEP (Figure 5) and ECMWF (figure not shown), positive geopotential height anomalies are forecasted along the coast of China from midsummer to early autumn. These positive anomalies are forecasted to strengthen and expand eastward, and this positive geopotential height anomalies are unfavourable for TC activity. ECMWF forecasts suggest that the frequencies of TS and TY in the second half of the year will be lower than the LTCA.

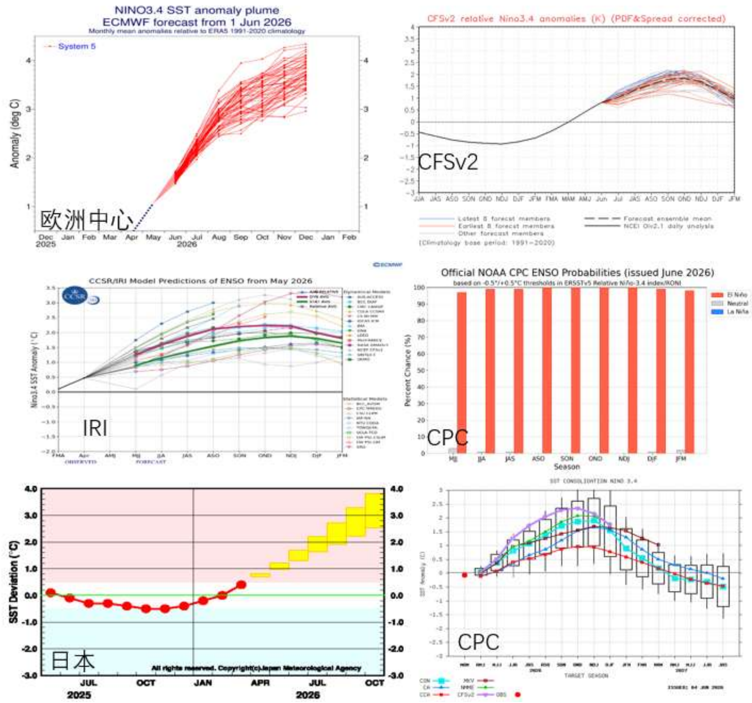

Figure 4. Forecasts of Niño-3.4 SST Anomalies for 2026 from Major Domestic and International Climate Centres

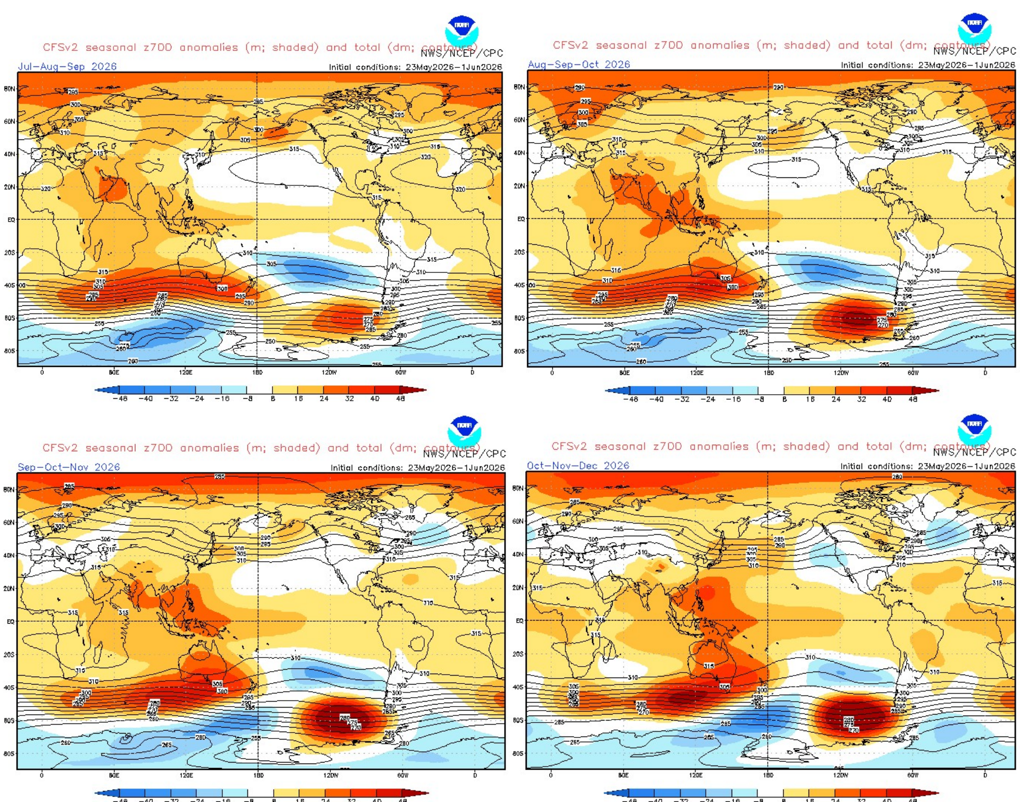

Figure 5. Seasonal 700hPa Geopotential Height Anomalies Forecast by NCEP CFSv2

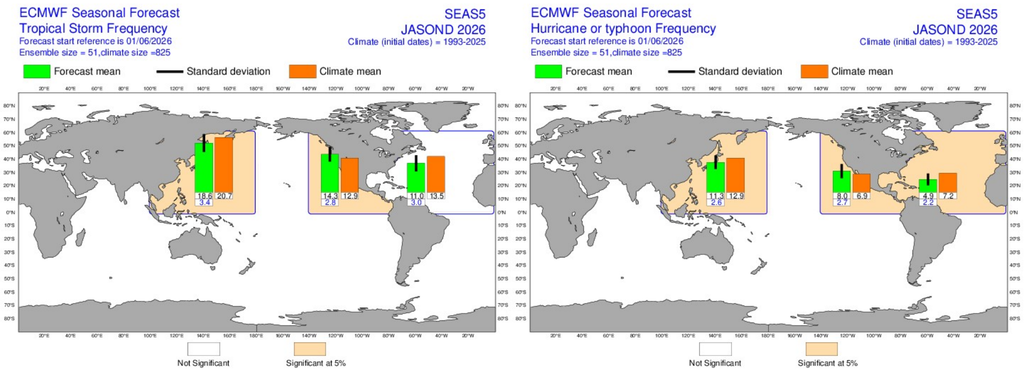

Figure 6. ECMWF Forecast of TS and TY Frequencies over the Northwest Pacific

3. ENSO Evolution and Tropical Cyclone Activity in Historical Analogue Years

An analogue analysis utilizing four Niño-region indices over the preceding 12 months, seven analogue years were identified: 1953, 1993, 1997, 2002, 2012, 2017, and 2025 (Figure 7). Among these analogue years, strong El Niño events developed in 1997 and 2002. In contrast, positive SST anomalies in the Niño 3.4 region remained modest in 1953, 1993, and 2012, corresponding to ENSO-neutral conditions, while in 2017 and 2025 it subsequently developed into La Niña events.

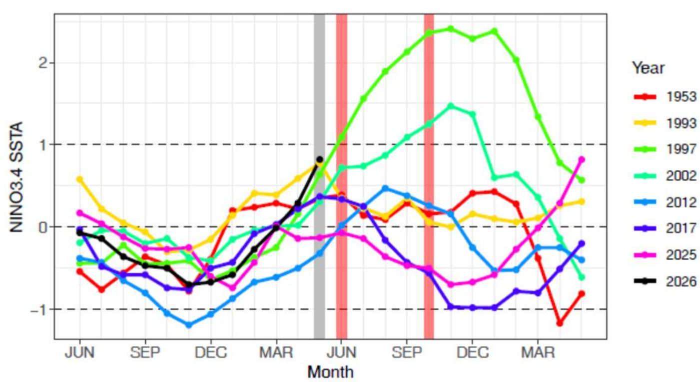

Figure 7. Evolution of the Niño-3.4 SST Index in Seven Analogue Years

The composite distributions of seasonal circulation anomalous for 1997 and 2002 (Figure 8) indicate a extensive cyclonic circulation anomaly persistent over the water eastern of the Philippines. At the same time, an anomalous anticyclonic circulation developed over the Philippines and gradually expanded eastward to around 140°E. Such a circulation pattern is generally unfavourable for TCs affecting China.

Therefore, the characteristics of TC activity in 1997 and 2002 were highly representative (Table 2): In both years, the genesis of TS over the Northwest Pacific and the South China Sea was slightly above the LTCA, the frequencies of STY were above the LTCA. However, the frequencies of TS making landfall in China was below the LTCA, and the frequencies of TC affecting China and specific sub-regions were all below the LTCA.

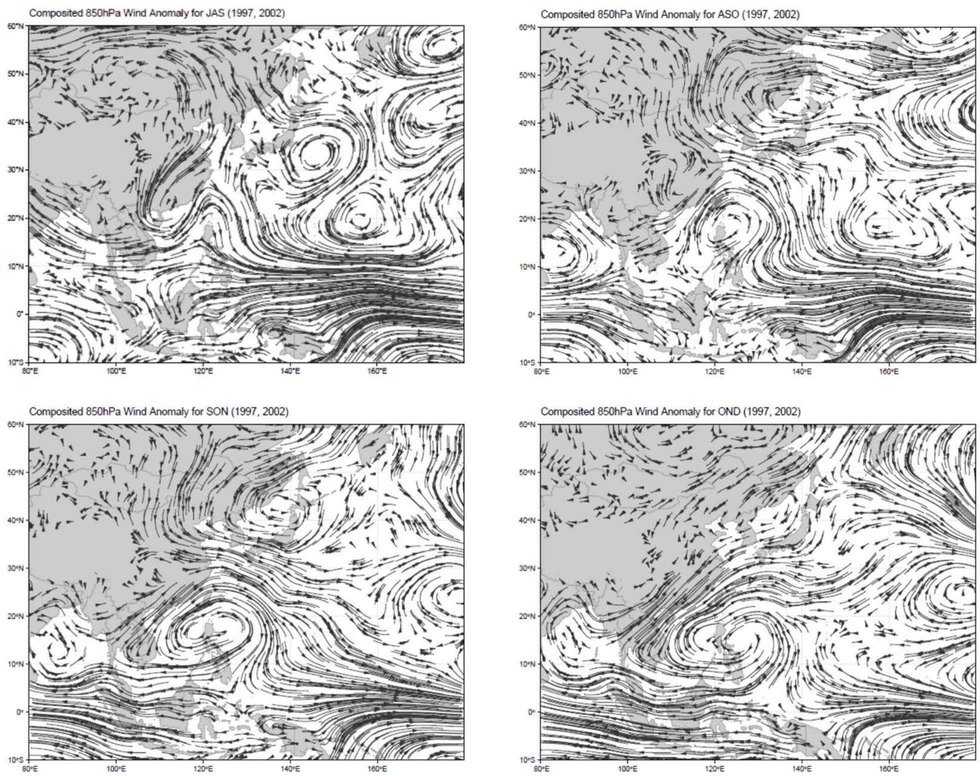

Figure 8. Composite Seasonal Circulation Anomalous for Two Analogous Years that Evolved into El Niño Events (JAS: July–September; ASO: August–October; SON: September–November; OND: October–December)

ENSO Evolution	Analogous Years	TS Cyclogenesis	STY	TS landing	Impact Countrywide	Impact South China	Impact East China	Impact Shanghai
Develop into EN	1997	26	14	4	8	4	6	1
	2002	26	13	5	10	6	7	1

Table 2. TC Activity Statistics for Two Analogous Years that Developed into El Niño Events

Comparison between the circulation patterns of the analogue years and the dynamical model forecasts indicates that the projected seasonal circulation over the tropical regions during the second half of 2026 is broadly consistent with that observed in the analogue years. However, substantial differences remain in the extratropical region characteristics. These discrepancies may result in TC activity during the year deviating from the analogue years.

III. Objective Methods and Regional Model Forecast Results

1. Deterministic Forecasts Based on Statistical Models

Statistical forecasts were produced based on regression models constructed using ocean–atmosphere environmental fields that exhibit strong correlations with the predictand. The forecast results are summarized in Table 3. Specifically, in 2026, the frequency of TS genesis is projected to be slightly below the LTCA, while the frequency of TS landfalls is projected to remain near the LTCA. The frequency of TC affecting overall China and East China is projected to be near or above the LTCA, whereas the frequency of TC affecting South China is projected to be near or below the LTCA. The frequency of TCs impacting Shanghai is projected to remain near the LTCA.

Table 3. Forecast results of annual tropical cyclone frequencies for 2026 based on Statistical model

			TC Affecting China (Notes 1-2)			
	TS Genesis	TS Landfall	Countrywide	South	East	Shanghai
1991-2020 EV ± SD	25±4.5	7±1.9	13.0±3.6	9.0±3.5	9.5±3.3	2.0±1.5
2026 Forecast (Regressive)	21.2/24.0	8.1/8.6	15.0	8.2	10.9	1.6

2. Hybrid Dynamic–Statistical Model Prediction

Using forecasts of sea surface temperature anomalies during spring-summer 2026, as well as the vertical wind shear and low-level vorticity from the NCEP/CFS system, combining with statistical models constructed on the basis of relationship between key regional factors and TS activity, a hybrid dynamic–statistical prediction is performed. Based on ensemble forecasts initialized in April, May, and June from the CFSv2 model, deterministic and probabilistic forecasts of TS genesis frequency and STY frequency were produced (Table 4). The results indicate that the frequency of TS generated during July–December 2026 is near to below the LTCA, while the frequency of STY genesis remains near the LTCA. The probabilistic forecasts (Figure 9) similarly indicate a comparatively elevated likelihood of TS genesis frequency that is above the LTCA, whereas the frequency of STY genesis is likely to remain near the LTCA in 2026.

Table 4. Ensemble forecast results for 2026 based on the hybrid dynamic–statistical model

2026 Forecast	Reporting Month	Apr	May	Jun	1991-2020 EV ± SD
TS Genesis	Whole year	24.9	26.1	26.1	25±4.5
	Jul - Dec	18.9	20.1	20.1	21±4.5
STY Genesis	Whole year	7.1	9.6	9.6	9.5±3.5
	Jul - Dec	6.1	8.6	8.6	8.3±3.4

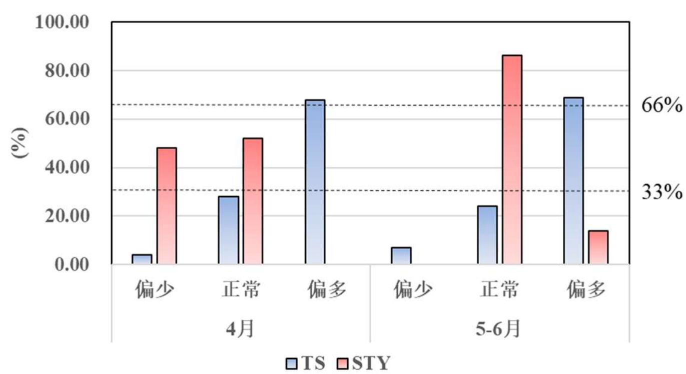

Figure 9. Probabilistic forecasts of the annual frequency of (a) TS and (b) STY over the Northwest Pacific and the South China Sea in 2026, based on the hybrid dynamic–statistical model. The horizontal axis indicates the forecast initialization month.

3. Forecast Results of Dynamical Downscaling Model (iRAM2)

Driven by five CFSv2 forecast fields (initialized at 00:00 UTC on 1, 3, 5, 7, and 9 June 2026) are adopted as boundary conditions, ensemble forecasts were conducted using the regional model iRAM2, with individual ensemble members denoted as E1–E4. The forecasts were initialized at 00:00 UTC on 14 June 2026. The forecasts from each ensemble member and the ensemble mean are summarized in Table 5. The ensemble-mean indicates that 23 TSs genesis during July–December. Given that this forecasting approach typically exhibits a positive bias of approximately 3–4 TSs relative to observations, the actual TS genesis frequency is expected to be near normal, compared with the LTCA of 21 TSs for the 1991–2020 climatological period average.

Table 5. July–December TS genesis frequency forecasts based on the iRAM2 dynamical downscaling regional model

Members	E1	E2	E3	E4	Mean	LTCA
TS Frequency	26	18	23	25	23	21

IV. Assessment of Tropical Cyclone Impacts

As discussed above, based on the influence of the ENSO on TC activity, two analogue years (1997 and 2002) were identified as years in which El Niño conditions developed during the latter part of the year. As shown in Figure 10, both analogue years experienced severe losses from typhoon-related disasters. Particularly, 1997 was characterized by exceptionally high losses from individual typhoon events. The ratio of direct economic losses to GDP ranked third among all years during 1984–2024, while the average direct economic loss per typhoon ranked sixth over the same 41-year period.

Typhoon 9711, *Winnie*, caused especially impacts. When Winnie made landfall along the Zhejiang coast, its central pressure was 960 hPa, with maximum wind speed near the centre reaching 40 m/s (exceeding Beaufort wind scale 12 strength). The typhoon was characterized by intense winds, extensive geographical impacts, and extreme rainfall. Its landfall coincided with the period of astronomical high tide, and water levels at multiple coastal tide stations exceeded historical records. As a result, more than ten provinces, including Zhejiang, Fujian, Shanghai, Jiangsu, Anhui, Shandong, Henan, Hebei, Tianjin, Liaoning, and Jilin, were affected to varying degrees. Typhoon *Winnie* impacted 25.82 million people, caused 248 fatalities, affected farmland totalled 7.1586 million hectares, 476,200 houses collapsed, and resulted in direct economic losses of RMB 43.63 billion [Note: 3]. Zhejiang, Jiangsu, and Shandong provinces suffered the most severe losses.

Typhoon 0216, *Sinlaku*, made landfall along the Zhejiang coast with a minimum central pressure of 965 hPa and maximum wind speed of 37 m/s near its centre. Owing to its heavy rainfall, extensive wind field, and strong winds while coincided with the occurrence of astronomical high tide, it caused a concurrence of winds, rainfall, and surge impacts. The typhoon caused the collapse of 58,000 houses and direct economic losses of RMB 8.126 billion [Note: 3].

Based on the analysis of analogue years, attention should be paid to the potential occurrence of extreme TC associated with the simultaneous impacts of winds, rainfall, and storm surge. Preparedness efforts should focus on mitigating compound hazards, including destructive coastal winds, storm surges, extreme precipitation, and localized torrential rainfall that may trigger flooding and related secondary disasters.

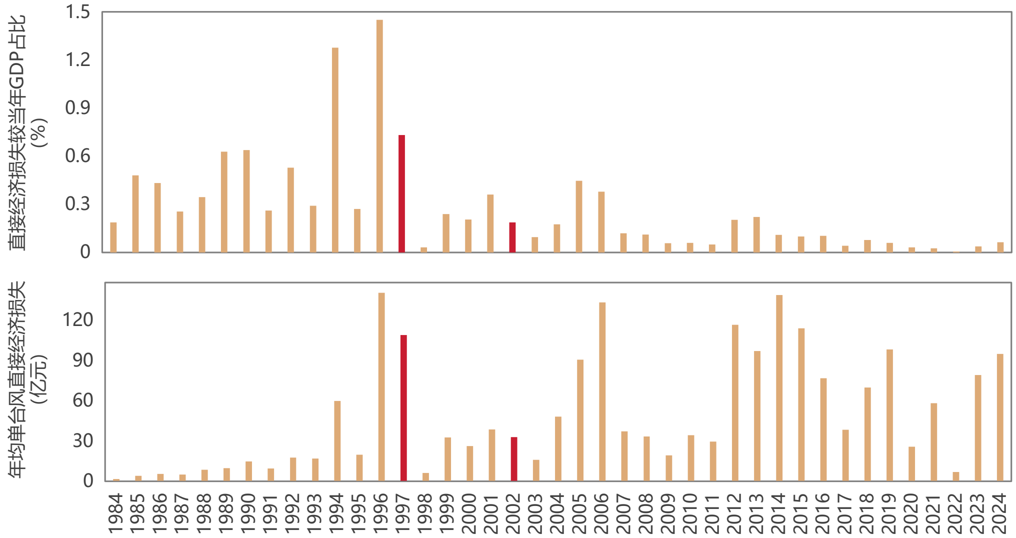

Figure 10. Changes in China's Typhoon Direct Economic Losses as a Percentage of GDP and Average Loss per Typhoon, 1984–2024

V. Summary

In conclusion, as of the end of June 2026, the probability of the tropical Pacific developing into an El Niño event has become extremely high, and the anomalous cyclonic circulation over the tropical Pacific has already exhibited typical El Niño signatures. Considering the evolving ocean–atmosphere system together with the forecast from objective approaches, the frequency of TS genesis over the Northwest Pacific and the South China Sea in 2026 is forecasted to be near to below the LTCA, while the frequency of TS landfalls in China is forecasted to remain close to the LTCA The frequency of TC affecting overall China is also forecasted to be near the LTCA. TC activity affecting South China is forecasted to be near or below the LTCA, whereas that affecting East China is forecasted to be near or above the LTCA. The number of TC activity in the vicinity of Shanghai remains projected close to the LTCA.

Based on the analysis of analogue years, attention should be paid to the potential occurrence of extreme TC events with compound impacts of winds, precipitation, and storm surge. Preparedness efforts should focus on mitigating compound hazards, including coastal extreme wind gust and storm surges, as well as flooding and secondary disasters triggered by extreme rainfall and localized torrential rainfall.

Notes:

1. A TC that causes significant impacts is defined as a TC meeting any one of the following criteria:
   (1) At least one station within the region records cumulative precipitation of 50 mm or more during the event; or
   (2) At least one station within the region records sustain wind speeds of Beaufort force 7 or higher, or gusts of Beaufort force 8 or higher; or
   (3) At least one station within the region records cumulative precipitation of 30 mm or more during the event, in conjunction with sustain wind speeds of Beaufort force 6 or higher or gusts of Beaufort force 7 or higher.

2. The South China region refers to Guangdong, Guangxi, and Hainan Provinces. The East China region refers to Fujian, Jiangxi, Zhejiang, Anhui, Shanghai, Jiangsu and Shandong.

3. Data Source: Shanghai Typhoon Institute (STI)

4. This document is a free translation of the Chinese report. In case of any discrepancy or ambiguity, the Chinese version shall prevail. For further clarification, please refer to the Chinese report or contact Peak Re staff (Kun Cheng).