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Macao
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FOR PARTICIPANTS ONLY
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ENGLISH ONLY

REVIEW OF THE 2022 TYPHOON SEASON

(submitted by the RSMC Tokyo – Typhoon Center)

Action Proposed

The Committee is invited to review the 2022 typhoon season.

APPENDIXES:

- A) DRAFT TEXT FOR INCLUSION IN SESSION REPORT
- B) Review of the 2022 Typhoon Season

APPENDIX A:
DRAFT TEXT FOR INCLUSION IN THE SESSION REPORT

x.x. Summary of typhoon season in Typhoon Committee region

- 1 The Committee noted with appreciation the review of the 2022 typhoon season provided by the RSMC Tokyo in **Appendix XX**, for which a summary is presented in paragraph **xx(2)** – **xx(12)**.
- 2 Over the western North Pacific and the South China Sea, 25 named tropical cyclones (TCs) formed in 2022 – almost the same as the 30-year average of 25.1 (1991 – 2020). Ten of these reached typhoon (TY) intensity, which was below the 30-year average of 13.3. A total of 12 formed during the peak period from August to September (above the average of 10.7), while only 6 formed from January to July (less than the average of 7.8), due to suppressed convection over the area where TCs frequently form, in association with a persistent La Niña event. The negative phase of the Indian Ocean Dipole (IOD) may also have contributed to suppressed convection, particularly from June to July.
- 3 The 2022 typhoon season started with Malakas (2201), which formed over the sea around the Chuuk Islands at 06 UTC on 6 April and became the first TC to reach TY intensity in the western North Pacific. It reached peak intensity with maximum sustained winds of 90 kt and a central pressure of 945 hPa over the sea east of the Philippines at 18 UTC on 13 April.
- 4 The mean genesis point of named TCs was 19.3°N and 135.8°E, representing a northward deviation from the 30-year average (16.3°N and 135.9°E). The mean genesis point of named TCs in summer (June to August) was 21.8°N and 132.1°E, with a north-westward deviation from the 30-year summer average (18.5°N and 134.2°E), and that of named TCs in autumn (September to November) was 19.4°N and 139.1°E, representing a north-eastward deviation from the 30-year autumn average (16.2°N and 137.0°E). The clear northward shift of the mean genesis point throughout the year is partly due to the persistent La Niña event and to the intrusion of high potential vorticity from higher latitudes over the area from the central Pacific to the sea south of Japan.
- 5 The mean duration of TCs with tropical storm (TS) intensity or higher was 3.7 days, which was shorter than the 30-year average of 5.2 days. The mean duration of TCs with TS intensity or higher in summer was 3.8 days, which was shorter than the average of 5.0 days, and that of TCs with TS intensity or higher in autumn was 3.8 days, which was shorter than the average of 5.4 days. The shorter-than-average duration in autumn is consistent with the results of statistical studies on the La Niña event.
- 6 Two named TCs formed in April. The first, Malakas (2201), formed as a tropical depression (TD) over the sea around the Chuuk Islands (here, TC locations are expressed as the area of TD formation unless otherwise noted) and further developed to typhoon (TY) intensity. Megi (2202) formed over the sea east of the Philippines. Although it did not intensify significantly, it caused flooding, landslides and other destructive effects in the Philippines.
- 7 Two named TCs formed in June. The first, Chaba (2203), formed over the South China Sea and hit the coast of southern China with TY intensity before transitioning into an extratropical cyclone over central China and bringing rain to wide areas of China, Macao China and Hong Kong China. Aere (2204), which formed over the sea east of the Philippines and made landfall on Japan's Nagasaki Prefecture with TS intensity, caused heavy rain, flooding and landslides over the Seto Inland Sea toward the Pacific Ocean even after transitioning into an extratropical cyclone.
- 8 Two named TCs formed in July. The first, Songda (2205) formed over the sea west of the Mariana Islands and dissipated over the Yellow Sea. Trases (2206) formed over the sea

south of Okinawa Island and weakened to TD intensity near the western coast of the Korean Peninsula.

- 9 Five named TCs formed in August. The first, Mulan (2207), formed over the sea south of Hainan Island and moved southeastward before taking a counterclockwise path and hitting the coast of Viet Nam with TS intensity and bringing heavy rain, strong wind and storm surges to partial areas of China, Macao China, Lao PDR, Thailand and Viet Nam. Meari (2208) formed over the sea west of Minamitorishima Island and made landfall on Japan's Izu Peninsula after passing around Omaezaki in Shizuoka Prefecture with TS intensity. Maon (2209) formed over the sea east of the Philippines and reached severe tropical storm (STS) intensity before crossing the northern part of Luzon Island, and further hit southern China with STS intensity. Many Typhoon Committee Members in the western North Pacific (WNP) region were affected by this TC and its after-effects. Both Tokage (2210) and Hinnamnor (2211) formed over the sea around Minamitorishima Island. Tokage reached TY intensity over the sea east of Japan, and after accelerating east-northeastward crossed longitude 180°E. Hinnamnor reached peak intensity with maximum sustained winds of 105 kt (a tied record for 2022), bringing torrential rain and wind to a wide area of the WNP region.
- 10 Seven named TCs formed in September. The first, Muifa (2212), formed over the sea east of the Ogasawara Islands and developed to TY intensity over the sea south of Okinawa Island. After a slight weakening, it redeveloped and hit the coast line of central China. Merbok (2213) formed over the sea southeast of Minamitorishima Island, and after reaching TY intensity transitioned into an extratropical cyclone and crossed longitude 180°E over the Bering Sea. Nanmadol (2214), one of the strongest TCs of the season, formed over the sea south of Japan, reached TY intensity and made landfall on Japan's Kyushu region, resulting in extensive rain in Japan and Korea. Talas (2215) formed over the Ogasawara Islands and moved over the sea from the south to the east of Honshu Island. Noru (2216) formed over the sea east of the Philippines and crossed Luzon Island with TY intensity, hit Viet Nam and dissipated over Thailand, bringing heavy rain and flooding in the Philippines, Lao PDR, Thailand and Viet Nam. Kulap (2217) formed over the sea around the Mariana Islands and reached STS intensity, finally crossing longitude 180°E over the Bering Sea. Roke (2218) formed over the sea south of Japan and moved to the sea east of Japan after developing to TY intensity.
- 11 Five named TCs formed in October. The first, Sonca (2219), formed over the South China Sea and hit Viet Nam, causing severe damage to the country and widespread rain in Thailand. Nesat (2220) actually formed over the sea east of the Philippines before Sonca but was named later, and reached TY intensity after moving over the South China Sea. Haitang (2221) formed over the sea northeast of Minamitorishima Island and developed to TS intensity. Nalgae (2222) formed over the sea east of the Philippines and crossed Luzon Island with STS intensity. Banyan (2223) formed near the Caroline Islands and dissipated over the sea east of Mindanao Island.
- 12 The only named TC for November was Yamaneko (2224), which formed over the sea northeast of Wake Island and weakened to TD intensity over the sea north of the island.
- 13 The last-named TC, Pakhar (2225), formed in December over the sea east of the Philippines and transitioned into an extratropical cyclone over the sea south of Japan.

APPENDIX B:

Review of the 2022 Typhoon Season

Over the western North Pacific and the South China Sea, 25 named tropical cyclones (TCs) formed in 2022 – almost the same as the 30-year average of 25.1 (1991 – 2020). Ten of these reached typhoon (TY) intensity, which was below the 30-year average of 13.3. A total of 12 formed during the peak period from August to September (above the average of 10.7), while only 6 formed from January to July (less than the average of 7.8), due to suppressed convection over the area where TCs frequently form, in association with a persistent La Niña event. The negative phase of the Indian Ocean Dipole (IOD) may also have contributed to suppressed convection, particularly from June to July.

The 2022 typhoon season started with Malakas (2201), which formed over the sea around the Chuuk Islands at 06 UTC on 6 April and became the first TC to reach TY intensity in the western North Pacific. It reached peak intensity with maximum sustained winds of 90 kt and a central pressure of 945 hPa over the sea east of the Philippines at 18 UTC on 13 April.

The mean genesis point of named TCs was 19.3°N and 135.8°E, representing a northward deviation from the 30-year average (16.3°N and 135.9°E). The mean genesis point of named TCs in summer (June to August) was 21.8°N and 132.1°E, with a north-westward deviation from the 30-year summer average (18.5°N and 134.2°E), and that of named TCs in autumn (September to November) was 19.4°N and 139.1°E, representing a north-eastward deviation from the 30-year autumn average (16.2°N and 137.0°E). The clear northward shift of the mean genesis point throughout the year is partly due to the persistent La Niña event and to the intrusion of high potential vorticity from higher latitudes over the area from the central Pacific to the sea south of Japan.

The mean duration of TCs with tropical storm (TS) intensity or higher was 3.7 days, which was shorter than the 30-year average of 5.2 days. The mean duration of TCs with TS intensity or higher in summer was 3.8 days, which was shorter than the average of 5.0 days, and that of TCs with TS intensity or higher in autumn was 3.8 days, which was shorter than the average of 5.4 days. The shorter-than-average duration in autumn is consistent with the results of statistical studies on the La Niña event.

Two named TCs formed in April (see pink lines in Figure 3). The first, Malakas (2201), formed as a tropical depression (TD) over the sea around the Chuuk Islands (here, TC locations are expressed as the area of TD formation unless otherwise noted) and further developed to typhoon (TY) intensity. Megi (2202) formed over the sea east of the Philippines. Although it did not intensify significantly, it caused flooding, landslides and other destructive effects in the Philippines.

Two named TCs formed in June (see yellow lines in Figure 3). The first, Chaba (2203), formed over the South China Sea and hit the coast of southern China with TY intensity before transitioning into an extratropical cyclone over central China and bringing rain to wide areas of

China, Macao China and Hong Kong China. Aere (2204), which formed over the sea east of the Philippines and made landfall on Japan's Nagasaki Prefecture with TS intensity, caused heavy rain, flooding and landslides over the Seto Inland Sea toward the Pacific Ocean even after transitioning into an extratropical cyclone.

Two named TCs formed in July (see light green lines in Figure 3). The first, Songda (2205) formed over the sea west of the Mariana Islands and dissipated over the Yellow Sea. Trases (2206) formed over the sea south of Okinawa Island and weakened to TD intensity near the western coast of the Korean Peninsula.

Five named TCs formed in August (see blue lines in Figure 3). The first, Mulan (2207), formed over the sea south of Hainan Island and moved southeastward before taking a counterclockwise path and hitting the coast of Viet Nam with TS intensity and bringing heavy rain, strong wind and storm surges to partial areas of China, Macao China, Lao PDR, Thailand and Viet Nam. Meari (2208) formed over the sea west of Minamitorishima Island and made landfall on Japan's Izu Peninsula after passing around Omaezaki in Shizuoka Prefecture with TS intensity. Ma-on (2209) formed over the sea east of the Philippines and reached severe tropical storm (STS) intensity before crossing the northern part of Luzon Island, and further hit southern China with STS intensity. Many Typhoon Committee Members in the western North Pacific (WNP) region were affected by this TC and its after-effects. Both Tokage (2210) and Hinnamnor (2211) formed over the sea around Minamitorishima Island. Tokage reached TY intensity over the sea east of Japan, and after accelerating east-northeastward crossed longitude 180°E. Hinnamnor reached peak intensity with maximum sustained winds of 105 kt (a tied record for 2022), bringing torrential rain and wind to a wide area of the WNP region.

Seven named TCs formed in September (see red lines in Figure 3). The first, Muifa (2212), formed over the sea east of the Ogasawara Islands and developed to TY intensity over the sea south of Okinawa Island. After a slight weakening, it redeveloped and hit the coast line of central China. Merbok (2213) formed over the sea southeast of Minamitorishima Island, and after reaching TY intensity transitioned into an extratropical cyclone and crossed longitude 180°E over the Bering Sea. Nanmadol (2214), one of the strongest TCs of the season, formed over the sea south of Japan, reached TY intensity and made landfall on Japan's Kyushu region, resulting in extensive rain in Japan and Korea. Talas (2215) formed over the Ogasawara Islands and moved over the sea from the south to the east of Honshu Island. Noru (2216) formed over the sea east of the Philippines and crossed Luzon Island with TY intensity, hit Viet Nam and dissipated over Thailand, bringing heavy rain and flooding in the Philippines, Lao PDR, Thailand and Viet Nam. Kulap (2217) formed over the sea around the Mariana Islands and reached STS intensity, finally crossing longitude 180°E over the Bering Sea. Roke (2218) formed over the sea south of Japan and moved to the sea east of Japan after developing to TY intensity.

Five named TCs formed in October (see pale green lines in Figure 3). The first, Sonca (2219), formed over the South China Sea and hit Viet Nam, causing severe damage to the country and widespread rain in Thailand. Nesat (2220) actually formed over the sea east of the

Philippines before Sonca but was named later, and reached TY intensity after moving over the South China Sea. Haitang (2221) formed over the sea northeast of Minamitorishima Island and developed to TS intensity. Nalgae (2222) formed over the sea east of the Philippines and crossed Luzon Island with STS intensity. Banyan (2223) formed near the Caroline Islands and dissipated over the sea east of Mindanao Island.

The only named TC for November was Yamaneko (2224, see the purple line in Figure 3), which formed over the sea northeast of Wake Island and weakened to TD intensity over the sea north of the island.

The last-named TC, Pakhar (2225, see the brown line in Figure 3), formed in December over the sea east of the Philippines and transitioned into an extratropical cyclone over the sea south of Japan.

Table 1 List of named TCs in 2022

Tropical Cyclone			Duration (UTC)				Minimum Central Pressure				Max Wind (kt)	
			(TS or higher)				(UTC)	lat(N)	long(E)	(hPa)		
TY	Malakas	(2201)	080000	Apr	-	151200	Apr	131800	19.8	137.5	945	90
TS	Megi	(2202)	091800	Apr	-	110000	Apr	100000	10.8	125.7	996	40
TY	Chaba	(2203)	300000	Jun	-	030600	Jul	020000	20.6	111.7	965	70
TS	Aere	(2204)	301800	Jun	-	050000	Jul	020600	25.9	129.5	994	45
TS	Songda	(2205)	281200	Jul	-	311800	Jul	310000	33.5	123.1	996	40
TS	Trases	(2206)	310000	Jul	-	011200	Aug	310000	25.7	127.9	998	35
TS	Mulan	(2207)	090600	Aug	-	110000	Aug	091200	18.3	112.8	994	35
TS	Meari	(2208)	111200	Aug	-	141200	Aug	140600	41.0	146.9	996	40
STS	Ma-on	(2209)	211800	Aug	-	260000	Aug	231800	19.0	118.8	985	55
TY	Tokage	(2210)	220000	Aug	-	251800	Aug	231200	31.6	149.1	970	75
TY	Hinnamnor	(2211)	280600	Aug	-	061200	Sep	301200	26.6	133.6	920	105
TY	Muifa	(2212)	071800	Sep	-	160000	Sep	110000	22.6	124.4	950	85
TY	Merbok	(2213)	111200	Sep	-	150600	Sep	141200	31.9	161.9	965	70
TY	Nanmadol	(2214)	131800	Sep	-	191800	Sep	161800	25.5	133.8	910	105
TS	Talas	(2215)	220000	Sep	-	231200	Sep	230000	30.7	134.8	1000	35
TY	Noru	(2216)	221800	Sep	-	281200	Sep	250000	15.0	123.6	940	95
STS	Kulap	(2217)	260000	Sep	-	291200	Sep	290600	42.0	159.0	965	60
TY	Roke	(2218)	281200	Sep	-	011800	Oct	300000	28.2	136.0	975	70
TS	Sonca	(2219)	140000	Oct	-	150000	Oct	140000	14.1	111.9	998	35
TY	Nesat	(2220)	150600	Oct	-	200000	Oct	171200	19.0	115.5	965	75
TS	Haitang	(2221)	180000	Oct	-	191200	Oct	180000	28.7	158.6	1004	35
STS	Nalgae	(2222)	270000	Oct	-	021800	Nov	310600	17.1	116.5	975	60
TS	Banyan	(2223)	301800	Oct	-	010000	Nov	301800	8.1	135.2	1002	40
TS	Yamaneko	(2224)	121200	Nov	-	140600	Nov	121200	21.1	165.5	1004	35
TS	Pakhar	(2225)	111200	Dec	-	121200	Dec	111800	19.0	128.1	998	40

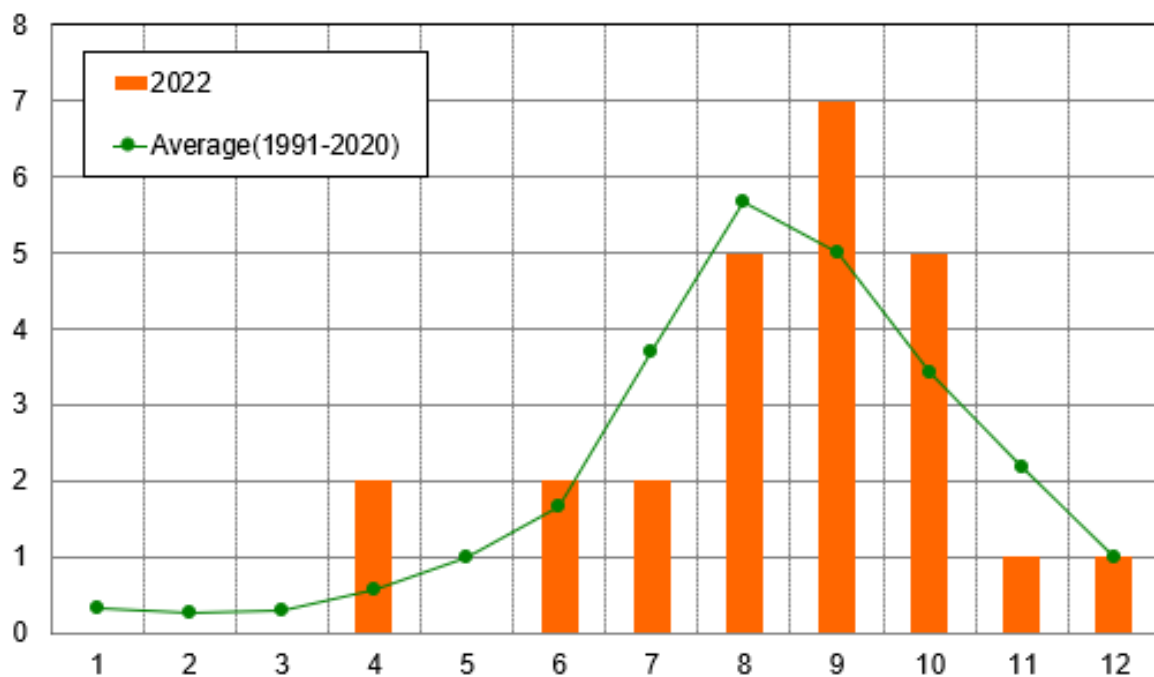


Figure 1 Monthly formation number of named TCs in 2022

Orange bar: formation number in 2022, green line: 30-year average from 1991 to 2020

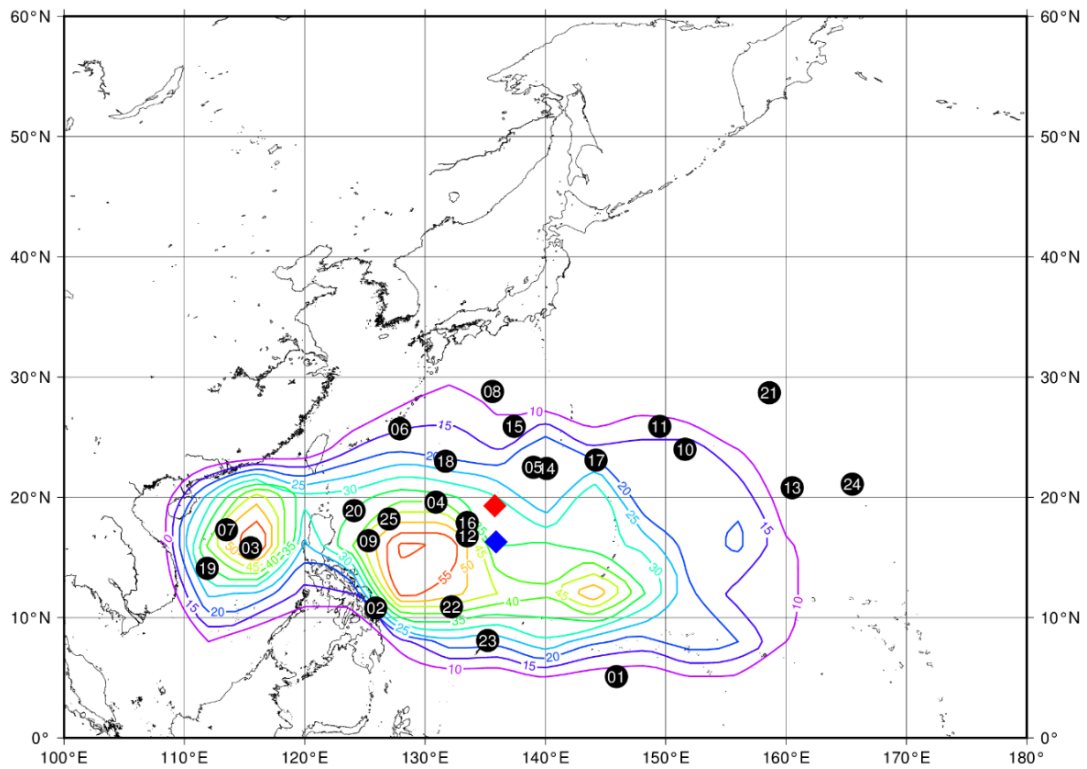


Figure 2 Genesis points of named TCs in 2022 (dots with the last two digits of TC identification numbers) and frequency distribution of genesis points for 1951-2021 (lines)
 Red and blue diamonds show the mean genesis points of named TCs in 2022 and the 30-year average period (1991 – 2020), respectively.

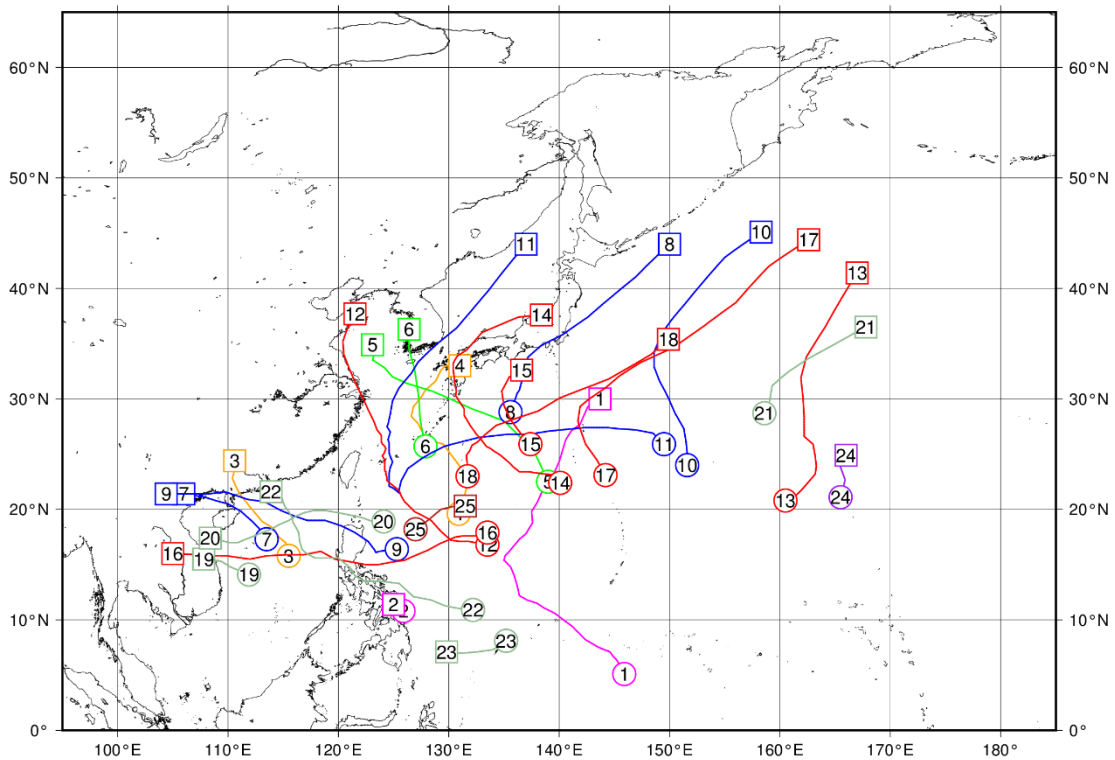


Figure 3 Tracks of named TCs in 2022
 The numbers represent the genesis and dissipation points of named TCs (the last two digits of their identification numbers).

Narrative Accounts of the 25 Named Tropical Cyclones in 2022

TY MALAKAS (2201)

MALAKAS formed as a tropical depression (TD) over the sea around the Chuuk Islands at 06 UTC on 6 April 2022 and moved westward. It changed its move north-northwestward before it was upgraded to tropical storm (TS) intensity over the sea around the Caroline Islands at 00 UTC on 8 April and gradually moved northwestward. It was upgraded to typhoon (TY) intensity over the sea east of the Philippines at 00 UTC on 12 April and turned northeastward. Keeping its northeastward track, it reached its peak intensity with maximum sustained winds of 90 kt and a central pressure of 945 hPa over the same waters at 18 UTC the next day. It transitioned into an extratropical cyclone over the sea east of Japan by 12 UTC on 15 April. It entered the sea around the Aleutian Islands and crossed longitude 180 degrees east before 00 UTC on 18 April.

TS MEGI (2202)

MEGI formed as a tropical depression (TD) over the sea east of the Philippines at 18 UTC on 8 April 2022 and moved northward and soon turned westward. It was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC on 9 April. It reached its peak intensity with maximum sustained winds of 40 kt and a central pressure of 996 hPa over the central part of the Philippines at 00 UTC on 10 April and decelerated northwestward. It weakened to TD intensity near the central part of the Philippines at 00 UTC on 11 April and remained almost stationary until it dissipated at 06 UTC on 12 April.

TY CHABA (2203)

CHABA formed as a tropical depression (TD) over the South China Sea at 18 UTC on 28 June 2022 and moved northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 30 June and after upgrading to severe tropical storm (STS) intensity 18 hours later, it was further upgraded to typhoon (TY) intensity at 18 UTC on 1 July over the same waters. It reached its peak intensity with maximum sustained winds of 70 kt and a central pressure of 965 hPa over the waters east of Hainan Island 6 hours later. It hit the coast of southern China with TY intensity before 12 UTC on 2 July and moved northward. It weakened to TD intensity in southern China at 06 UTC on 3 July and moved north-northeastward. It transitioned into an extratropical cyclone in the central part of China by 18 UTC on 5 July. It dissipated over the Yellow Sea at 00 UTC on 8 July.

TS AERE (2204)

AERE formed as a tropical depression (TD) over the sea east of the Philippines at 12 UTC on 30 June 2022 and moved northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC the same day and moved north-northeastward. After changing its move northwestward, it reached its peak intensity with maximum sustained winds of 45 kt and a

central pressure of 994 hPa near Okinawa Island at 06 UTC on 2 July. It crossed Okinawa Island with TS intensity around 14 UTC the same day and moved northwestward and then turned northeastward. It landed near Sasebo City, Nagasaki Prefecture with TS intensity before 21 UTC on 4 July. It transitioned into an extratropical cyclone over the northern part of Kyushu Island by 00 UTC on 5 July. It moved eastward over the Seto Inland Sea toward the Kii Peninsula and entered the Pacific Ocean. It further moved over the waters east of Honshu Island and dissipated over the waters south of Hokkaido Island at 18 UTC on 10 July.

TS SONGDA (2205)

SONGDA formed as a tropical depression (TD) over the sea west of the Mariana Islands at 12 UTC on 26 July 2022 and moved northwestward. Keeping its northwestward track, it was upgraded to tropical storm (TS) intensity at 12 UTC 28 July over the sea south of Japan. It reached its peak intensity with maximum sustained winds of 40 kt over the waters southwest of Kyushu Island at 12 UTC on 29 July. Its central pressure was 1000 hPa at that time and lowered to 996 hPa at 00 UTC on 31 July. It decelerated and changed its move northward over the Yellow Sea. It weakened to TD intensity at 18 UTC on 31 July and dissipated over the same waters at 12 UTC on 1 August.

TS TRASES (2206)

TRASES formed as a tropical depression (TD) over the sea south of Okinawa Island at 12 UTC on 29 July 2022 and moved west-northwestward. It gradually changed its move northward and was upgraded to tropical storm (TS) intensity, and at the same time, reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 998 hPa over the same waters at 00 UTC on 31 July. Keeping its northward track, it weakened to TD intensity over the waters near the western coast of the Korean Peninsula at 12 UTC on 1 August and dissipated over the northern part of the Korean Peninsula 12 hours later.

TS MULAN (2207)

MULAN formed as a tropical depression (TD) over the sea south of Hainan Island at 00 UTC on 8 August 2022. It moved southeastward over the South China Sea for several hours and then gradually turned northeastward over the same waters. It was upgraded to tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt over the same waters at 06 UTC on 9 August. Its central pressure was 996 hPa at that time and lowered to 994 hPa at 12 UTC the same day. After changing its move northwestward, it crossed the Leizhou Peninsula before 12 UTC on 10 August. It moved west-northwestward over the Gulf of Tonkin, and hit the coast of Viet Nam in the second half of 10 August. It weakened to TD intensity over the northern part of Viet Nam at 00 UTC on 11 August and dissipated 12 hours later.

TS MEARI (2208)

MEARI formed as a tropical depression (TD) over the sea west of Minamitorishima Island at 18 UTC on 8 August 2022 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the sea south of Japan at 12 UTC on 11 August, and turned north-northeastward. It reached its peak intensity with maximum sustained winds of 40 kt over the same waters at 12 UTC on 12 August. Its central pressure was 1000 hPa at that time and lowered to 998 hPa 12 hours later. MEARI gradually turned northeastward, and passed around Omaezaki, Shizuoka Prefecture with TS intensity before 06 UTC on 13 August and then landed on the Izu Peninsula, Shizuoka Prefecture with TS intensity around 0830 UTC the same day. Its central pressure further lowered to 996 hPa over the sea east of Japan at 06 UTC on 14 August keeping its peak intensity of maximum sustained winds of 40 kt. It transitioned into an extratropical cyclone over the sea around the Kuril Islands by 12 UTC the same day. It gradually turned northward, and crossed latitude 60 degrees north before 18 UTC on 16 August.

STS MA-ON (2209)

MA-ON formed as a tropical depression (TD) over the sea east of the Philippines at 00 UTC on 21 August 2022 and moved southwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC on the same day and moved west-southwestward. After changing its move northwestward, it was further upgraded to severe tropical storm (STS) intensity at 18 UTC on 22 August and it reached its peak intensity with maximum sustained winds of 55 kt and a central pressure of 985 hPa over the South China Sea at 18 UTC the next day. It hit southern China with STS intensity on 25 August and moved westward. It weakened to TD intensity in Viet Nam at 00 UTC on 26 August and dissipated six hours later.

TY TOKAGE (2210)

TOKAGE formed as a tropical depression (TD) over the sea southwest of Minamitorishima Island at 06 UTC on 21 August 2022 and moved north-northeastward. It was upgraded to tropical storm (TS) intensity at 00 UTC the next day to the west of the island. Gradually changing its move north-northwestward, it was further upgraded to Typhoon (TY) intensity over the sea east of Japan at 06 UTC on 23 August. It reached its peak intensity with maximum sustained winds of 75 kt and a central pressure of 970 hPa over the same waters at 12 UTC the same day. It gradually changed its move northeastward and transitioned into an extratropical cyclone over the sea east of the Kuril Islands by 18 UTC on 25 August. After it accelerated east-northeastward toward the sea around the Aleutian Islands, it further moved eastward and crossed longitude 180 degrees east before 00 UTC on 27 August.

TY HINNAMNOR (2211)

HINNAMNOR formed as a tropical depression (TD) over the sea around Minamitorishima Island at 18 UTC on 27 August 2022 and moved northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 06 UTC on 28 August before moving westward. It

was upgraded to typhoon (TY) intensity over the sea around the Ogasawara Islands at 00 UTC on 29 August. Keeping its westward track, it reached its peak intensity with maximum sustained winds of 105 kt and a central pressure of 920 hPa over the same waters at 12 UTC on 30 August. Gradually weakening and turning southward, it decelerated over the sea south of Okinawa Island during 1 September. Then it turned sharply northward over the same waters on the next day. It developed again over the East China Sea in the first half of 4 September. It passed through the Tsushima Strait in the second half of 5 September and moved northeastward. It was downgraded to STS intensity over the Sea of Japan at 06 UTC on 6 September and transitioned into an extratropical cyclone over the same waters by 12 UTC the same day. It entered the Sea of Okhotsk and crossed latitude 60 degrees north over Russia before 00 UTC on 9 September.

TY MUIFA (2212)

MUIFA formed as a tropical depression (TD) over the sea east of the Ogasawara Islands at 18 UTC on 3 September 2022 and moved west-southwestward for about two days and then south-southwestward. After turning westward, it was upgraded to tropical storm (TS) intensity over the sea east of the Philippines at 18 UTC on 7 September and was further upgraded to severe tropical storm (STS) intensity over the same waters at 06 UTC on 9 September. It gradually turned northward and decelerated and was upgraded to typhoon (TY) intensity over the sea south of Okinawa Island at 00 UTC on 10 September. It reached its peak intensity with maximum sustained winds of 85 kt and a central pressure of 950 hPa over the same waters at 00 UTC on 11 September. After a slight weakening, it passed over Ishigakijima Island still with TY intensity around 03 UTC the next day. It redeveloped and accelerated north-northwestward and reached an intensity with maximum sustained winds of 80 kt and a central pressure of 955 hPa over the East China Sea at 00 UTC on 13 September. It hit the coast line of central China with TY intensity late on 14 September. It turned north-northeastward and transitioned into an extratropical cyclone by 00 UTC on 16 September near the Shandong Peninsula. After changing its move northeastward, it dissipated in Northeast China at 06 UTC on 17 September.

TY MERBOK (2213)

MERBOK formed as a tropical depression (TD) southeast of Minamitorishima Island at 12 UTC on 10 September 2022 and moved eastward. It was upgraded to tropical storm (TS) intensity west-northwest of Wake Island 24 hours later and moved northeastward. It was upgraded to severe tropical storm (STS) intensity at 06 UTC on 12 September and was further upgraded to typhoon (TY) intensity at 18 UTC on 13 September over the same waters and moved northward. It reached its peak intensity with maximum sustained winds of 70 kt and a central pressure of 970 hPa over the sea far off east of Japan at 06 UTC on 14 September. It lowered to 965 hPa six hours later and moved north-northeastward. It transitioned into an extratropical cyclone over the same waters by 06 UTC the next day. Keeping its move north-northeastward, it crossed

longitude 180 degrees east before 18 UTC on 16 September.

TY NANMADOL (2214)

NANMADOL formed as a tropical depression (TD) over the sea south of Japan at 12 UTC on 12 September 2022 and turned in a counterclockwise direction to circle over the same waters for about one day long. It moved east-northeastward and was upgraded to tropical storm (TS) intensity over the sea south of the Ogasawara Islands at 18 UTC on 13 September and turned sharply westward 12 hours later. Keeping its westward track, it developed rapidly and was upgraded to typhoon (TY) intensity over the sea south of Japan at 12 UTC on 15 September. It turned northwestward six hours later and subsequently reached its peak intensity with maximum sustained winds of 105 kt and a central pressure of 910 hPa over the waters east of Minamidaitojima Island at 18 UTC on 16 September. NANMADOL turned north-northwestward and passed over Yakushima Island with TY intensity at around 0430 UTC on 18 September before moving northward. It further crossed near Ibusuki City, Kagoshima Prefecture with TY intensity about four hours later and then landed near Kagoshima City, Kagoshima Prefecture with TY intensity at around 10 UTC on 18 September. Keeping its northward track, it entered the Ariake Sea and landed again near Yanagawa City, Fukuoka Prefecture with TY intensity at around 18 UTC on 18 September. Gradually turning northeastward, it was downgraded to severe tropical storm (STS) intensity at 00 UTC on 19 September and entered the Sea of Japan at around 06 UTC the same day. It gradually turned eastward and transformed into an extratropical cyclone over the same waters by 18 UTC on 19 September. It crossed Honshu Island to the east-northeast and dissipated over the sea east of Japan at 06 UTC on 20 September.

TS TALAS (2215)

TALAS formed as a tropical depression (TD) near the Ogasawara Islands at 18 UTC on 20 September 2022. It moved northward until 06 UTC on 21 September, and gradually turned northwestward. It was upgraded to tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt over the sea south of Japan at 00 UTC on 22 September. Its central pressure was 1002 hPa at that time. TALAS continued to move northwestward and gradually turned to the north over the sea south of Japan, and its central pressure lowered to 1000 hPa at 00 UTC on 23 September. After moving over the same waters, it weakened to TD intensity south of the Kii peninsula at 12 UTC on 23 September. The TD moved northeastward and transitioned into an extratropical cyclone over the waters south of Shizuoka Prefecture by 00 UTC on 24 September. It further moved over the waters east of Honshu Island and dissipated over the waters southeast of Hokkaido Island at 18 UTC on 27 September.

TY NORU (2216)

NORU formed as a tropical depression (TD) over the sea east of the Philippines at 06 UTC on 21 September 2022 and moved eastward. It turned sharply westward around 06 UTC on 22

September, and was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC the same day. It gradually turned west-southwestward and was upgraded to typhoon (TY) intensity over the sea east of the Philippines at 06 UTC on 24 September. It reached its peak intensity with maximum sustained winds of 95 kt and a central pressure of 940 hPa over the same waters at 00 UTC on 25 September. It gradually turned westward and crossed Luzon Island with TY intensity on the same day. After weakening to maximum sustained winds of 65 kt and a central pressure of 980 hPa over the South China Sea at 06 UTC on September 26, NORU developed again and reached maximum sustained winds of 85 kt and a central pressure of 950 hPa over the same waters at 00 UTC on 27 September. It hit Viet Nam before 00 UTC on 28 September, and weakened to TD intensity in eastern Thailand at 12 UTC the same day. It dissipated in the same country at 12 UTC on 29 September.

STS KULAP (2217)

KULAP formed as a tropical depression (TD) over the sea around the Mariana Islands at 00 UTC on 25 September 2022 and moved northwestward. It was upgraded to tropical storm (TS) intensity over the sea around the Ogasawara Islands at 00 UTC on 26 September and was further upgraded to severe tropical storm (STS) intensity around Chichijima Island at 18 UTC the same day. It gradually turned northeastward and accelerated in that direction. It reached its peak intensity with maximum sustained winds of 60 kt over the sea east of Japan at 00 UTC on 28 September. Its central pressure was 975 hPa at that time and lowered to 970 hPa at 18 UTC the same day. Keeping its move northeastward, it transitioned into an extratropical cyclone over the sea east of the Kuril Islands by 12 UTC on 29 September. It entered the Bering Sea and crossed longitude 180 degrees east before 12 UTC on 1 October.

TY ROKE (2218)

ROKE formed as a tropical depression (TD) over the sea south of Japan at 00 UTC on 28 September 2022 and moved northward. It was upgraded to tropical storm (TS) intensity south of Minamidaitojima Island 12 hours later. After changing its move northeastward, it was upgraded to severe tropical storm (STS) intensity at 03 UTC on 29 September and was further upgraded to typhoon (TY) intensity nine hours later over the same waters and moved east-northeastward. It reached its peak intensity with maximum sustained winds of 70 kt and a central pressure of 975 hPa over the same waters at 00 UTC on 30 September. It gradually changed its move northeastward and transitioned into an extratropical cyclone over the sea east of Japan by 18 UTC on 1 October. It dissipated over the waters far off east of Japan at 12 UTC on 5 October.

TS SONCA (2219)

SONCA formed as a tropical depression (TD) over the South China Sea at 06 UTC on 13 October 2022 and moved northward. After changing its move west-northwestward, it was upgraded to

tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 998 hPa over the same waters at 00 UTC on 14 October. It moved northwestward and hit Viet Nam with TS intensity in the second half of 14 October before weakening to TD intensity in Viet Nam at 00 UTC on 15 October and dissipated six hours later.

TY NESAT (2220)

NESAT formed as a tropical depression (TD) over the sea east of the Philippines at 12 UTC on 14 October 2022 and moved westward. It was upgraded to tropical storm (TS) intensity at 06 UTC on 15 October over the same waters and was upgraded to severe tropical storm (STS) intensity at 18 UTC the same day before passing the Bashi Channel. After entering the South China Sea, it gradually turned west-southwestward and was upgraded to typhoon (TY) intensity and reached its peak intensity with maximum sustained winds of 75 kt and a central pressure of 965 hPa at 12 UTC on 17 October. It downgraded to STS intensity at 00 UTC on 19 October and weakened to TS intensity over the same waters 12 hours later. It further weakened to TD intensity over the Gulf of Tonkin at 00 UTC on 20 October and dissipated over the same waters at 12 UTC the same day.

TS HAITANG (2221)

HAITANG formed as a tropical depression (TD) over the sea northeast of Minamitorishima Island at 00 UTC on 17 October 2022 and moved eastward. After changing its move north-northeastward, it was upgraded to tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 1004 hPa over the same waters at 00 UTC on 18 October. It gradually turned northeastward, and transitioned into an extratropical cyclone over the sea far off east of Japan by 12 UTC on 19 October. After entering the sea south of the Aleutian Islands, it moved east-northeastward and crossed longitude 180 degrees east before 12 UTC on 20 October.

STS NALGAE (2222)

NALGAE formed as a tropical depression (TD) over the sea east of the Philippines at 00 UTC on 26 October 2022 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity at 00 UTC the next day over the same waters and kept its west-northwestward track. Turning westward, it was upgraded to severe tropical storm (STS) intensity at 18 UTC on 28 October and crossed Luzon Island with STS intensity from 28 to 29 October. Downgrading to TS intensity, it turned westward and entered the South China Sea around 18 UTC on 29 October. Gradually turning north-northwestward, it developed again and was upgraded to STS intensity over the same waters at 18 UTC on 30 October. Keeping its north-northwestward track, it reached its peak intensity with maximum sustained winds of 60 kt and a central pressure of 975 hPa over the same waters at 06 UTC on 31 October. It kept its peak intensity for about one day long and then rapidly weakened to TD intensity over the same waters at 18

UTC on 2 November. It slowly moved northwestward and dissipated over the same waters 12 hours later.

TS BANYAN (2223)

BANYAN formed as a tropical depression (TD) near the Caroline Islands at 06 UTC on 28 October 2022 and moved northward. After changing its move southwestward around 06 UTC on 30 October, it was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC on the same day and reached its peak intensity with maximum sustained winds of 40 kt and a central pressure of 1002 hPa over the same waters at 00 UTC on 31 October. It continued to move westward and weakened to TD intensity over the sea east of Mindanao Island at 00 UTC on 1 November. After moving westward, it gradually became stationary over the same waters until 18 UTC on 2 November. It dissipated over the same waters at 06 UTC on 3 November.

TS YAMANEKO (2224)

YAMANEKO formed as a tropical depression (TD) over the sea northeast of Wake Island at 12 UTC on 11 November 2022. It moved west-northwestward, and then gradually turned northward around 00 UTC on 12 November. It was upgraded to tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 1004 hPa over the sea north of Wake Island at 12 UTC the same day. Gradually turning north-northeastward around 00 UTC on 14 November, it weakened to TD intensity over the same waters at 06 UTC the same day and dissipated 18 hours later.

TS PAKHAR (2225)

PAKHAR formed as a tropical depression (TD) over the sea east of the Philippines at 00 UTC on 10 December 2022 and moved northwestward. It gradually turned northeastward and was upgraded to tropical storm (TS) intensity over the same waters at 12 UTC on 11 December. It reached its peak intensity with maximum sustained winds of 40 kt and a central pressure of 998 hPa six hours later. After changing its move eastward, it transitioned into an extratropical cyclone over the sea south of Japan by 12 UTC on 12 December and dissipated six hours later.