

ESCAP/WMO Typhoon Committee
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Vientiane
Lao PDR

FOR PARTICIPANTS ONLY
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14 February 2022
ENGLISH ONLY

REVIEW OF THE 2021 TYPHOON SEASON

(submitted by the RSMC Tokyo – Typhoon Center)

Action Proposed

The Committee is invited to review the 2021 typhoon season.

APPENDIXES:

- A) DRAFT TEXT FOR INCLUSION IN SESSION REPORT
- B) Review of the 2021 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 2021 typhoon season provided by the RSMC Tokyo as provided in **Appendix XX**, whose summary is presented in paragraph **xx(2)** – **xx(12)**.
- 2 In the western North Pacific and the South China Sea, 22 named tropical cyclones (TCs) formed in 2021, which was below the 30-year average (25.1, averaged for the 1991 – 2020 period) and nine out of them reached typhoon (TY) intensity, which was below the 30-year average (13.3). Eight named TCs formed from August to September (the peak formation period), which was also less than the normal of 10.7, mainly due to inactive convection over the sea, where TCs frequently form. The lower number of formations during the peak period may have contributed to the reduced annual total.
- 3 The second named TC, Surigae (2102), formed over the Caroline Islands at 18 UTC on 12 April 2021 and reached peak intensity with maximum sustained winds of 120 kt (the highest for April since statistics began in 1977) and a central pressure of 895 hPa east of the Philippines at 18 UTC on 17 April. It brought moderate-to-heavy rain over the Eastern Visayas region.
- 4 The mean genesis point of named TCs was 16.0°N and 132.4°E, which showed a west-southwestward deviation from that of the 30-year average (16.3°N and 135.9°E). The mean genesis point of named TCs formed in summer (June to August) was 21.5°N and 129.8°E, with a west-northwestward deviation from that of the 30-year summer average (18.5°N and 134.2°E), and that of named TCs formed in autumn (September to November) was 14.4°N and 133.6°E, which was a west-southwestward deviation from that of the 30-year autumn average (16.2°N and 137.0°E).
- 5 The mean duration of TCs sustaining tropical storm (TS) intensity or higher was 5.5 days, longer than that of the 30-year average (5.2 days). The mean duration of TCs sustaining TS intensity or higher formed in summer was 4.6 days, shorter than that of the 30-year average (5.0 days), and the mean duration of TCs sustaining TS intensity or higher formed in autumn was 5.7 days, longer than that of the 30-year average (5.4 days).
- 6 Dajuan (2101) – the first named TC of 2021 – formed in February as a tropical depression (TD) over the sea around the Caroline Islands (here, TC locations are expressed as the area of TD formation unless otherwise noted). The second – Surigae (T2102) – formed in April over the sea around the Caroline Islands and developed to TY intensity with a peak intensity of maximum sustained winds of 120 kt and a central pressure of 895 hPa (a record for the 2021 season), d . The third – Choi-wan (2103) – formed in May over the sea around the Caroline Islands and passed over the central part of the Philippines in early June.
- 7 The two named TCs in June were Koguma (2104), which formed over the South China Sea and crossed Hainan Island with TS intensity before hitting northern Viet Nam and causing floods along its path, and Champi (2105), which formed around the Chuuk Islands.
- 8 Three named TCs formed in July. The first, In-fa (2106) formed over the sea east of the Philippines and developed to TY intensity, affecting Japan, the Philippines and China with torrential rain, strong winds and high waves, resulting in flooding over wide areas. Cempaka (2107) then formed over the South China Sea, and after developing to TY intensity hit southern China with severe tropical storm (STS) intensity. Nepartak (2108) subsequently formed over the sea around the Ogasawara Islands and made landfall on the Pacific side of northern Japan.

- 9 Four named TCs formed in August. Lupit (2109) formed over the South China Sea and hit southern China, crossed the Taiwan Strait and made landfall on the southern part of Kyushu in Japan. After moving over Seto Inland Sea, it made landfall again in Hiroshima Prefecture, bringing torrential rain to areas in its path. Mirinae (2110) formed over the sea south of Okinawa and Nida (2111) formed over the sea around the Ogasawara Islands, with both transitioning into extratropical cyclones over the sea far off east of Japan. Omais (2112) formed over the sea east of the Philippines and reached peak intensity before crossing the southern part of the Korean Peninsula, bringing heavy rain and flooding.
- 10 Four named TCs formed in September. The first, Conson (2113) formed over the sea east of Mindanao Island and crossed the Philippines before moving over the South China Sea. Chanthu (2114) then formed over the sea around the Mariana Islands and reached TY intensity over the sea east of the Philippines. After a complex progression over the East China Sea, it made landfall on Japan and also affected the Philippines, the Republic of Korea and Japan. Dianmu (2115) subsequently formed over the South China Sea and hit Viet Nam, resulting in torrential rain in adjacent regions. Mindulle (2116) then formed over waters near the Mariana Islands and was upgraded to TY intensity over the sea east of the Philippines. Accelerating north-eastward, it brought strong winds and heavy rain to the south-eastern part of Japan's Kanto region.
- 11 Four named TCs formed in October. The first, Lionrock (2117), formed over the South China Sea and hit northern Viet Nam, affecting several regions along its path. Kompasu (2118) then formed over the sea east of the Philippines, and after crossing Hainan Island also hit Viet Nam. Heavy rain and strong wind were reported in the Philippines, China and Hong Kong China. Namtheun (2119) formed over the sea south-southwest of Wake Island and developed into STS intensity. Malou (2120) formed over the sea southwest of Guam Island and reached TY intensity over the sea south of Japan. After transitioning into an extratropical cyclone, both Namtheun and Malou crossed longitude 180 degrees east.
- 12 The one named TC for November was Nyatoh (2121), which formed over the sea south-southwest of Guam Island, developed to STS intensity and transitioned into an extratropical cyclone over the sea east-northeast of the Ogasawara Islands. The last-named TC, Rai (2122) formed in December over the sea around the Caroline Islands and crossed the Philippines with TY intensity and brought intense wind and heavy rain.

APPENDIX B:

Review of the 2021 Typhoon Season

In the western North Pacific and the South China Sea, 22 named tropical cyclones (TCs) formed in 2021, which was below the 30-year average (25.1, averaged for the 1991 – 2020 period) (see Table 1) and nine out of them reached typhoon (TY) intensity, which was below the 30-year average (13.3). Eight named TCs formed from August to September (the peak formation period), which was also less than the normal of 10.7, mainly due to inactive convection over the sea, where TCs frequently form. The lower number of formations during the peak period may have contributed to the reduced annual total.

The second named TC, Surigae (2102), formed over the Caroline Islands at 18 UTC on 12 April 2021 and reached peak intensity with maximum sustained winds of 120 kt (the highest for April since statistics began in 1977) and a central pressure of 895 hPa east of the Philippines at 18 UTC on 17 April. It brought moderate-to-heavy rain over the Eastern Visayas region.

The mean genesis point of named TCs was 16.0°N and 132.4°E, which showed a west-southwestward deviation from that of the 30-year average (16.3°N and 135.9°E) (see Figure 2). The mean genesis point of named TCs formed in summer (June to August) was 21.5°N and 129.8°E, with a west-northwestward deviation from that of the 30-year summer average (18.5°N and 134.2°E), and that of named TCs formed in autumn (September to November) was 14.4°N and 133.6°E, which was a west-southwestward deviation from that of the 30-year autumn average (16.2°N and 137.0°E).

The mean duration of TCs sustaining tropical storm (TS) intensity or higher was 5.5 days, longer than that of the 30-year average (5.2 days). The mean duration of TCs sustaining TS intensity or higher formed in summer was 4.6 days, shorter than that of the 30-year average (5.0 days), and the mean duration of TCs sustaining TS intensity or higher formed in autumn was 5.7 days, longer than that of the 30-year average (5.4 days).

Dujuan (2101, see a dark green line in Figure 3) – the first named TC of 2021 – formed in February as a tropical depression (TD) over the sea around the Caroline Islands (here, TC locations are expressed as the area of TD formation unless otherwise noted). The second – Surigae (T2102, see a dark green line in Figure 3) – formed in April over the sea around the Caroline Islands and developed to TY intensity with a peak intensity of maximum sustained winds of 120 kt and a central pressure of 895 hPa (a record for the 2021 season), affecting several countries along its path. The third – Choi-wan (2103, see a dark green line in Figure 3) – formed in May over the sea around the Caroline Islands and passed over the central part of the Philippines in early June.

The two named TCs in June (see light green lines in Figure 3) were Koguma (2104), which formed over the South China Sea and crossed Hainan Island with TS intensity before hitting northern Viet Nam and causing floods along its path, and Champi (2105), which formed around the Chuuk Islands.

Three named TCs formed in July (see orange lines in Figure 3). The first, In-fa (2106) formed over the sea east of the Philippines and developed to TY intensity, affecting Japan, the Philippines and China with torrential rain, strong winds and high waves, resulting in flooding over wide areas. Cempaka (2107) then formed over the South China Sea, and after developing to TY intensity hit southern China with severe tropical storm (STS) intensity. Nepartak (2108) subsequently formed over the sea around the Ogasawara Islands and made landfall on the Pacific side of northern Japan.

Four named TCs formed in August (see red lines in Figure 3). Lupit (2109) formed over the South China Sea and hit southern China, crossed the Taiwan Strait and made landfall on the southern part of Kyushu in Japan. After moving over Seto Inland Sea, it made landfall again in Hiroshima Prefecture, bringing torrential rain to areas in its path. Mirinae (2110) formed over the sea south of Okinawa and Nida (2111) formed over the sea around the Ogasawara Islands, with both transitioning into extratropical cyclones over the sea far off east of Japan. Omais (2112) formed over the sea east of the Philippines and reached peak intensity before crossing the southern part of the Korean Peninsula, bringing heavy rain and flooding.

Four named TCs formed in September (see blue lines in Figure 3). The first, Conson (2113) formed over the sea east of Mindanao Island and crossed the Philippines before moving over the South China Sea. Chanthu (2114) then formed over the sea around the Mariana Islands and reached TY intensity over the sea east of the Philippines. After a complex progression over the East China Sea, it made landfall on Japan and also affected the Philippines, the Republic of Korea and Japan. Dianmu (2115) subsequently formed over the South China Sea and hit Viet Nam, resulting in torrential rain in adjacent regions. Mindulle (2116) then formed over waters near the Mariana Islands and was upgraded to TY intensity over the sea east of the Philippines. Accelerating north-eastward, it brought strong winds and heavy rain to the south-eastern part of Japan's Kanto region.

Four named TCs formed in October (see red-purple lines in Figure 3). The first, Lionrock (2117), formed over the South China Sea and hit northern Viet Nam, affecting several regions along its path. Kompasu (2118) then formed over the sea east of the Philippines, and after crossing Hainan Island also hit Viet Nam. Heavy rain and strong wind were reported in the Philippines, China and Hong Kong China. Namtheun (2119) formed over the sea south-southwest of Wake Island and developed into STS intensity. Malou (2120) subsequently formed over the sea southwest of Guam Island and reached TY intensity over the sea south of Japan. After transitioning into an extratropical cyclone, both Namtheun and Malou crossed longitude 180 degrees east.

The one named TC for November was Nyatoh (2121, see a light blue line in Figure 3), which formed over the sea south-southwest of Guam Island, developed to STS intensity and transitioned into an extratropical cyclone over the sea east-northeast of the Ogasawara Islands. The last-named TC, Rai (2122, see a light blue line in Figure 3) formed in December over the sea around the Caroline Islands and crossed the Philippines with TY intensity and brought

intense wind and heavy rain.

Table 1 List of named TCs in 2021

Tropical Cyclone	Duration (UTC)				Minimum Central Pressure			Max Wind (kt)		
	(TS or higher)				(UTC)	lat(N)	long(E) (hPa)			
TS Dujan (2101)	180000	Feb	-	211200	Feb	181200	7.2	131.9	996	40
TY Surigae (2102)	131800	Apr	-	250000	Apr	171800	12.6	128.4	895	120
TS Choi-wan (2103)	301800	May	-	050600	Jun	311800	9.7	128.3	998	40
TS Koguma (2104)	111800	Jun	-	130600	Jun	120600	19.4	108.9	996	35
TY Champi (2105)	230000	Jun	-	271800	Jun	250600	21.9	139.1	980	65
TY In-fa (2106)	171200	Jul	-	271800	Jul	211800	23.7	126.2	950	85
TY Cempaka (2107)	181800	Jul	-	220000	Jul	200000	21.3	112.4	980	70
TS Nepartak (2108)	231200	Jul	-	280600	Jul	261800	34.3	142.9	990	40
TS Lupit (2109)	040000	Aug	-	090000	Aug	081800	33.9	132.3	984	45
STS Mirinae (2110)	050600	Aug	-	100000	Aug	071800	33.2	139.5	980	50
STS Nida (2111)	040000	Aug	-	080000	Aug	061800	37.8	155.5	992	55
TS Omais (2112)	201200	Aug	-	240000	Aug	212100	23.9	126.1	994	45
STS Conson (2113)	060000	Sep	-	111800	Sep	091200	15.8	115.1	992	50
TY Chanthu (2114)	061200	Sep	-	180600	Sep	101800	19.5	122.3	905	115
TS Dianmu (2115)	230600	Sep	-	231800	Sep	230600	14.8	110.5	1000	35
TY Mindulle (2116)	231200	Sep	-	020000	Oct	260600	18.8	136.7	920	105
TS Lionrock (2117)	071800	Oct	-	100600	Oct	071800	17.3	110.9	994	35
STS Kompasu (2118)	080000	Oct	-	141200	Oct	111800	18.8	120.5	975	55
STS Namtheun (2119)	100000	Oct	-	170000	Oct	160000	29.2	164.3	996	50
TY Malou (2120)	241800	Oct	-	291200	Oct	271800	22.7	140.0	965	75
TY Nyatoh (2121)	300000	Nov	-	040000	Dec	030000	21.0	138.7	925	100
TY Rai (2122)	130600	Dec	-	201800	Dec	160600	9.9	126.0	915	105

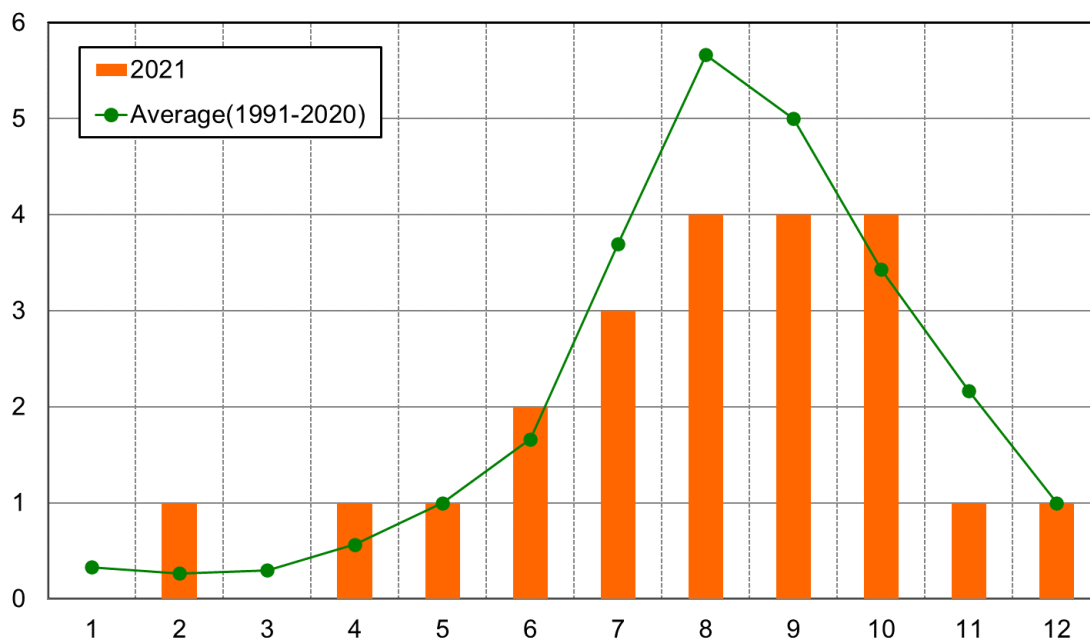


Figure 1 Monthly formation number of named TCs in 2021

Orange bar: formation number in 2021, green line: 30-year average from 1991 to 2020

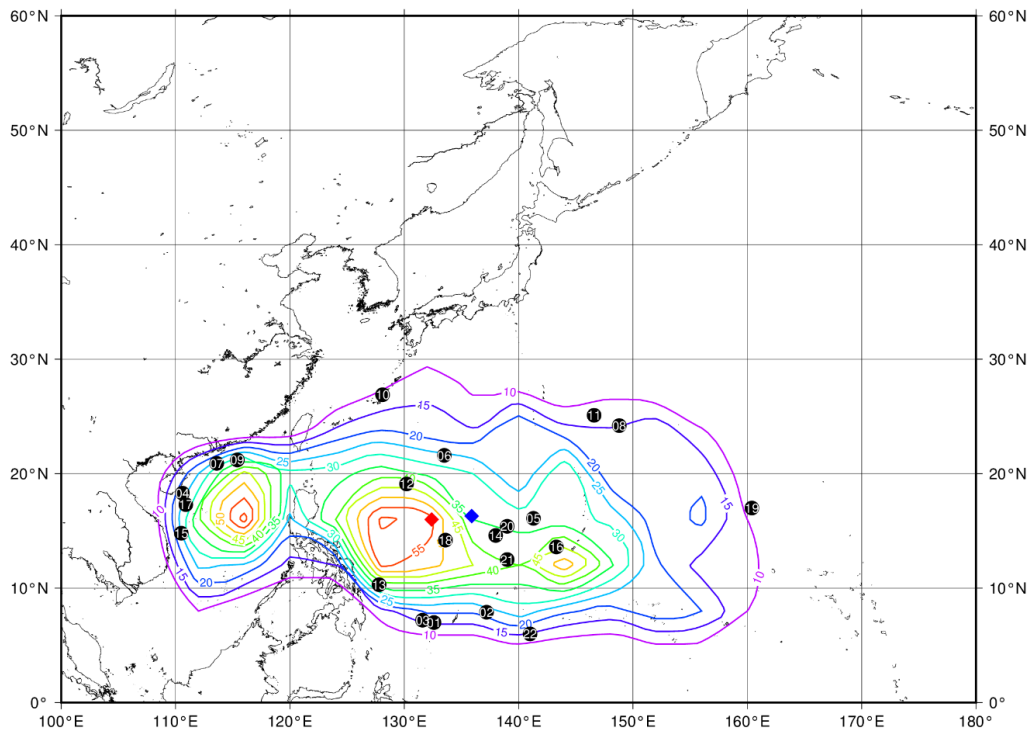


Figure 2 Genesis points of named TCs in 2021 (dots with the last two digits of TC identification numbers) and frequency distribution of genesis points for 1951-2020 (lines)
 Red and blue diamonds show the mean genesis points of named TCs in 2021 and the 30-year average period (1991 – 2020), respectively.

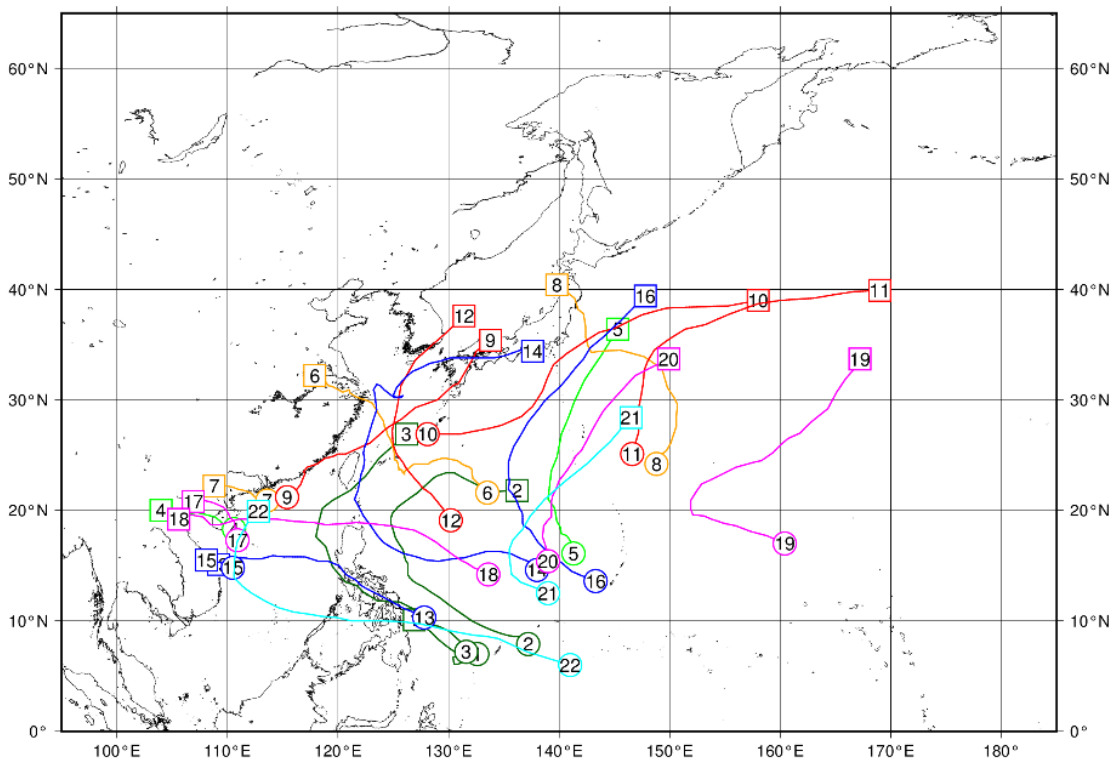


Figure 3 Tracks of named TCs in 2021
 The numbers represent the genesis points of named TCs (the last two digits of their identification numbers).

Narrative Accounts of the 22 Named Tropical Cyclones in 2021

TS DUJUAN (2101)

DUJUAN formed as a tropical depression (TD) over the sea around the Caroline Islands at 06 UTC on 16 February 2021 and moved westward. DUJUAN was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 18 February. It reached its peak intensity with maximum sustained winds of 40 kt and a central pressure of 996 hPa east of Mindanao Island 12 hours later. DUJUAN turned in a counterclockwise direction to circle over the same waters from 19 to 20 February and then accelerated northwestward. It weakened to TD intensity off the eastern coast of the Philippines at 12 UTC on 21 February. It continuously moved northwestward and dissipated around the eastern coast of Luzon Island at 06 UTC on 23 February.

TY SURIGAE (2102)

SURIGAE formed as a tropical depression (TD) over the sea around the Caroline Islands at 18 UTC on 12 April 2021. It moved northwestward and was upgraded to tropical storm (TS) intensity over the same waters at 18 UTC on 13 April. Keeping its northwestward track, SURIGAE was upgraded to typhoon (TY) intensity northeast of the Palau Islands at 12 UTC on 15 April. It reached its peak intensity with maximum sustained winds of 120 kt and a central pressure of 895 hPa over the sea east of the Philippines at 18 UTC on 17 April. SURIGAE started to weaken slowly on 18 April, and turned northward around 00 UTC on 19 April. It turned northeastward around 00 UTC on 22 April over the sea northeast of Luzon Island, and then turned southeastward around 12 UTC on 23 April over the sea south of Okinawa Island. SURIGAE transitioned into an extratropical cyclone over the sea south of Japan by 00 UTC on 25 April. After accelerating northeastward, it turned eastward over the sea east of the Kuril Islands around 00 UTC on 28 April and crossed longitude 180 degrees east before 18 UTC on 30 April.

TS CHOI-WAN (2103)

CHOI-WAN formed as a tropical depression (TD) over the sea around the Caroline Islands at 00 UTC on 29 May 2021 and moved westward. It turned northwestward over the same waters on 30 May, and was upgraded to tropical storm (TS) intensity over the sea east of Mindanao at 18 UTC the same day. CHOI-WAN reached its first peak intensity with maximum sustained winds of 40 kt and a central pressure of 998 hPa over the same waters at 18 UTC on 31 May. After passing over the central part of the Philippines with weakened maximum sustained winds of 35 kt, it entered the South China Sea late on 2 June. Subsequently, it reached its second peak intensity with maximum sustained winds of 40 kt and a central pressure of 998 hPa at 00 UTC on 3 June. The next day, it turned northeastward over the same waters and transitioned into an extratropical cyclone over the East China Sea by 06 UTC on 5 June. It dissipated over the sea south of Japan at 06 UTC on 6 June.

TS KOGUMA (2104)

KOGUMA formed as a tropical depression (TD) over the South China Sea at 00 UTC on 11 June 2021 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the same waters 18 hours later. It crossed Hainan Island with TS intensity early on 12 June and reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 996 hPa at 06 UTC on the same day. KOGUMA subsequently entered the Gulf of Tonkin and hit northern Viet Nam with TS intensity late on 12 June. It weakened to TD intensity in Laos at 06 UTC on 13 June and dissipated 12 hours later.

TY CHAMPI (2105)

CHAMPI formed as a tropical depression (TD) around the Chuuk Islands at 00 UTC on 20 June 2021. The TD moved west-northwestward and then gradually turned northward around the Mariana Islands. It was upgraded to tropical storm (TS) intensity over the sea west of the Mariana Islands at 00 UTC on 23 June. After moving over the same waters, CHAMPI reached Severe Tropical Storm (STS) intensity 24 hours later. It subsequently moved northward and reached typhoon (TY) intensity with maximum sustained winds of 65 kt and a central pressure of 980 hPa over the sea south of Japan at 06 UTC on 25 June. It gradually downgraded to TS intensity over the same waters by 18 UTC on 26 June. It then accelerated north-northeastward and transitioned into an extratropical cyclone over the sea east of Japan by 18 UTC on 27 June. CHAMPI turned northeastward and dissipated over the sea far off east of Japan at 00 UTC on 29 June.

TY IN-FA (2106)

IN-FA formed as a tropical depression (TD) over the sea east of the Philippines at 18 UTC on 15 July 2021 and moved northward. It was upgraded to tropical storm (TS) intensity near Minamidaitojima Island over the sea south of Japan at 12 UTC on 17 July and moved northwestward. Changing its move westward, it was further upgraded to typhoon (TY) intensity over the sea south of Okinawa Island at 12 UTC on 20 July. Before sharply turning northwestward, IN-FA reached its peak intensity with maximum sustained winds of 85 kt and a central pressure of 950 hPa over the same waters at 18 UTC on 21 July. After turning northwestward and entering the East China Sea, it hit the coast of central China with severe tropical storm (STS) intensity late on 25 July. IN-FA weakened to TD intensity in the central part of China at 18 UTC on 27 July and it transitioned into an extratropical cyclone by 18 UTC on 29 July. After moving northeastward, it dissipated in northeastern China at 12 UTC on 31 July.

TY CEMPAKA (2107)

CEMPAKA formed as a tropical depression (TD) over the South China Sea at 00 UTC on 17 July 2021 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 18

UTC on 18 July. Keeping its west-northwestward track, CEMPAKA was upgraded to typhoon (TY) intensity near the coast of southern China at 18 UTC on 19 July and reached its peak intensity with maximum sustained winds of 70 kt and a central pressure of 980 hPa six hours later. It hit southern China with severe tropical storm (STS) intensity after 12 UTC on 20 July. It moved westward and weakened to TD intensity in southern China at 00 UTC on 22 July. It entered the Gulf of Tonkin and dissipated over the same waters at 06 UTC on 25 July.

TS NEPARTAK (2108)

NEPARTAK formed as a tropical depression (TD) over the sea around the Ogasawara Islands at 12 UTC on 22 July 2021 and moved north-eastward. It was upgraded to tropical storm (TS) intensity west of Minamitorishima Island at 12 UTC on 23 July. It reached its peak intensity with maximum sustained winds of 40 kt 24 hours later and moved north-westward afterwards. Its central pressure was 994 hPa at 12 UTC on 24 July and lowered to 990 hPa at 18 UTC on 26 July when it turned northward over the sea east of Japan. NEPARTAK landed around Ishinomaki City, Miyagi Prefecture with TS intensity before 21 UTC on 27 July and changed its move north-westward on the next day. It transitioned into an extratropical cyclone over the Sea of Japan by 06 UTC on 28 July and dissipated over the same waters at 12 UTC on 31 July.

TS LUPIT (2109)

LUPIT formed as a tropical depression (TD) over the South China Sea at 12 UTC on 2 August 2021 and moved eastward. It was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 4 August. It gradually turned north-northeastward and hit southern China with TS intensity early on 5 August and moved northeastward. Crossing the Taiwan Strait on 6 August, it entered the East China Sea at around 00UTC on 7 August. Keeping its northeastward track and TS intensity, LUPIT made landfall near Makurazaki City, Kagoshima Prefecture after 11 UTC on 8 August. It reached its peak intensity with maximum sustained winds of 45 kt and a central pressure of 984 hPa over the sea between Honshu Island and Shikoku Island 7 hours later. LUPIT made landfall again near Kure City, Hiroshima Prefecture with TS intensity after 20 UTC on the same day and transitioned into an extratropical cyclone in Tottori Prefecture by 00 UTC on 9 August. It entered the Sea of Japan and after crossing the northern part of Honshu Island, it moved east-northeastward and dissipated over the sea south of the Aleutian Islands at 00 UTC on 16 August.

STS MIRINAE (2110)

MIRINAE formed as a tropical depression (TD) over the sea south of Okinawa at 06 UTC on 3 August 2021 and moved northeastward. It was upgraded to tropical storm (TS) intensity around Okinawa Island at 06 UTC on 5 August, and moved eastward. Gradually turning northeastward, MIRINAE reached its peak intensity with maximum sustained winds of 50 kt and a central pressure of 980 hPa around Hachijojima Island at 18 UTC on 7 August. MIRINAE gradually turned eastward and transitioned into an extratropical cyclone over the sea far off east of Japan by 00 UTC on 10 August. It dissipated over the

same waters at 06 UTC on 11 August.

STS NIDA (2111)

NIDA formed as a tropical depression (TD) over the sea around the Ogasawara Islands at 12 UTC on 3 August 2021. It moved northeastward and was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 4 August. After gradually turning east-northeastward, NIDA reached its peak intensity with maximum sustained winds of 55 kt and a central pressure of 992 hPa over the sea far off east of Japan at 18 UTC on 6 August. Keeping its east-northeastward track, NIDA transitioned into an extratropical cyclone over the same waters by 00 UTC on 8 August, and dissipated over the sea south of the Aleutian Islands at 18 UTC the same day.

TS OMAIS (2112)

OMAIS formed as a tropical depression (TD) over the sea east of the Philippines at 12 UTC on 18 August 2021 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 12 UTC on 20 August and moved northwestward afterwards. OMAIS reached its peak intensity with maximum sustained winds of 45 kt south of Okinawa Island 24 hours later. Its central pressure was 998 hPa at that time and lowered to 994 hPa nine hours later. OMAIS changed its move northward over the East China Sea and gradually turned northeastward. After crossing the southern part of the Korean Peninsula late on 23 August, OMAIS transitioned into an extratropical cyclone over the Sea of Japan by 00 UTC on 24 August. It gradually turned eastward and finally dissipated over the sea around the Aleutian Islands at 18 UTC on 31 August.

STS CONSON (2113)

CONSON formed as a tropical depression (TD) over the sea east of Mindanao Island at 06 UTC on 5 September 2021 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the sea east of the Philippines at 00 UTC on 6 September. It reached its first peak intensity with maximum sustained winds of 50 kt and a central pressure of 994 hPa at 12 UTC on 6 September. It weakened to maximum sustained winds of 45 kt and a central pressure of 998 hPa 12 hours later. After crossing the Philippines, it entered the South China Sea, and reached its second peak intensity with maximum sustained winds of 50 kt and a central pressure of 992 hPa at 12 UTC on 9 September. It weakened to TD intensity over the same waters at 18 UTC on 11 September and dissipated in Viet Nam at 18 UTC on 13 September.

TY CHANTHU (2114)

CHANTHU formed as a tropical depression (TD) over the sea around the Mariana Islands at 06 UTC on 5 September 2021 and moved northwestward. It was upgraded to tropical storm (TS) intensity over the sea east of the Philippines at 12 UTC on 6 September. It gradually turned westward developing rapidly, and was upgraded to typhoon (TY) intensity over the same waters at 12 UTC on 7 September. It gradually

turned northwestward and reached its peak intensity with maximum sustained winds of 115 kt east of the Luzon Island at 06 UTC on 10 September. Its central pressure was 910 hPa at that time and lowered to 905 hPa over the Bashi Channel 12 hours later. It moved northward and entered the East China Sea. Gradually weakening and keeping its northward track, it turned sharply southeastward over the same waters at around 18 UTC on 13 September and remained almost stationary until late on 15 September and turned northeastward afterwards. While then, it was downgraded to TS intensity at 18 UTC on 14 September, but was upgraded to severe tropical storm (STS) intensity again at 18 UTC on 15 September. It made landfall near Fukutsu City, Fukuoka Prefecture with STS intensity before 10 UTC on 17 September. It crossed the northern part of Kyushu Island and made landfall again near Matsuyama City, Ehime Prefecture with TS intensity after 15 UTC on 17 September. After crossing the Shikoku Island, it made its third landfall near Arida City, Wakayama Prefecture with TS intensity after 21 UTC on 17 September. It crossed the Kii peninsula and entered the Pacific Ocean at 03 UTC on 18 September and transitioned into an extratropical cyclone by 06 UTC on 18 September. It dissipated over the waters southeast of Hachijojima Island at 06 UTC on 20 September.

TS DIANMU (2115)

DIANMU formed as a tropical depression (TD) over the South China Sea at 00 UTC on 22 September 2021. It moved northwestward and was upgraded to tropical storm (TS) intensity and reached its peak intensity with maximum sustained winds of 35 kt and a central pressure of 1000 hPa over the same waters at 06 UTC on 23 September. After moving westward, it hit Viet Nam late on the same day and weakened to TD intensity at 18 UTC on 23 September. It continued moving westward and crossed longitude 100 degrees east before 00 UTC on 26 September.

TY MINDULLE (2116)

MINDULLE formed as a tropical depression (TD) over the waters near the Mariana Islands at 12 UTC on 22 September 2021 and moved west-northwestward. It was upgraded to tropical storm (TS) intensity over the same waters at 12 UTC on 23 September and continued moving west-northwestward. Changing its move northwestward, it was further upgraded to typhoon (TY) intensity over the sea east of the Philippines at 00 UTC on 25 September. It gradually changed its move northward and reached its peak intensity with maximum sustained winds of 105 kt and a central pressure of 920 hPa over the same waters at 06 UTC on 26 September. It accelerated northeastward over the sea east of Japan and transitioned into an extratropical cyclone over the same waters by 00 UTC on 2 October. It crossed latitude 60 degrees north before 12 UTC on 5 October.

TS LIONROCK (2117)

LIONROCK formed as a tropical depression (TD) over the South China Sea at 00 UTC on 5 October 2021 and moved northwestward. It 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 994 hPa over the same waters at 18 UTC on 7 October. Moving northward, it crossed Hainan Island with TS

intensity on 8 October and entered the Gulf of Tonkin on 9 October. Moving eastward, it hit northern Viet Nam and weakened to TD intensity at 06 UTC on 10 October and dissipated 18 hours later.

STS KOMPASU (2118)

KOMPASU formed as a tropical depression (TD) over the sea east of the Philippines at 00 UTC on 7 October 2021. It moved westward and was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 8 October. After turning northwestward and then westward, it gradually intensified and was upgraded to severe tropical storm (STS) intensity at 18 UTC on 10 October. It reached its peak intensity with maximum sustained winds of 55 kt and a central pressure of 975 hPa over the South China Sea at 18 UTC on 11 October. Keeping its westward track, it crossed Hainan Island on 13 October, hit Viet Nam on 14 October and then weakened to TD intensity. It dissipated at 18 UTC the same day.

STS NAMTHEUN (2119)

NAMTHEUN formed as a tropical depression (TD) over the sea south-southwest of Wake Island at 18 UTC on 8 October 2021 and moved westward. It was upgraded to tropical storm (TS) intensity over the same waters at 00 UTC on 10 October and turned west-northwestward. It turned sharply northward over the waters south-southwest of Minamitorishima Island at 06 UTC on 12 October and then gradually turned northeastward. It was upgraded to severe tropical storm (STS) intensity and reached its peak intensity with maximum sustained winds of 50 kt and a central pressure of 996 hPa over the sea north-northeast of Wake Island at 00 UTC on 16 October. It transitioned into an extratropical cyclone over the sea far off east of Japan by 00 UTC on 17 October and crossed longitude 180 degrees east before 00 UTC on 19 October.

TY MALOU (2120)

MALOU formed as a tropical depression (TD) over the sea southwest of Guam Island at 06 UTC on 23 October 2021 and moved westward. It turned north-northwestward after 18 UTC on the same day, and it was upgraded to tropical storm (TS) intensity over the sea east of the Philippines at 18 UTC on 24 October. Gradually turning northward, it was upgraded to typhoon (TY) intensity over the sea south of Japan at 12 UTC on October 27. It reached its peak intensity with maximum sustained winds of 75 kt and a central pressure of 965 hPa over the sea southwest of the Ogasawara Islands six hours later. Gradually accelerating northeastward, it transitioned into an extratropical cyclone over the sea east of Japan by 12 UTC on 29 October. Keeping its northeastward track, it gradually turned east-southeastward late on 30 October over the sea east of the Kuril Islands and crossed longitude 180 degrees east before 12 UTC on the next day.

TY NYATOH (2121)

NYATOH formed as a tropical depression (TD) over the sea south-southwest of Guam Island at 18 UTC on 28 November 2021 and moved westward. It was upgraded to tropical storm (TS) intensity over the

sea east of the Philippines at 00 UTC on 30 November and gradually changed its move northwestward. After it was upgraded to severe tropical storm (STS) intensity over the same waters at 00 UTC on 1 December, it moved northward and was further upgraded to typhoon (TY) intensity over the same waters at 12 UTC on 1 December. It developed rapidly while accelerating northeastward on 2 December, and reached its peak intensity with maximum sustained winds of 100 kt and a central pressure of 925 hPa over the same waters at 18 UTC the same day. It transitioned into an extratropical cyclone over the sea east-northeast of the Ogasawara Islands by 00 UTC on 4 December, and dissipated over the same waters at 12 UTC 12 hours later.

TY RAI (2122)

RAI formed as a tropical depression (TD) over the sea around the Caroline Islands at 18 UTC on 11 December 2021 and moved westward. It was upgraded to tropical storm (TS) intensity at 06 UTC on 13 December and further upgraded to typhoon (TY) intensity at 18 UTC on 14 December over the same waters. It reached its first peak intensity with maximum sustained winds of 105 kt and a central pressure of 915 hPa over Siargao Islands of the Philippines at 06 UTC on 16 December. After passing over the central part of the Philippines with weakened maximum sustained winds of 80 kt or more, it reached its second peak intensity with maximum sustained winds of 105 kt and a central pressure of 915 hPa over the South China Sea at 18 UTC on 18 December. It turned northeastward over the same waters and weakened to TD intensity at 18 UTC on 20 December. It dissipated over the same waters at 12 UTC on the next day.