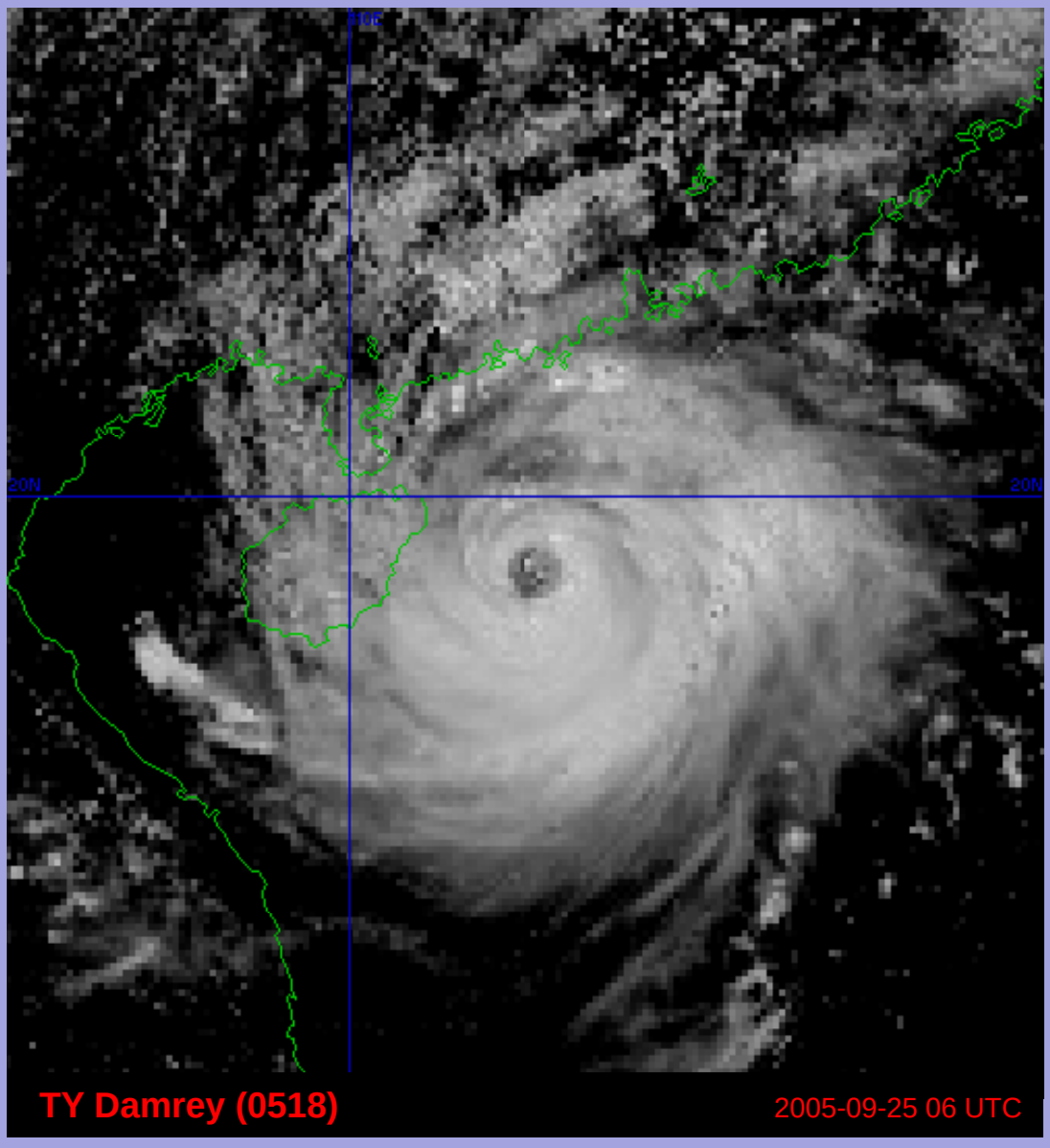
Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2005



Japan Meteorological Agency

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Introduction

The RSMC Tokyo - Typhoon Center (hereinafter referred to as "the Center") is the Regional Specialized Meteorological Centre (RSMC) with specialized activities in analysis, tracking and forecasting of western North Pacific tropical cyclones (TCs) within the framework of the World Weather Watch (WWW) Programme of the World Meteorological Organization (WMO). The Center was established at the headquarters of the Japan Meteorological Agency (JMA) in July 1989, following the designation by the WMO Executive Council at its 40th session held in Geneva in June 1988.

The Center conducts the following operations on a routine basis:

(1) Preparation of information on the formation, movement and development of TCs and associated meteorological phenomena,
(2) Preparation of information on synoptic scale atmospheric situations that affect the behavior of TCs, and
(3) Dissemination of the above information to National Meteorological Services (NMSs), in particular to the Members of the ESCAP/WMO Typhoon Committee, in appropriate formats for operational processing.

In addition to the routine services mentioned above, the Center distributes a series of reports entitled “Annual Report on Activities of the RSMC Tokyo - Typhoon Center” to serve as operational references for the NMSs concerned. This report aims at summarizing the activities of the Center and reviewing TCs of the year.

In this 2005 issue, the outline of routine operations at the Center and its operational products are presented in **Chapter 1**. **Chapter 2** reports the major activities of the Center in 2005. **Chapter 3** describes atmospheric and oceanic conditions in the tropics and gives the highlights of TC activities in 2005. In **Chapter 4**, verification statistics of operational forecasts and predictions of the two numerical weather prediction (NWP) models of the Center are presented. The best track data for the TCs in 2005 are shown in **table** and **chart** forms in appendices. All the texts, tables, charts and appendices are included in the CD-ROM attached to this report.

The CD-ROM contains three-hourly cloud images of all the TCs in 2005 of TS intensity or higher in the area of responsibility of the Center, together with the viewer software. The software has various functions for analyzing satellite imagery such as animation of images, which facilitates efficient post analysis of TCs and their environments. A setup program and a users’ manual for the software are also included in the CD-ROM. **Appendix 7** shows an outline of the CD-ROM and how to use the software.

Chapter 1

Operations at the RSMC Tokyo - Typhoon Center in 2005

The area of responsibility of the Center covers the western North Pacific and the South China Sea (0° - 60°N, 100°E - 180°) including the marginal seas and adjacent land areas (see Figure 1.1). The Center makes analyses and forecasts of tropical cyclones (TCs) when they are in or expected to move into the area. The Center provides the National Meteorological Services (NMSs) concerned with **the RSMC products** through such means as the GTS, the AFTN, the JMA radio facsimile broadcast (JMH).

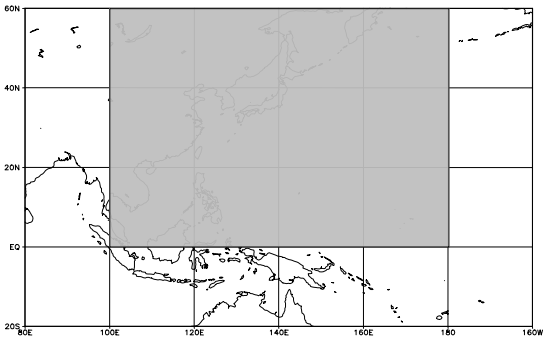


Figure 1.1
Area of responsibility of the RSMC Tokyo - Typhoon Center.

1.1 Analysis

Surface analyses are performed four times a day, at 00, 06, 12 and 18 UTC. The TC analysis begins with the determination of the center position of a TC. Cloud images from the Multi-functional Transport Satellite (MTSAT) are the principal source for the determination of the center position, especially of TCs migrating over the data-sparse ocean area. The direction and speed of the movement of a TC are determined primarily from the six-hourly displacement vectors of the center position.

The central pressure of a TC is determined mainly from the CI-number, which is derived from satellite imagery using Dvorak's method. The CI-number also gives the maximum sustained wind speed in the vicinity of the center. Radii of circles for the gale-force wind and the storm-force wind are determined mainly from surface observations, QuikScat observations and low-level cloud motion winds (LCW) derived from cloud motion vectors of satellite images in the vicinity of the TC.

1.2 Forecast

Predictions of two NWP models of JMA, Typhoon Model (TYM) and Global Spectral Model (GSM), provide a primary basis for TC track forecasts. The Persistence-Climatology method (PC method) that uses statistical techniques on the basis of linear extrapolation and climatological properties of TC movements is also adopted for TCs particularly in lower latitudes. The central pressure and the maximum sustained wind speed are forecasted based on the results of NWP, Dvorak's method and the PC method.

Probability circle shows the range into which the center of a TC is expected to move with 70% probability at each validation time. The radius of the circle is statistically determined according to the speed of TC movement based on verification results of the recent TC track forecasts.

1.3 Provision of RSMC Products

The Center prepares and disseminates the following RSMC bulletins and charts via the GTS, the AFTN or the JMH when

- a TC of tropical storm (TS) intensity or higher exists in the area of responsibility of the Center,
- a TC is expected to reach TS intensity or higher in the area within 24 hours, or
- a TC of TS intensity or higher is expected to move into the area within 24 hours.

The RSMC products are continually issued as long as a TC keeps TS intensity or higher within the area of responsibility. **Appendix 5** denotes the code forms of the bulletins transmitted through the GTS.

RSMC Tropical Cyclone Advisory (WTPQ20-25 RJTD: via GTS)

The RSMC Tropical Cyclone Advisory reports the following elements in the analysis, 24-, 48- and 72-hour forecasts of a TC, respectively:

Analysis	Center position Accuracy of determination of the center position Direction and speed of the movement Central pressure Maximum sustained wind speed (10-minute averaged) Radii of over 50- and 30-knot wind areas
24-, 48- and 72-hour forecast	Center position and radius of the probability circle Direction and speed of the movement Central pressure Maximum sustained wind speed (10-minute averaged)

RSMC Guidance for Forecast (FXPQ20-25 RJTD: via GTS)

The RSMC Guidance for Forecast reports the results of predictions of GSM and TYM; GSM is run twice a day with initial analyses at 00 and 12 UTC while TYM is run four times a day with initial analyses at 00, 06, 12 and 18 UTC. The Guidance presents GSM's six-hourly predictions of a TC up to 90 hours ahead for 00 and 12 UTC and TYM's six-hourly predictions up to 84 hours ahead for 00, 06, 12 and 18 UTC. It includes following elements:

NWP prediction (T=06 to 84 or 90)
Center position
Central pressure*
Maximum sustained wind speed*

** Predictions of these parameters are given as deviations from those at the initial time.*

SAREP (TCNA20/21 RJTD: via GTS)

The SAREP reports a TC analysis using satellite imagery including intensity information (CI-number) based on Dvorak's method. It is issued a half to one hour after observations at 00, 03, 06, 09, 12, 15, 18 and 21 UTC, and contains following elements

MTSAT imagery analysis
Center position
Accuracy of determination of the center position
Mean diameter of the cloud system
CI-number**
Apparent change in intensity in the last 24 hours**
Direction and speed of the movement

*** These parameters are reported only at 00, 06, 12 and 18 UTC.*

Regarding the WMO plan for migration to table driven code forms, the Center started disseminating SAREP report in BUFR format (IUCC10 RJTD) in November 2005, while the Center continues disseminating SAREP in the existing format. BUFR/CREX templates to translate into table driven code forms are given in the WMO webpage (**http://www.wmo.ch/web/www/WMOCodes.html**).

RSMC Prognostic Reasoning (WTPQ30-35 RJTD: via GTS)

The RSMC Prognostic Reasoning provides a brief reasoning for a TC forecast. It is issued at 00 and 06 UTC following the issuance of the RSMC Tropical Cyclone Advisory. In the bulletin, general comments on the forecasting method, synoptic situation of the subtropical ridge, movement and intensity of the TC, and some relevant remarks are given in plain language.

RSMC Tropical Cyclone Best Track (AXPQ20 RJTD: via GTS)

The RSMC Tropical Cyclone Best Track gives post-analyzed data of TCs of TS intensity or higher. It contains the center position, central pressure and maximum sustained wind. The best track for a TC is finalized usually one and a half months after the termination of issuance of the above RSMC bulletins for the TC.

Tropical Cyclone Advisory for SIGMET (FKPQ30-35 RJTD: via AFTN)

The Center, as one of the Tropical Cyclone Advisory Centres under the framework of the International Civil Aviation Organization (ICAO), provides the Tropical Cyclone Advisory for SIGMET for Meteorological Watch Offices (MWOs) concerned to support the preparation of SIGMET information on a TC. It includes the following elements in the analysis, and 12- and 24-hour forecasts of a TC:

Analysis	Center position Direction and speed of the movement Central pressure Maximum sustained wind speed (ten-minute average)
12- and 24-hour forecast	Center position Maximum sustained wind speed (ten-minute average)

1.4 RSMC Data Serving System

JMA has been operating the RSMC Data Serving System that allows NMSs concerned to retrieve NWP products such as predicted fields in grid-point-value (GPV) form and observational data through the Internet since 1995. The products and data provided through the System are listed in **Appendix 6**.

1.5 RSMC Tokyo - Typhoon Center Website

The RSMC Tokyo - Typhoon Center Website has been providing not only TC advisories on a real-time basis but also other products including TC analysis archive and annual reports on activities of the Center. The address of the website is as follows:

http://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/RSMC_HP.htm

1.6 Numerical Typhoon Prediction Website

JMA has been operating the Numerical Typhoon Prediction (NTP) website since 1 October 2004. NTP website provides predictions of TC tracks performed by the model of eight NWP centers: BoM (Australia), CMC (Canada), DWD (Germany), ECMWF, KMA (Republic of Korea), NCEP (USA), UKMO (UK), and JMA to assist the NMSs of the Typhoon Committee Members in better TC forecasting and warning services. NTP website includes:

- data tables and charts of the latest predicted positional data of the participating NWP centers with analysis data of JMA, which have several useful functions such as deriving an ensemble mean from any combination of the centers' predictions, and

- maps of the NWP models of the participating NWP centers.

Chapter 2

Major Activities of the RSMC Tokyo - Typhoon Center in 2005

2.1 Dissemination of RSMC Products

In 2005, the Center provided operational products for tropical cyclone (TC) forecasting to NMSs via such networks as the GTS and the AFTN. Monthly and annual total numbers of issuance of the products are listed in Table 2.1.

Table 2.1 Monthly and annual total number of products issued by the RSMC Tokyo - Typhoon Center in 2005.

Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TCNA20	15	0	11	18	0	41	85	108	122	58	28	0	**486**
TCNA21	19	0	18	22	4	42	95	125	144	61	33	3	**566**
WTPQ20-25	37	0	37	45	10	67	197	254	294	223	67	6	**1237**
WTPQ30-35	9	0	9	12	2	21	49	67	88	36	22	2	**317**
FXPQ20-25	29	0	25	33	7	62	141	185	213	91	48	4	**838**
FKPQ30-35	19	0	19	22	5	38	97	124	145	60	32	3	**564**
AXPQ20	0	1	1	0	1	0	1	3	7	5	1	3	**23**

2.2 Publication

The Center published “Annual Report on Activities of the RSMC Tokyo-Typhoon Center in 2004” in October 2005.

2.3 Monitoring of Observational Data Availability

The Center carried out regular monitoring of information exchange for enhanced observations of tropical cyclones in accordance with the standard procedures stipulated in Section 6.2, Chapter 6 of “The Typhoon Committee Operational Manual (TOM) - Meteorological Component.” The monitoring for the 2004-2005 season was conducted for the following two periods:

1. from 00UTC, 20 November to 18UTC, 24 November (for TY Muifa (0425)): and
2. from 00UTC, 1 August to 18UTC, 5 August (for TY Matsa (0509)).

The results were distributed to all the Typhoon Committee Members in March 2006, and are available on the Distributed Database of JMA at the following URL:

ftp://ddb.kishou.go.jp/pub/monitoring/

Chapter 3

Atmospheric and Oceanographic Conditions in the Tropics and Tropical Cyclones in 2005

3.1 Summary of Atmospheric and Oceanographic Conditions in the Tropics

As to sea surface temperature (SST) in the tropical Pacific, positive anomalies exceeding +0.5°C were widely found from 160°E to 160°W until March, and shrank after April. In the South China Sea, no anomalies were widely found throughout the year except March when negative SST anomalies were found.

Enhanced convection was widely found over the South China Sea and the sea east of the Philippines from June to September. Cyclonic wind circulations were found at lower troposphere over the sea east of the Philippines and the South China Sea from July to September, however not in June. In October, active convection was not found over the sea east of the Philippines. Monthly mean streamlines at 850hPa, outgoing longwave radiation (OLR) and TC tracks in June and September are presented in Figure 3.1. Low OLR area in lower latitudes indicates active convection.

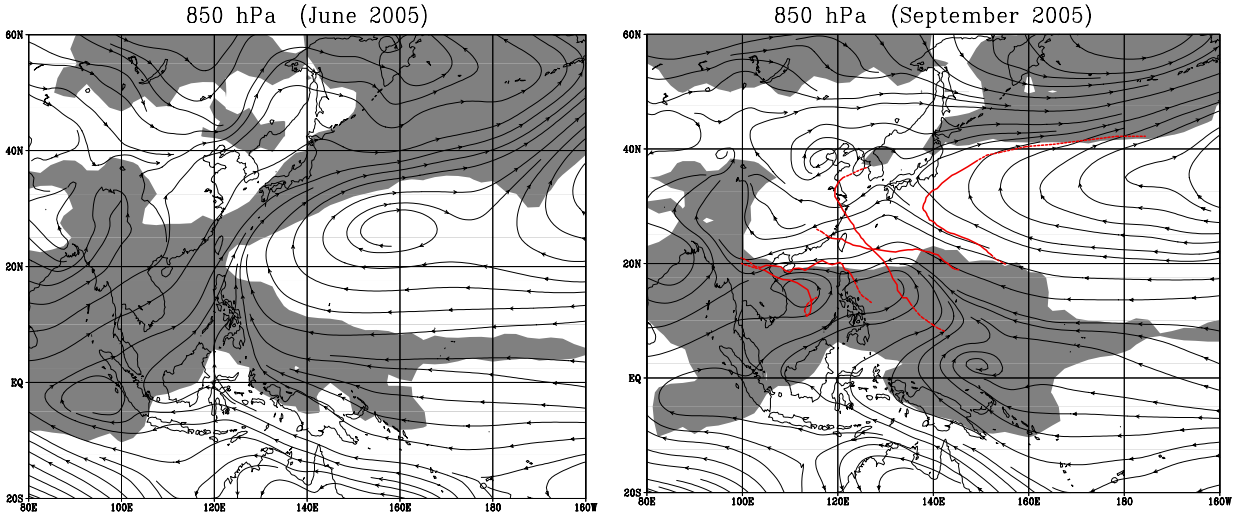


Figure 3.1 Monthly mean streamline at 850 hPa (lines with arrows) and area of less than 230 w/m^2 of OLR (shaded) in June and September 2005. Tracks of 5 named TCs formed in September are superimposed in the figure for September 2005. No named TCs formed in June 2005.

Consequently, many TCs formed over the South China Sea and the sea east of the Philippines from July to September, while few TCs formed in June and October.

Use attached CD-ROM to see charts. Charts of monthly mean SST anomalies for the western North Pacific and the South China Sea, monthly mean streamlines at 850hPa and 200hPa, and OLR for the months from January to December (**SST anomalies 2005.ppt** and **Streamline 2005.ppt**).

3.2 Tropical Cyclones in 2005

In 2005, twenty-three TCs of tropical storm (TS) intensity or higher formed in the western North Pacific and the South China Sea. The total number is below 26.7 of the 30-year average* frequency. Thirteen TCs out of them (57% of the total) reached typhoon (TY) intensity. Six out of the remainder attained severe tropical storm (STS) intensity and the others reached only TS intensity (see Table 3.1).

Table 3.1 List of TCs which attained TS intensity or higher in 2005.

Tropical Cyclone			Duration (UTC)			Duration (UTC)		Minimum Central Pressure (UTC)	(N)	(E)	(hPa)	Max Wind (kt)
STS	KULAP	(0501)	151200	Jan	-	190600	Jan	171200	15.7	149.6	985	50
STS	ROKE	(0502)	150000	Mar	-	171200	Mar	160600	11.7	128.9	980	55
TY	SONCA	(0503)	230000	Apr	-	271200	Apr	241200	14.5	130.8	935	90
TY	NESAT	(0504)	311200	May	-	110000	Jun	040000	14.6	131.4	930	95
TY	HAITANG	(0505)	130000	Jul	-	200600	Jul	160600	20.3	129.1	920	105
TS	NALGAE	(0506)	201200	Jul	-	241200	Jul	220600	30.6	158.7	990	45
STS	BANYAN	(0507)	211800	Jul	-	280000	Jul	231800	21.2	137.5	975	55
TS	WASHI	(0508)	291200	Jul	-	311800	Jul	291800	19.1	110.9	985	45
TY	MATSA	(0509)	311200	Jul	-	071200	Aug	041800	25.2	123.7	950	80
STS	SANVU	(0510)	110600	Aug	-	131800	Aug	121800	21.5	117.7	985	50
TY	MAWAR	(0511)	191800	Aug	-	280000	Aug	211800	22.9	139.8	930	95
STS	GUCHOL	(0512)	210600	Aug	-	251200	Aug	220600	28.2	146.7	980	55
TY	TALIM	(0513)	270000	Aug	-	020600	Sep	291800	21.2	130.6	925	95
TY	NABI	(0514)	291200	Aug	-	080600	Sep	020600	19.6	136.8	925	95
TY	KHANUN	(0515)	070000	Sep	-	130000	Sep	100900	24.5	124.9	945	85
TS	VICENTE	(0516)	161200	Sep	-	181800	Sep	180000	17.2	108.5	985	45
TY	SAOLA	(0517)	201800	Sep	-	261200	Sep	230600	27.6	139.2	950	80
TY	DAMREY	(0518)	210000	Sep	-	271800	Sep	250600	19.1	112.4	955	80
TY	LONGWAN(	(0519)	260000	Sep	-	030000	Oct	010000	22.5	126.9	930	95
TY	KIROGI	(0520)	100600	Oct	-	190600	Oct	120600	20.6	132.3	930	100
TY	KAI-TAK	(0521)	290000	Oct	-	020600	Nov	310000	14.6	111.8	950	80
TS	TEMBIN	(0522)	100000	Nov	-	101200	Nov	100000	14.9	124.5	1002	35
STS	BOLAVEN	(0523)	160600	Nov	-	200000	Nov	170600	13.0	128.9	985	55

The TC season of this year began in mid January with the formation of Kulap (0501). Roke (0502) is the first named TC formed in March in twelve years after Lewis (9303) formed. From April to May, two named TCs formed around active convection area over the sea far east of the Philippines. In June, no named TC formed (1.7 for the 30-year average*).

From July to September, five named TCs formed every month (4.1, 5.5 and 5.1 for the 30-year average* in July, August and September, respectively). In this period, subtropical high was enhanced south of Japan, and nine out of fifteen named TCs took westward track without recurving and made landfall on the continent or Taiwan. Among them, Talim (0513) and Damrey (0518) brought great damage to China, Laos, Viet Nam, the Philippines and Thailand. Talim made landfall on China in early September. Damrey took westward track in the South China Sea and made landfall on Viet Nam in late September. On the other hand, Nabi (0514) took northward track slowly in the sea around the Nansei Islands and

damaged Japan and Republic of Korea severely.

From October to December, there were fewer named TCs formed than normal. There were two named TCs formed in October and in November, while zero in December (3.9, 2.5 and 1.3 for 30-year average*).

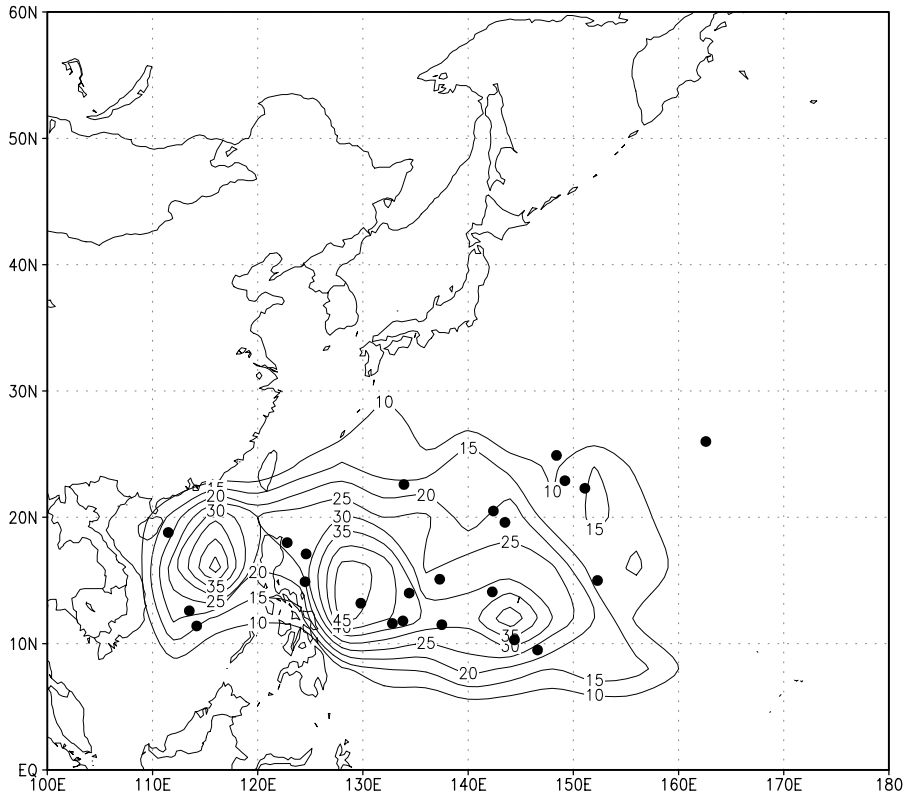


Figure 3.2 Genesis points of 23 TCs generated in 2005 (dots) and frequent distribution of genesis points for 1951-2004 (lines) derived from the RSMC TC best track data.

The mean formation position** of named TCs in 2005 of 16.4ºN and 136.2ºE was almost the same as the 30-year average* position of 16.2 ºN and 136.9ºE.

**30-year average from 1971 to 2000*

***Mean formation position here is defined as arithmetic average of latitudes (longitudes) of formation points of all TCs of TS intensity or higher in the year.*

Chapter 4

Verification of Forecasts in 2005

4.1 Operational Forecast

Operational forecasts of the twenty-three tropical cyclones (TCs) of TS intensity or higher in 2005 were verified with **the RSMC TC best track data**. Verified elements are 24-, 48- and 72-hour forecasts of the center position, central pressure and maximum sustained wind. Position and intensity errors of operational forecasts for each TC in 2005 are indicated in **Appendix 2**.

4.1.1 Center Position

Figure 4.1 shows annual mean errors of 24-hour (1982 - 2005), 48-hour (1988 - 2005) and 72-hour (1997 - 2005) forecasts of the center position. Annual mean position errors in 2005 were 101km (125km in 2004) for 24-hour forecast, 176km (243km) for 48-hour forecast and 266km (355km) for 72-hour forecast, all of which were the smallest since the beginning of operation of track forecast.

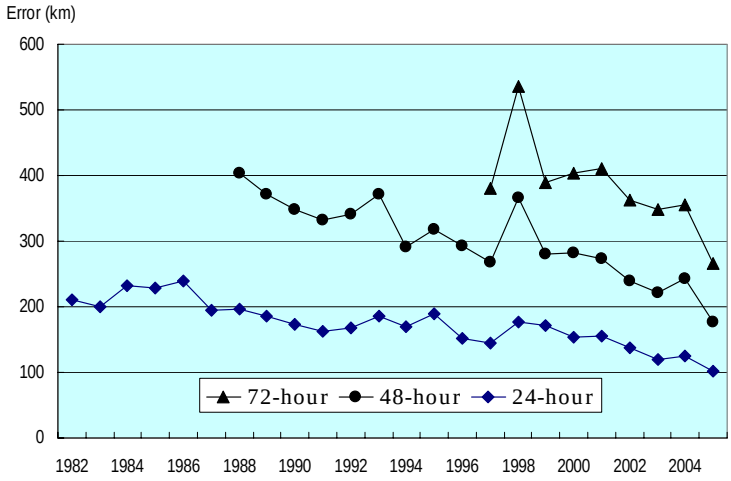


Figure 4.1 Annual means of position errors of 24-, 48- and 72-hour operational track forecasts.

Position errors of 24-, 48- and 72-hour track forecasts for each TC in this season are summarized in Table 4.1. The forecasts of Haitang (0505), Matsa (0509), Talim (0513), and Longwang (0519), which moved westward and then made landfall on China, had relatively small errors. On the other hand, the forecasts of Banyan (0507), which moved northward over the south of Japan and made landfall on Japan, had rather large errors.

Position errors were also compared with those by the persistency (PER) method*. The ratios of EO (position errors of operational forecasts) to EP (position errors of the PER method forecasts) in percentage are also described in Table 4.1. EO/EP smaller (greater) than 100% means that operational forecasts are better (worse) than the PER method forecasts. Annual mean EO/EPs for the 24-, 48- and 72-hour forecasts in 2005 were 53% (54% in 2004), 39% (47%) and 37% (45%), respectively.

**The PER method is based on the assumption that a TC holds the same movement throughout the forecast period, and the linear extrapolation of the latest 6-hour track of the TC can be applied for TC track forecast. Position errors by the PER method are used to evaluate the relative performance of operational forecast and model predictions.*

Table 4.1 Mean position errors of 24-, 48- and 72-hour operational forecasts for each TC in 2005. S.D., EO, EP, and EO/EP means standard deviation of operational forecast position errors, operational forecast position error, position error of the PER method, and the ratio of EO to EP, respectively.

Tropical Cyclone			24-hour Forecast				48-hour Forecast				72-hour Forecast			
			Mean (km)	S.D. (km)	Num.	EO/EP (%)	Mean (km)	S.D. (km)	Num.	EO/EP (%)	Mean (km)	S.D. (km)	Num	EO/EP (%)
STS	KULAP	(0501)	138	87	11	46	332	153	7	49	706	299	3	95
STS	ROKE	(0502)	178	107	6	104	98	21	2	0	0	0	0	0
TY	SONCA	(0503)	108	83	14	37	225	128	10	27	505	53	6	29
TY	NESAT	(0504)	74	41	38	42	120	81	33	29	225	129	28	32
TY	HAITANG	(0505)	95	45	25	47	122	67	21	22	142	69	17	14
TS	NALGAE	(0506)	140	86	12	78	144	110	8	26	200	76	4	19
STS	BANYAN	(0507)	138	56	21	51	324	123	17	56	573	193	13	71
TS	WASHI	(0508)	78	22	5	63	278	0	1	0	0	0	0	0
TY	MATSA	(0509)	75	50	24	56	91	54	20	36	188	122	16	52
STS	SANVU	(0510)	117	48	6	43	274	29	2	0	0	0	0	0
TY	MAWAR	(0511)	107	82	29	68	188	112	25	44	318	185	21	43
STS	GUCHOL	(0512)	74	43	13	27	210	72	9	20	355	212	5	13
TY	TALIM	(0513)	75	33	21	57	136	61	17	40	193	92	13	32
TY	NABI	(0514)	92	43	35	47	129	86	31	29	158	66	27	23
TY	KHANUN	(0515)	105	67	20	65	157	87	16	40	285	165	12	53
TS	VICENTE	(0516)	83	43	5	10	262	0	1	0	0	0	0	0
TY	SAOLA	(0517)	129	73	19	42	263	83	15	33	278	165	11	19
TY	DAMREY	(0518)	115	81	23	72	241	153	19	77	468	257	15	101
TY	LONGWAN	(0519)	78	37	24	61	145	61	20	42	226	84	16	42
TY	KIROGI	(0520)	112	61	32	81	208	151	28	68	209	117	24	40
TY	KAI-TAK	(0521)	78	35	13	48	115	35	9	34	152	21	5	26
TS	TEMBIN	(0522)	0	0	0	0	0	0	0	0	0	0	0	0
STS	BOLAVEN	(0523)	136	28	11	65	171	76	7	37	107	10	3	15
Annual Mean (Total)			101	63	407	53	176	118	318	39	266	191	239	37

Figure 4.2 presents the histograms of 24-hour forecast position errors. About 82% (71% in 2004) of 24-hour forecasts, 86% (72%) of 48-hour forecasts, and 87% (76%) of 72-hour forecasts had errors less than 150km, 300km, and 450 km, respectively.

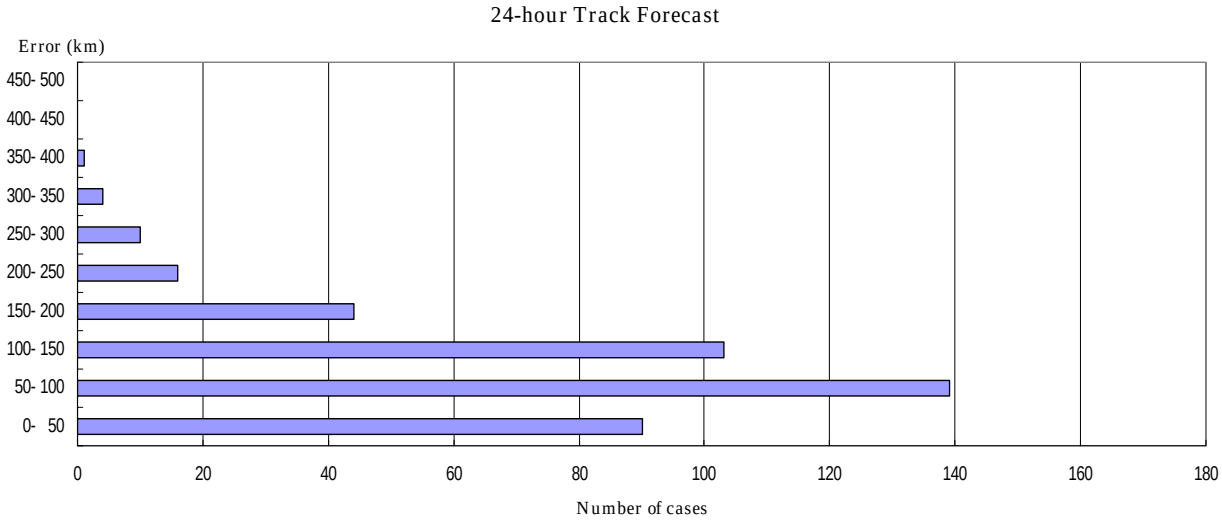


Figure 4.2 Histogram of 24-hour forecast position errors in 2005.

(Those for 48- and 72- hour forecasts are shown in the attached CD-ROM.)

Table 4.2 presents mean hitting ratios and radii of 70% probability circles of operational forecasts for each tropical cyclone in 2005. Hitting ratio means the ratio of positions within 70% probability circles among all six-hourly positions of TCs. The annual mean radius of the circles issued with 24-hour position forecasts was 160km (164km in 2004), and their hitting ratio was 84% (75% in 2004). As for 48-hour forecasts, those were 285km (288km) and 85% (70%), and for 72-hour forecasts, 434km (432km) and 87% (73%), respectively.

Table 4.2 Mean hitting ratios (%) and radii (km) of 70% probability circles issued for 24-, 48- and 72-hour operational forecasts for each TC in 2005.

Tropical Cyclone			24-hour Forecast			48-hour Forecast			72-hour Forecast		
			Ratio (%)	Num.	Radius (km)	Ratio (%)	Num.	Radius (km)	Ratio (%)	Num.	Radius (km)
STS	KULAP	(0501)	73	11	185	29	7	307	33	3	513
STS	ROKE	(0502)	50	6	176	100	2	315	0	0	0
TY	SONCA	(0503)	64	14	169	80	10	296	50	6	494
TY	NESAT	(0504)	92	38	163	94	33	282	96	28	435
TY	HAITANG	(0505)	92	25	148	100	21	278	100	17	408
TS	NALGAE	(0506)	58	12	164	88	8	285	100	4	408
STS	BANYAN	(0507)	71	21	165	41	17	287	38	13	448
TS	WASHI	(0508)	100	5	148	100	1	315	0	0	0
TY	MATSA	(0509)	92	24	157	100	20	278	94	16	408
STS	SANVU	(0510)	67	6	148	50	2	278	0	0	0
TY	MAWAR	(0511)	86	29	167	80	25	284	86	21	446
STS	GUCHOL	(0512)	100	13	178	100	9	317	80	5	508
TY	TALIM	(0513)	100	21	148	100	17	278	100	13	408
TY	NABI	(0514)	94	35	159	94	31	284	100	27	431
TY	KHANUN	(0515)	80	20	158	94	16	279	67	12	408
TS	VICENTE	(0516)	100	5	152	100	1	278	0	0	0
TY	SAOLA	(0517)	74	19	165	67	15	293	91	11	492
TY	DAMREY	(0518)	65	23	148	58	19	278	47	15	408
TY	LONGWANG	(0519)	96	24	154	100	20	287	100	16	417
TY	KIROGI	(0520)	84	32	168	86	28	287	100	24	460
TY	KAI-TAK	(0521)	100	13	148	100	9	278	100	5	408
TS	TEMBIN	(0522)	0	0	0	0	0	0	0	0	0
STS	BOLAVEN	(0523)	64	11	148	86	7	278	100	3	408
Annual Mean (Total)			84	407	160	85	318	285	87	239	434

4.1.2 Central Pressure and Maximum Wind Speed

Table 4.3 gives root mean square errors (RMSEs) of 24-, 48- and 72-hour operational central pressure forecasts for each TC in 2005. The RMSEs for maximum wind speed forecasts are included in **the attached CD-ROM**. Annual mean RMSEs of the central pressure and the maximum wind speed for 24-hour forecasts were 12.8hPa (11.4hPa in 2004) and 5.7m/s (5.1m/s in 2004), for 48-hour forecasts 17.0hPa (16.1hPa) and 7.7m/s (7.1m/s), and for 72-hour forecasts 19.0hPa (18.6hPa) and 10.0m/s (8.1m/s), respectively.

Operational forecasts for central pressure and maximum wind speed in 2005 were worse than those in 2004, which contributed to TCs developed quickly including Sonca (0503) and Mawar (0511). Sonca developed quickly from 990hPa at 06UTC, 23 April to 945hPa at 06UTC, 24 April, and Mawar also developed quickly from 985hPa at 18UTC, 20 August to 930hPa at 18UTC, 21 August.

Table 4.3 Mean intensity errors of 24-, 48- and 72-hour operational central pressure forecasts for each TC in 2005.

Tropical Cyclone			24-hour Forecast			48-hour Forecast			72-hour Forecast		
			Error (hPa)	RMSE (hPa)	Num.	Error (hPa)	RMSE (hPa)	Num.	Error (hPa)	RMSE (hPa)	Num.
STS	KULAP	(0501)	0.5	2.7	11	6.1	7.1	7	5.7	7.2	3
STS	ROKE	(0502)	1.5	8.4	6	2.0	2.8	2	0.0	0.0	0
TY	SONCA	(0503)	10.9	25.2	14	17.1	29.6	10	13.5	28.6	6
TY	NESAT	(0504)	0.1	14.4	38	-4.1	16.4	33	-6.1	12.7	28
TY	HAITANG	(0505)	1.7	10.5	25	1.9	10.9	21	-1.3	22.6	17
TS	NALGAE	(0506)	-5.8	7.3	12	-7.9	9.3	8	-9.8	11.5	4
STS	BANYAN	(0507)	-4.2	7.9	21	-11.4	14.9	17	-18.7	20.3	13
TS	WASHI	(0508)	2.8	3.6	5	6.0	6.0	1	0.0	0.0	0
TY	MATSA	(0509)	-6.4	9.1	24	-5.0	12.3	20	-6.6	18.5	16
STS	SANVU	(0510)	-1.0	3.1	6	0.0	7.0	2	0.0	0.0	0
TY	MAWAR	(0511)	1.8	17.0	29	1.7	20.3	25	-4.9	20.2	21
STS	GUCHOL	(0512)	2.8	6.5	13	2.2	5.8	9	5.4	8.0	5
TY	TALIM	(0513)	1.0	11.5	21	6.9	20.3	17	5.2	29.1	13
TY	NABI	(0514)	-2.6	12.7	35	-2.4	17.7	31	-3.7	16.4	27
TY	KHANUN	(0515)	3.4	6.8	20	7.8	13.4	16	13.4	18.0	12
TS	VICENTE	(0516)	-7.2	7.5	5	-14.0	14.0	1	0.0	0.0	0
TY	SAOLA	(0517)	4.2	6.8	19	9.0	13.1	15	11.4	15.4	11
TY	DAMREY	(0518)	1.8	11.5	23	8.7	19.6	19	17.9	22.6	15
TY	LONGWANG	(0519)	0.8	15.3	24	4.9	16.3	20	3.3	21.0	16
TY	KIROGI	(0520)	0.6	16.3	32	-0.2	20.0	28	1.6	15.5	24
TY	KAI-TAK	(0521)	-2.5	16.5	13	-6.0	23.7	9	-5.8	12.0	5
TS	TEMBIN	(0522)	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
STS	BOLAVEN	(0523)	-12.1	14.8	11	-13.3	14.3	7	-22.7	23.3	3
Annual Mean (Total)			-0.1	12.8	407	0.7	17.0	318	-0.2	19.0	239

Figure 4.3 presents the histogram of maximum wind speed errors for 24-hour forecasts. About 55% (60% in 2004) of 24-hour forecasts, 71% (67%) of 48-hour forecasts, and 62% (63%) of 72-hour forecasts had errors less than ±3.75 m/s, ±6.25 m/s and ±6.25 m/s, respectively.

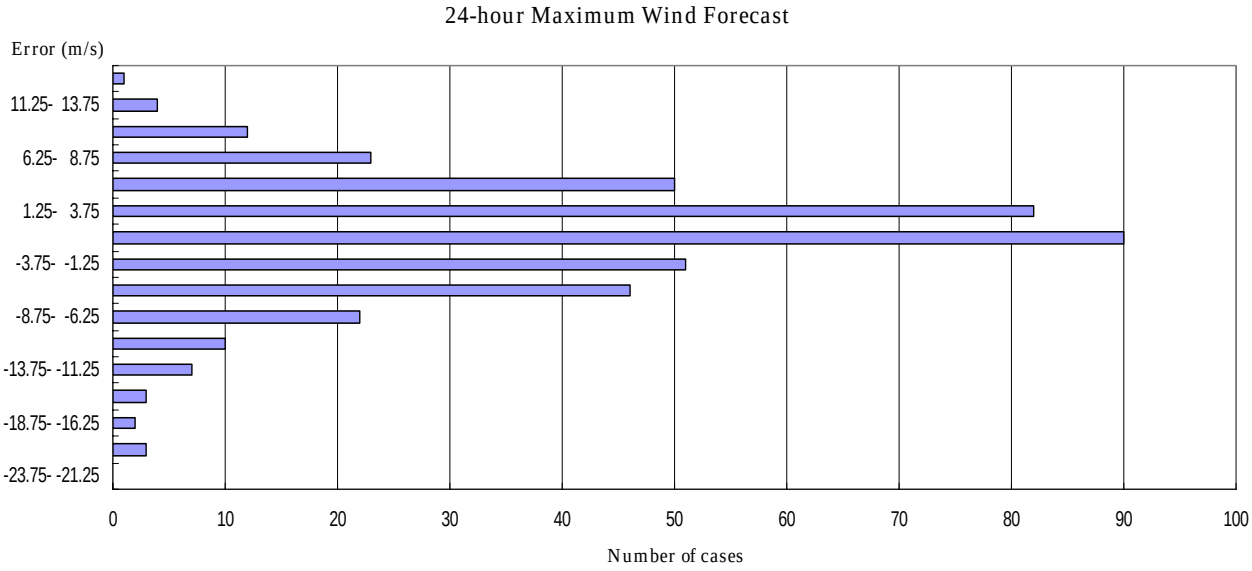


Figure 4.3 Histogram of 24-hour forecast maximum wind speed errors in 2005.

(Those for 48- and 72- hour forecasts are shown in **the attached CD-ROM**.)

4.2 TYM and GSM Predictions

JMA adopted the following changes to the JMA Global Spectral Model (GSM) and Typhoon Model (TYM) in 2005:

- introduction of a four-dimensional variational (4D-Var) method into global data assimilation system in February,
- introduction of a semi-Lagrangian advection scheme for GSM in February,
- a revised parameterization of cloud in radiation computation in GSM in July, and
- introduction of a new thinning scheme for one-hour time slots used in 4D-Var for ATOVS assimilation into global data assimilation system in August.

TYM and GSM provide primary information for forecasters of JMA to make operational track and intensity forecasts. Track predictions by TYM and GSM up to 84 and 90 hours, respectively, were verified with **the RSMC TC best track data** and predictions by the persistency (PER) method. 30-, 54- and 78-hour intensity predictions by TYM and GSM were also verified with these data.

4.2.1 TYM Prediction

1) Center Position

Annual mean position errors of TYM track predictions since 1996 are indicated in Figure 4.4. Annual mean position errors for 30-*, 54-* and 78-hour* predictions in 2005 were 131km (158km in 2004), 199km (249km) and 293km (361km), respectively. The overall performance of the TYM track predictions in 2005 was the best since 1996. Mean position errors of 18-, 30-, 42-, 54-, 66- and 78-hour predictions for each TC are also shown in Table 4.4.

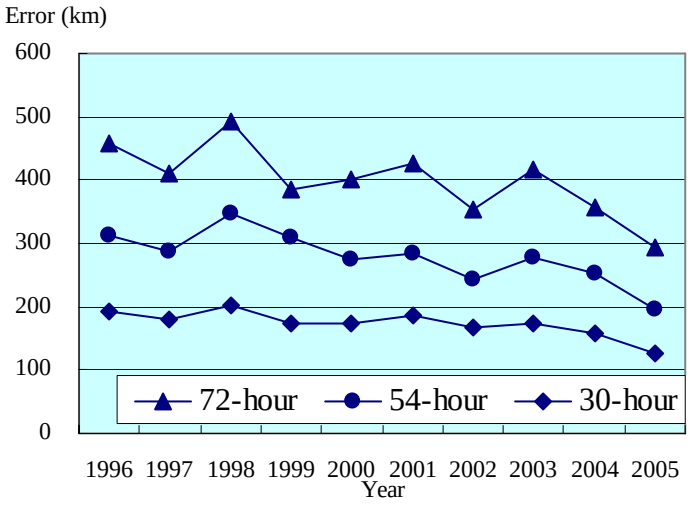


Figure 4.4 TYM annual mean position errors since 1996.

** 30-, 54- and 78-hour predictions by TYM and GSM are the primary information for forecasters in preparing 24-, 48- and 72-hour operational forecasts, respectively.*

Table 4.4 Mean position errors (km) of TYM for each TC in 2005.
Numbers of samples are given in parentheses.

Tropical Cyclone			T=18		T=30		T=42		T=54		T=66		T=78	
STS	0501	KULAP	91.4	(16)	148.8	(14)	193.9	(12)	252.8	(10)	355.4	(8)	448.0	(6)
STS	0502	ROKE	157.6	(15)	199.3	(13)	216.8	(11)	219.8	(9)	228.8	(7)	220.1	(4)
TY	0503	SONCA	99.6	(19)	112.7	(17)	126.6	(15)	165.9	(13)	240.9	(11)	390.7	(9)
TY	0504	NESAT	83.7	(43)	92.4	(41)	102.7	(39)	130.4	(37)	191.3	(35)	248.4	(33)
TY	0505	HAITANG	116.9	(33)	149.6	(31)	162.9	(29)	155.1	(27)	156.7	(25)	154.2	(23)
TS	0506	NALGAE	120.6	(15)	135.0	(13)	136.5	(11)	128.9	(9)	145.0	(7)	195.7	(5)
STS	0507	BANYAN	112.4	(24)	172.7	(22)	271.7	(20)	381.8	(18)	493.7	(16)	611.8	(14)
TS	0508	WASHI	70.5	(7)	92.7	(5)	84.6	(3)	315.3	(1)	-	(-)	-	(-)
TY	0509	MATSA	96.4	(28)	131.7	(26)	141.9	(24)	152.3	(22)	172.9	(20)	198.6	(18)
STS	0510	SANVU	116.1	(9)	190.1	(7)	208.0	(5)	284.6	(3)	292.9	(1)	-	(-)
TY	0511	MAWAR	108.4	(29)	160.6	(27)	197.0	(25)	235.0	(22)	296.7	(20)	326.6	(18)
STS	0512	GUCHOL	115.7	(14)	174.1	(12)	256.3	(10)	339.7	(8)	518.7	(6)	748.6	(4)
TY	0513	TALIM	97.6	(26)	118.2	(24)	135.0	(22)	158.5	(20)	174.7	(18)	223.4	(16)
TY	0514	NABI	73.0	(38)	103.4	(36)	124.7	(34)	144.6	(32)	169.6	(30)	189.3	(28)
TY	0515	KHANUN	83.4	(22)	114.2	(20)	145.5	(18)	197.7	(16)	254.0	(14)	299.7	(12)
TS	0516	VICENTE	113.7	(8)	68.3	(6)	83.2	(4)	131.5	(2)	-	(-)	-	(-)
TY	0517	SAOLA	93.7	(22)	124.5	(20)	188.5	(18)	253.8	(16)	365.5	(14)	520.9	(12)
TY	0518	DAMREY	100.7	(26)	156.3	(24)	216.8	(22)	304.5	(20)	353.4	(15)	468.5	(12)
TY	0519	LONGWANG	60.5	(27)	94.2	(25)	131.5	(23)	153.8	(21)	193.9	(19)	211.9	(17)
TY	0520	KIROGI	87.0	(35)	122.5	(33)	156.0	(31)	208.6	(29)	244.4	(27)	276.2	(25)
TY	0521	KAI-TAK	92.2	(16)	98.6	(14)	112.1	(12)	125.3	(10)	93.0	(8)	118.1	(6)
TS	0522	TEMBIN	182.1	(4)	153.9	(1)	-	(-)	-	(-)	-	(-)	-	(-)
STS	0523	BOLAVEN	170.4	(16)	191.5	(14)	204.9	(12)	245.5	(10)	306.9	(8)	336.8	(6)
	Annual	Mean	99.6	(492)	131.0	(445)	161.1	(400)	198.5	(355)	243.1	(309)	292.5	(268)

Table 4.5 gives TYM's relative performance compared with the PER method. In this comparison, life stages of TCs were classified into three stages, "Before", "During" and "After" recurvature. Each stage is defined with the direction of movement of each TC at each prediction time concerned. This table indicates that TYM outperformed the PER method throughout the forecast period beyond 18 hours from the initial time, and rates of error reduction of TYM to the PER-method were about 32% (28% in 2004), 49% (46%), 59% (53%), 63% (56%) and 65% (57%) for 18-, 30-, 42-, 54-, and 66-/78-hour predictions, respectively. The rates were better than those in 2004, and were relatively higher in "After" stage in which position errors of PER-methods were larger compared with other two stages, except for 66- and 78-hour predictions.

Figure 4.5 (in **the attached CD-ROM**) presents histograms of position errors of 30-, 54- and 78-hour predictions of TYM. About 65% (55% in 2004) of 30-hour predictions, 81% (73%) of 54-hour predictions, and 82% (75%) of 78-hour predictions had errors less than 150km, 300km, and 450km, respectively.

Table 4.5 Mean position errors (km) of TYM and PER predictions for the TCs in 2005 in stages before, during and after the recurvature. Numbers of samples are given in parentheses.

TIME	MODEL	Before	During	After	Total
T=18	TYM	105.0 (253)	96.1 (122)	91.8 (117)	99.6 (492)
	PER	137.8 (253)	137.7 (122)	176.0 (117)	146.8 (492)
	IMPROV	23.8 %	30.2 %	47.8 %	32.1 %
T=30	TYM	129.0 (221)	133.0 (108)	133.0 (116)	131.0 (445)
	PER	231.5 (221)	238.1 (108)	320.6 (116)	256.3 (445)
	IMPROV	44.3 %	44.2 %	58.5 %	48.9 %
T=42	TYM	153.8 (188)	152.2 (96)	180.4 (116)	161.1 (400)
	PER	343.9 (188)	323.2 (96)	529.8 (116)	392.9 (400)
	IMPROV	55.3 %	52.9 %	66.0 %	59.0 %
T=54	TYM	185.5 (159)	166.1 (82)	240.0 (114)	198.5 (355)
	PER	473.8 (159)	390.5 (82)	737.8 (114)	539.3 (355)
	IMPROV	60.8 %	57.5 %	67.5 %	63.2 %
T=66	TYM	209.4 (131)	187.8 (69)	318.6 (109)	243.1 (309)
	PER	608.5 (131)	482.0 (69)	904.3 (109)	684.6 (309)
	IMPROV	65.6 %	61.0 %	64.8 %	64.5 %
T=78	TYM	245.1 (103)	218.9 (64)	387.5 (101)	292.5 (268)
	PER	727.2 (103)	658.5 (64)	1053.8 (101)	833.9 (268)
	IMPROV	66.3 %	66.8 %	63.2 %	64.9 %

IMPROV: Error reduction rate of TYM to the PER method.

2) Central Pressure and Maximum Wind Speed

Mean errors of 30-, 54- and 78-hour central pressure predictions by TYM in 2005 were +3.0hPa (+2.1hPa in 2004), +5.3hPa (+4.4hPa) and +6.2hPa (+6.4hPa), respectively. Their root mean square errors (RMSEs) were 14.7hPa (13.3hPa in 2004) for 30-hour predictions, 18.5hPa (18.0hPa) for 54-hour predictions, and 20.3hPa (19.4hPa) for 78-hour predictions. The bias for 30-, 54-, and 78-hour maximum wind speed predictions was –2.4m/s (–2.0m/s in 2004) with a RMSE of 7.2m/s (7.0m/s), –3.7m/s (–3.4m/s) with a RMSE of 9.1m/s (8.4m/s), and –4.4m/s (–4.4m/s) with a RSME of 9.8m/s (9.0m/s), respectively.

Figure 4.6 shows histograms of the errors of 30-hour central pressure and maximum wind speed predictions. About 43% (40% in 2004) of the central pressure predictions had errors less than ±7.5hPa, while 42% (41%) of the maximum wind speed predictions had errors less than ±3.75m/s. As for 54-hour ones, these ratios were 59% (56%) with errors less than ±12.5hPa, and 61% (58%) with errors less than ±6.25m/s, respectively. These ratios for 78-hour ones were 67% (71%) with errors less than ±17.5hPa and 72% (71%) with errors less than ±8.75m/s, respectively. (Figures are shown in **the attached CD-ROM**.)

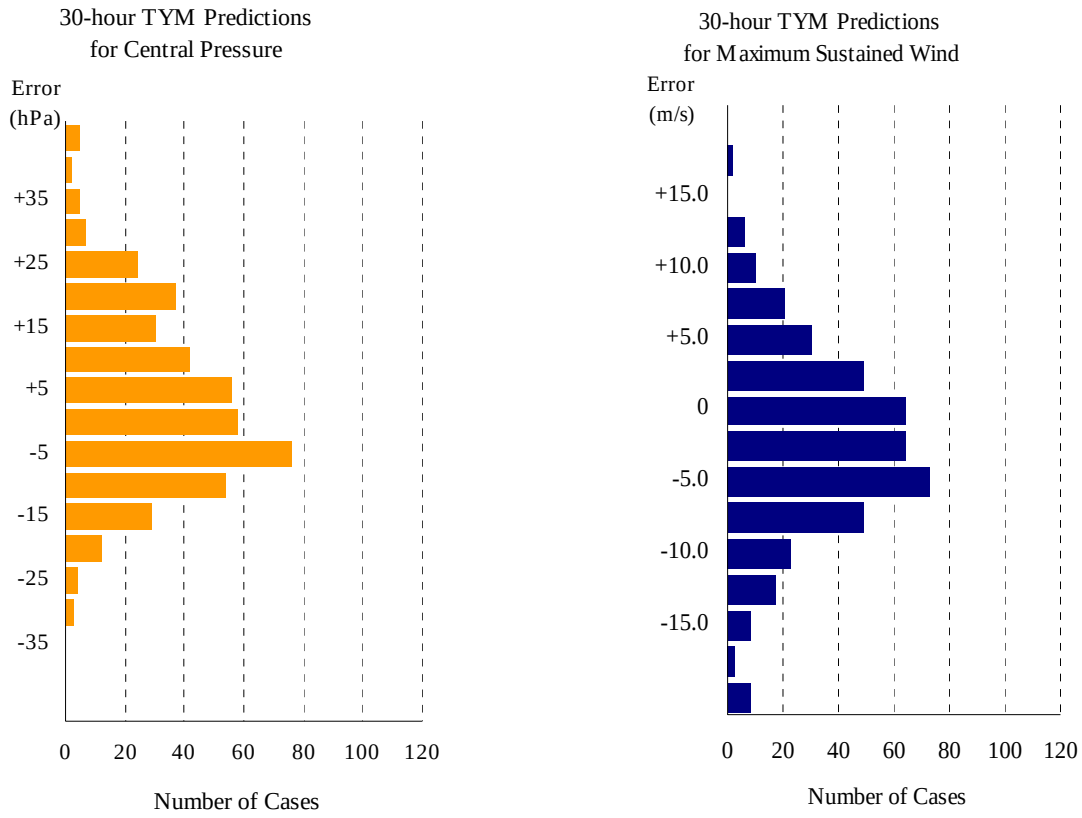


Figure 4.6 Error distributions of TYM 30-hour intensity predictions.
Left figure shows ones for central pressure, and right figure shows ones for maximum wind speed.
(Those for 54- and 78-hour predictions are included in **the attached CD-ROM**.)

4.2.2 GSM Prediction

1) Center Position

GSM annual mean position errors since 1996 are presented in Figure 4.7. In 2005, annual mean errors for 30-, 54- and 78-hour predictions were 127km (155km in 2004), 196km (252km) and 264km (358km), respectively. The overall performance of GSM was the best since 1996. Mean position errors of the 18-, 30-, 42-, 54-, 66- and 78-hour predictions for each TC are given in Table 4.6.

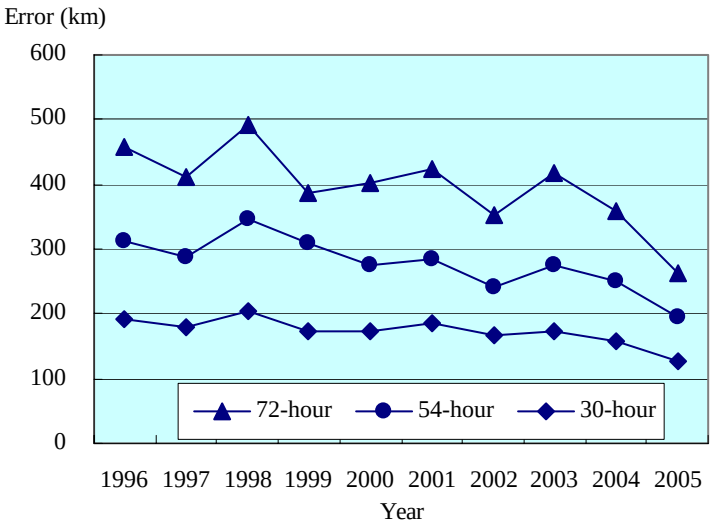


Figure 4.7 GSM annual mean position errors since 1996.

Table 4.6 Mean position errors (km) of GSM for each TC in 2005.
Numbers of samples are given in parentheses.

Tropical Cyclone			T=18		T=30		T=42		T=54		T=66		T=78	
STS	0501	KULAP	87.9	(8)	140.0	(7)	176.8	(6)	283.4	(5)	574.8	(4)	293.5	(2)
STS	0502	ROKE	204.3	(6)	233.6	(5)	238.0	(4)	277.0	(3)	236.5	(2)	203.1	(2)
TY	0503	SONCA	121.1	(10)	174.9	(9)	210.8	(8)	253.7	(7)	271.7	(6)	365.3	(5)
TY	0504	NESAT	86.0	(21)	107.6	(20)	125.5	(19)	134.3	(18)	177.1	(17)	231.1	(16)
TY	0505	HAITANG	108.3	(17)	139.5	(16)	164.0	(15)	166.2	(14)	154.1	(13)	158.4	(12)
TS	0506	NALGAE	110.6	(8)	136.9	(7)	173.0	(6)	182.5	(5)	188.0	(4)	190.8	(3)
STS	0507	BANYAN	76.1	(12)	112.0	(11)	178.7	(10)	278.5	(9)	348.6	(8)	446.1	(7)
TS	0508	WASHI	55.5	(2)	73.7	(1)	-	(-)	-	(-)	-	(-)	-	(-)
TY	0509	MATSA	96.3	(14)	112.3	(13)	129.9	(12)	140.8	(11)	179.6	(10)	236.8	(9)
STS	0510	SANVU	102.6	(5)	122.0	(3)	193.8	(2)	-	(-)	-	(-)	-	(-)
TY	0511	MAWAR	98.0	(15)	158.1	(13)	212.8	(11)	241.4	(9)	284.4	(7)	293.7	(6)
STS	0512	GUCHOL	135.7	(7)	184.5	(6)	285.6	(5)	395.4	(4)	565.0	(3)	635.9	(2)
TY	0513	TALIM	94.5	(13)	127.7	(12)	156.4	(11)	184.6	(10)	183.0	(9)	224.6	(8)
TY	0514	NABI	64.8	(19)	81.3	(18)	110.1	(17)	125.7	(16)	142.5	(15)	165.4	(14)
TY	0515	KHANUN	82.6	(11)	124.4	(10)	143.8	(9)	165.3	(8)	216.9	(7)	402.8	(6)
TS	0516	VICENTE	105.4	(4)	79.0	(2)	115.7	(1)	-	(-)	-	(-)	-	(-)
TY	0517	SAOLA	88.8	(11)	131.3	(10)	189.1	(9)	287.0	(8)	365.9	(7)	509.3	(6)
TY	0518	DAMREY	67.6	(13)	120.1	(12)	163.9	(10)	200.7	(9)	277.5	(7)	309.7	(5)
TY	0519	LONGWANG	88.6	(13)	108.7	(13)	110.0	(12)	119.5	(11)	128.3	(10)	146.6	(9)
TY	0520	KIROGI	92.6	(17)	130.3	(16)	190.0	(15)	254.3	(14)	271.6	(13)	251.7	(12)
TY	0521	KAI-TAK	55.1	(7)	81.4	(6)	130.3	(5)	169.9	(5)	158.5	(4)	207.5	(2)
TS	0522	TEMBIN	119.4	(1)	-	(-)	-	(-)	-	(-)	-	(-)	-	(-)
STS	0523	BOLAVEN	124.2	(8)	144.8	(7)	168.3	(6)	199.0	(5)	258.8	(4)	286.9	(3)
	Annual	Mean	94.4	(242)	126.8	(217)	161.9	(193)	195.9	(171)	231.5	(150)	263.8	(129)

Table 4.7 gives GSM's relative performance compared with the PER method. Rates of error reduction of GSM to the PER method were about 36% (30% in 2004), 51% (46%), 64% (56%) and 68% (57%) for 18-, 30-, 54- and 78-hour predictions, respectively.

Figure 4.8 (in **the attached CD-ROM**) presents histograms of the position errors of 30-, 54- and 78-hour predictions of GSM. About 70% (55% in 2004) of 30-hour prediction, 82% (71%) of 54-hour prediction, and 86% (76%) of 78-hour prediction had errors less than 150km, 300km, and 450km, respectively.

Table 4.7 Mean position errors (km) of GSM and PER predictions for the TCs in 2005 in stages before, during and after the recurvature.

TIME	MODEL	Before	During	After	Total
T=18	GSM	98.2 (118)	85.5 (63)	96.3 (61)	94.4 (242)
	PER	136.2 (118)	141.5 (63)	176.3 (61)	147.7 (242)
	IMPROV	27.9 %	39.6 %	45.4 %	36.1 %
T=30	GSM	117.8 (103)	116.1 (55)	152.4 (59)	126.8 (217)
	PER	226.6 (103)	244.6 (55)	326.9 (59)	258.4 (217)
	IMPROV	48.0 %	52.5 %	53.4 %	50.9 %
T=42	GSM	142.4 (87)	145.8 (48)	204.6 (58)	161.9 (193)
	PER	332.1 (87)	321.4 (48)	549.7 (58)	394.8 (193)
	IMPROV	57.1 %	54.6 %	62.8 %	59.0 %
T=54	GSM	160.2 (74)	164.4 (41)	266.1 (56)	195.9 (171)
	PER	464.4 (74)	356.1 (41)	771.2 (56)	538.9 (171)
	IMPROV	65.5 %	53.8 %	65.5 %	63.7 %
T=66	GSM	178.3 (63)	193.3 (34)	319.3 (53)	231.5 (150)
	PER	589.7 (63)	473.2 (34)	939.1 (53)	686.8 (150)
	IMPROV	69.8 %	59.2 %	66.0 %	66.3 %
T=78	GSM	193.5 (48)	265.6 (33)	332.8 (48)	263.8 (129)
	PER	736.9 (48)	607.0 (33)	1078.8 (48)	830.9 (129)
	IMPROV	73.7 %	56.3 %	69.1 %	68.3 %

IMPROV: Error reduction rate of GSM to the PER method

2) Central Pressure and Maximum Wind Speed

Figure 4.9 shows histograms of central pressure errors and the maximum wind speed errors of 30-hour predictions of GSM. The histograms show that in most cases GSM underestimated the intensity of TCs in its 30-hour predictions and had a relatively positive bias in the central pressure prediction.

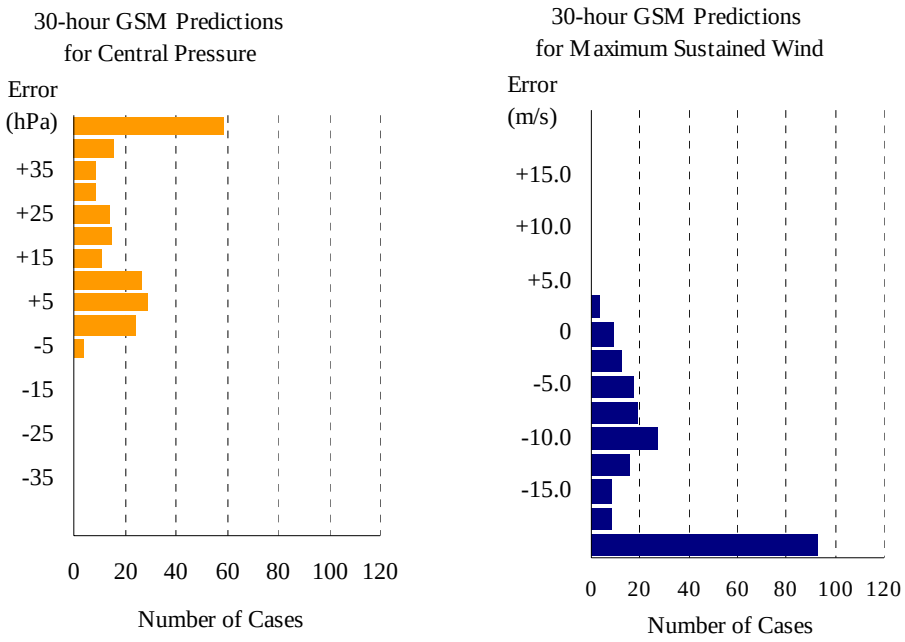
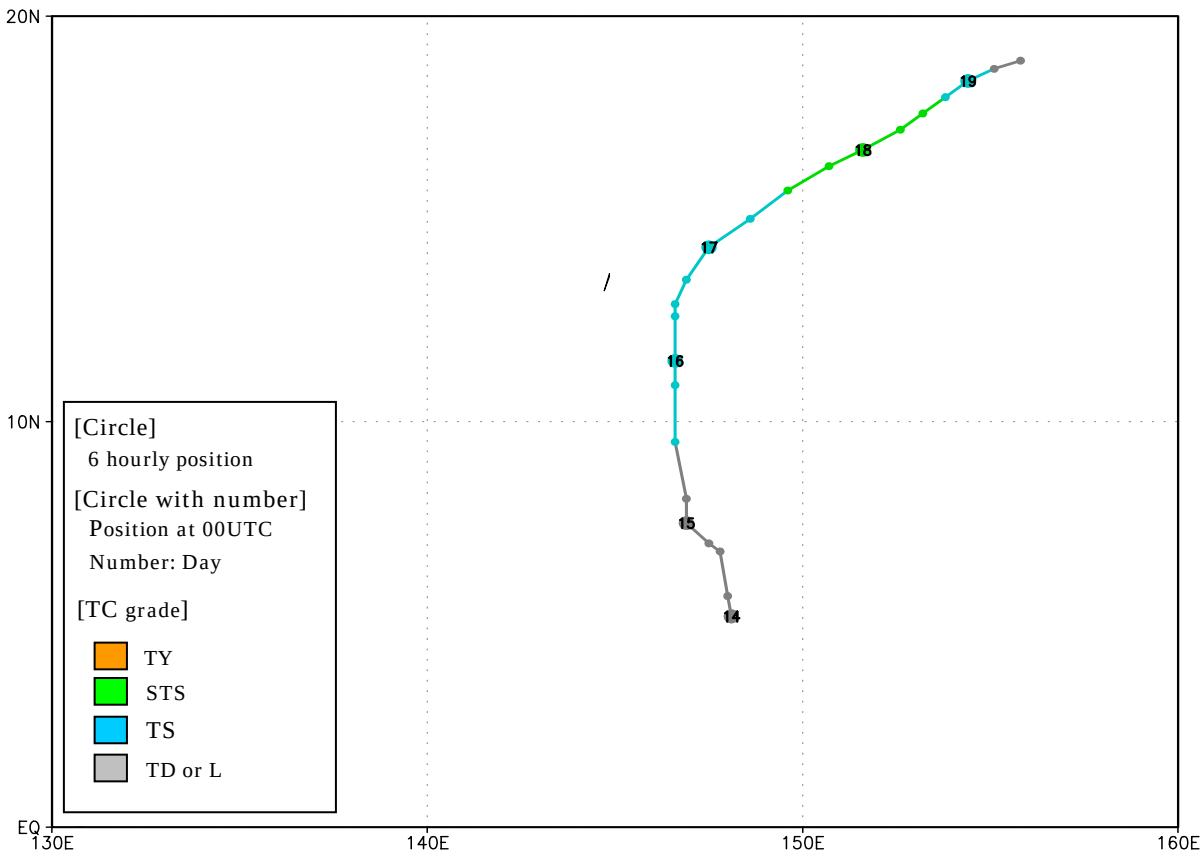


Figure 4.9 Error distributions of GSM 30-hour intensity predictions in 2005. Left figure shows ones for central pressure, and right figure shows ones for maximum wind speed. (Those for 54- and 78-hour predictions are included in the attached CD-ROM.)

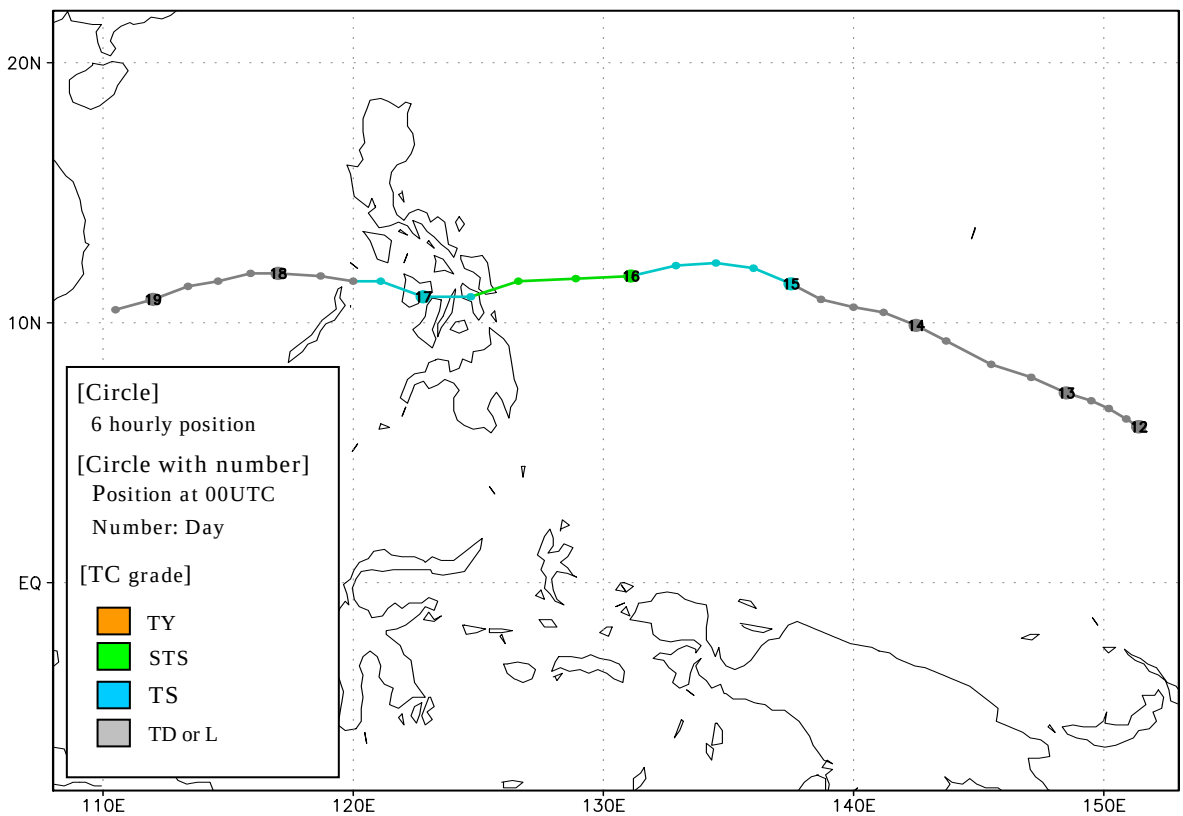
STS KULAP (0501)

KULAP formed as a tropical depression (TD) over the sea west of Truk Island at 00UTC, 14 January 2005. Moving northward, it developed into a tropical storm (TS) over the sea south of Guam at 12UTC, 15 January. Turning gradually to the northeast over the sea east of Guam, it attained the peak strength with the maximum sustained wind of 50kt and central pressure of 985hPa, and was upgraded to the Severe Tropical Storm (STS) intensity east of the Mariana Islands at 12UTC, 17 January. Keeping the track to the northeast, it was downgraded to the TS intensity and then transformed into an extratropical cyclone over the sea south of Minamitorishima Island at 18UTC, 18 January and 06UTC, 19 January respectively. It dissipated over the same waters at 18UTC, 19 January.



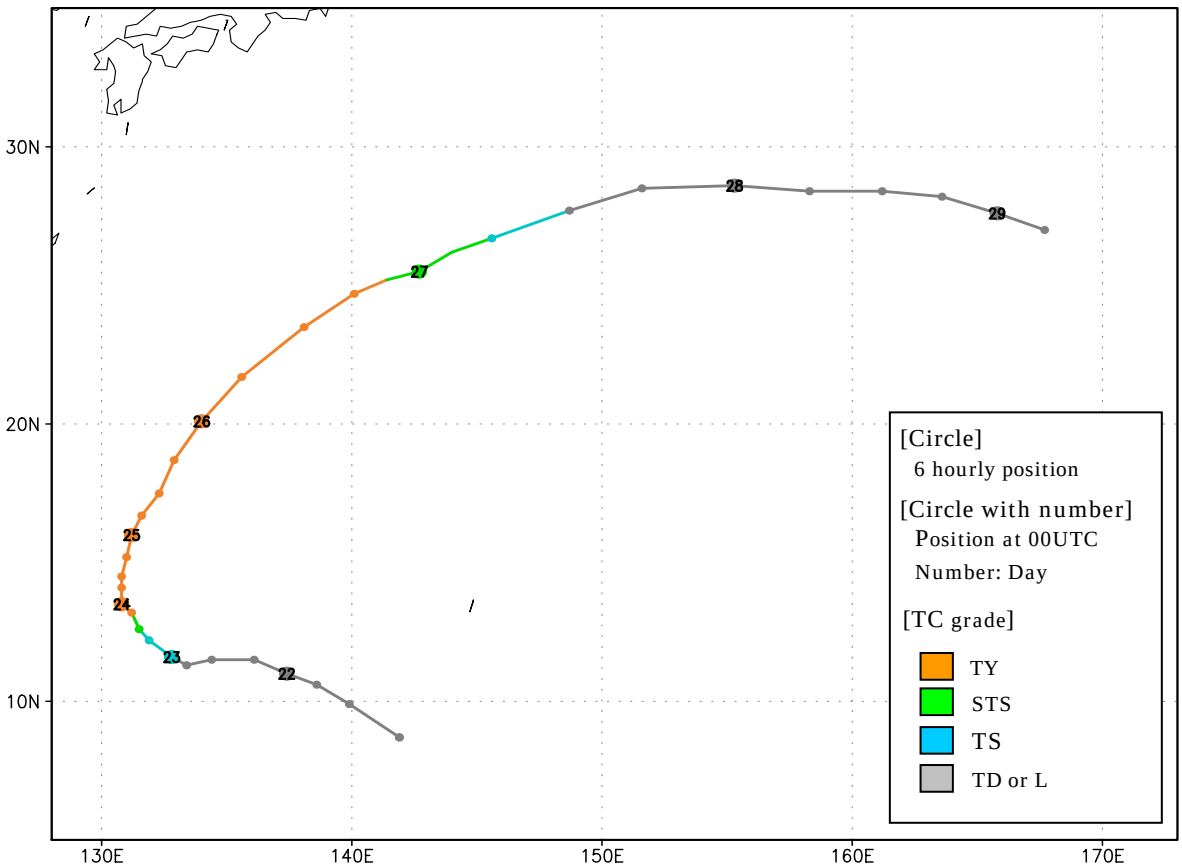
STS ROKE (0502)

ROKE formed as a tropical depression (TD) around Truck Island at 00UTC on 12 March 2005. It moved west-northwestward, and developed into a tropical storm (TS) far east of the Philippines at 00UTC, 15 March. Moving westward, it was upgraded to the Severe Tropical Storm (STS) intensity, and then reached the peak intensity with maximum sustained wind of 55kt and central pressure of 980hPa over the waters east of the Philippines at 00UTC and 06UTC, 16 March, respectively. Crossing the Philippines, it was downgraded to the TS intensity at 18UTC, 16 March and then weakened into a TD at 12UTC, 17 March. Keeping the track to the west, ROKE dissipated in the South China Sea at 12UTC, 19 March.



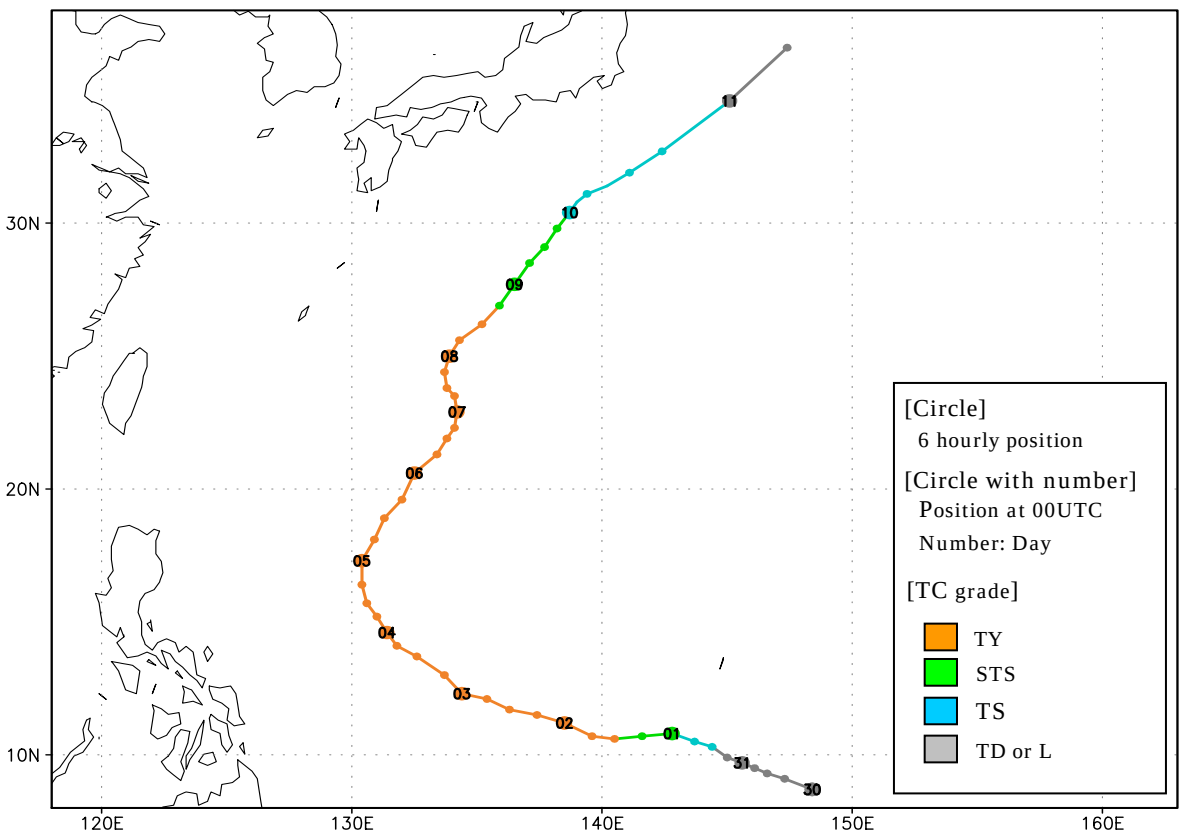
TY SONCA (0503)

SONCA formed as a tropical depression (TD) around the Caroline Islands at 06UTC on 21 April 2005 and moved west-northwestward. Continuing on the westward track, it became a tropical storm (TS) over the sea east of the Philippines at 00UTC on 23 April. Then turning gradually to the north, it developed quickly into the typhoon (TY) intensity at 18UTC, 23 April. It reached the peak strength with maximum sustained wind of 90kt and central pressure of 935hPa over the same waters at 12UTC on 24 April. After the recurvature, SONCA accelerated toward the east-northeast and quickly transformed into an extratropical cyclone east-northeast of Chichijima Island at 12UTC on 27 April. Then it turned to the east and dissipated north of Wake Island at 12UTC, 29 April.



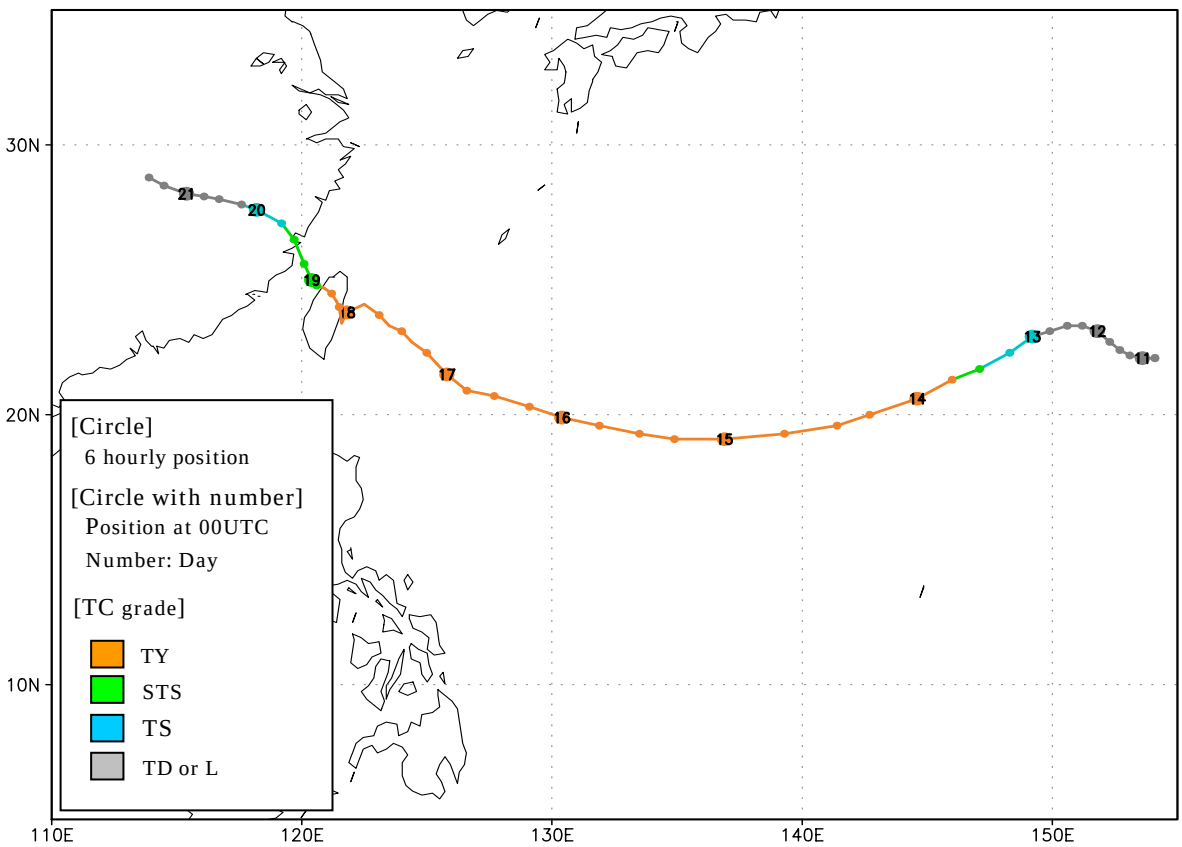
TY NESAT (0504)

NESAT formed as a tropical depression (TD) around the Caroline Islands at 00UTC, 30 May 2005 and moved west-northwestward. It reached the tropical storm (TS) intensity south of Guam at 12UTC, 31 May. Then it developed quickly into the typhoon (TY) intensity over the sea southwest of Guam at 12UTC, 1 June. NESAT gradually turned to the northwest on 3 June and reached its peak intensity with maximum sustained wind of 95 knots and central pressure of 930hPa east of the Philippines at 00UTC on the next day. After the recurvature, it moved northeastward with slight meander. After it passed south of Hachijojima Island, it weakened into a TD and then dissipated over the sea east of Japan at 00UTC and 12UTC, 11 June, respectively.



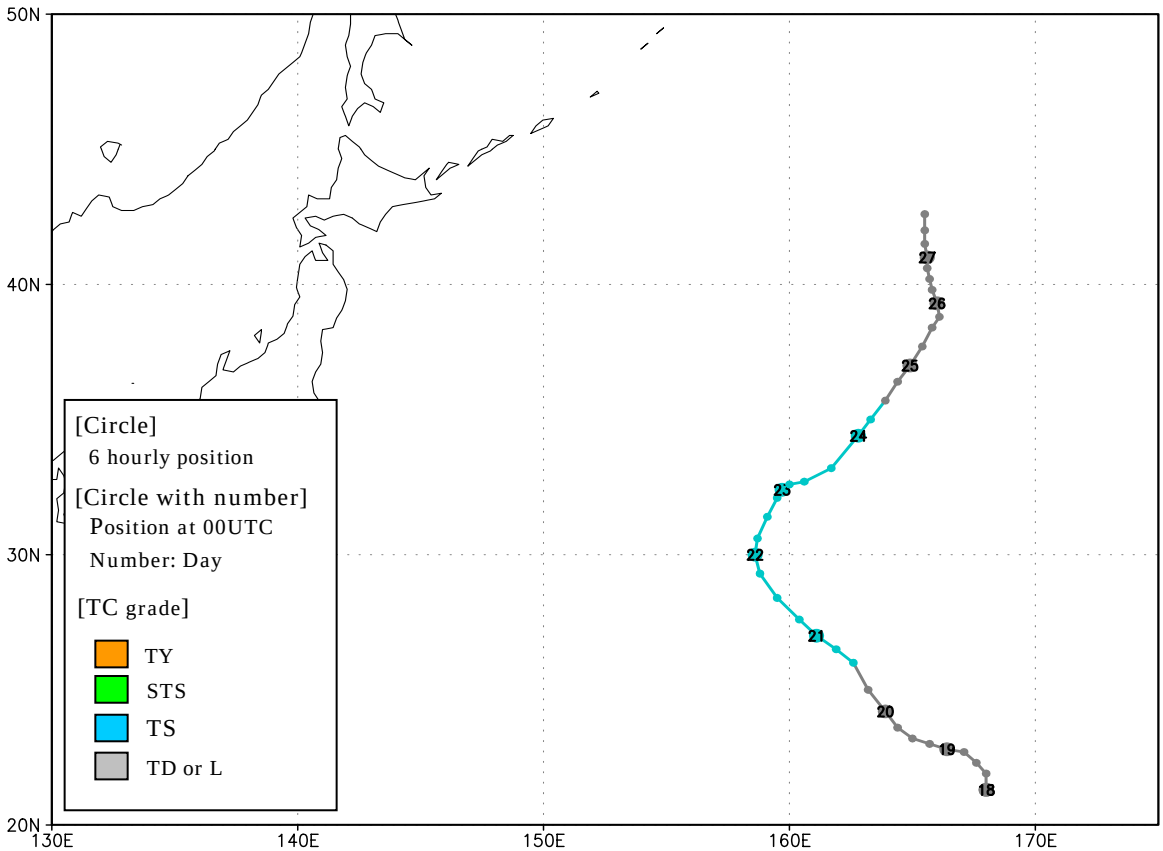
TY HAITANG (0505)

HAITANG formed as a tropical depression (TD) over the sea south of Minamitorishima Island at 18UTC on 10 July 2005. It moved westward, and developed into a tropical storm (TS) southwest of Minamitorishima Island at 00UTC, 13 July. Moving to the west-southwest, it developed quickly to the typhoon (TY) intensity north of the Mariana Islands at 18UTC, the same day. Turning westward and then west-northwestward, HAITANG reached the peak intensity with maximum sustained wind of 105kt and central pressure of 920hPa over the waters south of Okinawa Island at 06UTC, 16 July. After it moved northwestwards over the sea south of Ishigakijima Island on 17 July, it turned in the counterclockwise direction off the eastern coast of Taiwan. HAITANG turned toward the northwest, crossed Taiwan on 18 July, and then made landfall on Fujian, China on 19 July. It weakened into a TD and dissipated in the central China at 06UTC, 20 July and 18UTC, 21 July, respectively.



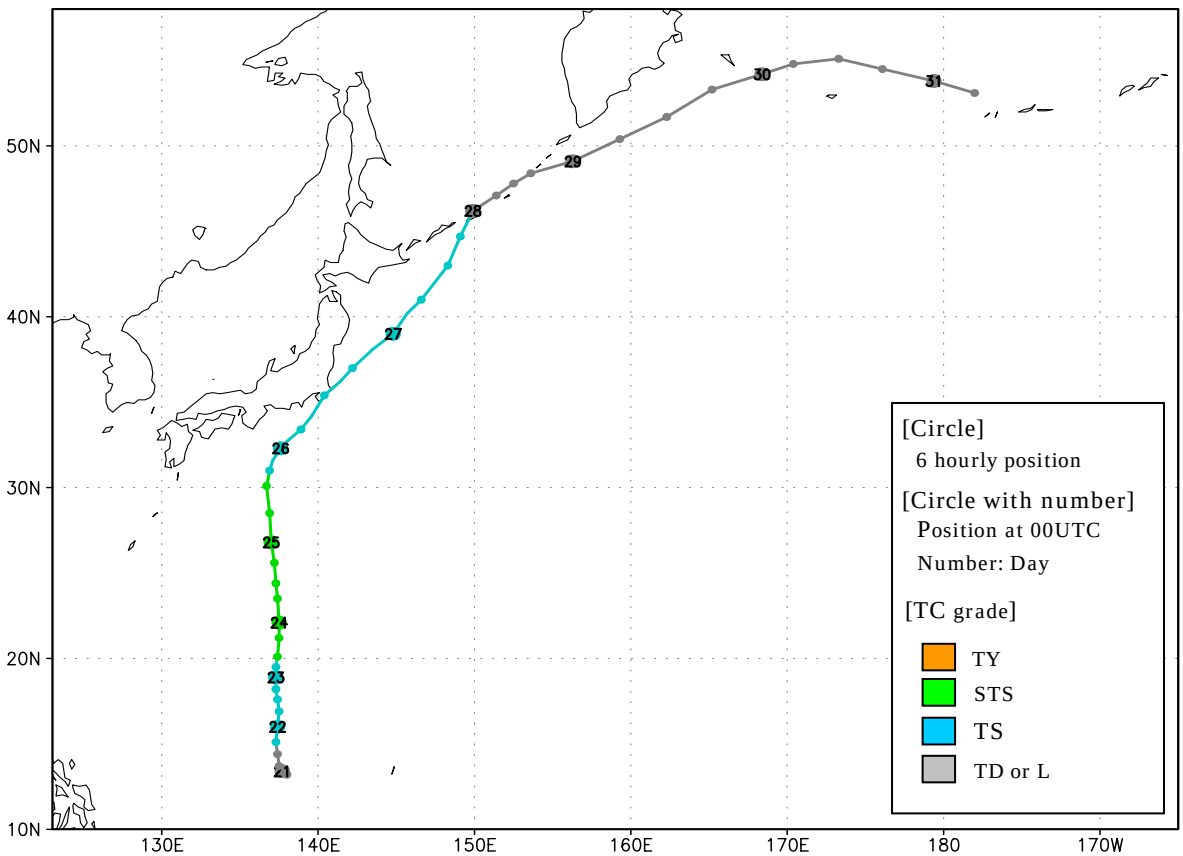
TS NALGAE (0506)

NALGAE formed as a tropical depression (TD) northeast of Wake Island at 00UTC on 18 July 2005. It moved northwestward, and developed into a tropical storm (TS) over the sea east of Minamitorishima Island at 12UTC, 20 July. During the recurvature, it reached the peak intensity with maximum sustained wind of 45kt and central pressure of 990hPa over the waters northeast of Minamitorishima Island at 06UTC, 22 July. Moving to the northeast, it weakened slightly and transformed into an extratropical cyclone over the waters far east of Japan at 12UTC, 24 July. It turned to the north and dissipated over the same waters at 00UTC, 28 July.



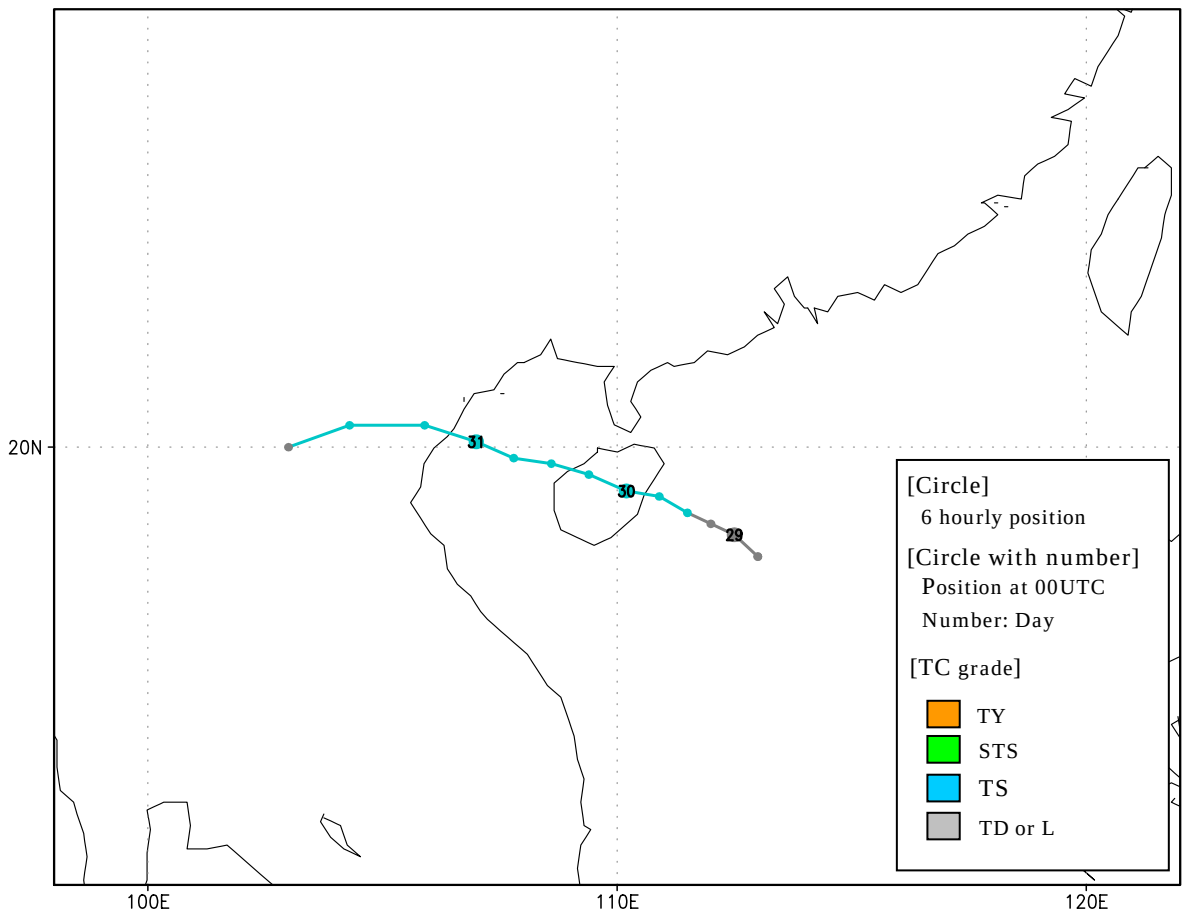
STS BANYAN (0507)

BANYAN formed as a tropical depression (TD) over the sea far east of the Philippines at 12UTC on 20 July 2005. Moving northward, it developed into a tropical storm (TS) over the same waters at 18UTC, 21 July. Keeping the track to the north, it was upgraded to the severe tropical storm (STS) intensity and reached the peak intensity with maximum sustained wind of 55kt and central pressure of 975hPa over the waters east of Okinotorishima Island at 12UTC and 18UTC, 23 July, respectively. From 24 to 26 July, it moved northward with almost the same intensity. After it turned northeastward south of Japan, BANYAN made landfall on Honshu before 12UTC, 26 July. Keeping the northeast track, it transformed into an extratropical cyclone around the Kurile Islands at 00UTC, 28 July. It turned gradually toward the east and crossed the International Date Line around the Aleutian Islands before 06UTC, 31 July.



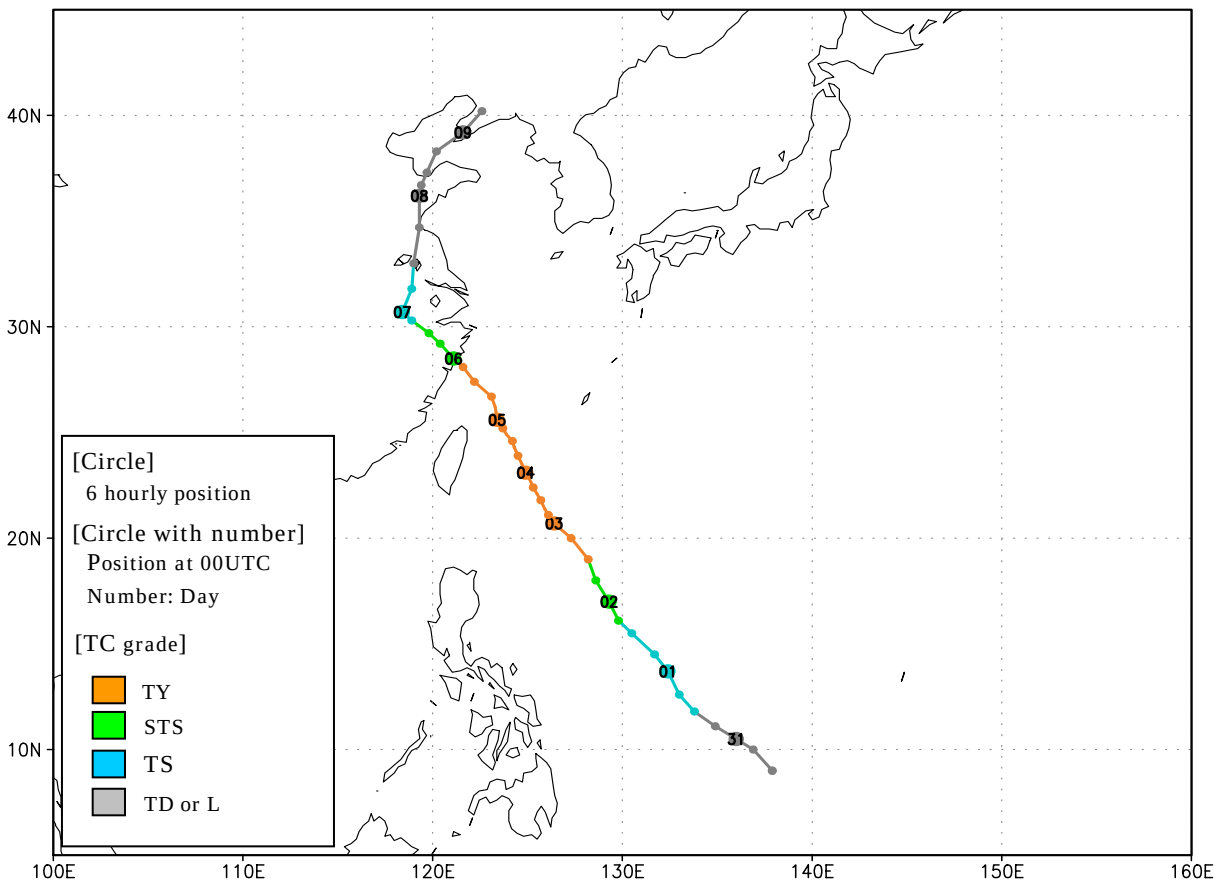
TS WASHI (0508)

WASHI formed as a tropical depression (TD) in the South China Sea at 18UTC on 28 July 2005. Moving westward, it developed into a tropical storm (TS) off the east coast of Hainan Island at 12UTC on the next day. Crossing Hainan Island westward, it reached the peak intensity with maximum sustained wind of 45kt and central pressure of 985hPa at 00UTC, 30 July. It moved westward in the Gulf of Tongking and then made landfall on Vietnam on 31 July. WASHI weakened into a TD and dissipated around the boundary between Laos and Vietnam at 18UTC, 31 July and 00UTC 1 August, respectively.



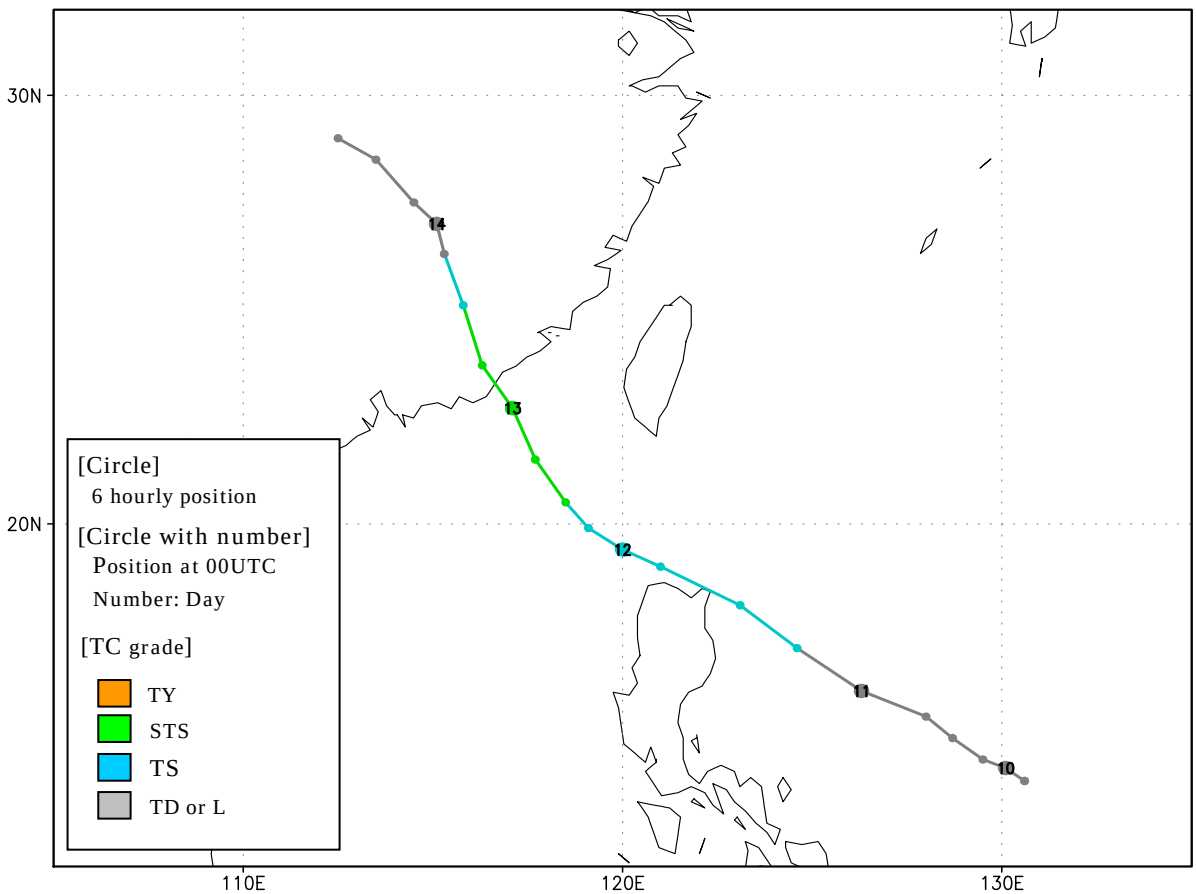
TY MATSA (0509)

MATSA formed as a tropical depression (TD) over the sea south of Yap Island at 12UTC on 30 July 2005. Moving northwestward, it developed into a tropical storm (TS) far east of the Philippines at 12UTC, 31 July. It moved to the northwest, and was upgraded to the typhoon (TY) intensity over the same waters at 12UTC, 2 August. Keeping the northwest track, it passed Ishigakijima Island before 11UTC, 4 August. Soon after it entered the East China Sea, it reached the peak intensity with maximum sustained wind of 80kt and central pressure of 950hPa at 18UTC on the same day. Moving to the northwest, MATSA made landfall on the central China and then was downgraded to the severe tropical storm (STS) intensity at 00UTC, 6 August. After it turned abruptly toward the north, it weakened into a TD north of Nanjin at 12UTC, 7 August. It transformed into an extratropical cyclone around Shandong Peninsula at 06UTC, 8 August and then turned toward the northeast. MATSA passed the Bohai and then dissipated around Liaodong Peninsula at 12UTC, 9 August.



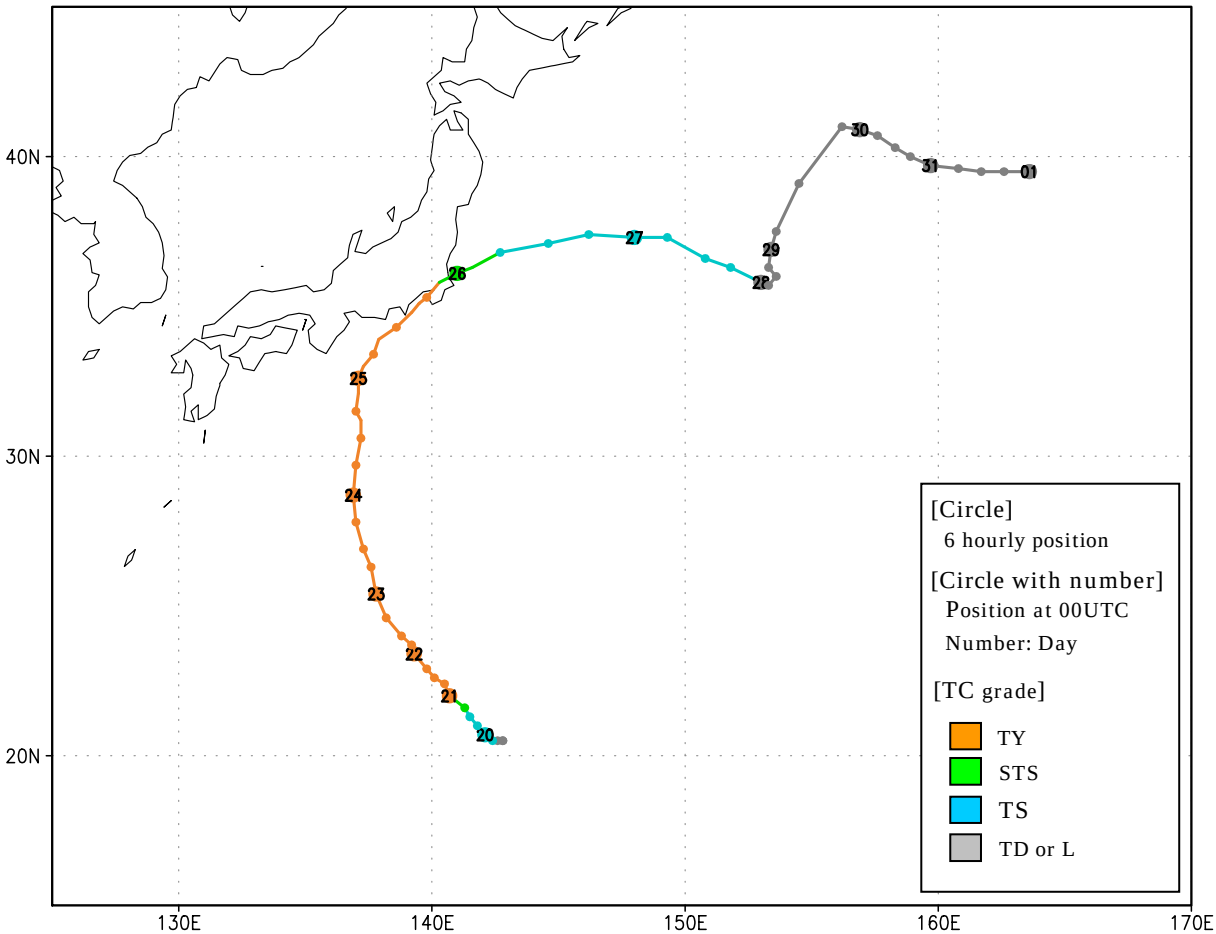
STS SANVU (0510)

SANVU formed as a tropical depression (TD) over the waters east of the Philippines at 18UTC on 9 August 2005. Moving to the west-northwest, it developed into a tropical storm (TS) over the same waters at 06UTC, 11 August. Keeping the west-northwestward track, it approached the north coast of Luzon Island after 12UTC on the same day. Turning gradually to the northwest, it was upgraded to the severe tropical storm (STS) intensity and reached the peak intensity with maximum sustained wind of 50kt and central pressure of 985hPa in the South China Sea at 12UTC and 18UTC on the next day. SANVU made landfall on the southern China after 00UTC, 13 August. Moving to the northwest, it was downgraded to the TS intensity and then weakened into a TD in the southern China at 12UTC and 18UTC on the same day. It dissipated in the central China at 00UTC, 15 August.



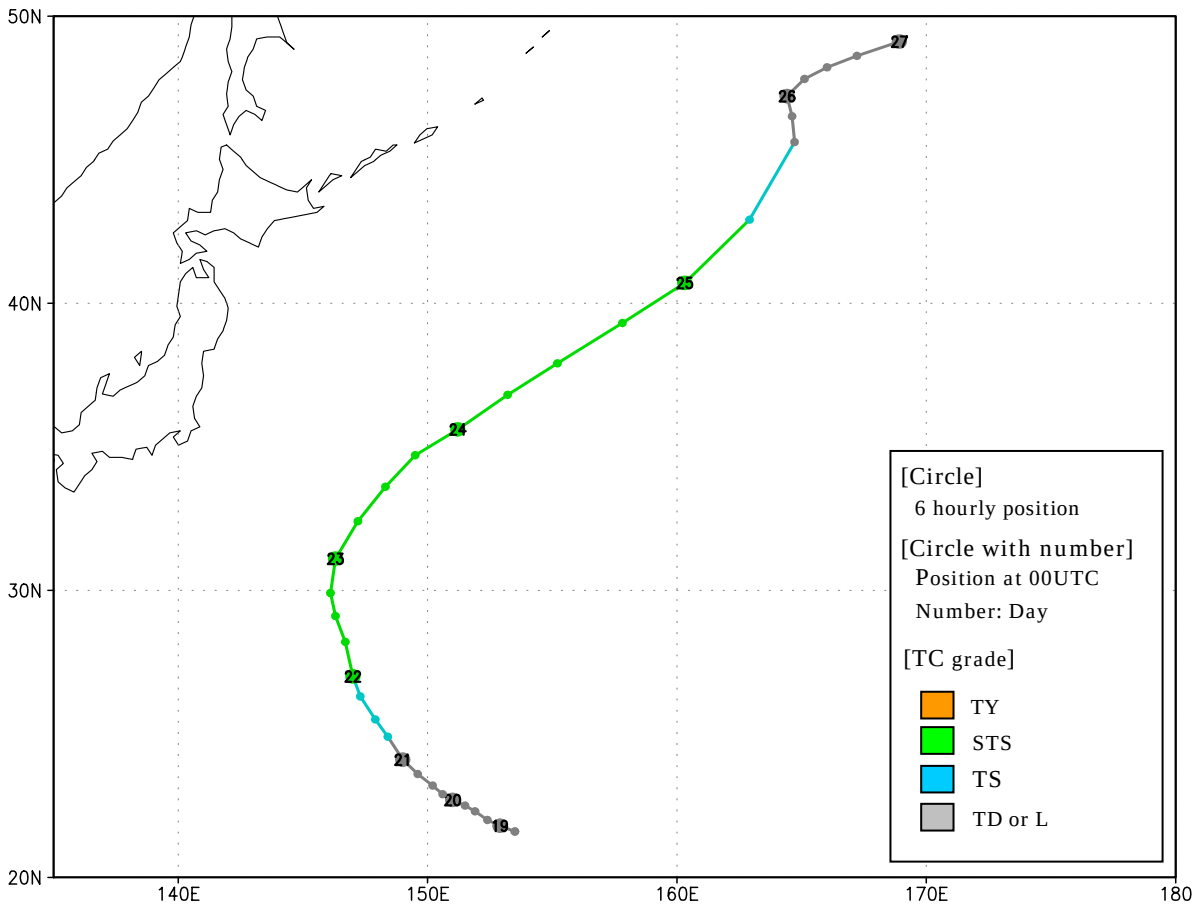
TY MAWAR (0511)

MAWAR formed as a tropical depression (TD) over the waters northwest of the Mariana Islands at 06UTC on 19 August 2005. Moving westward, it developed into a tropical storm (TS) over the same waters at 18UTC, 19 August. Turning to the northwest, it was upgraded to the typhoon (TY) intensity over the same waters at 00UTC, 21 August and then reached the peak intensity with maximum sustained wind of 95kt and central pressure of 930hPa at 18UTC on the same day. After it recurved south of Honshu on 24 August, it made landfall on Honshu with the TY intensity after 19UTC, 25 August. Soon after MAWAR entered the Pacific again, it was downgraded to the TS intensity at 06UTC, 26 August. Moving to the east, it transformed into an extratropical cyclone east of Japan at 00UTC, 28 August. It turned abruptly to the north and then to the east again, and dissipated over the same waters at 06UTC, 1 September.



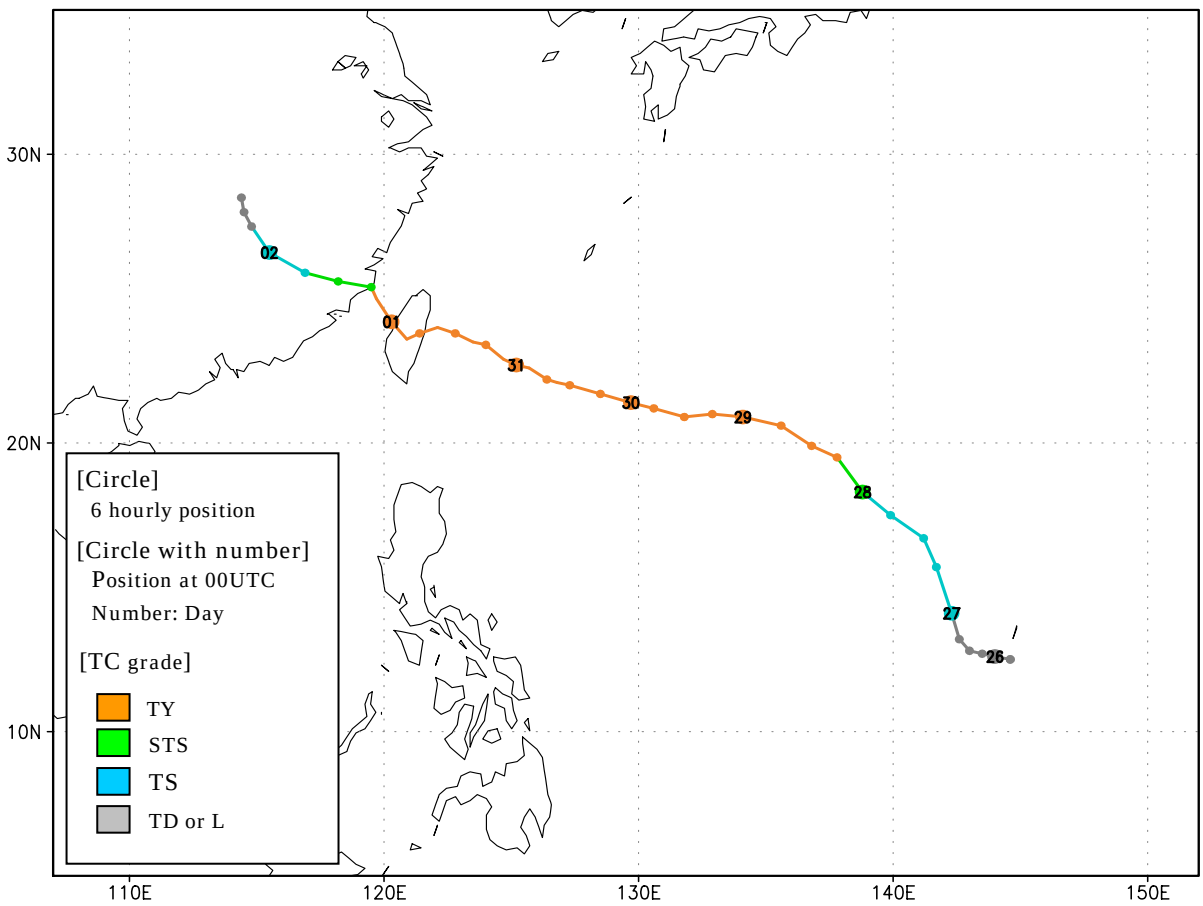
STS GUCHOL (0512)

GUCHOL formed as a tropical depression (TD) south of Minamitorishima Island at 18UTC, 18 August 2005. Moving to the west-northwest, it developed into a tropical storm (TS) west of Minamitorishima Island at 06UTC, 21 August. Turning to the north, it was upgraded to the severe tropical storm (STS) intensity and reached the peak intensity with maximum sustained wind of 55kt and central pressure of 980hPa over the sea east of Chichijima Island at 00UTC and 06UTC on the next day, respectively. After the recurvature on 22 August, it moved northeastward east of Japan keeping the intensity. GUCHOL transformed into an extratropical cyclone over the waters east of the Kurile Islands at 12UTC, 25 August. It dissipated over the same waters at 06UTC, 27 August.



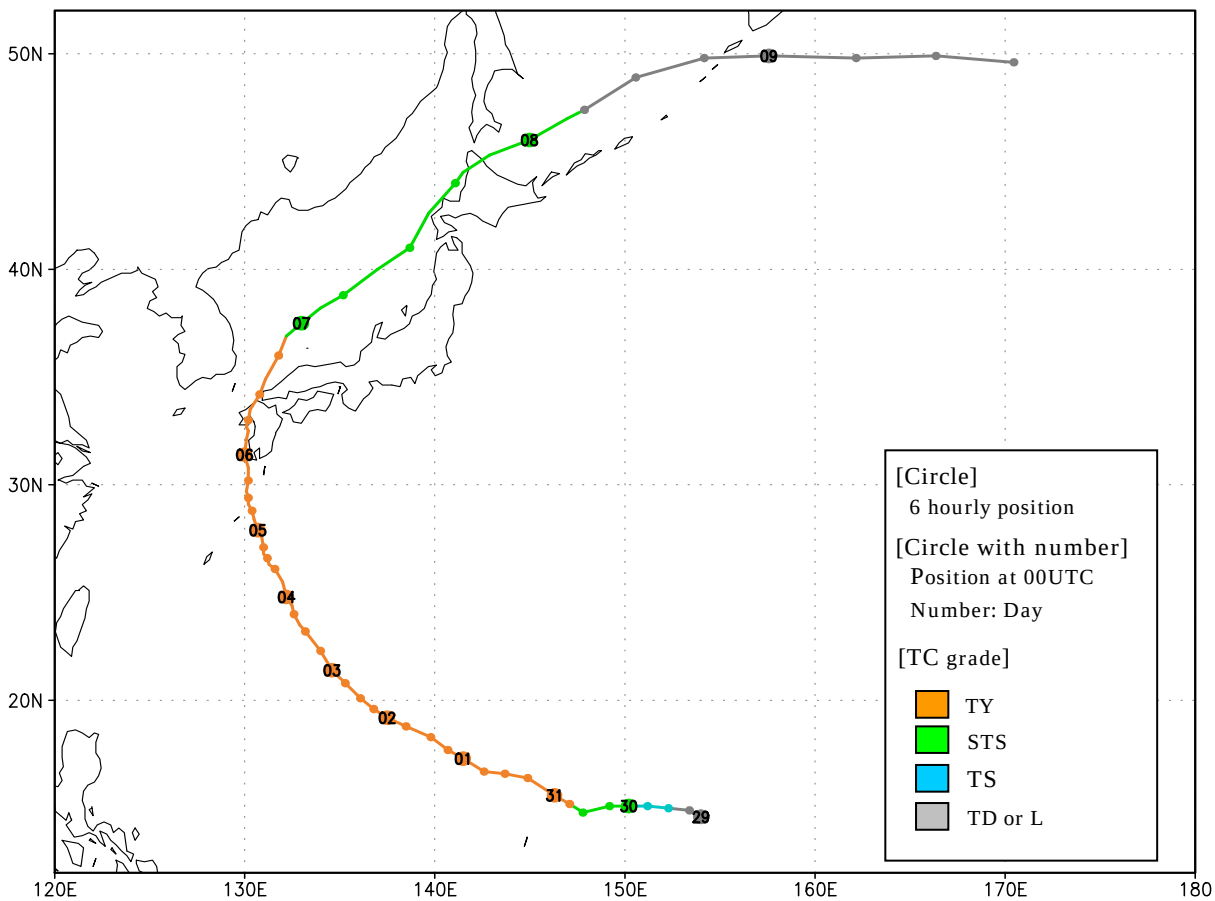
TY TALIM (0513)

TALIM formed as a tropical depression (TD) south of Guam at 18UTC on 25 August 2005. It turned to the north-northwest and developed into a tropical storm (TS) west of Guam at 00UTC, 27 August. Turning to the west-northwest, it developed into a typhoon (TY) far east of the Philippines at 06UTC, 28 August and reached the peak intensity with maximum sustained wind of 95kt and central pressure of 925hPa over the waters southeast of Okinawa at 18UTC on the next day. Weakening the intensity gradually, it passed south of Yonagunijima Island and then made landfall on Taiwan on 31 August. Moving to the west-northwest, TALIM entered the Taiwan Strait and then made landfall on the southern China with the severe tropical storm (STS) intensity on 1 September. It weakened into a TD at 06UTC, 2 September and dissipated in the central China at 00UTC on the next day.



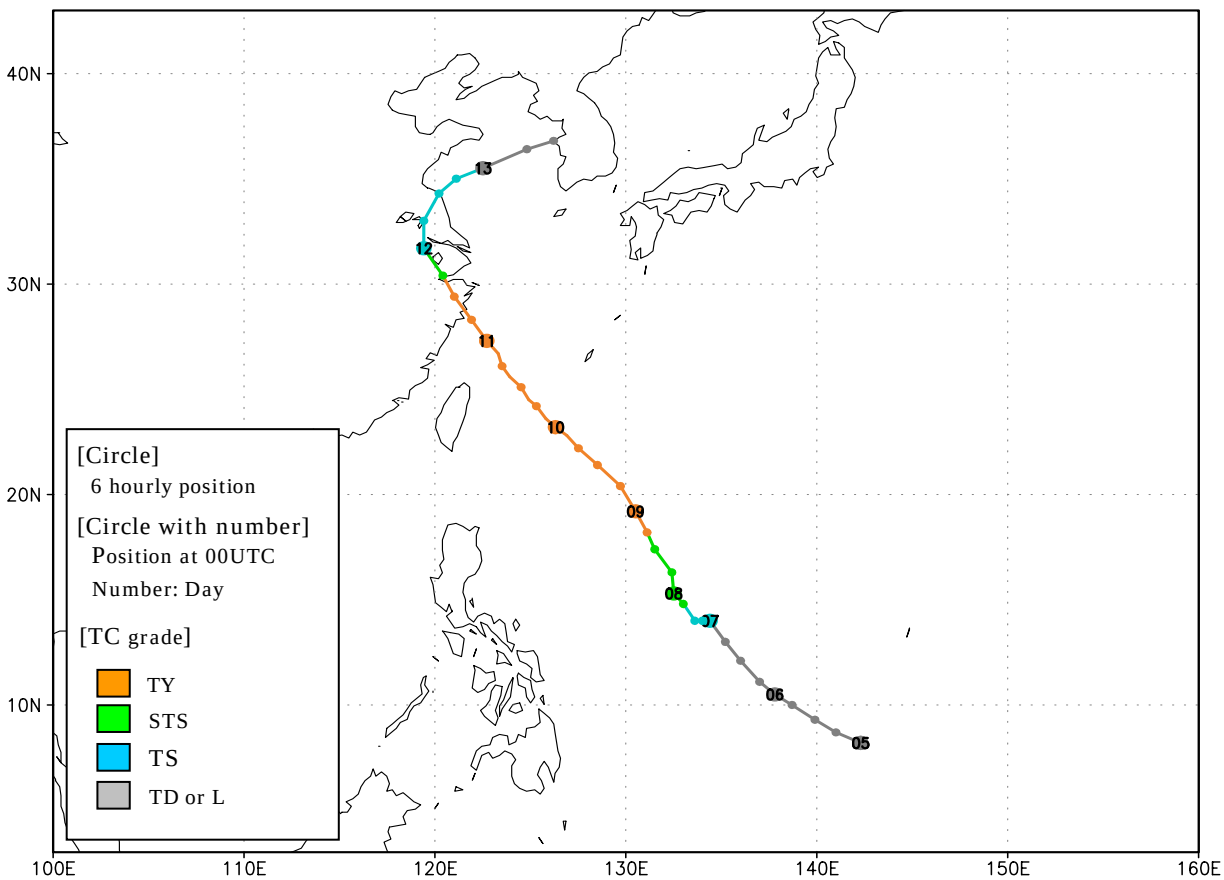
TY NABI (0514)

NABI formed as a tropical depression (TD) east of the Mariana Islands at 00UTC on 29 August 2005. Moving to the west, it developed into a tropical storm (TS) over the same waters at 12UTC, 29 August. Turning to the west-northwest, it developed into a typhoon (TY) around the Mariana Islands at 18UTC, 30 August and reached the peak intensity with maximum sustained wind of 95kt and central pressure of 925hPa far east of the Philippines at 06UTC, 2 September. Turning toward the north, it passed slowly around Minamidaitojima Island and Yakushima Island, and then made landfall on Kyushu with the TY intensity after 05UTC, 6 September. It moved northeastward in the Japan Sea and made landfall on Hokkaido on the next day. Turning to the east, NABI transformed into an extratropical cyclone in the Sea of Okhotsk at 06UTC, 8 September and dissipated south of the Aleutian Islands at 00UTC, 10 September.



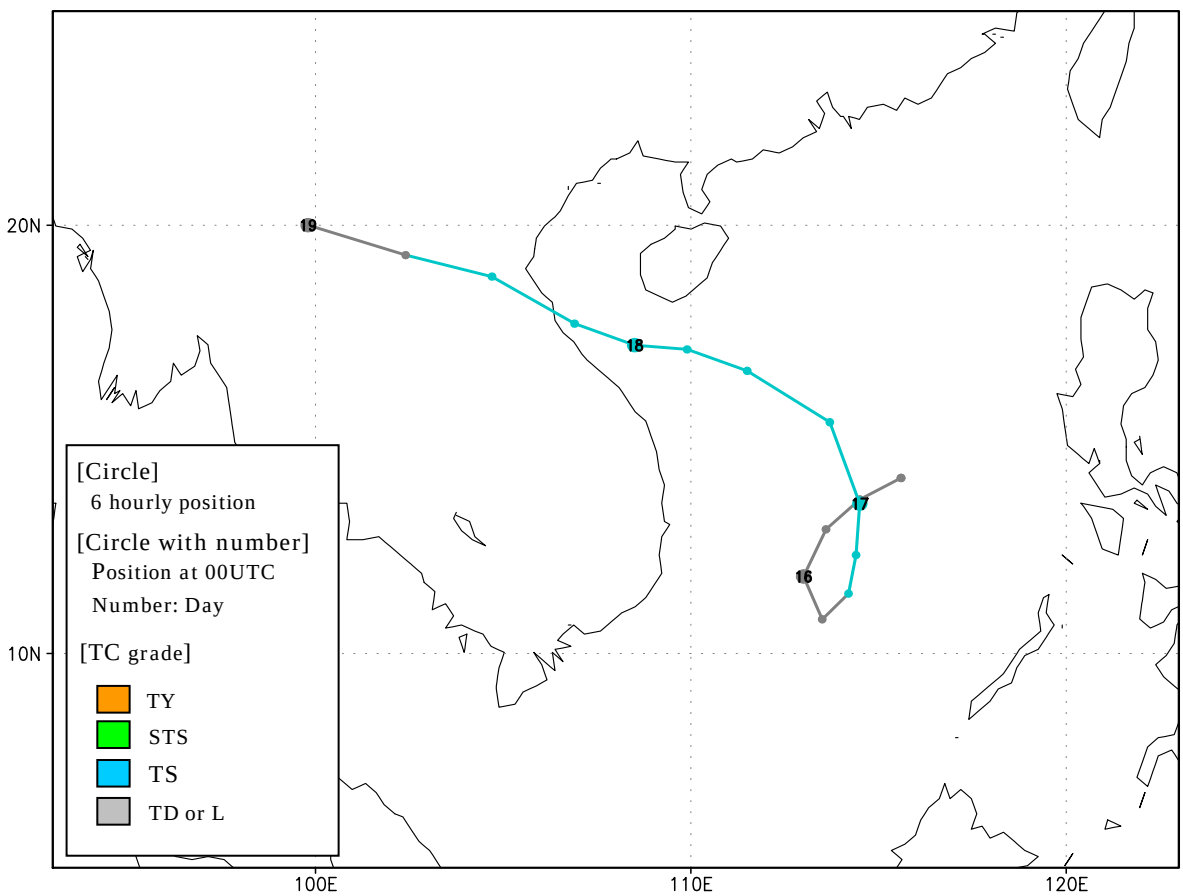
TY KHANUN (0515)

KHANUN formed as a tropical depression (TD) over the waters east of Yap Island at 00UTC, 5 September 2005. It moved northwestward and developed into a tropical storm (TS) over the waters far east of the Philippines at 00UTC, 7 September. Moving to the northwest, it was upgraded into the typhoon (TY) intensity over the same waters at 18UTC on the next day. Keeping the track to the northwest, KHANUN approached Miyakojima Island and reached the peak intensity with maximum sustained wind of 85kt and central pressure of 945hPa at 09UTC, 10 September. After it made landfall on China with the TY intensity on 11 September, it recurved with weakening the intensity in China. It transformed into an extratropical cyclone and dissipated in the Yellow Sea at 00UTC and 18UTC, 13 September, respectively.



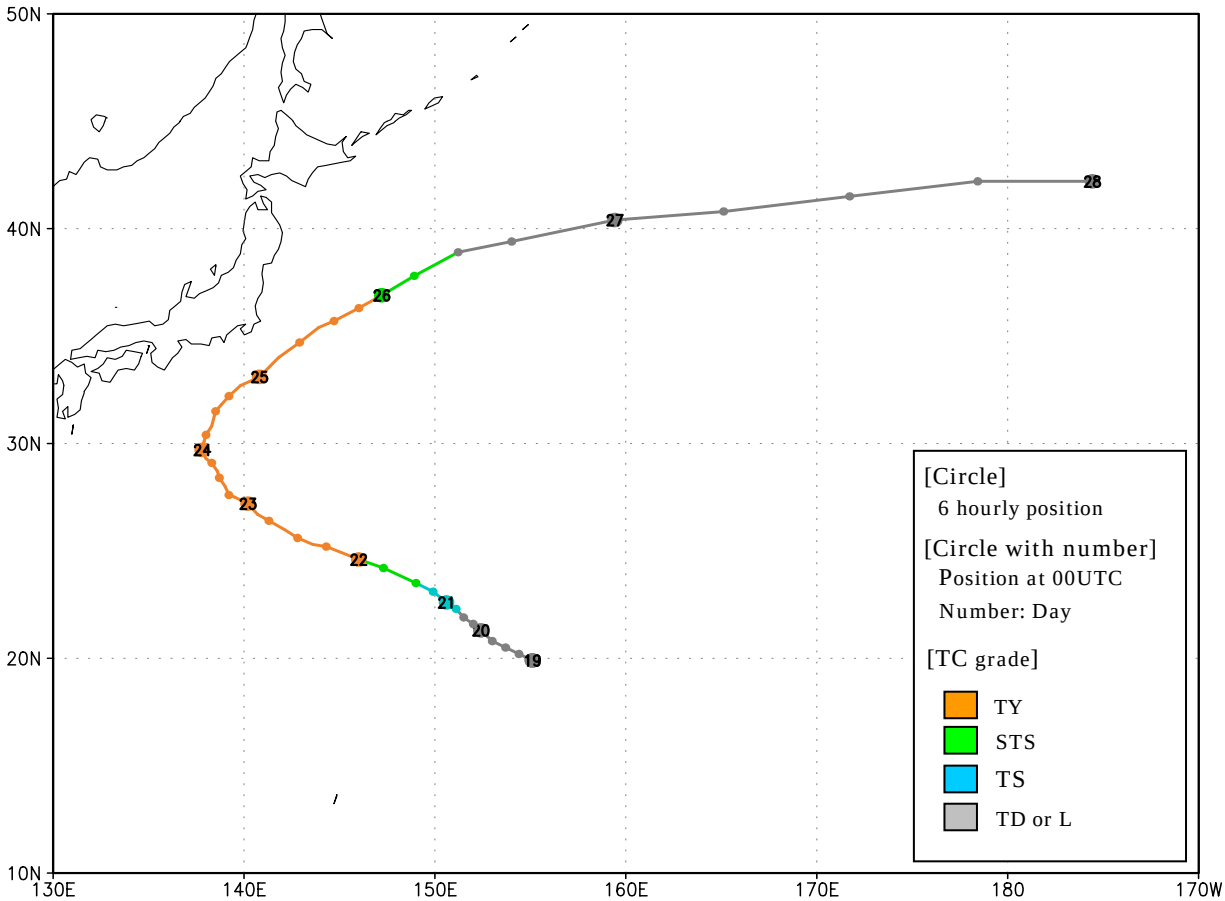
TS VICENTE (0516)

VICENTE formed as a tropical depression (TD) in the South China Sea at 06UTC, 15 September 2005. Moving to the southwest and then turning in anticlockwise direction, it developed into a tropical storm (TS) over the same waters at 12UTC, 16 September. Then it turned to the west-northwest and attained the peak intensity with maximum sustained wind of 45kt and central pressure of 985hPa over the same waters at 00UTC, 18 September. VICENTE made landfall on Vietnam on the same day, and weakened into a TD around the boundary between Laos and Thailand at 18UTC, 18 September. It crossed the 100 deg. E. longitudes at 00UTC on the next day.



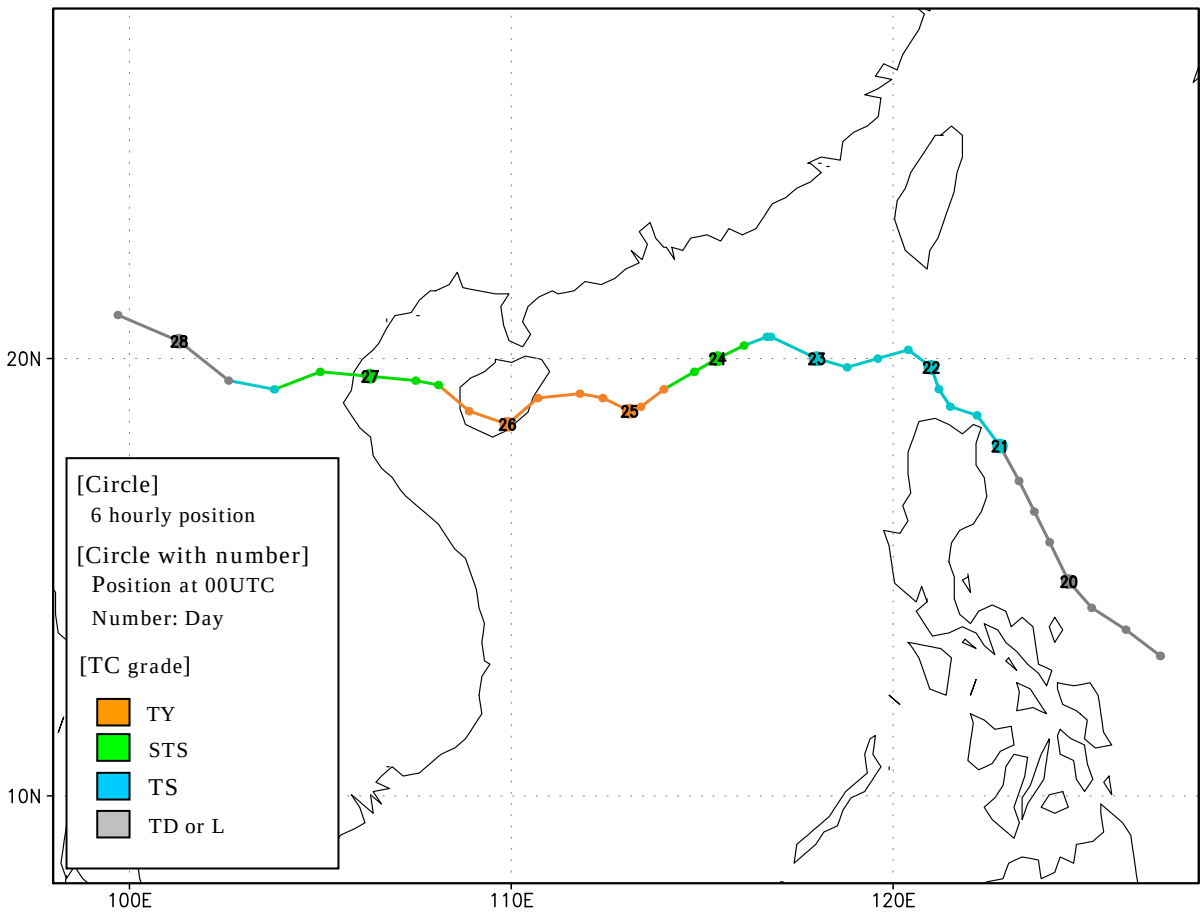
TY SAOLA (0517)

SAOLA formed as a tropical depression (TD) over the sea south of Minamitorishima Island at 00UTC, 19 September 2005. It moved to the west-northwest and developed into a tropical storm (TS) over the same waters at 18UTC on the next day. Keeping the west-northwestward track, it was upgraded into the typhoon (TY) intensity north of the Mariana Islands at 00UTC, 22 September. After it passed south of Chichijima Island, it reached the peak intensity with maximum sustained wind of 80kt and central pressure of 950hPa at 06UTC on the next day. After the recurvature south of Honshu, SAOLA approached Hachijojima Island with the TY intensity before 00UTC, 25 September. Turning to the east, it transformed into an extratropical cyclone over the sea east of Japan at 12UTC, 26 September and crossed the International Date Line at 00UTC, 28 September.



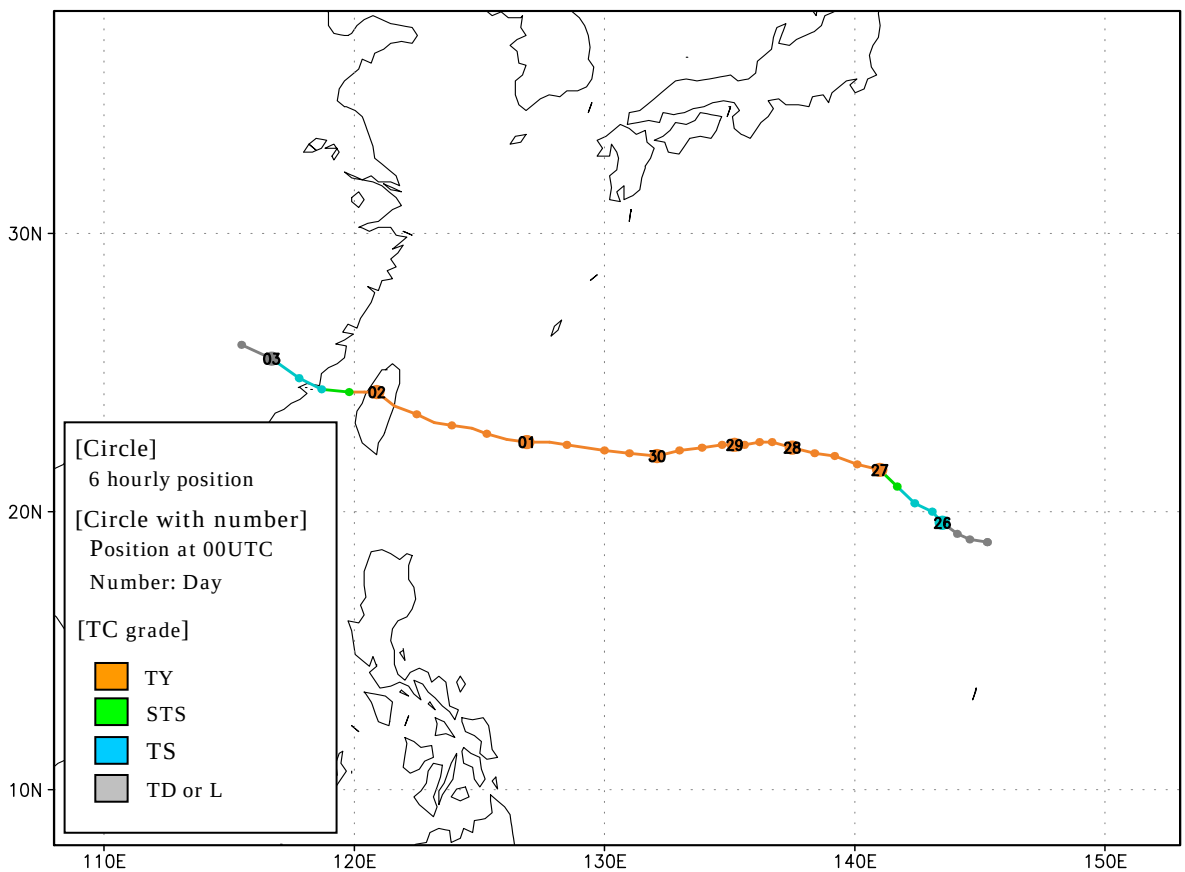
TY DAMREY (0518)

DAMREY formed as a tropical depression (TD) east of the Philippines at 06UTC, 19 September 2005. Moving to the northwest, it developed into a tropical storm (TS) off the northeast coast of Luzon Island at 00UTC, 21 September. Turning to the west, it passed the Luzon Strait and entered the South China Sea. Keeping the westward track, DAMREY was upgraded to the typhoon (TY) intensity and reached the peak intensity with maximum sustained wind of 80kt and central pressure of 955hPa in the South China Sea at 12UTC, 24 September and 06UTC, 25 September, respectively. After the landfall on Hainan Island with the TY intensity on 26 September, it entered the Gulf of Tongking and then landed on Vietnam with the severe tropical storm (STS) intensity on the next day. It weakened into a TD and crossed the 100 deg. E. longitudes at 18UTC, 27 September and 06UTC, 28 September, respectively.



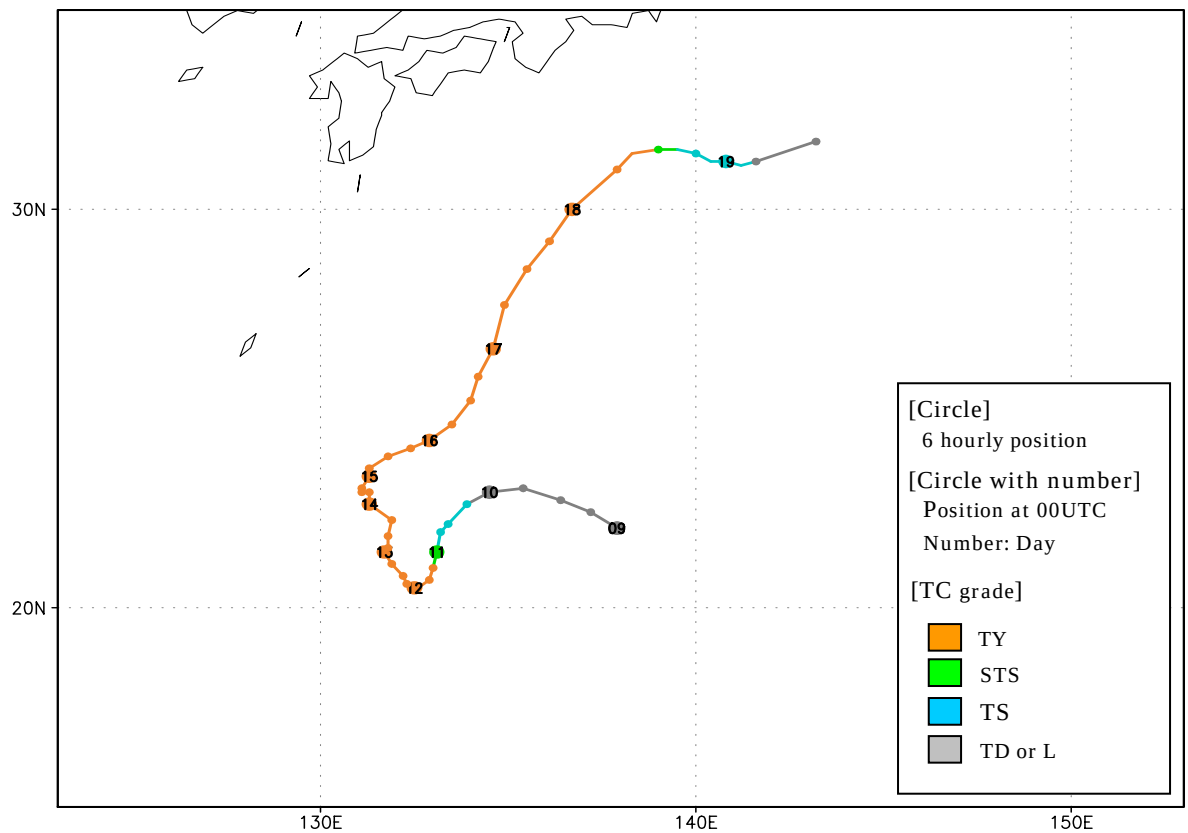
TY LONGWANG (0519)

LONGWANG formed as a tropical depression (TD) over the waters around the Mariana Islands at 06UTC, 25 September 2005. Moving to the west, it developed into a tropical storm (TS) over the same waters at 00UTC, 26 September. It moved west-northwestwards and was upgraded to the typhoon (TY) intensity south of Iwojima Island at 00UTC on the next day. It turned to the west and reached the peak intensity with maximum sustained wind of 95kt and central pressure of 930hPa south of Okinawa Island at 00UTC, 1 October. Keeping the intensity, it made landfall on Taiwan on the same day. Weakening the intensity rapidly, it passed the Taiwan Strait and made landfall again on southern China on 2 October. It weakened into a TD and dissipated in the southern China at 00UTC and 12 UTC, 3 October, respectively.



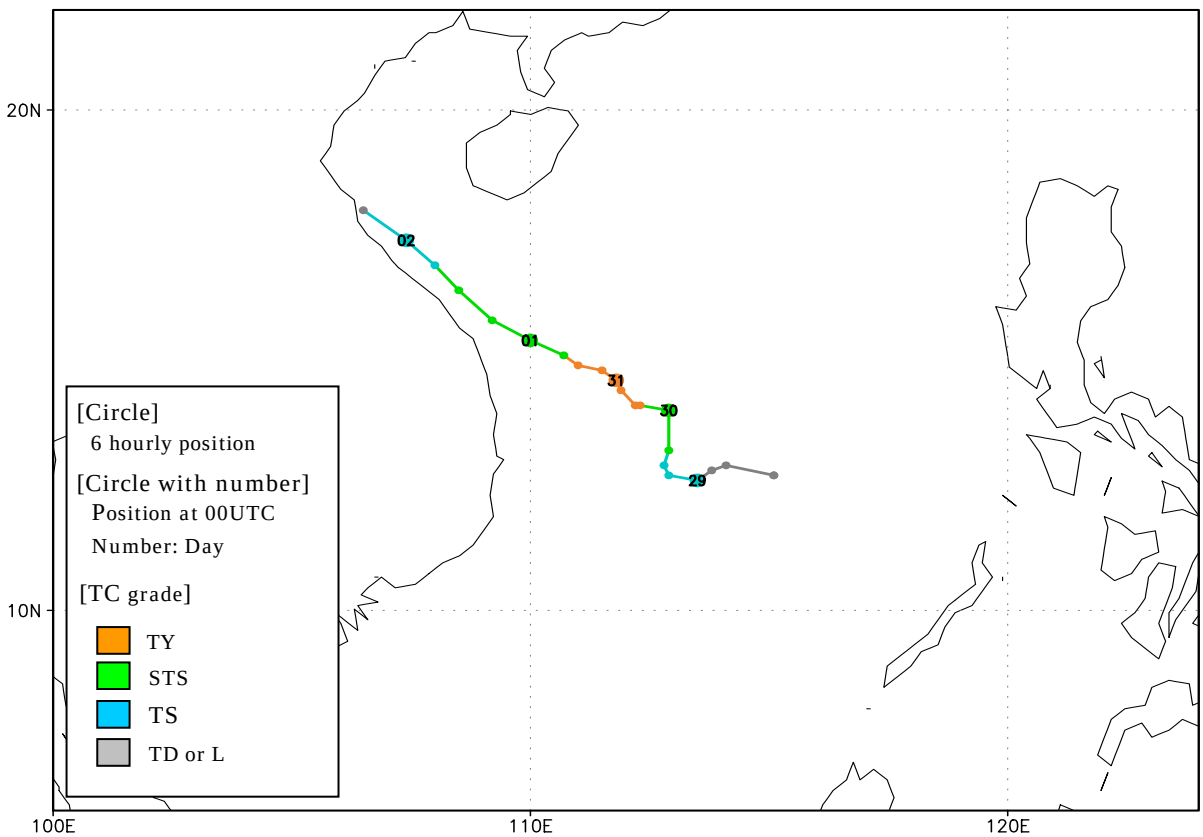
TY KIROGI (0520)

KIROGI formed as a tropical depression (TD) over the waters southwest of Iwojima Island at 00UTC, 9 October 2005. Moving to the west and then turning to the south, it developed into a tropical storm (TS) over the waters south of Minamidaitojima Island at 06UTC on the next day. It was upgraded to the typhoon (TY) intensity over the same waters at 06UTC, 11 October. Turning to the north, it reached the peak intensity with maximum sustained wind of 100kt and central pressure of 930hPa over the same waters at 06UTC on the next day. KIROGI moved slowly toward the north with almost the same intensity. On 15 October, it turned to the northeast over the same waters. Keeping the northeastward track over the sea east of Minamidaitojima Island, it gradually weakened the intensity on 17 October. After KIROGI turned to the east over the waters south of Honshu on 18 October, it weakened into a TD and dissipated southeast of Hachijojima Island at 06UTC and 18UTC on the next day, respectively.



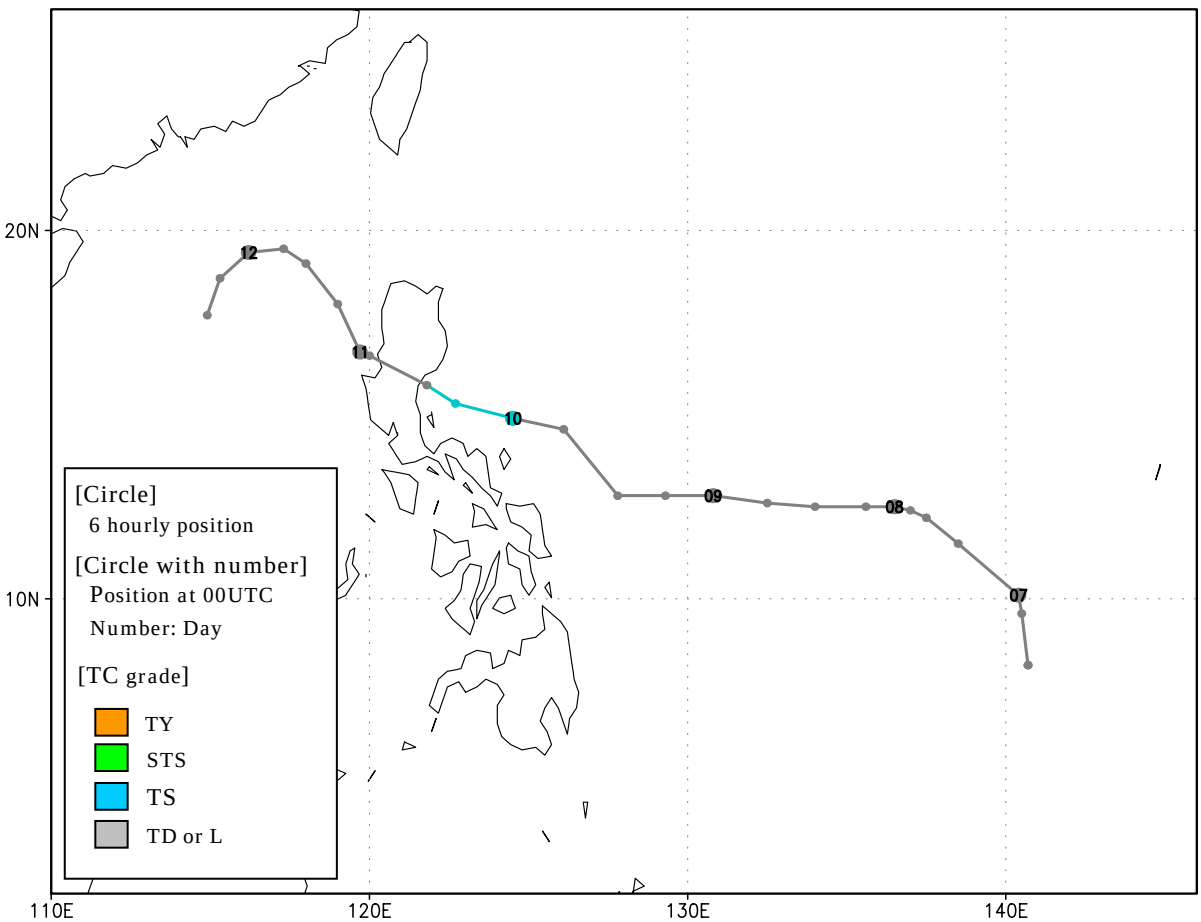
TY KAI-TAK (0521)

KAI-TAK formed as a tropical depression (TD) in the South China Sea at 06UTC, 28 October 2005. Moving to the west, it developed into a tropical storm (TS) over the same waters at 00UTC, 29 October. It turned to the northwest on the same day and was upgraded to the typhoon (TY) intensity over the same waters at 06UTC on the next day. It reached the peak intensity with maximum sustained wind of 80kt and central pressure of 950hPa over the same waters at 00UTC, 31 October. Keeping the northwestward track, it weakened into a TD and dissipated off the coast of Vietnam at 06UTC and 12UTC, 2 November, respectively.



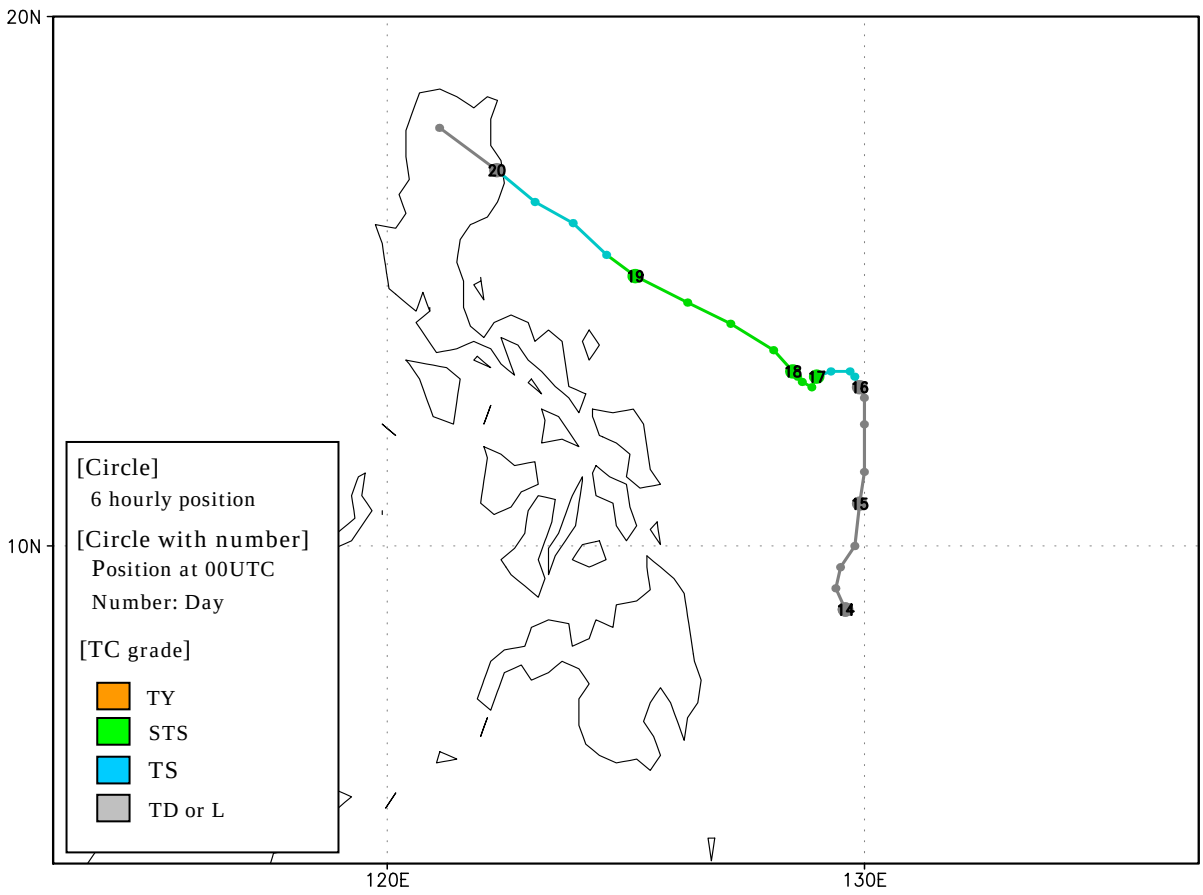
TS TEMBIN (0522)

TEMBIN formed as a tropical depression (TD) southeast of Yap Island at 12UTC, 6 November 2005. It moved northwards and then turned to the west over the waters east of Philippines from 7 to 8 November. It moved to the west-northwest over the same waters on 9 November and developed into a tropical storm (TS) east of Luzon Island at 00UTC, 10 November. Moving west-northwestwards, it weakened into a TD around the east coast of Luzon Island at 12UTC on the same day. After it passed through Luzon Island, it gradually turned to the south and dissipated in the South China Sea at 18UTC, 12 November.



STS BOLAVEN (0523)

BOLAVEN formed as a tropical depression (TD) east of Mindanao Island at 00UTC, 14 November 2005. It moved northward and developed into a tropical storm (TS) over the waters east of the Philippines at 06UTC, 16 November. After it turned to the west, it was upgraded to the severe tropical storm (STS) intensity over the same waters at 00UTC on the next day and reached the peak intensity with the maximum sustained wind of 55kt and central pressure of 985hPa 6 hours later. Then BOLAVEN turned to the west-northwest. Keeping the same track, it weakened into a TD around the east coast of Luzon Island at 00UTC, 20 November. It dissipated on Luzon Island 12 hours later.



RSMC Tropical Cyclone Best Tracks in 2005

STS KULAP (0501)
14 Jan. - 19 Jan.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jan. 14/00	5.2	148.1	1004	-	-	TD
14/06	5.7	148.0	1002	-	-	TD
14/12	6.8	147.8	1000	-	-	TD
14/18	7.0	147.5	998	-	-	TD
15/00	7.5	146.9	998	-	-	TD
15/06	8.1	146.9	998	-	-	TD
15/12	9.5	146.6	996	35	2.5	TS
15/18	10.9	146.6	994	40	3.0	TS
16/00	11.5	146.6	994	40	3.0	TS
16/06	12.6	146.6	992	40	3.0	TS
16/12	12.9	146.6	992	40	3.0	TS
16/18	13.5	146.9	990	45	3.5	TS
17/00	14.3	147.5	990	45	3.5	TS
17/06	15.0	148.6	990	45	3.5	TS
17/12	15.7	149.6	985	50	3.5	STS
17/18	16.3	150.7	985	50	3.5	STS
18/00	16.7	151.6	985	50	3.5	STS
18/06	17.2	152.6	985	50	3.5	STS
18/12	17.6	153.2	985	50	3.5	STS
18/18	18.0	153.8	990	45	3.0	TS
19/00	18.4	154.4	1000	35	2.5	TS
19/06	18.7	155.1	1004	-	-	L
19/12	18.9	155.8	1012	-	-	L
19/18						Dissip.

STS ROKE (0502)
12 Mar. - 19 Mar.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Mar. 12/00	6.0	151.4	1008	-	-	TD
12/06	6.3	150.9	1006	-	-	TD
12/12	6.7	150.2	1008	-	-	TD
12/18	7.0	149.5	1006	-	-	TD
13/00	7.3	148.5	1008	-	-	TD
13/06	7.9	147.1	1004	-	-	TD
13/12	8.4	145.5	1002	-	-	TD
13/18	9.3	143.7	1000	-	-	TD
14/00	9.9	142.5	1000	-	-	
14/06	10.4	141.2	1000	-	-	TD
14/12	10.6	140.0	1000	-	-	TD
14/18	10.9	138.7	1000	-	-	TD
15/00	11.5	137.5	996	35	3.0	TS
15/06	12.1	136.0	992	40	3.0	TS
15/12	12.3	134.5	990	40	3.0	TS
15/18	12.2	132.9	985	45	4.0	TS
16/00	11.8	131.1	985	50	4.0	STS
16/06	11.7	128.9	980	55	4.0	STS
16/12	11.6	126.6	980	55	4.0	STS
16/18	11.0	124.7	990	45	3.5	TS
17/00	11.0	122.8	992	40	3.0	TS
17/06	11.6	121.1	996	35	2.5	TS
17/12	11.6	120.0	1000	-	-	TD
17/18	11.8	118.7	1004	-	-	TD
18/00	11.9	117.0	1008	-	-	TD
18/06	11.9	115.9	1008	-	-	TD
18/12	11.6	114.6	1008	-	-	TD
18/18	11.4	113.4	1008	-	-	TD
19/00	10.9	112.0	1008	-	-	TD
19/06	10.5	110.5	1008	-	-	TD
19/12						Dissip.

TY SONCA (0503)
21 Apr. - 29 Apr.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Apr. 21/06	8.7	141.9	1004	-	-	TD
21/12	9.9	139.9	1006	-	-	TD
21/18	10.6	138.6	1004	-	-	TD
22/00	11	137.4	1004	-	-	TD
22/06	11.5	136.1	1004	-	-	TD
22/12	11.5	134.4	1002	-	-	TD
22/18	11.3	133.4	1002	-	-	TD
23/00	11.6	132.8	1000	35	2.5	TS
23/06	12.2	131.9	990	45	3.0	TS
23/12	12.6	131.5	975	60	4.0	STS
23/18	13.2	131.2	965	70	4.5	TY
24/00	13.5	130.8	955	75	5.0	TY
24/06	14.1	130.8	945	85	5.5	TY
24/12	14.5	130.8	935	90	6.5	TY
24/18	15.2	131	935	90	6.5	TY
25/00	16	131.2	935	90	6.5	TY
25/06	16.7	131.6	940	85	6.0	TY
25/12	17.5	132.3	940	85	6.0	TY
25/18	18.7	132.9	940	85	6.0	TY
26/00	20.1	134	940	85	6.0	TY
26/06	21.7	135.6	950	80	5.5	TY
26/12	23.5	138.1	960	75	5.0	TY
26/18	24.7	140.1	970	65	4.5	TY
26/21	25.2	141.4	975	60	-	STS
27/00	25.5	142.7	980	55	4.0	STS
27/03	26.2	144	985	50	-	STS
27/06	26.7	145.6	990	45	3.5	TS
27/12	27.7	148.7	996	-	-	L
27/18	28.5	151.6	1000	-	-	L
28/00	28.6	155.3	1004	-	-	L
28/06	28.4	158.3	1006	-	-	L
28/12	28.4	161.2	1006	-	-	L
28/18	28.2	163.6	1006	-	-	L
29/00	27.6	165.8	1008	-	-	L
29/06	27	167.7	1008	-	-	L
29/12						Dissip.

TY HAITANG (0505)
10 Jul. - 21 Jul.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jul. 10/18	22.1	154.1	1010	-	-	TD
11/00	22.1	153.6	1010	-	-	TD
11/06	22.2	153.1	1008	-	-	TD
11/12	22.4	152.7	1006	-	-	TD
11/18	22.7	152.3	1006	-	-	TD
12/00	23.1	151.8	1004	-	-	TD
12/06	23.3	151.2	1004	-	-	TD
12/12	23.3	150.6	1004	-	-	TD
12/18	23.1	149.9	1002	-	-	TD
13/00	22.9	149.2	998	35	2.5	TS
13/06	22.3	148.3	990	40	3.0	TS
13/12	21.7	147.1	980	55	4.0	STS
13/18	21.3	146.0	970	65	4.0	TY
14/00	20.6	144.6	965	70	4.5	TY
14/06	20.0	142.7	965	70	4.5	TY
14/12	19.6	141.4	965	70	4.5	TY
14/18	19.3	139.3	960	75	5.0	TY
15/00	19.1	136.9	960	75	5.0	TY
15/06	19.1	134.9	955	80	5.0	TY
15/12	19.3	133.5	940	90	6.0	TY
15/18	19.6	131.9	930	95	6.5	TY
16/00	19.9	130.4	925	100	7.0	TY
16/06	20.3	129.1	920	105	7.0	TY
16/12	20.7	127.7	920	105	7.0	TY
16/18	20.9	126.6	920	105	7.0	TY
17/00	21.5	125.8	920	105	7.0	TY
17/03	21.9	125.4	925	100	-	TY
17/06	22.3	125.0	930	95	6.0	TY
17/09	22.7	124.4	930	95	-	TY
17/12	23.1	124.0	935	95	6.0	TY
17/15	23.3	123.5	935	95	-	TY
17/18	23.7	123.1	940	90	6.0	TY
17/21	24.1	122.5	945	90	-	TY
18/00	23.8	121.8	950	85	5.5	TY
18/03	23.4	121.6	955	80	-	TY
18/06	24.0	121.5	960	75	4.5	TY
18/09	24.2	121.4	965	70	-	TY
18/12	24.5	121.2	970	65	4.5	TY
18/15	24.7	120.9	970	65	-	TY
18/18	24.8	120.6	975	60	4.0	STS
19/00	25.0	120.4	980	55	3.5	STS
19/06	25.6	120.1	980	55	3.5	STS
19/12	26.5	119.7	985	50	3.5	STS
19/18	27.1	119.2	990	45	3.0	TS
20/00	27.6	118.2	992	35	2.5	TS
20/06	27.8	117.6	996	-	-	TD
20/12	28.0	116.7	998	-	-	TD
20/18	28.1	116.1	998	-	-	TD
21/00	28.2	115.4	1000	-	-	TD
21/06	28.5	114.5	1000	-	-	TD
21/12	28.8	113.9	1000	-	-	TD
21/18						Dissip.

TY NESAT(0504)
30 May - 11 Jun.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
May 30/00	8.7	148.4	1008	-	-	TD
30/06	9.1	147.3	1006	-	-	TD
30/12	9.3	146.6	1006	-	-	TD
30/18	9.5	146.1	1004	-	-	TD
31/00	9.7	145.6	1004	-	-	TD
31/06	9.9	145.0	1002	-	-	TD
31/12	10.3	144.4	1000	35	2.5	TS
31/18	10.5	143.7	994	45	3.0	TS
Jun. 01/00	10.8	142.8	985	50	3.5	STS
01/06	10.7	141.6	975	60	4.0	STS
01/12	10.6	140.5	965	70	4.5	TY
01/18	10.7	139.6	955	75	5.0	TY
02/00	11.2	138.5	945	80	6.0	TY
02/06	11.5	137.4	940	85	6.0	TY
02/12	11.7	136.3	935	90	6.0	TY
02/18	12.1	135.4	935	90	6.0	TY
03/00	12.3	134.4	935	90	6.0	TY
03/06	13.0	133.7	935	90	6.0	TY
03/12	13.7	132.6	935	90	6.0	TY
03/18	14.1	131.8	935	90	6.0	TY
04/00	14.6	131.4	930	95	6.5	TY
04/06	15.2	131.0	930	95	6.5	TY
04/12	15.7	130.6	930	95	6.5	TY
04/18	16.4	130.4	940	90	5.5	TY
05/00	17.3	130.4	945	85	5.5	TY
05/06	18.1	130.9	945	85	5.5	TY
05/12	18.9	131.3	950	80	5.0	TY
05/18	19.6	132.0	955	80	5.0	TY
06/00	20.6	132.5	955	80	5.5	TY
06/06	21.3	133.4	945	85	6.0	TY
06/12	21.9	133.8	945	85	6.0	TY
06/18	22.3	134.1	945	85	6.0	TY
07/00	22.9	134.2	945	80	6.0	TY
07/06	23.5	134.1	950	80	6.0	TY
07/12	23.8	133.8	955	80	5.5	TY
07/18	24.4	133.7	955	80	5.0	TY
08/00	25.0	133.9	955	75	5.0	TY
08/06	25.6	134.3	960	70	4.5	TY
08/12	26.2	135.2	970	65	4.0	TY
08/18	26.9	135.9	970	60	4.0	STS
09/00	27.7	136.5	975	60	3.5	STS
09/06	28.5	137.1	975	60	3.5	STS
09/12	29.1	137.7	980	55	3.0	STS
09/18	29.8	138.2	985	50	3.0	STS
10/00	30.4	138.7	990	45	2.5	TS
10/03	30.8	139.0	990	45	-	TS
10/06	31.1	139.4	990	45	2.5	TS
10/09	31.4	140.2	990	45	-	TS
10/12	31.9	141.1	992	45	2.5	TS
10/18	32.7	142.4	994	40	2.0	TS
11/00	34.6	145.1	994	-	-	TD
11/06	36.6	147.4	996	-	-	TD
11/12						Dissip.

TY NALGAE (0506)
18 Jul. - 27 Jul.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jul. 18/00	21.3	168.0	1008	-	-	TD
18/06	21.9	168.0	1008	-	-	TD
18/12	22.3	167.6	1008	-	-	TD
18/18	22.7	167.1	1008	-	-	TD
19/00	22.8	166.4	1008	-	-	TD
19/06	23.0	165.7	1008	-	-	TD
19/12	23.2	165.0	1008	-	-	TD
19/18	23.6	164.4	1006	-	-	TD
20/00	24.2	163.9	1004	-	-	TD
20/06	25.0	163.2	1004	-	-	TD
20/12	26.0	162.6	1000	35	2.5	TS
20/18	26.5	161.9	996	40	2.5	TS
21/00	27.0	161.1	992	45	2.5	TS
21/06	27.6	160.4	992	45	2.5	TS
21/12	28.4	159.5	992	45	2.5	TS
21/18	29.3	158.8	992	45	2.5	TS
22/00	30.0	158.6	992	45	2.5	TS
22/06	30.6	158.7	990	45	2.5	TS
22/12	31.4	159.1	990	45	2.5	TS
22/18	32.1	159.5	990	45	2.5	TS
23/00	32.4	159.7	992	40	2.5	TS
23/06	32.6	160.0	992	40	2.5	TS
23/12	32.7	160.6	992	40	2.5	TS
23/18	33.2	161.7	992	40	2.5	TS
24/00	34.4	162.8	996	35	2.5	TS
24/06	35.0	163.3	996	35	2.5	TS
24/12	35.7	163.9	1000	-	-	L
24/18	36.4	164.4	1002	-	-	L
25/00	37.0	164.9	1004	-	-	L
25/06	37.7	165.4	1004	-	-	L
25/12	38.4	165.8	1004	-	-	L
25/18	38.8	166.1	1004	-	-	L
26/00	39.3	166.0	1004	-	-	L
26/06	39.8	165.8	1004	-	-	L
26/12	40.2	165.7	1004	-	-	L
26/18	40.6	165.6	1004	-	-	L
27/00	41.0	165.6	1004	-	-	L
27/06	41.5	165.5	1006	-	-	L
27/12	42.0	165.5	1006	-	-	L
27/18	42.6	165.5	1006	-	-	L
28/00						Dissip.

TY SANVU (0410)
9 Aug. - 14 Aug.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Aug. 09/18	14.0	130.6	1002	-	-	TD
10/00	14.3	130.1	1002	-	-	TD
10/06	14.5	129.5	998	-	-	TD
10/12	15.0	128.7	998	-	-	TD
10/18	15.5	128.0	998	-	-	TD
11/00	16.1	126.3	996	-	-	TD
11/06	17.1	124.6	994	35	1.5	TS
11/12	18.1	123.1	994	40	1.5	TS
11/18	19.0	121.0	992	40	1.5	TS
12/00	19.4	120.0	992	40	2.0	TS
12/06	19.9	119.1	990	45	2.5	TS
12/12	20.5	118.5	990	50	2.5	STS
12/18	21.5	117.7	985	50	2.5	STS
13/00	22.7	117.1	985	50	2.5	STS
13/06	23.7	116.3	985	50	2.5	STS
13/12	25.1	115.8	992	35	2.0	TS
13/18	26.3	115.3	996	-	-	TD
14/00	27.0	115.1	998	-	-	TD
14/06	27.5	114.5	998	-	-	TD
14/12	28.5	113.5	1000	-	-	TD
14/18	29.0	112.5	1000	-	-	TD
15/00						Dissip.

TY BANYAN (0507)
20 Jul. - 31 Jul.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jul. 20/12	13.2	138.0	1004	-	-	TD
20/18	13.3	137.8	1000	-	-	TD
21/00	13.4	137.7	998	-	-	TD
21/06	13.7	137.5	996	-	-	TD
21/12	14.4	137.4	996	-	-	TD
21/18	15.1	137.3	990	35	2.0	TS
22/00	16.0	137.4	990	35	2.5	TS
22/06	16.9	137.5	990	40	2.5	TS
22/12	17.6	137.4	990	40	2.5	TS
22/18	18.2	137.3	990	40	2.5	TS
23/00	18.9	137.3	985	45	3.0	TS
23/06	19.5	137.3	985	45	3.0	TS
23/12	20.1	137.4	980	50	3.0	STS
23/18	21.2	137.5	975	55	3.5	STS
24/00	22.1	137.5	975	55	3.5	STS
24/06	23.5	137.4	975	55	3.5	STS
24/12	24.4	137.3	975	55	3.5	STS
24/18	25.6	137.2	975	55	3.5	STS
25/00	26.8	137.0	975	55	3.5	STS
25/06	28.5	136.9	975	50	3.0	STS
25/12	30.1	136.7	975	50	3.0	STS
25/15	30.5	136.8	975	50	-	STS
25/18	31.0	136.9	975	45	2.5	TS
25/21	31.6	137.1	975	45	-	TS
26/00	32.3	137.6	975	45	2.5	TS
26/03	32.7	138.0	975	45	-	TS
26/06	33.4	138.9	975	45	2.5	TS
26/09	34.2	139.6	975	45	-	TS
26/11	35.1	140.2	978	45	-	TS
26/12	35.4	140.4	978	45	2.5	TS
26/15	36.2	141.4	980	45	-	TS
26/18	37.0	142.2	980	45	2.5	TS
26/21	38.1	143.5	980	45	-	TS
27/00	39.0	144.8	980	45	2.5	TS
27/03	40.2	145.7	980	45	-	TS
27/06	41.0	146.6	980	45	2.5	TS
27/12	43.0	148.3	980	40	-	TS
27/18	44.7	149.1	980	35	2.5	TS
28/00	46.2	149.9	984	-	-	L
28/06	47.1	151.4	986	-	-	L
28/12	47.8	152.5	988	-	-	L
28/18	48.4	153.6	990	-	-	L
29/00	49.1	156.3	990	-	-	L
29/06	50.4	159.3	990	-	-	L
29/12	51.7	162.3	988	-	-	L
29/18	53.3	165.2	988	-	-	L
30/00	54.2	168.4	988	-	-	L
30/06	54.8	170.4	990	-	-	L
30/12	55.1	173.3	992	-	-	L
30/18	54.5	176.1	992	-	-	L
31/00	53.8	179.4	994	-	-	L
31/06	53.1	182.0	994	-	-	Out

TY WASHI (0508)
28 Jul. - 31 Jul.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jul. 28/18	18.0	113.0	996	-	-	TD
29/00	18.4	112.5	996	-	-	TD
29/06	18.6	112.0	994	-	-	TD
29/12	18.8	111.5	992	35	2.0	TS
29/18	19.1	110.9	985	40	2.5	TS
30/00	19.2	110.2	985	45	2.5	TS
30/06	19.5	109.4	985	45	2.5	TS
30/12	19.7	108.6	985	45	2.5	TS
30/18	19.8	107.8	985	45	2.5	TS
31/00	20.1	107.0	985	45	3.0	TS
31/06	20.4	105.9	985	40	2.5	TS
31/12	20.4	104.3	990	35	2.0	TS
31/18	20.0	103.0	998	-	-	TD
Aug. 01/00						Dissip.

TY MATSA (0509)
30 Jul. - 9 Aug.

Date/Time (UTC)	Center Position Lat (N)	Lon (E)	Central pressure (hPa)	Max Wind (kt)	CI number	Grade
Jul. 30/12	9.0	137.9	1002	-	-	TD
30/18	10.0	136.9	1000	-	-	TD
31/00	10.5	136.0	1000	-	-	TD
31/06	11.1	134.9	1000	-	-	TD
31/12	11.8	133.8	998	35	2.0	TS
31/18	12.6	133.0	998	35	2.0	TS
Aug. 01/00	13.7	132.4	994	40	2.5	TS
01/06	14.5	131.7	992	40	2.5	TS
01/12	15.5	130.5	990	45	2.5	TS
01/18	16.1	129.8	985	50	3.0	STS
02/00	17.0	129.3	980	55	3.5	STS
02/06	18.0	128.6	980	60	3.5	STS
02/12	19.0	128.2	975	65	4.0	TY
02/18	20.0	127.3	970	70	5.0	TY
03/00	20.7	126.4	965	75	5.0	TY
03/06	21.1	126.1	960	75	5.0	TY
03/09	21.4	125.9	960	75	-	TY
03/12	21.8	125.7	960	75	5.0	TY
03/15	22.1	125.5	960	75	-	TY
03/18	22.4	125.3	955	80	5.0	TY
03/21	22.8	125.1	955	80	-	TY
04/00	23.1	124.9	955	80	5.0	TY
04/03	23.5	124.7	955	80	-	TY
04/06	23.9	124.5	955	80	5.0	TY
04/09	24.1	124.4	955	80	-	TY
04/10	24.3	124.3	955	80	-	TY
04/12	24.6	124.2	955	80	5.0	TY
04/15	24.9	123.9	955	80	-	TY
04/18	25.2	123.7	950	80	5.0	TY
04/21	25.5	123.5	950	80	-	TY
05/00	25.6	123.4	955	80	5.0	TY
05/03	26.2	123.3	955	80	-	TY
05/06	26.7	123.1	960	75	4.5	TY
05/12	27.4	122.2	965	70	4.5	TY
05/18	28.1	121.6	970	65	4.0	TY
06/00	28.5	121.1	975	60	4.0	STS
06/06	29.2	120.4	985	55	4.0	STS
06/12	29.7	119.8	985	50	3.5	STS
06/18	30.3	118.9	990	45	3.0	TS
07/00	30.7	118.4	992	40	2.5	TS
07/06	31.8	118.9	994	40	2.5	TS
07/12	33.0	119.0	994	-	-	TD
07/18	34.7	119.3	996	-	-	TD
08/00	36.2	119.3	996	-	-	TD
08/06	36.7	119.4	992	-	-	L
08/12	37.3	119.7	994	-	-	L
08/18	38.3	120.2	994	-	-	L
09/00	39.2	121.6	998	-	-	L
09/06	40.2	122.6	998	-	-	L
09/12						Dissip.

TY MAWAR (0511)

19 Aug. - 1 Sep

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Aug.	19/06	20.5	142.8	1008	-	-	TD
	19/12	20.5	142.6	1008	-	-	TD
	19/18	20.5	142.4	1002	35	2.5	TS
	20/00	20.7	142.1	1000	40	3.0	TS
	20/06	21.0	141.8	1000	40	3.5	TS
	20/12	21.3	141.5	996	45	4.0	TS
	20/18	21.6	141.3	985	50	4.5	STS
	21/00	22.0	140.7	970	65	5.0	TY
	21/06	22.4	140.5	955	75	6.0	TY
	21/12	22.6	140.1	940	90	6.5	TY
	21/18	22.9	139.8	930	95	6.5	TY
	22/00	23.4	139.3	930	95	6.5	TY
	22/06	23.7	139.2	935	90	6.5	TY
	22/12	24.0	138.8	940	85	5.5	TY
	22/18	24.6	138.2	950	80	5.5	TY
	23/00	25.4	137.8	950	80	5.5	TY
	23/06	26.3	137.6	945	80	5.5	TY
	23/12	26.9	137.3	945	80	5.5	TY
	23/18	27.8	137.0	945	80	5.5	TY
	24/00	28.7	136.9	945	85	5.5	TY
	24/06	29.7	137.0	945	85	5.5	TY
	24/12	30.6	137.2	945	85	5.5	TY
	24/15	31.2	137.2	950	80	-	TY
	24/18	31.5	137.0	955	80	5.0	TY
	24/21	32.1	137.1	960	80	-	TY
	25/00	32.6	137.1	960	75	4.5	TY
	25/03	33.0	137.3	965	75	-	TY
	25/06	33.4	137.7	965	70	4.5	TY
	25/09	33.9	137.9	965	70	-	TY
	25/12	34.3	138.6	965	70	4.5	TY
	25/15	34.8	139.2	970	65	-	TY
	25/17	35.1	139.5	975	65	-	TY
	25/18	35.3	139.8	975	65	4.0	TY
	25/19	35.5	140.0	980	65	-	TY
	25/21	35.8	140.3	985	60	-	STS
	26/00	36.1	141.0	985	50	3.5	STS
	26/03	36.3	141.6	990	50	-	STS
	26/06	36.8	142.7	990	45	3.0	TS
	26/12	37.1	144.6	990	45	3.0	TS
	26/18	37.4	146.2	992	40	3.0	TS
	27/00	37.3	148.0	994	40	2.5	TS
	27/06	37.3	149.3	996	40	2.0	TS
	27/12	36.6	150.8	998	40	2.0	TS
	27/18	36.3	151.8	998	40	2.0	TS
	28/00	35.8	153.0	1000	-	-	L
	28/06	35.7	153.3	1000	-	-	L
	28/12	36.0	153.6	1000	-	-	L
	28/18	36.3	153.3	1002	-	-	L
	29/00	36.9	153.4	1004	-	-	L
	29/06	37.5	153.6	1004	-	-	L
	29/12	39.1	154.5	1004	-	-	L
	29/18	41.0	156.2	1004	-	-	L
	30/00	40.9	156.9	1006	-	-	L
	30/06	40.7	157.6	1006	-	-	L
	30/12	40.3	158.3	1008	-	-	L
	30/18	40.0	158.9	1008	-	-	L
	31/00	39.7	159.7	1008	-	-	L
	31/06	39.6	160.8	1010	-	-	L
	31/12	39.5	161.7	1012	-	-	L
	31/18	39.5	162.6	1012	-	-	L
Sep.	01/00	39.5	163.6	1014	-	-	L
	01/06						Dissip.

STS GUCHOL (0512)

18 Aug. - 27 Aug.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Aug.	18/18	21.6	153.5	1010	-	-	TD
	19/00	21.8	152.9	1010	-	-	TD
	19/06	22.0	152.4	1008	-	-	TD
	19/12	22.3	151.9	1008	-	-	TD
	19/18	22.5	151.5	1008	-	-	TD
	20/00	22.7	151.0	1006	-	-	TD
	20/06	22.9	150.6	1004	-	-	TD
	20/12	23.2	150.2	1004	-	-	TD
	20/18	23.6	149.6	1004	-	-	TD
	21/00	24.1	149.0	1004	-	-	TD
	21/06	24.9	148.4	1000	35	2.0	TS
	21/12	25.5	147.9	996	40	2.5	TS
	21/18	26.3	147.3	992	45	3.0	TS
	22/00	27.0	147.0	985	55	4.0	STS
	22/06	28.2	146.7	980	55	4.0	STS
	22/12	29.1	146.3	980	55	4.0	STS
	22/18	29.9	146.1	985	50	3.5	STS
	23/00	31.1	146.3	985	50	3.5	STS
	23/06	32.4	147.2	980	55	3.5	STS
	23/12	33.6	148.3	980	55	3.5	STS
	23/18	34.7	149.5	980	55	3.5	STS
	24/00	35.6	151.2	980	55	3.5	STS
	24/06	36.8	153.2	980	55	3.5	STS
	24/12	37.9	155.2	980	55	3.5	STS
	24/18	39.3	157.8	980	55	3.5	STS
	25/00	40.7	160.3	985	50	3.0	STS
	25/06	42.9	162.9	990	45	3.0	TS
	25/12	45.6	164.7	992	-	-	L
	25/18	46.5	164.6	996	-	-	L
	26/00	47.2	164.4	998	-	-	L
	26/06	47.8	165.1	1000	-	-	L
	26/12	48.2	166.0	1000	-	-	L
	26/18	48.6	167.2	1000	-	-	L
	27/00	49.1	168.9	1000	-	-	L
	27/06						Dissip.

TY TALIM (0513)

25 Aug. - 2 Sep.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Aug.	25/18	12.5	144.6	1004	-	-	TD
	26/00	12.6	144.0	1004	-	-	TD
	26/06	12.7	143.5	1002	-	-	TD
	26/12	12.8	143.0	1002	-	-	TD
	26/18	13.2	142.6	998	-	-	TD
	27/00	14.1	142.3	996	35	2.0	TS
	27/06	15.7	141.7	996	35	2.5	TS
	27/12	16.7	141.2	992	40	2.5	TS
	27/18	17.5	139.9	990	45	3.0	TS
	28/00	18.3	138.8	985	50	3.5	STS
	28/06	19.5	137.8	975	65	4.0	TY
	28/12	19.9	136.8	970	65	4.5	TY
	28/18	20.6	135.6	965	70	4.5	TY
	29/00	20.9	134.1	965	70	5.0	TY
	29/06	21.0	132.9	955	75	5.5	TY
	29/12	20.9	131.8	935	90	6.5	TY
	29/18	21.2	130.6	925	95	6.5	TY
	30/00	21.4	129.7	925	95	6.5	TY
	30/06	21.7	128.5	925	95	6.5	TY
	30/12	22.0	127.3	925	95	6.0	TY
	30/15	22.1	126.8	925	95	-	TY
	30/18	22.2	126.4	940	85	5.0	TY
	30/21	22.6	125.7	945	85	-	TY
	31/00	22.7	125.2	945	85	5.0	TY
	31/03	22.9	124.7	945	85	-	TY
	31/06	23.4	124.0	945	85	4.5	TY
	31/09	23.5	123.5	940	85	-	TY
	31/12	23.8	122.8	935	90	5.0	TY
	31/15	24.0	122.1	940	85	-	TY
	31/18	23.8	121.4	950	80	5.0	TY
	31/21	23.6	120.9	950	80	-	TY
Sep.	01/00	24.2	120.3	960	75	4.0	TY
	01/03	25.0	119.7	970	70	-	TY
	01/06	25.4	119.5	980	60	4.0	STS
	01/12	25.6	118.2	985	50	-	STS
	01/18	25.9	116.9	992	45	3.5	TS
	02/00	26.6	115.5	996	40	3.0	TS
	02/06	27.5	114.8	1000	-	-	TD
	02/12	28.0	114.5	1002	-	-	TD
	02/18	28.5	114.4	1002	-	-	TD
	03/00						Dissip.

TY NABI (0514)

29 Aug. - 9 Sep.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Aug.	29/00	14.6	154.0	1004	-	-	TD
	29/06	14.9	153.4	1000	-	-	TD
	29/12	15.0	152.3	994	40	3.0	TS
	29/18	15.1	151.2	990	45	3.0	TS
	30/00	15.1	150.2	985	50	3.5	STS
	30/06	15.1	149.2	980	55	4.0	STS
	30/12	14.8	147.8	975	60	4.5	STS
	30/18	15.2	147.1	965	70	5.0	TY
	31/00	15.6	146.3	950	80	6.0	TY
	31/06	16.4	144.9	945	85	6.0	TY
	31/12	16.6	143.7	935	90	6.0	TY
	31/18	16.7	142.6	935	90	6.0	TY
Sep.	01/00	17.3	141.5	935	90	6.0	TY
	01/06	17.7	140.7	935	90	6.0	TY
	01/12	18.3	139.8	930	95	6.0	TY
	01/18	18.8	138.5	930	95	6.0	TY
	02/00	19.2	137.5	930	95	6.0	TY
	02/06	19.6	136.8	925	95	6.0	TY
	02/12	20.1	136.1	925	95	5.5	TY
	02/18	20.8	135.3	930	95	5.5	TY
	03/00	21.4	134.6	935	90	5.5	TY
	03/06	22.3	134.0	935	90	5.5	TY
	03/12	23.2	133.2	935	90	5.0	TY
	03/15	23.5	132.9	935	90	-	TY
	03/18	24.0	132.6	940	85	5.0	TY
	03/21	24.4	132.5	940	85	-	TY
	04/00	24.8	132.2	940	85	5.0	TY
	04/03	25.5	132.0	940	85	-	TY
	04/06	26.1	131.6	935	85	5.0	TY
	04/09	26.3	131.3	935	85	-	TY
	04/12	26.6	131.2	935	85	5.0	TY
	04/15	26.8	131.0	935	85	-	TY
	04/18	27.1	131.0	935	85	5.5	TY
	04/21	27.6	130.9	935	85	-	TY
	05/00	27.9	130.7	935	85	5.5	TY
	05/03	28.4	130.5	935	85	-	TY
	05/06	28.8	130.4	935	85	5.5	TY
	05/09	29.1	130.2	935	85	-	TY
	05/12	29.4	130.2	935	85	5.5	TY
	05/15	29.7	130.1	940	85	-	TY
	05/18	30.2	130.2	945	80	5.5	TY
	05/21	30.8	130.2	945	80	-	TY
	06/00	31.4	130.0	950	80	5.0	TY
	06/03	32.1	130.1	955	75	-	TY
	06/04	32.5	130.2	960	70	-	TY
	06/05	32.7	130.1	960	65	-	TY
	06/06	33.0	130.2	965	65	4.5	TY
	06/09	33.5	130.3	970	65	-	TY
	06/12	34.2	130.8	970	65	4.0	TY
	06/15	34.9	131.1	970	65	-	TY
	06/18	36.0	131.8	975	65	3.5	TY
	06/21	36.9	132.2	975	60	-	STS
	07/00	37.5	133.0	980	55	3.0	STS
	07/03	38.2	134.0	985	55	-	STS
	07/06	38.8	135.2	985	50	2.5	STS
	07/09	40.0	137.0	985	50	-	STS
	07/12	41.0	138.7	985	50	2.5	STS
	07/15	42.6	139.7	985	50	-	STS
	07/18	44.0	141.1	985	50	2.0	STS
	07/19	44.5	141.5	985	50	-	STS
	07/21	45.3	142.9	985	50	-	STS
	08/00	46.0	145.0	985	50	2.0	STS
	08/03	47.0	147.0	985	50	-	STS
	08/06	47.4	147.9	986	-	-	L
	08/12	48.9	150.6	984	-	-	L
	08/18	49.8	154.2	976	-	-	L
	09/00	49.9	157.6	976	-	-	L
	09/06	49.8	162.2	976	-	-	L
	09/12	49.9	166.4	978	-	-	L
	09/18	49.6	170.5	978	-	-	L
	10/00						Dissip.

TY KAHNUN (0515)

5 Sep. - 13 Sep.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Sep. 05/00	8.2	142.3	1006	-	-	TD
05/06	8.7	141.0	1004	-	-	TD
05/12	9.3	139.9	1004	-	-	TD
05/18	10.0	138.7	1004	-	-	TD
06/00	10.5	137.8	1006	-	-	TD
06/06	11.1	137.0	1004	-	-	TD
06/12	12.1	136.0	1004	-	-	TD
06/18	13.0	135.2	1004	-	-	TD
07/00	14.0	134.4	1002	35	2.0	TS
07/06	14.0	134.0	998	40	2.5	TS
07/12	14.0	133.6	992	45	3.0	TS
07/18	14.8	133.0	985	50	3.5	STS
08/00	15.3	132.5	980	55	3.5	STS
08/06	16.3	132.4	980	55	3.5	STS
08/12	17.4	131.5	975	60	4.0	STS
08/18	18.2	131.1	970	65	4.5	TY
09/00	19.2	130.5	955	80	5.0	TY
09/06	20.4	129.7	955	80	5.0	TY
09/12	21.4	128.5	955	80	5.0	TY
09/18	22.2	127.5	955	75	5.0	TY
09/21	22.8	126.9	955	75	-	TY
10/00	23.2	126.3	955	75	5.0	TY
10/03	23.6	125.8	955	75	-	TY
10/06	24.2	125.3	950	85	6.0	TY
10/09	24.5	124.9	945	85	-	TY
10/12	25.1	124.5	945	85	6.0	TY
10/15	25.6	123.9	945	85	-	TY
10/18	26.1	123.5	945	85	6.0	TY
10/21	26.7	123.3	945	85	-	TY
11/00	27.3	122.7	950	80	6.0	TY
11/06	28.3	121.9	955	75	5.5	TY
11/12	29.4	121.0	970	65	5.0	TY
11/18	30.4	120.4	985	50	4.5	STS
12/00	31.7	119.4	996	40	4.0	TS
12/06	33.0	119.4	996	35	3.5	TS
12/12	34.3	120.2	998	35	3.0	TS
12/18	35.0	121.1	998	35	2.5	TS
13/00	35.5	122.5	1000	-	-	L
13/06	36.4	124.8	1002	-	-	L
13/12	36.8	126.2	1004	-	-	L
13/18						Dissip.

TY VINCENTE (0516)

15 Sep. - 19 Sep.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Sep. 15/06	14.1	115.6	1004	-	-	TD
15/12	13.6	114.5	1004	-	-	TD
15/18	12.9	113.6	1002	-	-	TD
16/00	11.8	113.0	1000	-	-	TD
16/06	10.8	113.5	998	-	-	TD
16/12	11.4	114.2	992	35	2.0	TS
16/18	12.3	114.4	990	40	2.0	TS
17/00	13.5	114.5	990	40	2.0	TS
17/06	15.4	113.7	990	40	2.0	TS
17/12	16.6	111.5	990	40	2.0	TS
17/18	17.1	109.9	990	45	2.5	TS
18/00	17.2	108.5	985	45	3.0	TS
18/06	17.7	106.9	992	40	3.0	TS
18/12	18.8	104.7	994	35	3.0	TS
18/18	19.3	102.4	1000	-	-	TD
19/00	20.0	99.8	1004	-	-	Out

TY SAOLA (0517)

19 Sep. - 28 Sep.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Sep. 19/00	20.6	156.6	1010	-	-	TD
19/06	20.2	155.2	1008	-	-	TD
19/12	20.4	154.0	1008	-	-	TD
19/18	20.8	153.0	1004	-	-	TD
20/00	21.3	152.4	1002	-	-	TD
20/06	21.6	152.0	1000	-	-	TD
20/12	21.9	151.5	1000	-	-	TD
20/18	22.3	151.1	998	35	2.5	TS
21/00	22.6	150.6	996	40	3.0	TS
21/06	23.1	149.9	990	45	3.0	TS
21/12	23.5	149.0	985	50	3.0	STS
21/18	24.2	147.3	980	55	3.5	STS
22/00	24.6	146.0	975	65	4.0	TY
22/06	25.2	144.3	970	70	4.5	TY
22/09	25.3	143.6	965	70	-	TY
22/12	25.6	142.8	955	75	5.5	TY
22/15	26.0	142.1	955	75	-	TY
22/18	26.4	141.3	955	75	5.5	TY
22/21	26.7	140.7	955	75	-	TY
23/00	27.2	140.2	955	75	5.5	TY
23/03	27.5	139.5	955	75	-	TY
23/06	27.6	139.2	950	80	5.5	TY
23/09	28.0	139.0	950	80	-	TY
23/12	28.4	138.7	950	80	5.5	TY
23/15	28.7	138.6	950	80	-	TY
23/18	29.1	138.3	950	80	5.5	TY
23/21	29.3	138.0	950	80	-	TY
24/00	29.7	137.8	950	80	5.5	TY
24/03	30.1	137.9	950	80	-	TY
24/06	30.4	138.0	950	80	5.5	TY
24/09	30.8	138.3	950	80	-	TY
24/12	31.5	138.5	950	80	5.5	TY
24/15	31.8	138.8	950	80	-	TY
24/18	32.2	139.2	955	75	5.5	TY
24/21	32.7	139.8	955	75	-	TY
25/00	33.1	140.8	955	75	5.5	TY
25/03	34.0	141.8	955	75	-	TY
25/06	34.7	142.9	960	75	5.0	TY
25/09	35.4	143.9	960	75	-	TY
25/12	35.7	144.7	965	70	4.5	TY
25/18	36.3	146.0	970	65	4.5	TY
26/00	36.9	147.2	975	65	4.0	TY
26/06	37.8	148.9	980	55	3.5	STS
26/12	38.9	151.2	992	-	-	L
26/18	39.4	154.0	992	-	-	L
27/00	40.4	159.4	996	-	-	L
27/06	40.8	165.1	1000	-	-	L
27/12	41.5	171.7	1002	-	-	L
27/18	42.2	178.4	1002	-	-	L
28/00	42.2	184.4	1002	-	-	Out

TY DAMREY (0518)

19 Sep. - 28 Sep.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Sep. 19/06	13.2	127.0	1006	-	-	TD
19/12	13.8	126.1	1006	-	-	TD
19/18	14.3	125.2	1004	-	-	TD
20/00	14.9	124.6	1000	-	-	TD
20/06	15.8	124.1	1000	-	-	TD
20/12	16.5	123.7	1000	-	-	TD
20/18	17.2	123.3	998	-	-	TD
21/00	18.0	122.8	996	35	2.0	TS
21/06	18.7	122.2	992	40	2.5	TS
21/12	18.9	121.5	990	45	2.5	TS
21/18	19.3	121.2	990	45	2.5	TS
22/00	19.8	121.0	990	45	2.5	TS
22/06	20.2	120.4	990	45	2.5	TS
22/12	20.0	119.6	990	45	2.5	TS
22/18	19.8	118.8	990	45	2.5	TS
23/00	20.0	118.0	990	45	3.0	TS
23/06	20.5	116.8	990	45	3.0	TS
23/12	20.5	116.7	990	45	3.0	TS
23/18	20.3	116.1	985	50	3.0	STS
24/00	20.0	115.4	980	55	3.5	STS
24/06	19.7	114.8	975	60	4.0	STS
24/12	19.3	114.0	970	65	4.0	TY
24/18	18.9	113.4	970	65	4.0	TY
25/00	18.8	113.1	960	75	5.0	TY
25/06	19.1	112.4	955	80	5.0	TY
25/12	19.2	111.8	955	80	5.0	TY
25/18	19.1	110.7	955	80	5.5	TY
26/00	18.5	109.9	965	70	4.5	TY
26/06	18.8	108.9	970	65	4.0	TY
26/12	19.4	108.1	975	60	4.0	STS
26/18	19.5	107.5	975	60	4.0	STS
27/00	19.6	106.3	980	60	3.5	STS
27/06	19.7	105.0	990	50	3.5	STS
27/12	19.3	103.8	996	35	3.0	TS
27/18	19.5	102.6	1004	-	-	TD
28/00	20.4	101.3	1006	-	-	TD
28/06	21.0	99.7	1006	-	-	Out

TY LONGWANG (0519)

25 Sep. - 3 Oct.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Sep. 25/06	18.9	145.3	1002	-	-	TD
25/12	19.0	144.6	1002	-	-	TD
25/18	19.2	144.1	1002	-	-	TD
26/00	19.6	143.5	1000	35	2.0	TS
26/06	20.0	143.1	996	40	2.5	TS
26/12	20.3	142.4	992	45	3.0	TS
26/18	20.9	141.7	980	55	4.0	STS
27/00	21.5	141.0	970	65	4.5	TY
27/06	21.7	140.1	960	70	5.0	TY
27/12	22.0	139.2	955	75	5.0	TY
27/18	22.1	138.4	950	80	5.5	TY
28/00	22.3	137.5	945	85	5.5	TY
28/06	22.5	136.7	940	90	6.0	TY
28/12	22.5	136.2	940	90	6.0	TY
28/18	22.4	135.6	940	90	6.0	TY
29/00	22.4	135.2	940	90	6.0	TY
29/06	22.4	134.7	940	90	6.0	TY
29/12	22.3	133.9	940	90	6.0	TY
29/18	22.2	133.0	940	90	6.0	TY
30/00	22.0	132.1	950	80	5.0	TY
30/06	22.1	131.0	950	80	5.0	TY
30/12	22.2	130.0	940	85	6.0	TY
30/18	22.4	128.5	935	90	6.0	TY
30/21	22.5	127.8	935	90	-	TY
Oct. 01/00	22.5	126.9	930	95	6.5	TY
01/03	22.6	126.1	930	95	-	TY
01/06	22.8	125.3	930	95	6.5	TY
01/09	23.0	124.7	930	95	-	TY
01/12	23.1	123.9	930	95	6.5	TY
01/15	23.2	123.2	930	95	-	TY
01/18	23.5	122.5	935	90	6.5	TY
01/21	23.8	121.6	945	85	-	TY
02/00	24.3	120.9	965	70	6.0	TY
02/03	24.3	120.4	970	65	-	TY
02/06	24.3	119.8	980	55	5.0	STS
02/12	24.4	118.7	990	45	5.0	TS
02/18	24.8	117.8	998	35	4.5	TS
03/00	25.5	116.7	1000	-	-	TD
03/06	26.0	115.5	1004	-	-	TD
03/12						Dissip.

TY KIROGI (0520)

9 Oct. - 19 Oct.

Date/Time	Center Position		Central pressure	Max Wind	CI number	Grade
(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
Oct. 09/00	22.0	137.9	1008	-	-	TD
09/06	22.4	137.2	1008	-	-	TD
09/12	22.7	136.4	1008	-	-	TD
09/18	23.0	135.4	1006	-	-	TD
10/00	22.9	134.5	1004	-	-	TD
10/06	22.6	133.9	1000	35	2.5	TS
10/12	22.1	133.4	994	40	3.0	TS
10/18	21.9	133.2	990	45	4.0	TS
11/00	21.4	133.1	985	50	4.5	STS
11/06	21.0	133.0	970	65	5.0	TY
11/12	20.7	132.9	950	80	5.5	TY
11/18	20.5	132.6	940	85	6.5	TY
12/00	20.5	132.5	935	95	6.5	TY
12/06	20.6	132.3	930	100	6.5	TY
12/12	20.8	132.2	930	100	6.0	TY
12/18	21.1	131.9	935	90	5.5	TY
13/00	21.4	131.7	940	85	5.5	TY
13/06	21.5	131.8	940	85	5.5	TY
13/12	21.8	131.8	940	85	5.5	TY
13/18	22.2	131.9	940	85	5.5	TY
14/00	22.6	131.3	940	85	5.5	TY
14/06	22.9	131.3	940	85	5.5	TY
14/12	22.9	131.1	940	85	5.5	TY
14/18	23.0	131.1	940	85	5.5	TY
15/00	23.3	131.3	940	85	5.5	TY
15/06	23.5	131.3	940	85	5.5	TY
15/12	23.8	131.8	940	85	5.5	TY
15/18	24.0	132.4	940	85	5.5	TY
16/00	24.2	132.9	940	85	5.5	TY
16/06	24.6	133.5	940	85	6.0	TY
16/12	25.2	134.0	940	85	6.0	TY
16/18	25.8	134.2	940	85	6.0	TY
17/00	26.5	134.6	945	85	6.0	TY
17/06	27.6	134.9	950	80	5.0	TY
17/12	28.5	135.5	955	75	5.0	TY
17/18	29.2	136.1	955	75	5.0	TY
18/00	30.0	136.7	955	75	5.0	TY
18/06	31.0	137.9	955	75	5.0	TY
18/09	31.4	138.3	960	65	-	TY
18/12	31.5	139.0	980	50	5.0	STS
18/15	31.5	139.5	990	45	-	TS
18/18	31.4	140.0	998	40	5.0	TS
18/21	31.2	140.4	1002	35	-	TS
19/00	31.2	140.8	1004	35	4.5	TS
19/03	31.1	141.2	1006	35	-	TS
19/06	31.2	141.6	1008	-	-	TD
19/12	31.7	143.2	1012	-	-	TD
19/18						Dissip.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
TY KAI-TAK (0521)							
	28 Oct. - 2 Nov.						
Oct.	28/06	12.7	115.1	1004	-	-	TD
	28/12	12.9	114.1	1004	-	-	TD
	28/18	12.8	113.8	1002	-	-	TD
	29/00	12.6	113.5	1000	35	2.5	TS
	29/06	12.7	112.9	990	40	3.0	TS
	29/12	12.9	112.8	985	45	3.5	TS
	29/18	13.2	112.9	985	50	4.0	STS
	30/00	14.0	112.9	975	60	4.0	STS
	30/06	14.1	112.3	965	70	4.5	TY
	30/12	14.1	112.2	955	75	5.5	TY
	30/18	14.4	111.9	955	80	5.5	TY
	31/00	14.6	111.8	950	80	5.5	TY
	31/06	14.8	111.5	960	70	5.5	TY
	31/12	14.9	111.0	965	65	5.0	TY
	31/18	15.1	110.7	970	60	4.5	STS
Nov.	01/00	15.4	110.0	975	60	4.5	STS
	01/06	15.8	109.2	980	55	4.5	STS
	01/12	16.4	108.5	985	50	4.0	STS
	01/18	16.9	108.0	994	40	3.5	TS
	02/00	17.4	107.4	1000	35	3.0	TS
	02/06	18.0	106.5	1004	-	-	TD
	02/12						Dissip.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
TS TEMBIN (0522)							
	6 Nov. - 12 Nov.						
Nov.	06/12	8.2	140.7	1008	-	-	TD
	06/18	9.6	140.5	1008	-	-	TD
	07/00	10.1	140.4	1008	-	-	TD
	07/06	11.5	138.5	1006	-	-	TD
	07/12	12.2	137.5	1006	-	-	TD
	07/18	12.4	137.0	1006	-	-	TD
	08/00	12.5	136.5	1008	-	-	TD
	08/06	12.5	135.6	1008	-	-	TD
	08/12	12.5	134.0	1008	-	-	TD
	08/18	12.6	132.5	1008	-	-	TD
	09/00	12.8	130.8	1008	-	-	TD
	09/06	12.8	129.3	1006	-	-	TD
	09/12	12.8	127.8	1008	-	-	TD
	09/18	14.6	126.1	1006	-	-	TD
	10/00	14.9	124.5	1002	35	2.5	TS
	10/06	15.3	122.7	1002	35	2.5	TS
	10/12	15.8	121.8	1004	-	-	TD
	10/18	16.6	120.0	1004	-	-	TD
	11/00	16.7	119.7	1004	-	-	TD
	11/06	18.0	119.0	1004	-	-	TD
	11/12	19.1	118.0	1008	-	-	TD
	11/18	19.5	117.3	1010	-	-	TD
	12/00	19.4	116.2	1010	-	-	TD
	12/06	18.7	115.3	1008	-	-	TD
	12/12	17.7	114.9	1008	-	-	TD
	12/18						Dissip.

Date/Time		Center Position		Central pressure	Max Wind	CI number	Grade
	(UTC)	Lat (N)	Lon (E)	(hPa)	(kt)		
STS BOLAVEN (0523)							
	14 Nov. - 20 Nov.						
Nov.	14/00	8.8	129.6	1004	-	-	TD
	14/06	9.2	129.4	1002	-	-	TD
	14/12	9.6	129.5	1002	-	-	TD
	14/18	10.0	129.8	1000	-	-	TD
	15/00	10.8	129.9	1000	-	-	TD
	15/06	11.4	130.0	996	-	-	TD
	15/12	12.3	130.0	998	-	-	TD
	15/18	12.8	130.0	996	-	-	TD
	16/00	13.0	129.9	996	-	-	TD
	16/06	13.2	129.8	996	35	2.0	TS
	16/12	13.3	129.7	996	40	2.0	TS
	16/18	13.3	129.3	994	45	2.5	TS
	17/00	13.2	129.0	990	50	3.0	STS
	17/06	13.0	128.9	985	55	3.0	STS
	17/12	13.1	128.7	985	55	3.0	STS
	17/18	13.2	128.6	985	55	3.0	STS
	18/00	13.3	128.5	985	55	3.0	STS
	18/06	13.7	128.1	985	55	3.0	STS
	18/12	14.2	127.2	985	55	3.0	STS
	18/18	14.6	126.3	985	55	2.5	STS
	19/00	15.1	125.2	985	55	2.5	STS
	19/06	15.5	124.6	985	45	2.5	TS
	19/12	16.1	123.9	990	40	2.0	TS
	19/18	16.5	123.1	998	35	2.0	TS
	20/00	17.1	122.3	1006	-	-	TD
	20/06	17.9	121.1	1006	-	-	TD
	20/12						Dissip.

Track and Intensity Analysis and Forecast Errors for Each Tropical Cyclone in 2005

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
STS KULAP (0501)											
Jan.	15/12	0	112	99	284	0	7	11	0	-10	-15
	15/18	47	340	463	892	0	7	6	0	-10	-10
	16/00	0	240	551	941	0	9	0	0	-10	0
	16/06	45	153	370		-5	7		5	-5	
	16/12	93	200	403		0	9		0	-10	
	16/18	43	82	138		0	6		0	-5	
	17/00	39	35	299		0	-2		0	0	
	17/06	11	54			5			-5		
	17/12	0	124			5			-5		
	17/18	0	103			2			0		
	18/00	0	71			-2			0		
	18/06	22									
	18/12	57									
	18/18	255									
	19/00	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
STS ROKE (0502)											
Mar.	15/00	44	86	76		7	4		-10	-5	
	15/06	0	31	119		10	0		-10	0	
	15/12	11	131			10			-10		
	15/18	0	253			0			0		
	16/00	11	349			-7			10		
	16/06	0	214			-11			15		
	16/12	0									
	16/18	0									
	17/00	0									
	17/06	11									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY SONCA (0503)											
Apr.	23/00	0	101	261	575	43	61	56	-40	-50	-45
	23/06	0	34	119	466	45	45	35	-40	-35	-30
	23/12	0	57	138	569	45	35	15	-35	-25	-15
	23/18	0	39	97	515	35	25	0	-25	-15	0
	24/00	0	49	161	467	20	20	-10	-15	-10	10
	24/06	0	24	147	436	10	15	-15	-5	-10	15
	24/12	0	46	323		5	5		-5	-5	
	24/18	0	44	249		5	-5		-5	5	
	25/00	0	52	204		10	-10		-10	10	
	25/06	0	168	551		0	-20		-5	20	
	25/12	0	274			-10			0		
	25/18	0	210			-15			10		
	26/00	0	206			-20			15		
	26/06	0	210			-20			20		
	26/12	0									
	26/18	0									
	27/00	0									
	27/06	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY HAITANG (0505)											
Jul.	13/00	0	115	277	293	25	15	40	-15	-15	-30
	13/06	0	103	154	99	20	15	40	-15	-15	-30
	13/12	0	113	223	202	-5	0	20	5	-5	-20
	13/18	0	81	123	160	-10	10	20	5	-10	-20
	14/00	0	176	184	193	-10	15	20	5	-15	-20
	14/06	49	109	79	46	-10	15	5	5	-15	-5
	14/12	0	157	166	121	5	15	0	-5	-15	-5
	14/18	22	147	169	154	10	15	-5	-10	-15	0
	15/00	0	128	147	211	15	15	-15	-15	-15	5
	15/06	0	11	43	91	15	5	-20	-15	-5	10
	15/12	0	25	51	84	10	-5	-35	-10	0	25
	15/18	0	100	22	120	10	-10	-35	-10	5	25
	16/00	0	115	112	200	5	-15	-30	-5	5	25
	16/06	0	93	105	102	-5	-10	-15	5	10	20
	16/12	0	115	161	105	-15	-10	-5	5	10	5
	16/18	0	93	87	104	-5	-5	-5	0	5	5
	17/00	0	11	69	126	-5	-10	-2	0	10	10
	17/06	0	54	46		-15	-10		10	10	
	17/12	0	69	110		0	0		0	0	
	17/18	0	46	112		-5	-5		5	5	
	18/00	15	104	129		0	0		0	10	
	18/06	35	83			5			0		
	18/12	11	105			5			-5		
	18/18	0	107			2			0		
	19/00	15	116			0			10		
	19/06	33									
	19/12	0									
	19/18	0									
	20/00	30									
	20/06	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY NESAT (0504)											
May	31/12	25	122	229		27	45		-25	-35	
	31/18	67	194			37			-30		
Jun.	01/00	47	157	204	255	30	25	20	-20	-15	-15
	01/06	0	78	195	154	20	15	10	-10	-10	-10
	01/12	0	118	88	140	20	10	10	-15	-10	-10
	01/18	0	88	22	46	15	10	0	-10	-10	-5
	02/00	0	59	60	48	5	0	-15	0	0	10
	02/06	0	55	55	162	-5	0	-15	5	0	10
	02/12	0	47	34	155	5	0	-15	0	0	10
	02/18	0	39	78	147	5	-10	-20	0	5	10
	03/00	0	25	59	196	5	-15	-20	-5	10	10
	03/06	0	64	105	179	0	-15	-10	0	10	5
	03/12	0	68	70	258	0	-20	-5	0	15	5
	03/18	0	46	126	268	-10	-25	-5	5	15	5
	04/00	0	24	53	137	-25	-35	-15	15	20	15
	04/06	0	103	189	395	-25	-25	-20	15	15	15
	04/12	0	133	303	436	-30	-25	-20	20	15	10
	04/18	0	178	317	380	-15	0	0	5	0	-5
	05/00	0	53	67	143	-10	5	5	0	0	0
	05/06	0	76	49	106	0	0	0	-5	0	5
	05/12	0	78	94	73	10	5	5	-10	-10	0
	05/18	0	49	143	127	15	10	5	-10	-10	0
	06/00	0	52	207	108	15	15	5	-10	-10	-5
	06/06	0	46	20	164	-10	-20	-25	10	20	20
	06/12	0	59	97	228	-10	-20	-20	5	15	20
	06/18	0	51	90	325	-5	-10	-10	0	15	10
	07/00	0	45	145	363	0	-5	-5	0	5	5
	07/06	0	23	221	444	-5	-5	-5	5	5	5
	07/12	0	77	237	545	-5	-5	-2	5	5	-5
	07/18	0	15	150	324	-5	-10	-4	10	10	0
	08/00	0	44	145		-10	-15		10	15	
	08/06	0	51	33		-10	-10		10	15	
	08/12	23	31	72		0	-2		0	0	
	08/18	39	78	19		-5	-4		5	5	
	09/00	45	106			-5			5		
	09/06	0	80			-5			5		
	09/12	0	91			-7			5		
	09/18	11	96			-4			5		
	10/00	0									
	10/06	0									
	10/12	35									
	10/18	44									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
STS BANYAN (0507)											
Jul.	21/18	15	138	190	318	-5	5	-5	5	0	10
	22/00	25	151	216	395	-5	-5	-15	5	10	20
	22/06	62	64	201	383	-10	-15	-25	15	20	30
	22/12	95	137	45	329	-5	-15	-25	10	20	30
	22/18	72	79	172	387	0	-15	-25	5	20	35
	23/00	25	154	318	575	-5	-15	-25	5	15	35
	23/06	70	244	479	774	-10	-20	-25	10	25	35
	23/12	53	235	512	916	-10	-20	-28	10	25	35
	23/18	91	224	408	792	-10	-20	-25	10	30	30
	24/00	59	190	379	793	-10	-20	-15	10	30	20
	24/06	0	138	388	625	-10	-20	-15	15	30	20
	24/12	20	106	273	580	-15	-23	-10	20	30	25
	24/18	32	150	472	583	-15	-15	-5	25	25	25
	25/00	0	153	421		-5	-5		20	15	
	25/06	24	84	375		5	5		10	5	
	25/12	0	115	368		2	0		10	15	
	25/18	0	154	293		5	5		5	15	
	26/00	11	173			5			0		
	26/06	0	93			5			0		
	26/12	0	14			5			5		
	26/18	0	100			0			10		
	27/00	0									
	27/06	48									
	27/12	11									
	27/18	24									

TS NALGAE (0506)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Jul. 20/12	23	154	45	142	4	2	0	-5	0	5
20/18	83	24	167	320	-12	-15	-17	10	15	20
21/00	0	120	22	211	-12	-12	-11	10	15	15
21/06	0	96	72	128	-10	-12	-11	10	15	15
21/12	15	36	99		-5	-7		5	10	
21/18	0	104	135		-5	-7		5	10	
22/00	39	178	385		-7	-6		10	10	
22/06	0	83	224		-7	-6		10	10	
22/12	59	199			-2			5		
22/18	83	313			-2			5		
23/00	0	284			-6			10		
23/06	0	92			-6			10		
23/12	0									
23/18	9									
24/00	0									
24/06	56									

TS WASHI (0508)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Jul. 29/12	46	74	278		5	6		-10	-35	
29/18	46	79			0			0		
30/00	46	113			0			0		
30/06	0	84			5			0		
30/12	46	43			4			0		
30/18	0									
31/00	31									
31/06	0									
31/12	0									

TY MATSA (0509)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Jul. 31/12	11	79	92	131	4	15	20	-5	-20	-20
31/18	78	224	260	353	5	10	15	-5	-15	-15
Aug. 01/00	43	134	84	102	5	10	10	-5	-15	-10
01/06	0	59	35	122	5	15	10	-10	-15	-10
01/12	0	54	102	135	-5	0	5	0	-5	-10
01/18	0	140	53	115	-5	0	10	0	-5	-5
02/00	0	178	38	101	-5	5	5	-5	-10	-10
02/06	0	62	74	80	-5	-5	-10	0	0	5
02/12	0	45	55	41	-5	-5	-15	0	0	10
02/18	0	38	24	145	-10	-10	-25	0	5	15
03/00	0	93	42	149	-15	-15	-25	5	5	20
03/06	10	46	83	273	-15	-20	-35	5	10	25
03/12	10	52	178	410	-15	-25	-35	5	15	30
03/18	10	46	135	397	-10	-5	-10	5	5	10
04/00	10	73	148	367	-10	-15	-17	5	15	20
04/06	0	80	78	82	-10	-15	-9	5	10	10
04/12	11	15	87		-10	-10		10	10	
04/18	15	39	68		-15	-15		10	15	
05/00	0	24	105		-15	-12		10	10	
05/06	30	90	83		-10	-4		5	5	
05/12	0	15			-5			5		
05/18	0	102			-5			5		
06/00	0	53			-2			0		
06/06	40	58			0			-5		
06/12	39									
06/18	87									
07/00	66									
07/06	29									

TY TALIM (0513)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Aug. 27/00	0	105	198	149	11	25	60	-10	-25	-45
27/06	0	21	112	276	15	25	45	-20	-20	-30
27/12	0	67	245	354	10	35	40	-10	-25	-25
27/18	0	61	186	248	5	35	10	-5	-20	-5
28/00	0	57	157	176	5	35	5	-5	-20	-5
28/06	0	100	137	128	5	25	5	0	-15	-5
28/12	0	103	136	176	15	20	15	-10	-10	-10
28/18	0	108	168	278	15	0	0	-10	0	0
29/00	0	140	179	331	15	0	-5	-10	-5	0
29/06	0	108	80	110	15	-5	-25	-10	0	15
29/12	0	46	0	51	0	-5	-40	5	5	30
29/18	0	106	82	146	-15	-15	-32	10	10	25
30/00	0	39	88	83	-20	-5	-11	10	0	10
30/06	0	30	60		-20	-20		10	10	
30/12	0	32	104		-5	-10		0	10	
30/18	0	52	178		5	-12		-5	5	
31/00	0	117	207		-5	-11		0	10	
31/06	0	51			-10			5		
31/12	0	67			-10			10		
31/18	0	100			-7			5		
Sep. 01/00	0	74			-4			-40		
01/06	0									
01/12	0									
01/18	0									
02/00	0									

STS SANVU (0510)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Aug. 11/06	91	137	245		2	7		-5	-10	
11/12	0	53	303		-5	-7		0	15	
11/18	172	119			0			0		
12/00	54	175			-5			5		
12/06	0	54			0			0		
12/12	0	165			2			5		
12/18	63									
13/00	0									
13/06	0									
13/12	30									

TY NABI (0514)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Aug. 29/12	0	209	212	268	15	45	40	-15	-35	-30
29/18	0	143	79	170	15	35	25	-15	-25	-20
30/00	49	78	88	211	20	25	20	-15	-15	-15
30/06	0	100	182	238	15	20	25	-10	-15	-15
30/12	0	139	250	266	25	20	20	-15	-15	-15
30/18	0	130	213	162	15	15	15	-10	-15	-15
31/00	0	138	228	189	5	0	-5	-5	-5	0
31/06	0	46	95	123	0	0	-10	0	0	5
31/12	0	34	11	67	-5	0	-10	0	0	5
31/18	0	109	59	84	-5	-5	-15	0	0	10
Sep. 01/00	0	84	67	135	-5	-10	-15	0	5	10
01/06	0	54	33	98	0	-10	-5	0	5	10
01/12	0	30	45	104	-10	-20	-15	5	10	15
01/18	0	62	84	78	-20	-30	-15	10	20	15
02/00	0	94	121	141	-20	-25	-15	10	15	10
02/06	0	91	161	127	-20	-20	-10	10	15	10
02/12	0	70	73	103	-15	-15	-5	10	15	5
02/18	0	53	82	124	-10	0	0	10	5	5
03/00	0	84	111	173	-5	5	-5	5	0	5
03/06	0	113	112	190	0	5	-20	5	0	20
03/12	0	39	69	149	0	5	-20	5	0	15
03/18	0	60	35	63	10	5	-10	0	0	5
04/00	0	46	104	144	5	0	-10	0	0	10
04/06	0	74	133	105	5	-10	-15	0	10	15
04/12	0	59	122	175	10	-10	-15	-5	10	15
04/18	0	73	129	309	0	-15	-15	0	10	15
05/00	0	96	115	277	-5	-15	-15	0	15	15
05/06	0	81	61		-20	-20		15	20	
05/12	0	67	217		-15	-20		10	15	
05/18	0	179	340		-10	-15		5	15	
06/00	0	91	381		-15	-15		15	15	
06/06	0	77			-20			15		
06/12	0	196			-15			15		
06/18	18	135			-10			10		
07/00	136	78			-5			5		
07/06	0									
07/12	0									
07/18	0									
08/00	0									

TY MAWAR (0511)

Date/Time (UTC)	Center Position T=00(km)	T=24(km)	T=48(km)	T=72(km)	Central Pressure T=24(hPa)	T=48(hPa)	T=72(hPa)	Max. Wind T=24(kt)	T=48(kt)	T=72(kt)
Aug. 19/18	21	104	131	224	11	62	40	-10	-50	-35
20/00	15	46	196	334	15	40	15	-15	-30	-10
20/06	15	89	257	344	30	35	20	-25	-25	-10
20/12	0	23	91	268	40	30	20	-35	-20	-10
20/18	15	39	108	133	40	10	15	-30	-5	-5
21/00	0	10	54	83	25	0	5	-20	0	-5
21/06	0	44	143	174	10	-5	-5	-10	5	0
21/12	0	113	201	150	-20	-25	-25	15	20	15
21/18	0	150	223	212	-30	-25	-35	20	20	20
22/00	0	127	158	224	-30	-25	-35	20	15	20
22/06	0	170	223	287	-25	-25	-40	20	15	25
22/12	0	146	171	222	-5	-5	-15	5	0	10
22/18	0	112	139	323	5	-5	-10	0	0	5
23/00	0	110	199	441	5	0	-10	-5	0	10
23/06	0	71	69	374	5	-5	-15	-5	5	15
23/12	0	73	64	148	5	-5	-15	-5	5	15
23/18	0	33	56	238	0	0	-7	0	-5	10
24/00	0	0	67	383	-5	-5	-4	5	5	5
24/06	0	58	107	557	-10	0	-2	10	0	0
24/12	0	62	180	751	0	2	-2	0	0	0
24/18	0	100	369	803	5	0	2	-10	10	5
25/00	0	108	309		-5	0		5	5	
25/06	0	143	302		-5	0		5	0	
25/12	0	133	472		0	-2		0	0	
25/18	0	52	417		-2	-4		5	0	
26/00	0	94			-2			5		
26/06	0	178			-4			5		
26/12	0	384			-2			-5		
26/18	0	323			0			0		
27/00	0									
27/06	0									
27/12	0									
27/18	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
STS GUCHOL (0512)											
Aug.	21/06	11	0	256	732	16	12	12	-15	-10	-10
	21/12	0	88	279	405	10	5	5	-10	-5	-5
	21/18	20	68	216	237	0	5	10	0	-5	-10
	22/00	11	116	223	300	0	5	5	0	-5	-5
	22/06	20	28	89	102	-5	-5	-5	5	5	5
	22/12	10	123	71		-5	-5		5	5	
	22/18	10	142	233		5	5		-5	-5	
	23/00	10	72	258		5	0		-5	0	
	23/06	0	21	263		5	-2		-5	5	
	23/12	35	71			5			-5		
	23/18	38	103			5			-5		
	24/00	0	102			0			0		
	24/06	0	24			-5			5		
	24/12	0									
	24/18	53									
	25/00	14									
	25/06	58									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY SAOLA (0517)											
Sep.	20/18	41	204	254	345	14	35	35	-15	-30	-30
	21/00	67	240	237	379	10	25	25	-15	-20	-20
	21/06	33	272	195	347	5	10	5	-10	-5	-5
	21/12	0	232	252	238	15	0	0	-10	0	0
	21/18	0	80	131	79	10	5	0	-5	-5	0
	22/00	0	70	195	96	0	5	5	0	-5	-5
	22/06	0	92	269	231	0	0	5	0	0	-5
	22/12	0	111	314	147	0	10	15	5	-5	-10
	22/18	0	111	418	643	0	10	15	5	-5	-15
	23/00	0	173	374	438	5	15	15	0	-10	-15
	23/06	0	53	143	112	0	10	5	0	-10	-5
	23/12	0	69	375		0	5		0	-5	
	23/18	0	36	330		-5	5		5	-5	
	24/00	0	50	279		0	0		0	0	
	24/06	0	177	187		0	0		0	0	
	24/12	0	176			5			-5		
	24/18	0	77			10			-10		
	25/00	0	37			5			-5		
	25/06	0	184			5			-5		
	25/12	0									
	25/18	42									
	26/00	0									
	26/06	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY DAMREY (0518)											
Sep.	21/00	31	179	228	338	6	4	10	-10	-5	-10
	21/06	48	66	83	124	-5	-10	0	5	10	0
	21/12	0	33	136	187	-10	-15	0	10	15	0
	21/18	22	97	188	242	-10	-10	0	10	10	0
	22/00	92	84	133	290	-10	-10	10	10	10	-10
	22/06	53	43	293	459	-10	-5	20	10	5	-20
	22/12	53	177	416	823	-10	10	40	10	-10	-45
	22/18	64	213	432	732	-5	15	43	5	-15	-80
	23/00	38	115	337	707	5	25	33	-5	-25	-70
	23/06	0	184	487	720	15	35	28	-15	-35	-65
	23/12	0	261	478	772	20	39	25	-20	-40	-60
	23/18	0	260	446	822	20	41	25	-20	-45	-60
	24/00	24	252	373	442	25	31	20	-25	-30	-60
	24/06	0	57	84	169	20	15	10	-20	-15	-50
	24/12	0	67	42	199	10	5	4	-10	-5	-35
	24/18	0	11	52		10	5		-10	-5	
	25/00	0	119	126		0	0		0	-5	
	25/06	0	88	126		0	-10		0	5	
	25/12	0	10	120		-5	0		5	-35	
	25/18	0	57			-5			5		
	26/00	0	10			-5			0		
	26/06	0	67			-10			5		
	26/12	0	191			-4			5		
	26/18	0									
	27/00	0									
	27/06	0									
	27/12	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY KHANUN (0515)											
	07/00	0	296	251	92	14	30	20	-15	-30	-15
Sep.	07/06	77	130	198	92	10	25	20	-10	-25	-20
	07/12	55	86	176	129	10	20	25	-10	-20	-20
	07/18	0	32	213	256	5	15	30	-5	-10	-25
	08/00	0	169	147	217	10	5	20	-10	0	-15
	08/06	0	95	174	432	10	10	30	-10	-10	-25
	08/12	0	94	186	409	5	15	15	-5	-10	-15
	08/18	0	145	256	527	0	10	5	0	-10	-5
	09/00	0	196	343	617	-5	10	0	10	-5	-5
	09/06	0	145	191	249	0	5	0	0	0	0
	09/12	0	61	83	180	5	-5	-2	-5	5	0
	09/18	0	55	11	219	10	-5	-2	-10	5	0
	10/00	0	35	36		5	-6		-5	5	
	10/06	0	15	56		5	-6		0	10	
	10/12	0	58	69		0	-2		0	5	
	10/18	0	22	127		-5	4		5	0	
	11/00	0	74			-6			5		
	11/06	0	89			-2			10		
	11/12	24	167			-2			5		
	11/18	38	134			-2			5		
	12/00	0									
	12/06	0									
	12/12	14									
	12/18	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TS VICENTE (0516)											
Sep.	16/12	0	158	262		-5	-14		5	15	
	16/18	0	74			-10			5		
	17/00	0	40			-5			10		
	17/06	0	100			-7			10		
	17/12	0	46			-9			15		
	17/18	0									
	18/00	46									
	18/06	39									
	18/12	0									

Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY KIROGI (0520)											
Oct.	10/06	0	148	220	176	22	55	40	-20	-50	-30
	10/12	0	133	179	145	30	40	20	-25	-35	-10
	10/18	0	122	111	84	30	25	15	-20	-20	-10
	11/00	0	115	143	215	30	20	15	-25	-10	-10
	11/06	0	126	178	231	30	15	10	-25	-10	-5
	11/12	0	81	89	105	0	-10	-10	-10	5	5
	11/18	0	43	24	70	-5	-15	-15	0	5	5
	12/00	0	63	73	68	-10	-15	-15	5	5	5
	12/06	0	47	92	145	-10	-15	-15	5	10	10
	12/12	0	61	127	127	-10	-15	-15	5	10	10
	12/18	0	49	168	171	-10	-10	-10	5	5	5
	13/00	0	91	198	217	0	0	5	0	0	-5
	13/06	0	72	165	168	0	0	5	0	0	-5
	13/12	0	108	153	145	0	0	5	0	0	-5
	13/18	0	158	194	238	0	0	10	0	0	-5
	14/00	0	188	295	369	0	0	5	0	0	-5
	14/06	0	75	101	125	10	10	10	-5	-5	-5
	14/12	0	39	112	53	5	5	0	-5	-5	0
	14/18	0	88	270	444	5	5	10	-5	-5	-5
	15/00	0	84	179	448	5	5	15	-5	-5	-10
	15/06	0	112	214	324	5	0	10	-5	0	-5
	15/12	0	33	97	379	5	0	-5	-5	0	10
	15/18	0	33	89	188	5	0	-23	-5	0	20
	16/00	0	70	227	371	5	5	-29	-5	0	25
	16/06	0	157	534		-10	-5		5	5	
	16/12	0	236	609		-5	-25		5	25	
	16/18	0	260	629		-5	-43		5	35	
	17/00	0	253	365		0	-39		0	35	
	17/06	0	161			0			0		
	17/12	0	123			-25			25		
	17/18	0	92			-38			30		
	18/00	0	171			-39			35		
	18/06	0									
	18/12	56									
	18/18	112									
	19/00	192									

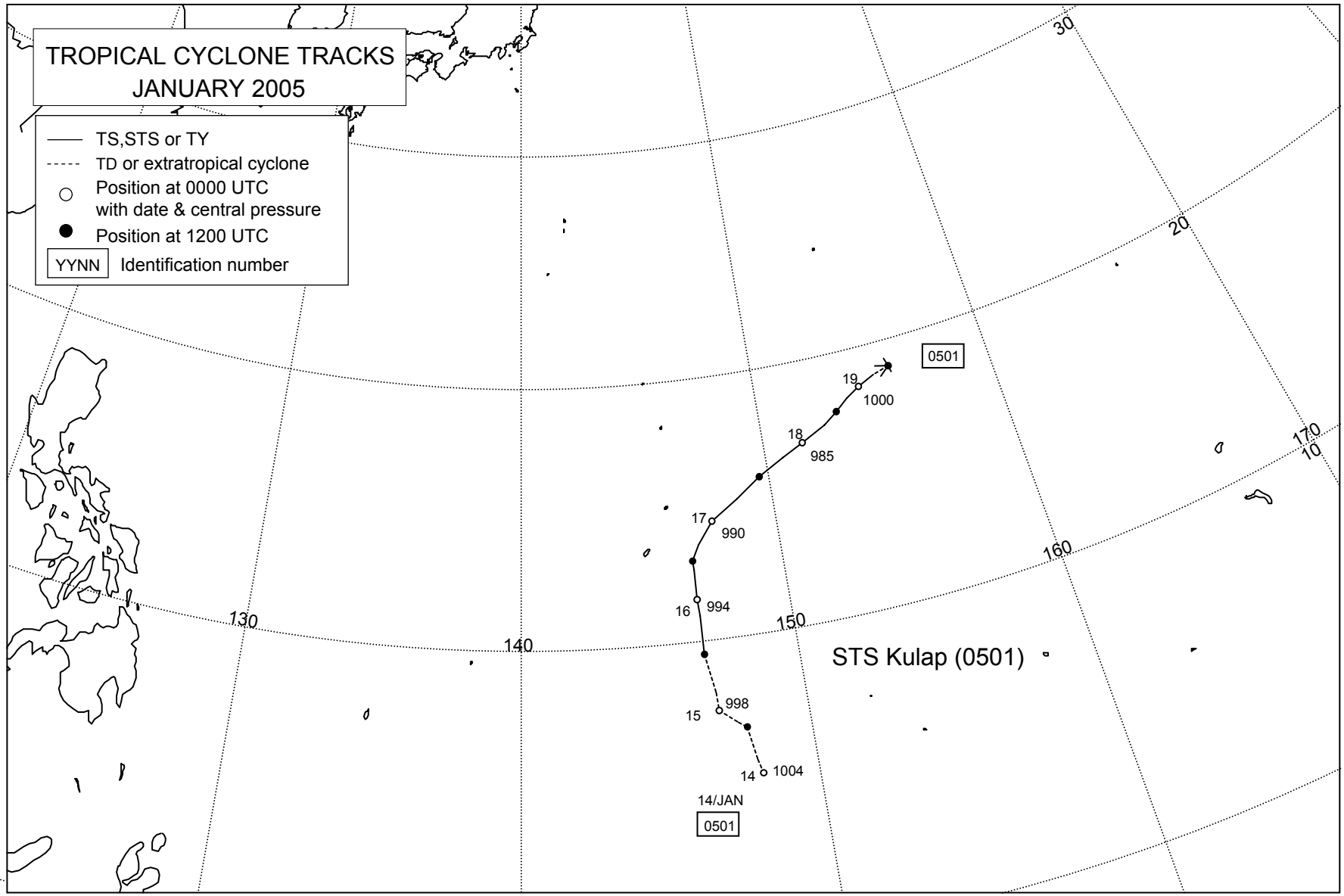
Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY LONGWANG (0519)											
Sep.	26/00	0	56	197	258	28	51	56	-30	-45	-50
	26/06	0	113	134	168	25	35	30	-20	-30	-25
	26/12	0	136	198	191	20	20	10	-15	-15	-10
	26/18	0	117	93	122	15	15	10	-10	-15	-10
	27/00	0	103	138	216	10	10	0	-10	-10	0
	27/06	0	47	100	202	5	0	-10	-10	-5	5
	27/12	0	54	133	216	5	0	0	-10	-5	0
	27/18	0	83	196	287	5	0	10	-10	-5	-10
	28/00	0	47	166	335	0	-10	15	-5	5	-15
	28/06	0	44	204	354	-5	-15	10	0	10	-10
	28/12	0	84	241	377	-5	-5	10	0	5	-10
	28/18	0	106	227	292	-5	0	5	0	0	-5
	29/00	0	159	237	242	-15	5	-25	15	0	20
	29/06	0	146	158	153	-15	5	-25	15	0	25
	29/12	0	114	117	110	-5	5	-25	10	0	25
	29/18	0	73	115	88	0	5	-18	0	-5	20
	30/00	0	46	60		20	5		-15	-5	
	30/06	0	46	56		20	-10		-15	10	
	30/12	0	33	88		5	-5		-5	5	
	30/18	0	61	32		0	-13		0	15	
Oct.	01/00	0	90			-15			10		
	01/06	0	46			-30			25		
	01/12	0	42			-20			20		
	01/18	0	39			-23			25		
	02/00	15									
	02/06	0									
	02/12	0									
	02/18	0									

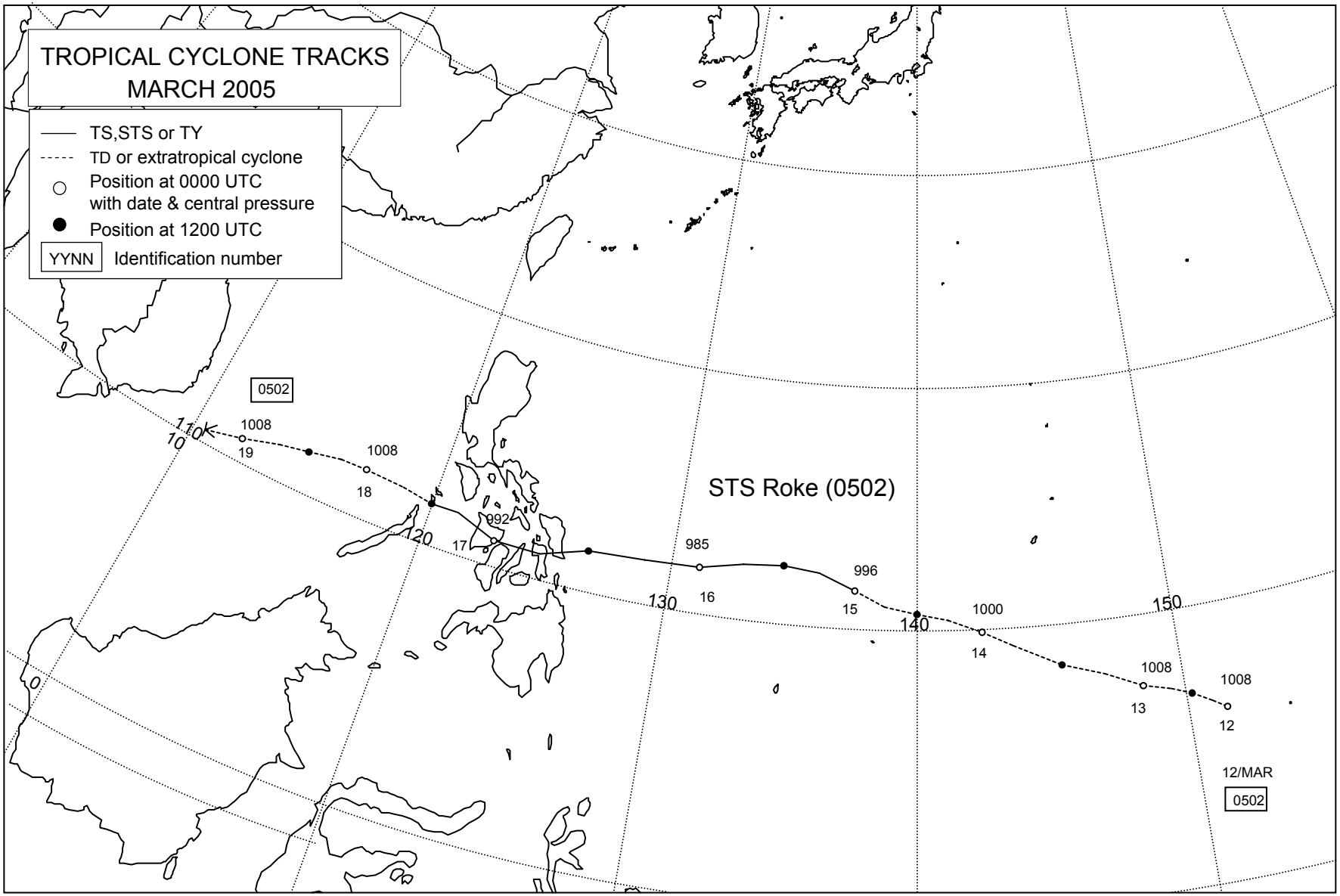
Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TY KAI-TAK (0521)											
Oct.	29/00	0	134	141	163	21	40	10	-20	-35	-10
	29/06	0	117	155	134	15	15	0	-15	-10	0
	29/12	34	101	125	189	15	5	-5	-10	0	5
	29/18	0	79	85	134	15	0	-14	-15	5	15
	30/00	0	34	78	142	15	-5	-20	-10	5	20
	30/06	0	24	124		5	-15		0	15	
	30/12	0	40	141		-15	-35		15	30	
	30/18	0	46	145		-20	-29		20	30	
	31/00	0	46	46		-25	-30		20	30	
	31/06	0	78			-20			15		
	31/12	0	97			-10			10		
	31/18	0	102			-14			15		
	01/00	0	111			-15			15		
	01/06	39									
	01/12	0									
	01/18	49									
	02/00	101									

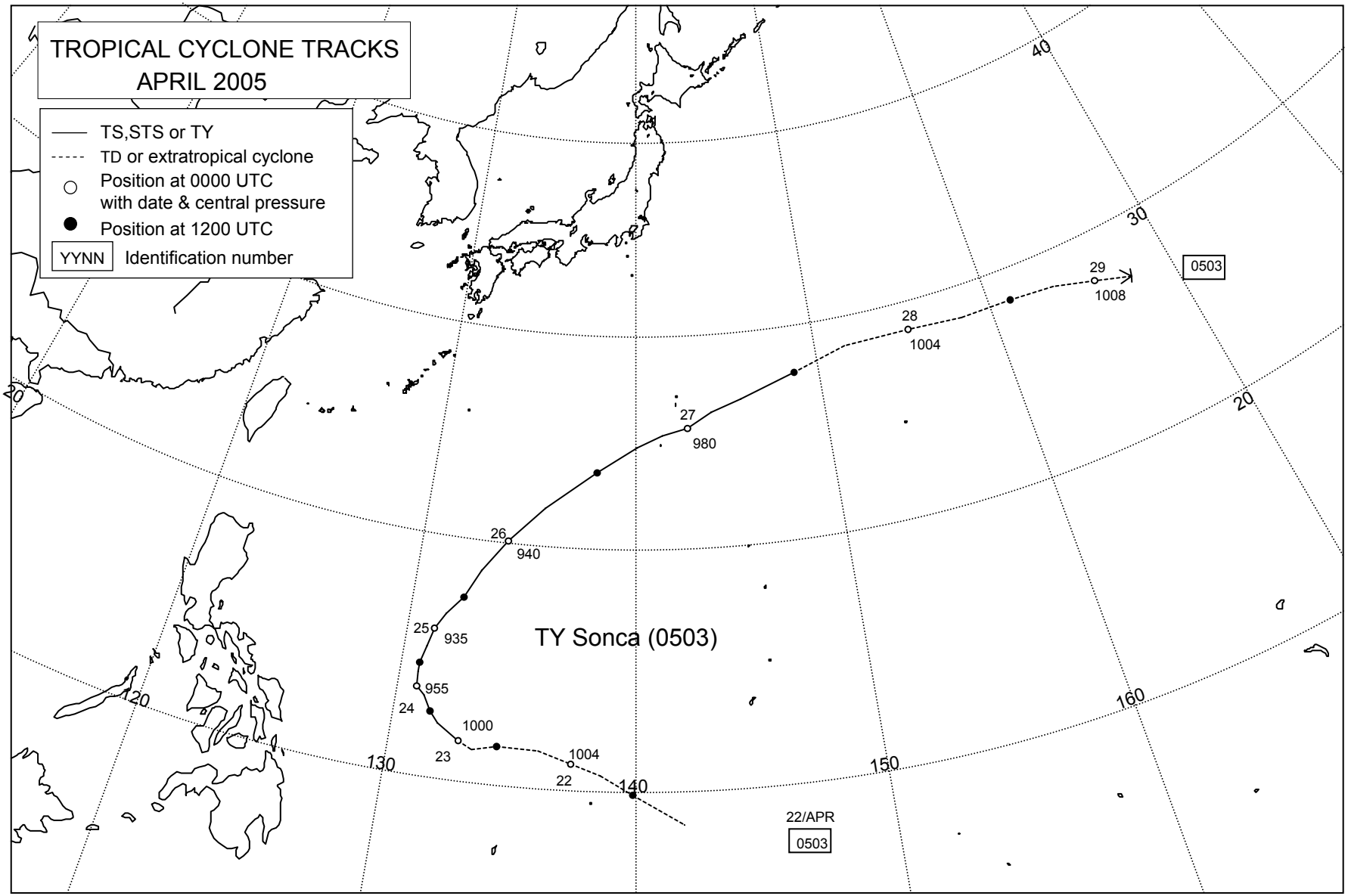
Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
TS TEMBIN (0522)											
Nov.	10/00	0									
	10/06	64									

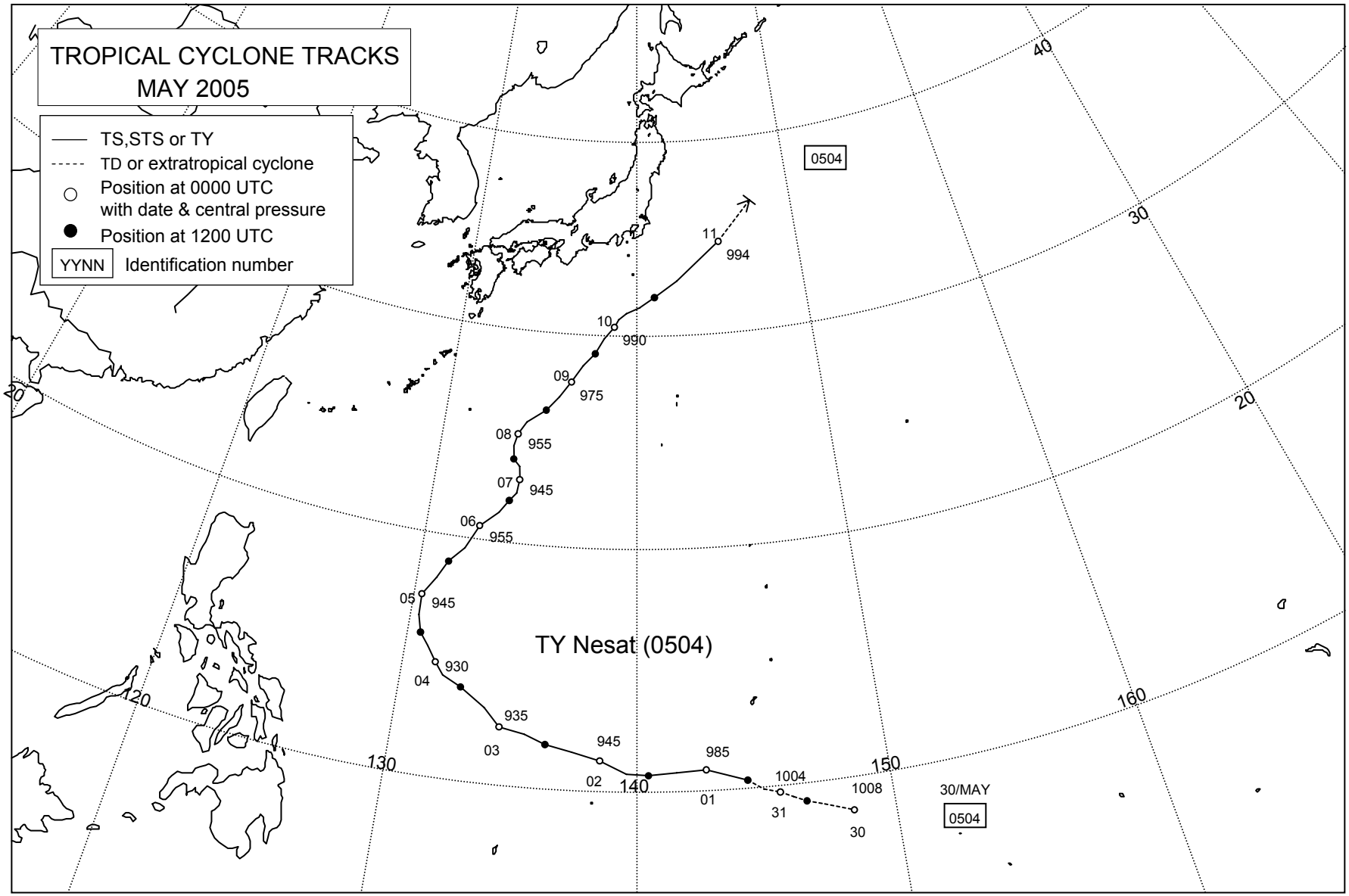
Date/Time		Center Position				Central Pressure			Max. Wind		
	(UTC)	T=00(km)	T=24(km)	T=48(km)	T=72(km)	T=24(hPa)	T=48(hPa)	T=72(hPa)	T=24(kt)	T=48(kt)	T=72(kt)
STS BOLAVEN (0523)											
Nov.	16/06	89	156	151	93	5	-5	-15	-15	-5	15
	16/12	101	168	113	117	0	-10	-25	-10	0	25
	16/18	35	148	55	110	-5	-15	-28	0	10	30
	17/00	0	98	131		-10	-10		5	5	
	17/06	24	109	240		-20	-15		15	20	
	17/12	34	127	295		-20	-15		15	20	
	17/18	78	194	210		-20	-23		15	25	
	18/00	78	136			-20			15		
	18/06	86	116			-10			15		
	18/12	89	109			-15			20		
	18/18	102	139			-18			20		
	19/00	35									
	19/06	0									
	19/12	25									
	19/18	34									

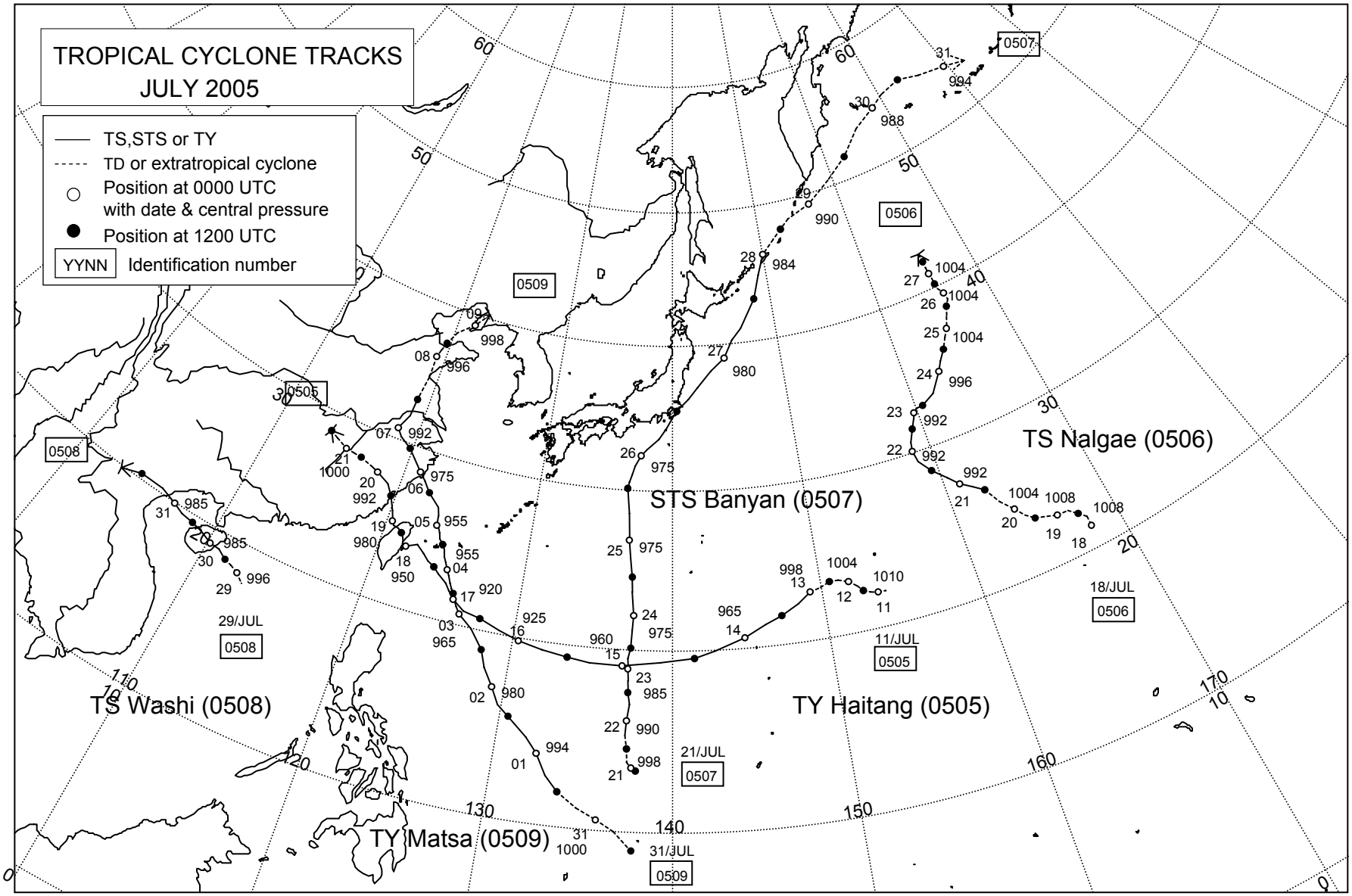
Tropical Cyclone Tracks in 2005

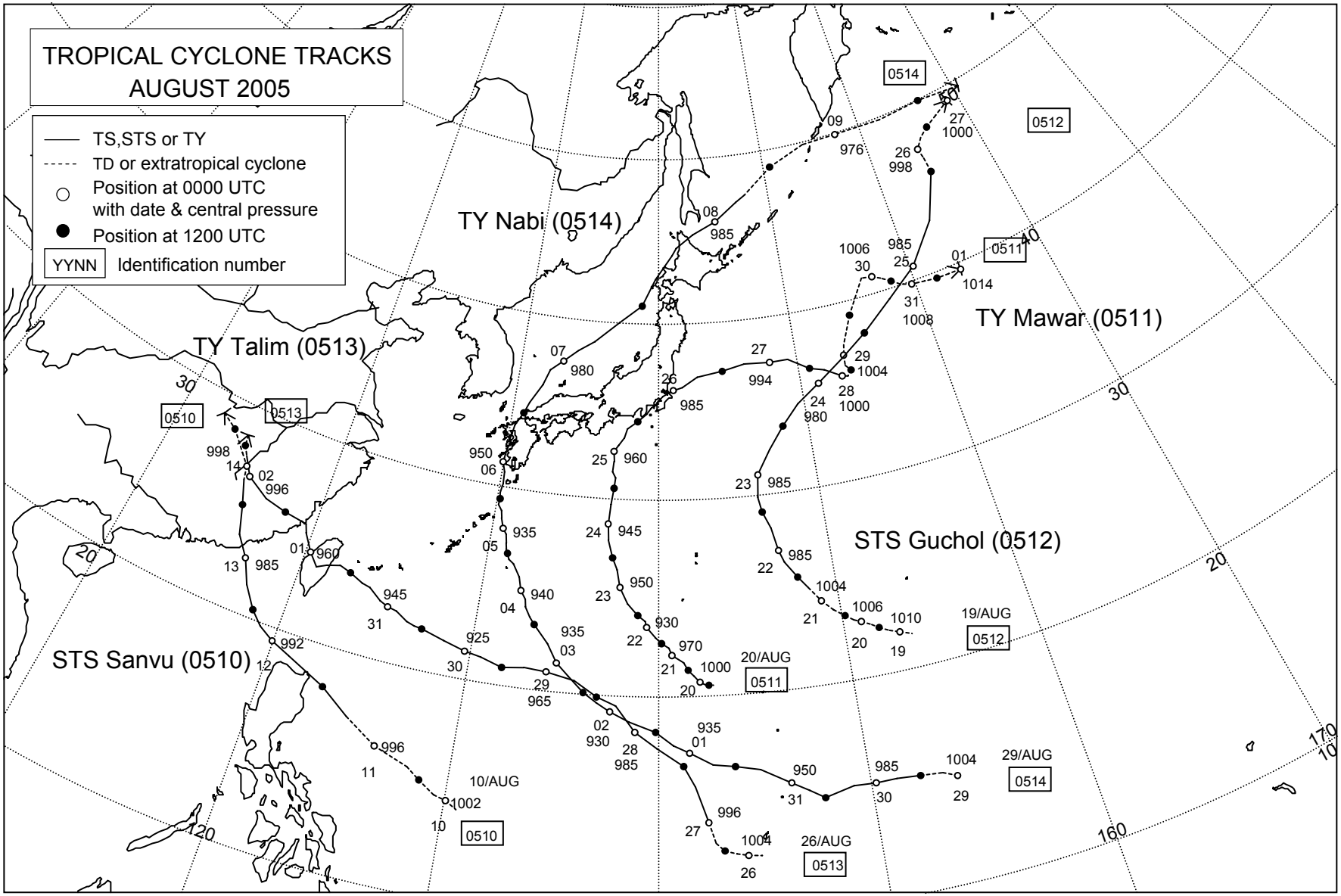


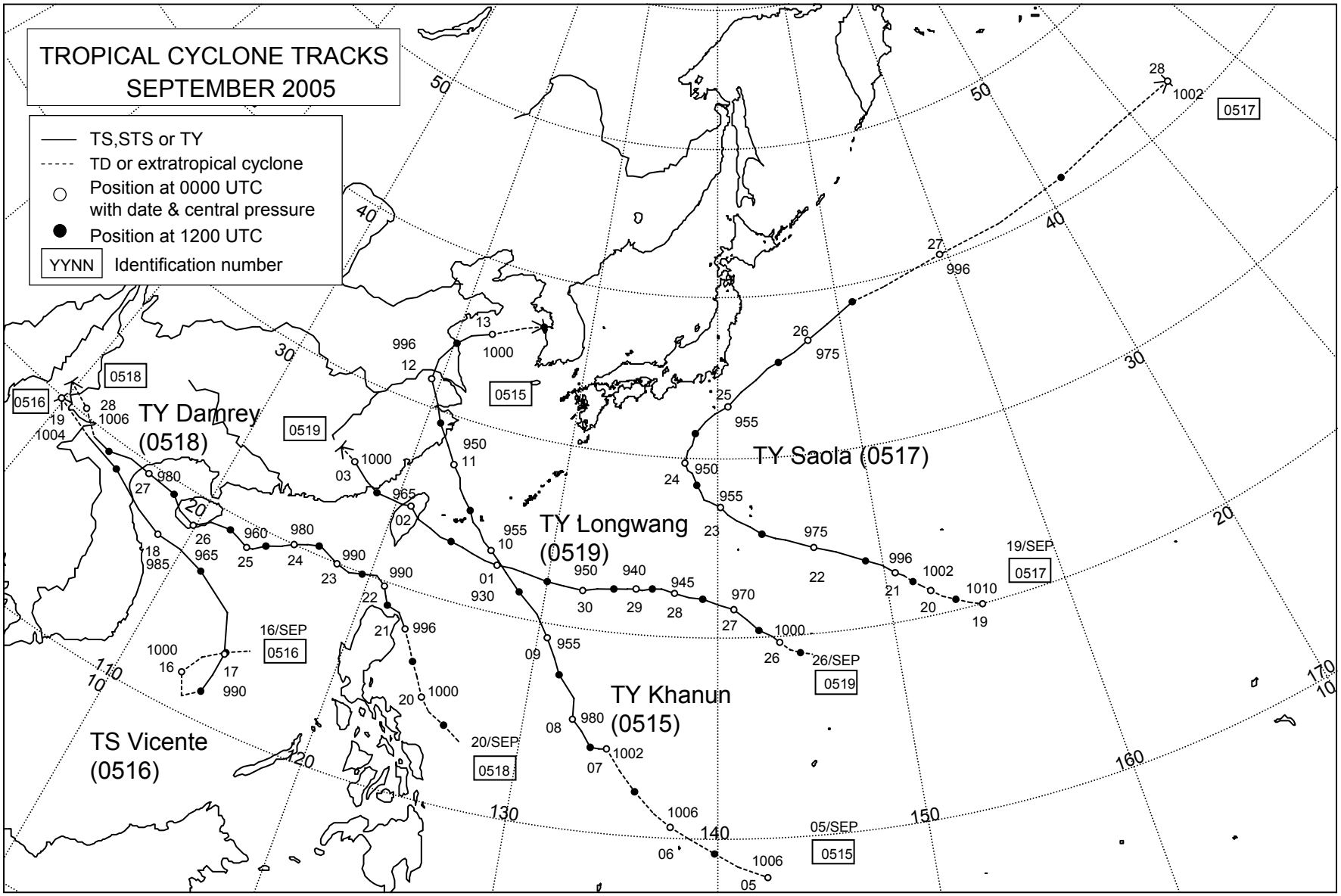

TROPICAL CYCLONE TRACKS
MARCH 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
0502
STS Roke (0502)
1008
19
1008
18
992
17
985
16
996
15
1000
14
1008
13
1008
12
12/MAR
0502
110
10
120
130
140
150
0

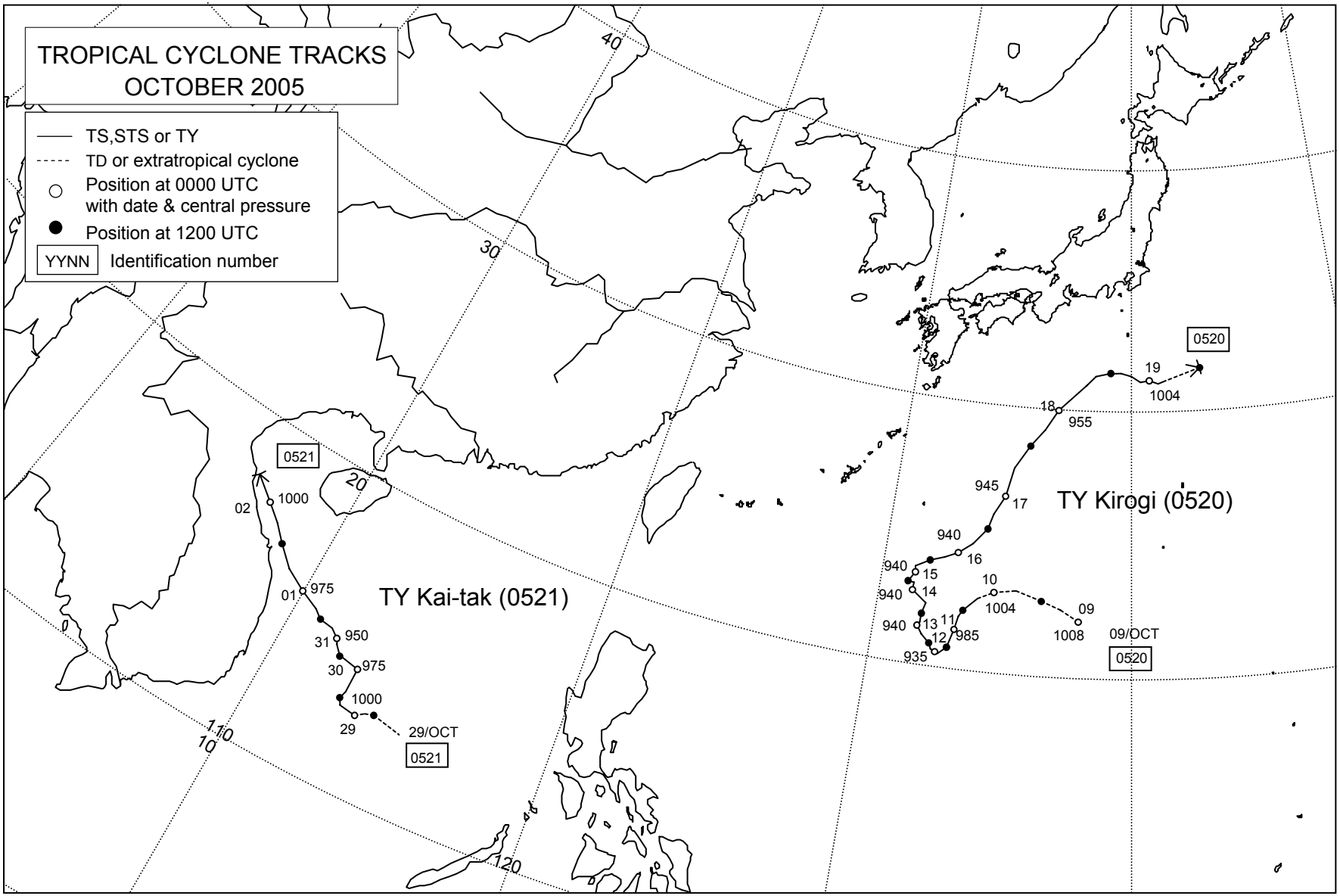

TROPICAL CYCLONE TRACKS
APRIL 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
TY Sonca (0503)
0503
22/APR
0503
20
30
40
120
130
140
150
160
22
1004
23
1000
24
955
25
935
26
940
27
980
28
1004
29
1008

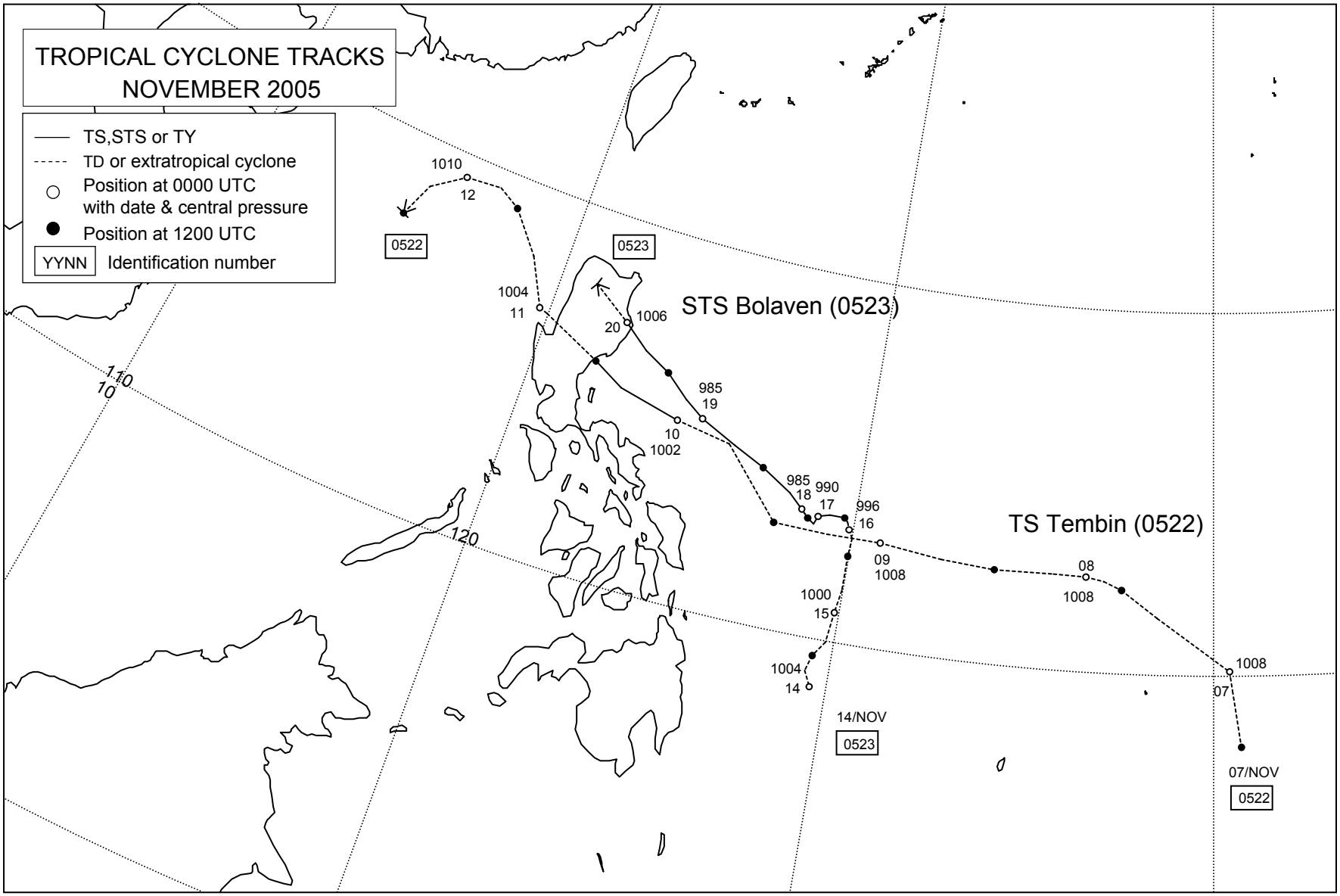

TROPICAL CYCLONE TRACKS
MAY 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
0504
TY Nesat (0504)
01 985
02 945
03 935
04 930
05 945
06 955
07 945
08 955
09 975
10 990
11 994
01 1004
31 1008
30
30/MAY
0504
20
30
40
120
130
140
150
160


TROPICAL CYCLONE TRACKS
JULY 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
TS Washi (0508)
TY Matsa (0509)
STS Banyan (0507)
TY Haitang (0505)
TS Nalgae (0506)
29/JUL
0508
31/JUL
0509
21/JUL
0507
11/JUL
0505
18/JUL
0506


TROPICAL CYCLONE TRACKS
AUGUST 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
TY Nabi (0514)
TY Talim (0513)
TY Mawar (0511)
STS Guchol (0512)
STS Sanvu (0510)
0514
0512
0511
0510
0513
10/AUG
20/AUG
19/AUG
29/AUG
26/AUG
10
20
30
120
160
170


TROPICAL CYCLONE TRACKS
SEPTEMBER 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
TY Damrey
(0518)
TY Saola (0517)
TY Longwang
(0519)
TY Khanun
(0515)
TS Vicente
(0516)
0516
0517
0518
0519
0515
16/SEP
19/SEP
20/SEP
26/SEP
05/SEP
10
20
30
40
50
110
120
130
140
150
160
170


TROPICAL CYCLONE TRACKS
OCTOBER 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
40
30
20
0
110
10
120
0521
02
1000
01
975
31
950
30
975
1000
29
29/OCT
0521
TY Kai-tak (0521)
0520
19
1004
18
955
945
17
940
16
940
15
940
14
940
13
11
12
985
935
10
1004
09
1008
09/OCT
0520
TY Kirogi (0520)


TROPICAL CYCLONE TRACKS
NOVEMBER 2005
TS,STS or TY
TD or extratropical cyclone
Position at 0000 UTC
with date & central pressure
Position at 1200 UTC
YYNN Identification number
1010
12
0522
0523
1004
11
1006
20
STS Bolaven (0523)
985
19
10
1002
985
18
990
17
996
16
TS Tembin (0522)
09
1008
08
1008
1000
15
1004
14
1008
07
14/NOV
0523
07/NOV
0522
110
10
120

Monthly and Annual Frequency of Tropical Cyclones

Monthly and annual frequency of tropical cyclones that attained TS intensity or higher in the western North Pacific and the South China Sea for 1951 - 2005

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1951		1	1	2	1	1	3	3	2	4	1	2	21
1952						3	3	5	3	6	3	4	27
1953		1			1	2	1	6	3	5	3	1	23
1954			1		1		1	5	5	4	3	1	21
1955	1	1	1	1		2	7	6	4	3	1	1	28
1956			1	2		1	2	5	6	1	4	1	23
1957	2			1	1	1	1	4	5	4	3		22
1958	1			1	1	4	7	5	5	3	2	2	31
1959		1	1	1			2	5	5	4	2	2	23
1960				1	1	3	3	10	3	4	1	1	27
1961	1		1		2	3	4	6	6	4	1	1	29
1962		1		1	2		5	8	4	5	3	1	30
1963				1		4	4	3	5	4		3	24
1964					2	2	7	5	6	5	6	1	34
1965	2	1	1	1	2	3	5	6	7	2	2		32
1966				1	2	1	4	10	9	5	2	1	35
1967		1	2	1	1	1	7	9	9	4	3	1	39
1968				1	1	1	3	8	3	5	5		27
1969	1		1	1			3	4	3	3	2	1	19
1970		1				2	3	6	5	5	4		26
1971	1		1	3	4	2	8	5	6	4	2		36
1972	1				1	3	7	5	4	5	3	2	31
1973							7	5	2	4	3		21
1974	1		1	1	1	4	4	5	5	4	4	2	32
1975	1						2	4	5	5	3	1	21
1976	1	1		2	2	2	4	4	5	1	1	2	25
1977			1			1	3	3	5	5	1	2	21
1978	1			1		3	4	8	5	4	4		30
1979	1		1	1	2		4	2	6	3	2	2	24
1980				1	4	1	4	2	6	4	1	1	24
1981			1	2		3	4	8	4	2	3	2	29
1982			3		1	3	3	5	5	3	1	1	25
1983						1	3	5	2	5	5	2	23
1984						2	5	5	4	7	3	1	27
1985	2				1	3	1	8	5	4	1	2	27
1986		1		1	2	2	4	4	3	5	4	3	29
1987	1			1		2	4	4	6	2	2	1	23
1988	1				1	3	2	8	8	5	2	1	31
1989	1			1	2	2	7	5	6	4	3	1	32
1990	1			1	1	3	4	6	4	4	4	1	29
1991			2	1	1	1	4	5	6	3	6		29
1992	1	1				2	4	8	5	7	3		31
1993			1			1	4	7	5	5	2	3	28
1994				1	1	2	7	9	8	6		2	36
1995				1		1	2	6	5	6	1	1	23
1996		1		1	2		6	5	6	2	2	1	26
1997				2	3	3	4	6	4	3	2	1	28
1998							1	3	5	2	3	2	16
1999				2		1	4	6	6	2	1		22
2000					2		5	6	5	2	2	1	23
2001					1	2	5	6	5	3	1	3	26
2002	1	1			1	3	5	6	4	2	2	1	26
2003	1			1	2	2	2	5	3	3	2		21
2004				1	2	5	2	8	3	3	3	2	29
2005	1		1	1	1		5	5	5	2	2		23
Normal 1971-2000	0.5	0.1	0.4	0.8	1.0	1.7	4.2	5.4	5.0	3.9	2.5	1.3	26.7

Appendix 5

Code Forms of RSMC Products

(a) RSMC Tropical Cyclone Advisory (WTPQ20-25 RJTD)

WTPQ i i RJTD YYGGgg
RSMC TROPICAL CYCLONE ADVISORY
NAME class ty-No. name (common-No.)
ANALYSIS
PSTN YYGGgg UTC LaLa.La N LoLoLo.Lo E (or W) confidence
MOVE direction SpSpSp KT
PRES PPPP HPA
MXWD VmVmVm KT
50KT RdRdRd NM (or 50KT RdRdRd NM octant RdRdRd NM octant)
30KT RdRdRd NM (or 30KT RdRdRd NM octant RdRdRd NM octant)
FORECAST
24HF YYGGGg$_F$ UTC LaLa.La$_F$ N LoLoLo.Lo$_F$ E (or W) FrFrFr NM 70%
MOVE direction SpSpSp KT
PRES PPPP HPA
MXWD VmVmVm KT
Ft1Ft1HF YYGGgg$_F$ UTC LaLa.La$_F$ N LoLoLo.Lo$_F$ E (or W) FrFrFr NM 70%
MOVE direction SpSpSp KT
PRES PPPP HPA
MXWD VmVmVm KT
Ft2Ft2HF YYGGgg$_F$ UTC LaLa.La$_F$ N LoLoLo.Lo$_F$ E (or W) FrFrFr NM 70%
MOVE direction SpSpSp KT
PRES PPPP HPA
MXWD VmVmVm KT =

Notes:

a. Underlined is fixed.

b. Abbreviations

PSTN	:	Position
MOVE	:	Movement
PRES	:	Pressure
MXWD	:	Maximum wind
HF	:	Hour forecast

c. Symbolic letters

i i	:	'20', '21', '22', '23', '24' or '25'.
YYGGgg	:	Time of observation submitting the data for analysis. Date(YY), hour(GG) and minute(gg) are given in UTC.
class	:	Intensity classification of the tropical cyclone. 'TY', 'STS', 'TS' or 'TD'.
ty-No.	:	Domestic identification number of the tropical cyclone adopted in Japan. Given in four digits and same as the international identification number.
name	:	Name assigned to the tropical cyclone from the name list prepared by the Typhoon Committee.
common-No.	:	International identification number of the tropical cyclones given in four digits.
LaLa.La	:	Latitude of the center position in "ANALYSIS" part.
LoLoLo.Lo	:	Longitude of the center position in "ANALYSIS" part.
confidence	:	Confidence of the center position. 'GOOD', 'FAIR' or 'POOR'.
direction	:	Direction of movement given in 16 azimuthal direction as 'N', 'NNE', 'NE', 'ENE', etc.
SpSpSp	:	Speed of movement.
PPPP	:	Central pressure.
VmVmVm	:	Maximum sustained wind.
RdRdRd	:	Radii of 30knots and 50knots wind.

octant	:	Eccentric distribution of wind given in 8 azimuthal direction as 'NORTH', 'NORTHEAST', 'EAST' etc.
Ft1Ft1	:	48 (00, 06, 12 and 18 UTC) or 45 (03, 09, 15 and 21 UTC)
Ft2Ft2	:	72 (00, 06, 12 and 18 UTC) or 69 (03, 09, 15 and 21 UTC)
$YYGGgg_F$	:	Time in UTC on which the forecast is valid.
$LaLa.La_F$	:	Latitude of the center of 70% probability circle in "FORECAST" part.
$LoLoLo.Lo_F$	:	Longitude of the center of 70% probability circle in "FORECAST" part.
FrFrFr	:	Radius of 70% probability circle.

d. MOVE is optionally described as 'ALMOST STATIONARY' or '(direction) SLOWLY', depending on the speed of movement.

Example:

```
WTPQ20 RJTD 150000
RSMC TROPICAL CYCLONE ADVISORY
NAME   STS 0320 NEPARTAK (0320)
ANALYSIS
PSTN   150000UTC 12.6N 117.8E FAIR
MOVE   WNW 13KT
PRES   980HPA
MXWD   055KT
50KT   40NM
30KT   240NM NORTHEAST 160NM SOUTHWEST
FORECAST
24HF   160000UTC 14.7N 113.7E 110NM 70%
MOVE   WNW 11KT
PRES   965HPA
MXWD   070KT
48HF   170000UTC 16.0N 111.0E 170NM 70%
MOVE   WNW 07KT
PRES   970HPA
MXWD   065KT
72HF   180000UTC 19.5N 110.0E 250NM 70%
MOVE   NNW 09KT
PRES   985HPA
MXWD   050KT =
```

(b) RSMC Guidance for Forecast (FXPQ20-25 RJTD)

FXPQ i i RJTD YYGGgg
RSMC GUIDANCE FOR FORECAST
NAME class ty-No. name (common-No.)
PSTN YYGGgg UTC LaLa.La N LoLoLo.Lo E (or W)
PRES PPPP HPA
MXWD WWW KT
FORECAST BY TYPHOON (or GLOBAL) MODEL

TIME	PSTN	PRES	MXWD
			(CHANGE FROM T=0)
T=06	LaLa.La N LoLoLo.Lo E (or W)	appp HPA	awww KT
T=12	LaLa.La N LoLoLo.Lo E (or W)	appp HPA	awww KT
T=18	LaLa.La N LoLoLo.Lo E (or W)	appp HPA	awww KT
	:		
	:		
T=78 (or 84)	LaLa.La N LoLoLo.Lo E (or W)	appp HPA	awww KT=

Notes:

a. Underlined is fixed.

b. Symbolic letters

i i	:	'20', '21', '22', '23', '24' or '25'.
YYGGgg	:	Initial time of the model in UTC.
PPPP	:	Central pressure in hPa.
WWW	:	Maximum wind speed in knots.
a	:	Sign of ppp and www (+, - or blank).

ppp : Absolute value of change in central pressure from T=0, in hPa.
www : Absolute value of change in maximum wind speed from T=0, in knots.

c. The prediction terminates in T=78 for Typhoon Model and in T=84 for Global Model.

Example:

```
FXPQ20 RJTD 180600
RSMC GUIDANCE FOR FORECAST
NAME T 0001DAMREY (0001)
PSTN 180000UTC 15.2N 126.3E
PRES   905HPA
MXWD   105KT
FORECAST BY GLOBAL MODEL
TIME      PSTN          PRES      MXWD
                    (CHANGE FROM T=0)
T=06 15.4N 125.8E +018HPA -008KT
T=12 15.5N 125.6E +011HPA -011KT
T=18 15.8N 125.7E +027HPA -028KT
                    :
                    :
T=78 20.7N 128.8E +021HPA -022KT=
```

(c) SAREP (TCNA20/21 RJTD)

TCNA i i RJTD YYGGgg
CCAA YYGGg 47644 name (common-No.) nt nt LaLaLa Qc LoLoLoLo 1At Wt at tm
2St St // (9ds ds fs fs)=

Notes:

a. Underlined is fixed.

b. Symbolic letters

i i : 20 for the observation at 03, 09, 15 and 21 UTC.
21 for the observation at 00, 06, 12 and 18 UTC.

YYGGgg : Time of observation submitting the data for analysis. Date(YY), hour(GG) and minute(gg) are given in UTC.

nt nt : Serial number of the tropical cyclone in order of its formation in the year. Given in '01' - '99' irrespective of TS attainment in intensity.

LaLaLa : Latitude given in 0.1E.

Qc : Quadrant of the earth. 1: N/E, 2: S/E, 3: S/W and 4: N/W.

LoLoLoLo : Longitude in 0.1E.

At: Confidence.
0: =<10km 1: =<20km 2: =<50km 3: =<100km 4: =<200km 5: =<300km
/: unable to determine

Wt : Mean diameter (d: degree in latitude) of cloud system.
0: d<1° 1: 1°=<d<2° 2: 2°=<d<3° 3: 3°=<d<4° 4: 4°=<d<5° 5: 5°=<d<6°
6: 6°=<d<7° 7: 7°=<d<8° 8: 8°=<d<9° 9: 9°=<d /: unable to determine

at : 24-hour intensity inclination.
0: further weakening 1: weakening 2: no change
3: intensifying 4: further intensifying 9: no former observation
/: unable to determine

tm : Time interval (t: hour) for determination of movement.
0: t<1 1: 1=<t<2 2: 2=<t<3 3: 3=<t<6 4: 6=<t<9 5: 9=<t<12
6: 12=<t<15 7: 15=<t<18 8: 18=<t<21 9: 21=<t<30 /: no (9dsdsfsfs) group

StSt : Intensity.
00: weakening 15, 20, 25 … 80: CI-number (in 0.1)
99: under extratropical transformation //: unable to determine

dsds : Direction of movement (in 10°).

fsfs : Speed of movement (in knots).

Example:

TCNA21 RJTD 180000
CCAA 18000 47644
DAMREY(0001) 29149 11272
11334 275// 92811=

(d) RSMC Prognostic Reasoning (WTPQ30-35 RJTD)

Example:

WTPQ30 RJTD 180000

RSMC TROPICAL CYCLONE PROGNOSTIC REASONING
REASONING NO. 9 FOR TY 0001 DAMREY (0001)
1.GENERAL COMMENTS
REASONING OF PROGNOSIS THIS TIME IS SIMILAR TO PREVIOUS ONE.
POSITION FORECAST IS MAINLY BASED ON NWP AND PERSISTENCY.
2.SYNOPTIC SITUATION
SUBTROPICAL RIDGE WILL NOT CHANGE ITS LOCATION AND STRENGTH FOR THE NEXT 24 HOURS.
3.MOTION FORECAST
POSITION ACCURACY AT 180000 UTC IS GOOD.
TY WILL DECELERATE FOR THE NEXT 12 HOURS.
TY WILL RECURVE WITHIN 60 HOURS FROM 180000 UTC.
TY WILL MOVE WEST FOR THE NEXT 12 HOURS THEN MOVE GRADUALLY TO WEST-NORTHWEST.
4.INTENSITY FORECAST
TY WILL KEEP PRESENT INTENSITY FOR NEXT 24 HOURS.
FI-NUMBER WILL BE 7.0 AFTER 24 HOURS.=

(e) Tropical Cyclone Advisory for SIGMET (FKPQ30-35 RJTD)

FKPQ i i RJTD YYGGgg	
TC ADVISORY	
DTG:	yyyymmdd/time Z
TCAC:	TOKYO
TC:	name
NR:	number
PSN:	N LaLa.LaLa E LoLoLo.LoLo
MOV:	direction SpSpSp KT
C:	PPPP HPA
MAX WIND:	WWW KT
FCST PSN +12HR:	YYGGgg NLaLa.LaLa ELoLoLo.LoLo
FCST MAX WIND +12HR:	WWW KT
FCST PSN +18HR:	NIL
FCST MAX WIND +18HR:	NIL
FCST PSN +24HR:	YYGGgg N LaLa.LaLa E LoLoLo.LoLo
FCST MAX WIND +24HR:	WWW KT
NXT MSG:	yyyymmdd/time Z=

Notes:

a. Underlined is fixed.

b. Abbreviations

DTG	:	Date and time
TCAC	:	Tropical Cyclone Advisory Centre
TC	:	Tropical Cyclone
NR	:	Number
PSN	:	Position
MOV	:	Movement
C	:	Central pressure

MAX WIND	:	Maximum wind
FCST	:	Forecast
NXT MSG	:	Next message

c. Symbolic letters

i i	:	'30', '31', '32', '33', '34' or '35'.
YYGGgg	:	Date(YY), hour(GG) and minute(gg) are given in UTC.
yyyymmdd/time	:	Year(yyyy), month(mm), date(dd), hour and minute (time) are given in UTC. (Using "Z")
name	:	Name assigned to the tropical cyclone by RSMC Tokyo-Typhoon Center.
Number	:	Advisory number. (starting with "01" for each cyclone)
LaLa.LaLa	:	Latitude of the center position.
LoLoLo.LoLo	:	Longitude of the center position.
direction	:	Direction of movement given in 16 azimuthal direction as 'N', 'NNE', 'NE', 'ENE', etc.
SpSpSp	:	Speed of movement.
PPPP	:	Central pressure.
WWW	:	Maximum sustained wind.

Example:

FKPQ30 RJTD 160600
TC ADVISORY

DTG:	20040416/0600Z
TCAC:	TOKYO
TC:	SUDAL
NR:	47
PSN:	N2830 E15855
MOV:	ENE 25KT
C:	985HPA
MAX WIND:	50KT
FCST PSN +12HR:	161800 N3150 E15855
FCST MAX WIND 12HR:	50KT
FCST PSN +18HR:	NIL
FCST MAX WIND 18HR:	NIL
FCST PSN +24HR:	170600 N3500 E16700
FCST MAX WIND 24HR:	45KT
NXT MSG:	20040416/1200Z =

(f) RSMC Tropical Cyclone Best Track (AXPQ20 RJTD)

AXPQ20 RJTD YYGGgg
RSMC TROPICAL CYCLONE BEST TRACK
NAME ty-No. name (common-No.)
PERIOD FROM MMMDDTTUTC TO MMMDDTTUTC
DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT
DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT
:
:
DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT DDTT LaLa.LaN LoLoLo.LoE PPPHPA WWWKT
REMARKS[1)]
TD FORMATION AT MMMDDTTUTC
FROM TD TO TS AT MMMDDTTUTC
:
:
DISSIPATION AT MMMDDTTUTC=

Notes:

a. Underlined is fixed.

b. [1)] REMARKS is given optionally.

c. Symbolic letters

MMM	:	Month in UTC. Given as 'JAN', 'FEB', etc.
DD	:	Date in UTC.
TT	:	Hour in UTC.
PPP	:	Central pressure.
WWW	:	Maximum wind speed.

Example:

```
AXPQ20 RJTD 020600

RSMC TROPICAL CYCLONE BEST TRACK
NAME 0001 DAMREY (0001)
PERIOD FROM OCT1300UTC TO OCT2618UTC
1300 10.8N 155.5E 1008HPA   //KT   1306 10.9N 153.6E 1006HPA   //KT
1312 11.1N 151.5E 1004HPA   //KT   1318 11.5N 149.8E 1002HPA   //KT
1400 11.9N 148.5E 1000HPA   //KT   1406 12.0N 146.8E   998HPA   35KT
                              :
                              :
1712 14.6N 129.5E   905HPA 105KT   1718 14.7N 128.3E   905HPA 105KT
                              :
                              :
2612 32.6N 154.0E 1000HPA   //KT   2618 33.8N 157.4E 1010HPA   //KT
REMARKS
TD    FORMATION   AT OCT1300UTC
FROM TD   TO TS   AT OCT1406UTC
FROM TS   TO STS AT OCT1512UTC
FROM STS TO TY   AT OCT1600UTC
FROM TY   TO STS AT OCT2100UTC
FROM STS TO TS   AT OCT2112UTC
FROM TS   TO L    AT OCT2506UTC
DISSIPATION       AT OCT2700UTC=
```

Appendix 6

List of GPV products and data on the RSMC Data Serving System

Area	20S-60N, 80E-160W	20S-60N, 60E-160W
Resolution	2.5x2.5 degrees	1.25x1.25 degrees
Levels and elements	Surface (P, U, V, T, TTd, R) 850hPa (Z, U, V, T, TTd, ω) 700hPa (Z, U, V, T, TTd, ω) 500hPa (Z, U, V, T, TTd, ζ) 300hPa (Z, U, V, T) 250hPa (Z, U, V, T) 200hPa (Z, U, V, T) 150hPa (Z, U, V, T) 100hPa (Z, U, V, T)	Surface (P, U, V, T, TTd, R)** 1000hPa (Z, U, V, T, TTd) 925hPa (Z, U, V, T, TTd, ω) 850hPa (Z*, U*, V*, T*, TTd*, ω, ψ, χ) 700hPa (Z*, U*, V*, T*, TTd*, ω) 500hPa (Z*, U*, V*, T*, TTd*, ζ) 400hPa (Z, U, V, T, TTd) 300hPa (Z, U, V, T, TTd) 250hPa (Z, U, V, T) 200hPa (Z*, U*, V*, T*, ψ, χ) 150hPa (Z, U, V, T) 100hPa (Z, U, V, T) 70hPa (Z, U, V, T) 50hPa (Z, U, V, T) 30hPa (Z, U, V, T) 20hPa (Z, U, V, T) 10hPa (Z, U, V, T)
Forecast hours	(00 and 12 UTC) 0, 6, 12, 18, 24, 30, 36, 48, 60 and 72 hours	(00 and 12 UTC) 0 to 84 every 6 hours In addition (12 UTC), * 96, 120, 144, 168 and 192 hours ** 90 to 192 every 6 hours
Frequency (initial times)	Twice a day (00 and 12 UTC)	Twice a day (00 and 12 UTC)

Area	Whole globe		Whole globe
Resolution	2.5x2.5 degrees		1.25x1.25 degrees
Levels and elements	Surface (P, R, U, V, T) 1000hPa (Z) 850hPa (Z, U, V, T, TTd) 700hPa (Z, U, V, T, TTd) 500hPa (Z, U, V, T) 300hPa (Z, U, V, T) 250hPa (Z, U, V, T)* 200hPa (Z, U, V, T) 100hPa (Z, U, V, T)* 70hPa (Z, U, V, T)* 50hPa (Z, U, V, T)* 30hPa (Z, U, V, T)*	Surface (P, U, V, T, TTd*) 1000hPa (Z, U, V, T, TTd*) 850hPa (Z, U, V, T, TTd) 700hPa (Z, U, V, T, TTd) 500hPa (Z, U, V, T, TTd*) 400hPa (Z, U, V, T, TTd*) 300hPa (Z, U, V, T, TTd*) 250hPa (Z, U, V, T) 200hPa (Z, U, V, T) 150hPa (Z, U, V, T) 100hPa (Z, U, V, T) 70hPa (Z, U, V, T) 50hPa (Z, U, V, T) 30hPa (Z, U, V, T) 20hPa (Z, U, V, T) 10hPa (Z, U, V, T)	Surface (P, U, V, T, RH, ω) 1000hPa (Z, U, V, T, RH, ω) 925hPa (Z, U, V, T, RH, ω) 850hPa (Z, U, V, T, RH, ω, ψ, χ) 700hPa (Z, U, V, T, RH, ω) 600hPa (Z, U, V, T, RH, ω) 500hPa (Z, U, V, T, RH, ω, ζ) 400hPa (Z, U, V, T, RH, ω) 300hPa (Z, U, V, T, RH, ω) 250hPa (Z, U, V, T) 200hPa (Z, U, V, T, ψ, χ) 150hPa (Z, U, V, T) 100hPa (Z, U, V, T) 70hPa (Z, U, V, T) 50hPa (Z, U, V, T) 30hPa (Z, U, V, T) 20hPa (Z, U, V, T) 10hPa (Z, U, V, T)
Forecast hours	(00 and 12 UTC) 24, 48 and 72 hours In addition (12 UTC), 96 to 192 every 24 hours * 96 and 120 only	(00 and 12 UTC) 0 hours * 00UTC only	(00 and 12 UTC) 0 to 84 every 6 hours In addition (12 UTC), 96 to 192 every 12 hours
Frequency (initial times)	Twice a day (00 and 12 UTC)		Twice a day (00 and 12 UTC)

Area	Whole globe
Resolution	2.5x2.5 degrees
Levels and elements	Surface (P) 1000hPa(Z) 850hPa (T, U, V) 500hPa (Z) 250hPa (U, V) Above GPVs are ensemble mean and standard deviation of ensemble forecast members.
Forecast hours	Every 12 hours from 0 to 192 hours
Frequency (initial times)	Once a day (12 UTC)

Notes: P : pressure reduced to MSL R : total precipitation RH : relative humidity
T : temperature TTd: dew point depression U : u-component of wind
V : v-component of wind Z : geopotential height ζ : relative vorticity
χ : velocity potential ψ : stream function ω : vertical velocity

Products/ Data	Typhoon Information	Global Wave Model (GRIB) 1.25x1.25 degrees	Obsevational data
Contents	Tropical cyclone related information (BUFR) •Position, etc.	• Significant wave height • Prevailing wave period • Prevailing wave direction Forecast hours: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84 (00 and 12 UTC); 96, 108, 120, 132, 144, 156, 168, 180 and 192 hours (12 UTC)	(a) Surface data (SYNOP, SHIP) (b) Upper-air data (TEMP, parts A-D) (PILOT, parts A-D)
Frequency (initial times)	4 times a day (00, 06, 12 and 18 UTC)	Twice a day (00 and 12 UTC)	(a) Mainly 4 times a day (b) Mainly 2 times a day

Appendix 7

User's Guide to the attached CD-ROM

1) This CD-ROM shall not be reproduced and not be provided to any third party.
2) The source shall be properly acknowledged, in publishing any outcome which uses software, data or documents in this CD-ROM

JMA does not accept liability for any direct and/or indirect loss or damage to the user caused by the use of the software, data or documents in this CD-ROM.

Preface

This CD-ROM contains all the texts, tables, charts of this report and satellite images of the tropical cyclones that attained TS intensity or higher in the western North Pacific and the South China Sea in 2005. This document is a brief user's guide for the CD-ROM. The CD-ROM was mastered in ISO-9660 format.

Directory and File layout

```
[Disk]
|------ar405eng.exe (Acrobat Reader Installer)
|------Readme.txt (belief explanation about the CD-ROM)
|------TopMenu.exe (start menu setup program)
|------SATAIDmanual.pdf (user's manual of a satellite image viewer)
|------Annual_Report
        |---Text (text of Annual Report 2005 in PDF)
        |---Figure (figures for MS PowerPoint)
        |---Table (tables for MS Excel)
        |---Appendix (appendixes for MS Excel and PowerPoint)
|------Programs
        |---Gmslpd
                |--Gmslpd.exe (viewer; tropical cyclone version in English)
                |--Gsetup.exe, etc. (setup program, etc.)
|------Satellite_Image_Data
        |---T0501 (3-hourly GOES image data)
        |---T0502 (3-hourly GOES image data)
                :
        |---T0523 (3-hourly GOES image data)
|------Andata
        |--Besttrack
                |--Best2005.txt (Best track data for the year 2005)
```

How to use the CD-ROM

When you set the CD-ROM, start menu will be popped up automatically with a panel which has “Annual Report 2005”, “Satellite Images”, “About CD-ROM” and “Close” buttons and a file list box for some introductory documents. Choose and click a button or file which you want to see and follow instructions on your display.

Required hardware/OS for the CD-ROM are:

Hardware	:	PC/AT compatible
OS	:	Microsoft Windows Ver. 3.1 or later

< Annual Report 2005 >

Annual Report 2005 is prepared in the following two formats: ”PDF files” and “MS Word/Excel/PowerPoint files”.

- PDF files:

Click the “Annual Report 2005” button to open the text in PDF. If you cannot open the PDF file, install ‘Adobe Acrobat Reader’ with its installer (ar405eng.exe) in the file list box on a start menu window, and try again. ‘Adobe Acrobat Reader’ (or ‘Adobe Acrobat’) is required to view PDF files.

- Word/Excel/PowerPoint files:

Original figures and tables prepared with Microsoft Word, Excel or PowerPoint are stored in Annual Report folder of the CD-ROM.

< Satellite Images >

- Installation of a program for displaying satellite images:

Click the “MTSAT Satellite Image” button to run a setup program (Gsetup.exe) of a satellite image viewer. Follow the instructions, and the satellite image viewer ‘Gmslpd.exe’ will be installed into the hard disk of your computer and a list of the tropical cyclones in 2005 is displayed in the ‘Selection window’ of satellite images for tropical cyclones.

- Displaying satellite images:

Choose and click a tropical cyclone from the list, and 3-hourly satellite images for the tropical cyclone will be displayed. You can also display the track of the tropical cyclone superimposed on the satellite image and measure the intensity of the tropical cyclone using Dvorak's technique.

- User’s manual for the viewer:

Besides the above functions, the viewer has many other useful functions. See the User's Manual (SATAIDmanual.pdf) for further detailed use.

- Explanation of satellite image data

Period : From Generating Stage to Weakening Stage of each tropical cyclone.
Images : Infrared images (00, 03, 06, 09, 12, 15, 18 and 21UTC)
Visible images (00, 03, 06, 09 and 21UTC)
Range : 40 degrees in both latitude and longitude.
(The image window moves following a tropical cyclone's track so that the center of a tropical cyclone is fixed at the center of the image window.)
Time interval : 3-hourly
Resolution : 0.08 degrees in both latitude and longitude.
Compression of file: Compressed using 'compress.exe' command of Microsoft Windows.

< About CD-ROM >

Click the “About CD-ROM” button to open ‘Readme.txt’ file.

< Close >

Click the “Close” button to close start menu window.

< File list box >

You can open document files from a file list box on the start menu window. Choose a file and click the “Open” button or double click the file name.

For further information, please contact the following address:

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