

Typhoon Hato (1713)

A tropical depression was formed over the ocean east of the Philippines, northwestern Pacific $\langle 19.8^{\circ}\text{N}, 128.1^{\circ}\text{E} \rangle$ during daytime on 20 August. It moved westward to the South China Sea through the Luzon Strait. The tropical depression intensified into a tropical storm at 2am on 21 August and was named as “Hato” (1713) $\langle 20.1^{\circ}\text{N}, 125.0^{\circ}\text{E} \rangle$.

Hato came into the 800km alert radius of Macau at 5am on 22 August. It moved west-northwestward at 25km/hr to the western coastal areas of the Pearl River Delta. Hato intensified into a severe tropical storm at 2pm on the same day $\langle 20.5^{\circ}\text{N}, 118.8^{\circ}\text{E} \rangle$, and upgraded to a typhoon at 6pm $\langle 20.6^{\circ}\text{N}, 117.8^{\circ}\text{E} \rangle$.

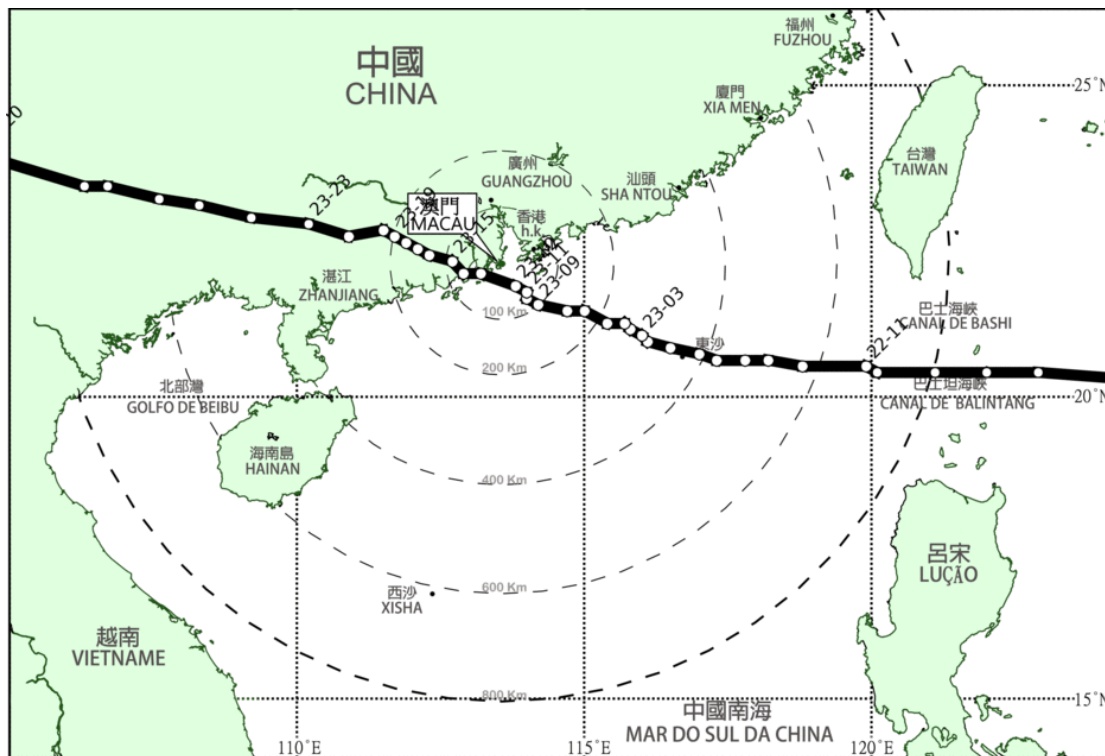
Hato was within 200km southeast of Macau at 7am on 23 August and kept its movement to the west of the Pearl River Delta. Meanwhile, Hato kept intensifying and reached its peak at noon (central pressure 945hPa, maximum wind speed near center 165km/hr), causing significant storm surge to the coastal areas. Hato made its landfall to Zhuhai, Guangdong around 1pm and came closest to Macao at the same time, about 40km west-southwest of Macau. It then kept moving inland to west-northwest at 25km/hr and started its weakening stage. Hato first degraded into a severe tropical storm at 6pm $\langle 22.4^{\circ}\text{N}, 111.7^{\circ}\text{E} \rangle$ and dropped to the level of tropical storm at 11pm $\langle 22.8^{\circ}\text{N}, 110.2^{\circ}\text{E} \rangle$. On 24 August Hato moved westward to Guangxi and dissipated at last.

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Record of tropical cyclone signal hoisting:

DATE	TIME	HOISTED
22 / AUG	11:00	No.1
23 / AUG	03:00	No.3
23 / AUG	09:00	No.8NE
23 / AUG	10:45	No.9
23 / AUG	11:30	No.10
23 / AUG	15:00	No.8SE
23 / AUG	18:30	No.3
23 / AUG	21:30	All signals were lowered

Track:



Extreme Values Recorded During the Passage of Typhoon "HATO" (1713)
(2017/08/22 - 2017/08/23)
Updated version at 2017/10/17

Minimum Station Pressure		Station	Maximum Wind Speed				Maximum Gust			Precipitation During the Signal Hoisting Period (mm)
			Corresponding Direction	Hourly Maximum (km/h)	Month-Day	Time (L.T.)	Maximum Gust (km/h)	Month-Day	Time (L.T.)	
Instantaneous Minimum (hPa)	Month-Day Time	Taipa Grande	N	95.1	08-23	11	217.4	08-23	11:06	35.0
		Ponte de Amizade sul	ESE	132.0	08-23	12	205.9	08-23	12:15	---
945.4	08-23 12:02	Ponte de Amizade norte	NE	121.3	08-23	12	215.3	08-23	12:15	---
		Ponte de Governador Nobre de Carvalho	NE	107.7	08-23	12	191.5	08-23	12:04	---
Minimum distance of the centre of tropical cyclone from Macao	40 km WSW of Macao (08-23 13:00 L.T.)	Ponte de Sai Van	NE	108.4	08-23	12	191.9	08-23	12:19	---
		Jardim Municipal Dr.Sun Yat Sen	NE	45.0	08-23	12	133.2	08-23	11:21	35.2
Terminal Marítimo de Passageiros do Porto Exterior	Universidade de Macau	Fortaleza do Monte	NE	47.9	08-23	12	147.2	08-23	12:22	30.8
		Museu Marítimo	S	54.1	08-23	13	182.9	08-23	11:19	37.6
40 km WSW of Macao (08-23 13:00 L.T.)	Ká Hó	Terminal Marítimo de Passageiros do Porto Exterior	SSE	113.8 *	08-23	13	197.3	08-23	12:16	32.0 *
		Delegação de Coloane	SSE	100.8	08-23	13	201.2	08-23	12:18	50.0
			S	111.1 #	08-23	13	207.4	08-23	12:15	24.0 #
			NW	47.5	08-23	10	139.0	08-23	12:15	45.2
<p>Signal No.1 was hoisted at 11:00 L.T. on 08-22.</p> <p>Signal No.1 was substituted by signal No.3 at 03:00 L.T. on 08-23.</p> <p>Signal No.3 was substituted by signal No.8NE at 09:00 L.T. on 08-23.</p> <p>Signal No.8NE was substituted by signal No.9 at 10:45 L.T. on 08-23.</p> <p>Signal No.9 was substituted by signal No.10 at 11:30 L.T. on 08-23.</p> <p>Signal No.10 was substituted by signal No.8SE at 15:00 L.T. on 08-23.</p> <p>Signal No.8SE was substituted by signal No.3 at 18:30 L.T. on 08-23.</p> <p>All signal was lowered at 21:30 L.T. on 08-23.</p> <p>The Storm Surge warning Red Signal was effective at 08:00 L.T. on 08-23.</p> <p>The Storm Surge warning Black Signal was effective at 11:30 L.T. on 08-23.</p> <p>The Storm Surge warning was cancelled at 15:30 L.T. on 08-23.</p>			<p>Historical extreme values of tropical cyclones hoisted in Macao (since 1953)</p> <p><u>Minimum Station Pressure</u> Typhoon "HATO" - 945.4 hPa at 12:02 L.T. on 2017-08-23 recorded at Taipa Grande. Break the record of typhoon "RUBY" - 954.6 hPa at 14:27 L.T. on 1964-09-05 recorded at Farol da Guia.</p> <p><u>Maximum Wind Speed</u> Typhoon "HATO" - 132.0 km/h at 12:00 L.T. on 2017-08-23 recorded at Ponte de Amizade sul. Break the record of Severe Tropical Storm "BECKY" - 124.0 km/h at 09:00 L.T. on 1993-09-17 recorded at Ponte de Governador Nobre de Carvalho.</p> <p><u>Maximum Gust</u> Typhoon "HATO" - 217.4 km/h at 11:06 L.T. on 2017-08-23 recorded at Taipa Grande. Break the record of typhoon "RUBY" - 211.0 km/h at 14:28 L.T. on 1964-09-05 recorded at Farol da Guia.</p>							

- Represents incompleting data due to breakdown or electricity interruption of devices.

* - Due to the power failure when the typhoon was affecting Macao, data was retrieved from the datalogger device at the stations afterward, and the respective data was verified before being updated.

Storm Surge Warning

Typhoon “HATO” (1713)

Issued Time	Content
2017-8-22 21:00	Red storm surge will be effective at 2017-8-23 08:00
2017-8-23 08:30	Red storm surge is effective at 2017-8-23 08:00
2017-8-23 11:30	Black storm surge is effective at 2017-8-23 11:30
2017-8-23 15:30	Cancel all storm surge signals

Water Level Monitoring System			Water Level Monitoring System		
Station	Maximum Water Level (m)	Observed Time	Station	Maximum Water Level (m)	Observed Time
(LPM) Rua da Praia do Manduco	1.52	2017-8-23 12:13	(LRR) Rua de Restauração	---	---
(LHK) [#] Largo do Pagode do Bazar	1.62	2017-8-23 12:05	(LIV) [#] Ilha Verde	0.18	2017-8-23 12:00
(LMF) [#] Rua de Missão de Fátima	1.15	2017-8-23 12:24	(LLM) Lam Mau	1.55	2017-8-23 12:00
(LAO) [#] Est. Gov. Albano de Oliveira	0.22	2017-8-23 12:18	(LPH) [#] Ponte e Horta	1.54	2017-8-23 11:50
(LCH) [#] Rua de Chaves	0.15	2017-8-23 12:23	(LPN) Ponte Negra	0	---
(LIL) Iec Long	0	---	(LCL) São Francisco Xavier	0.9	2017-8-23 11:36

(LCS) Chun Su Mei	0	---			
(LSP) Seac Pai Van	0	---	Tide Station		
(LPI) # Porto Interior	1.56	2017-8-23 11:42	Station	Maximum Tide Level (m)	Observed Time
(LSI) Porto Interior Norte	1.54	2017-8-23 11:33	(SBR) # Barra	4.51	2017-8-23 11:20
		2017-8-23 11:34	(SDV) # Doca de Ilha Verde	5.04	2017-8-23 11:52
(LTA) # Teatro de Alegria	0.73	2017-8-23 12:16			

Represents incompleted data due to breakdown or electricity interruption of devices. The observed time of the maximum water level is the time that the devices stopped working.