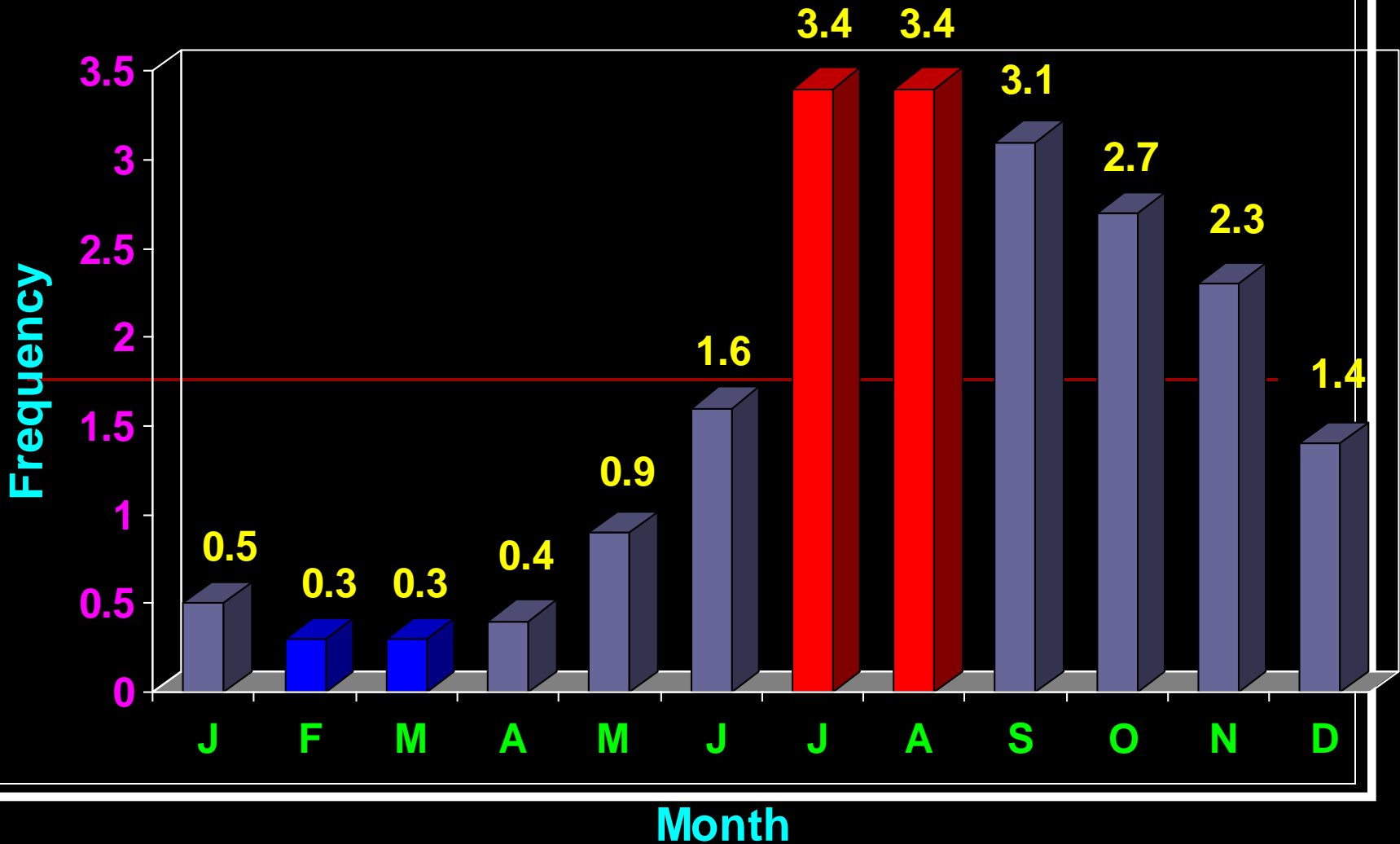


Typhoon Disasters in the Philippines During the 2009 El Nino Event

(TS KETSANA Sep. 24-27, T PARMA Sep. 30-Oct. 10, and
T MIRINAE Oct. 28-Nov. 2)



FREQUENCY OF OCCURRENCE OF TROPICAL CYCLONES



Tropical Cyclone Warning System

Weather Advisory

- no effect in 48 to 72 hours
- issued once a day (at 5pm)

Tropical Cyclone Alert

- no effect in 36 to 48 hours
- issued twice a day (11am and 11pm)

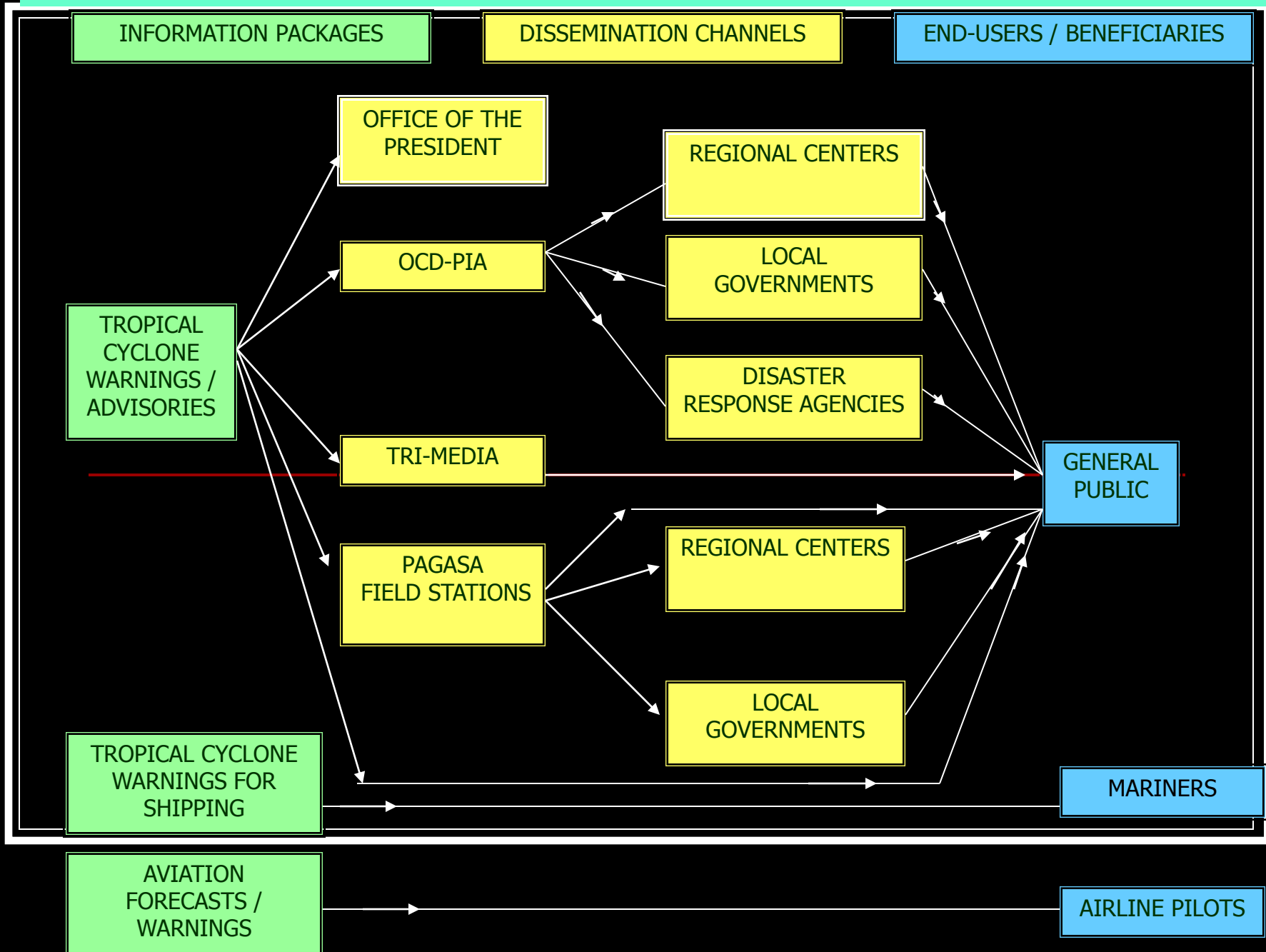
Tropical Cyclone Warning

- affect some areas in less than 36 hours
- issued 4 times a day (5am, 11am, 5pm, 11pm)

PUBLIC STORM SIGNALS

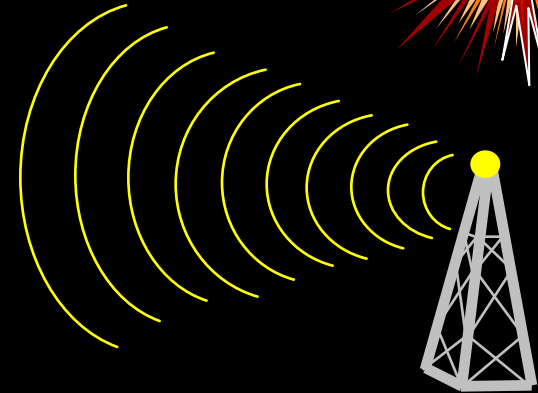
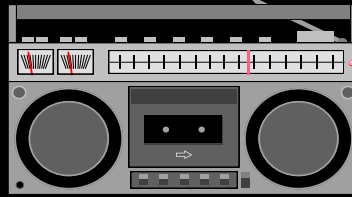
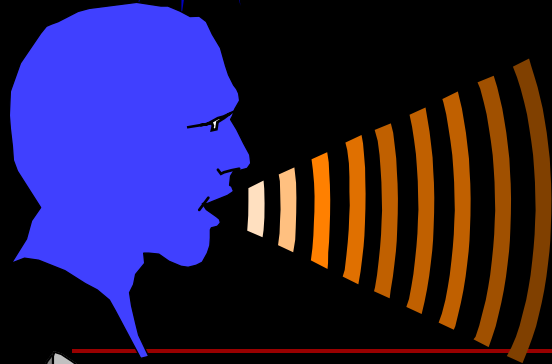
Signal Number 1	30-60 kph winds in 36 hours
Signal Number 2	61-100 kph winds in 24 hours
Signal Number 3	101-185 kph winds in 18 hours
Signal Number 4	>185 kph winds in 12 hours

DISSEMINATION SYSTEM

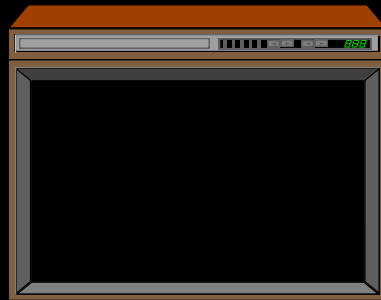
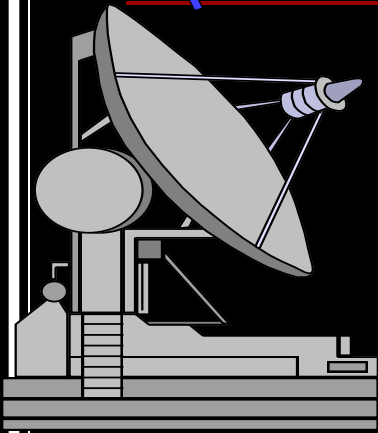


MODES OF DISSEMINATION

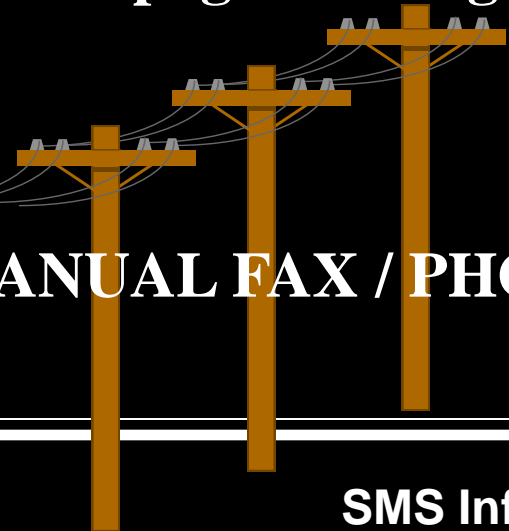
RADIO STATION



WEBSITE / or by email
www.pagasa.dost.gov.ph

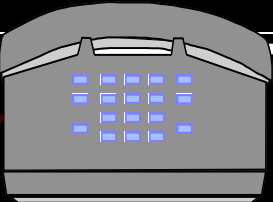


AUTO & MANUAL FAX / PHONE



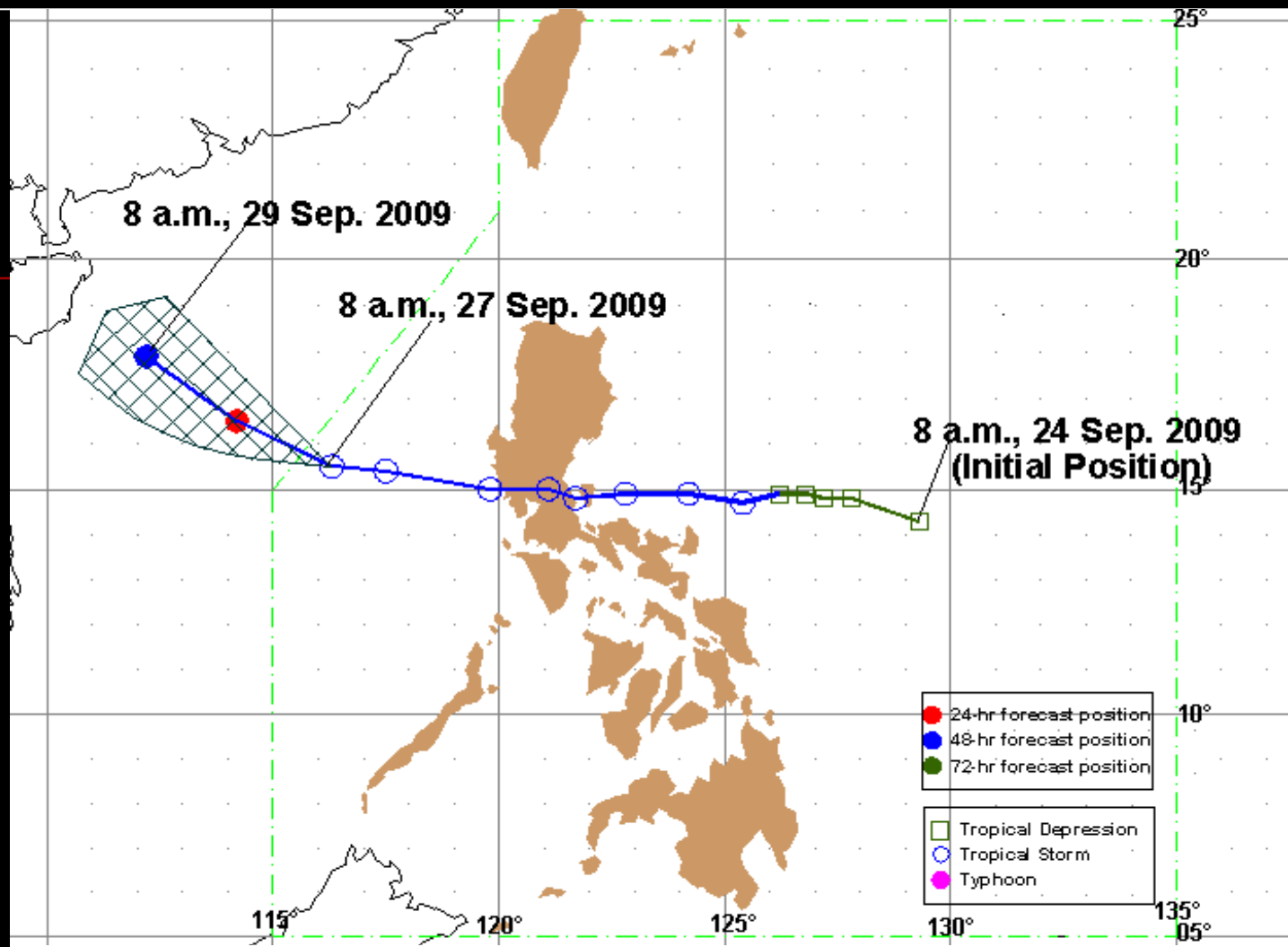
TV STATION

VOICE SERVER



SMS Infoboard

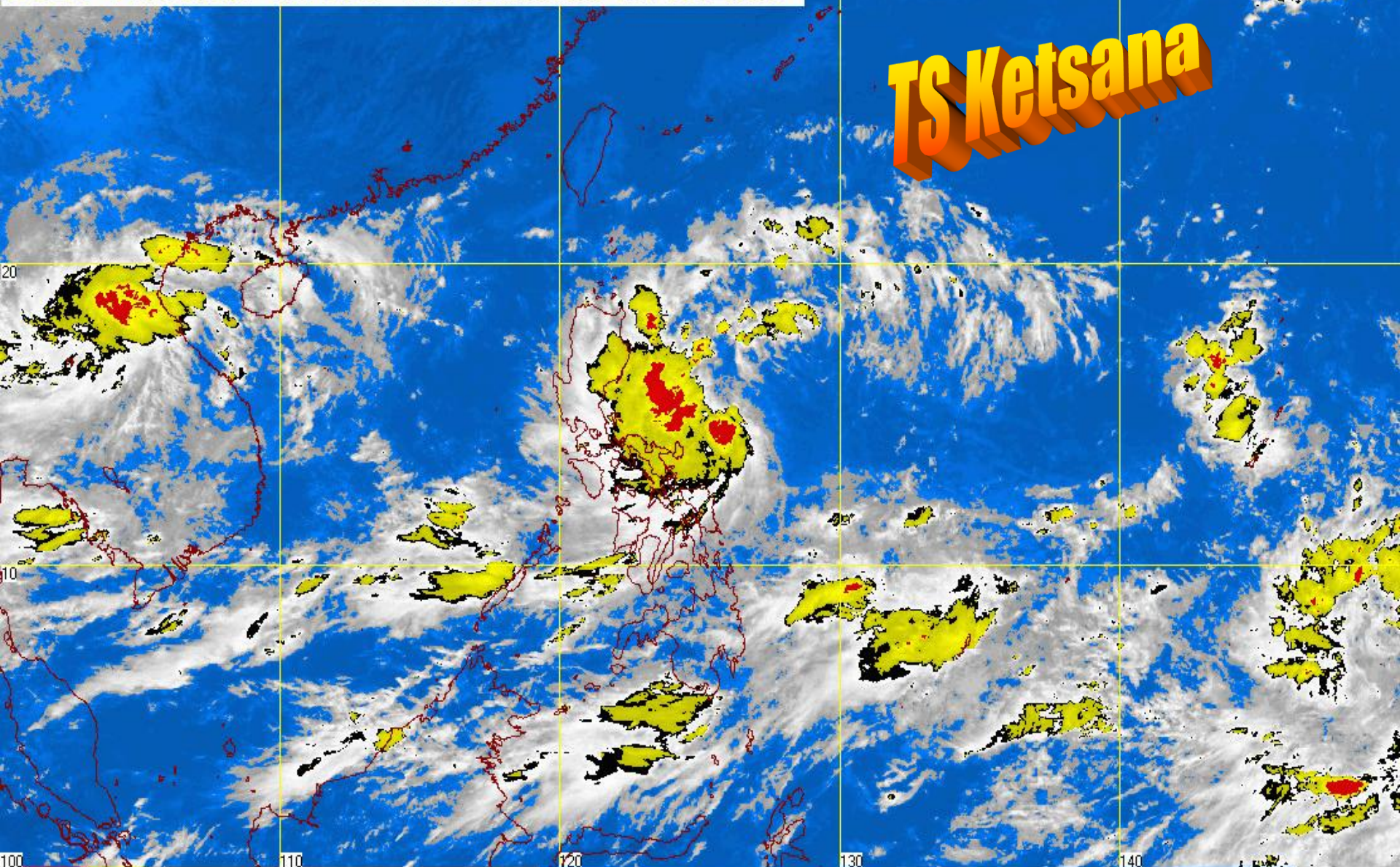
DIAL-A-WEATHER : TEL. NO. 925-62-01 UP TO 15



Tropical Storm KETSANA

DOST PAGASA MTSAT IR1 04:30:00 25/09/2009

TS Ketsana



Chronology of Events

- 11am Sept 24, 2009 – issued initial Bulletin for TD including alert for floods and landslides.
- 5pm Sept 25 – Signal # 1 raised in Metro Manila and other areas in Southern Luzon. Signal # 2 in most parts of central Luzon. Alert for floods and landslides reiterated.
- 6am Sept 26 – press conference held at WFFC, PAGASA to alert the public. The occurrence of flashfloods and landslides was “**highlighted**”.
- 11am Sept 26 – TS Ketsana made landfall in Aurora. It traversed Central Luzon area for 12 hrs.

Tropical Storm Ketsana

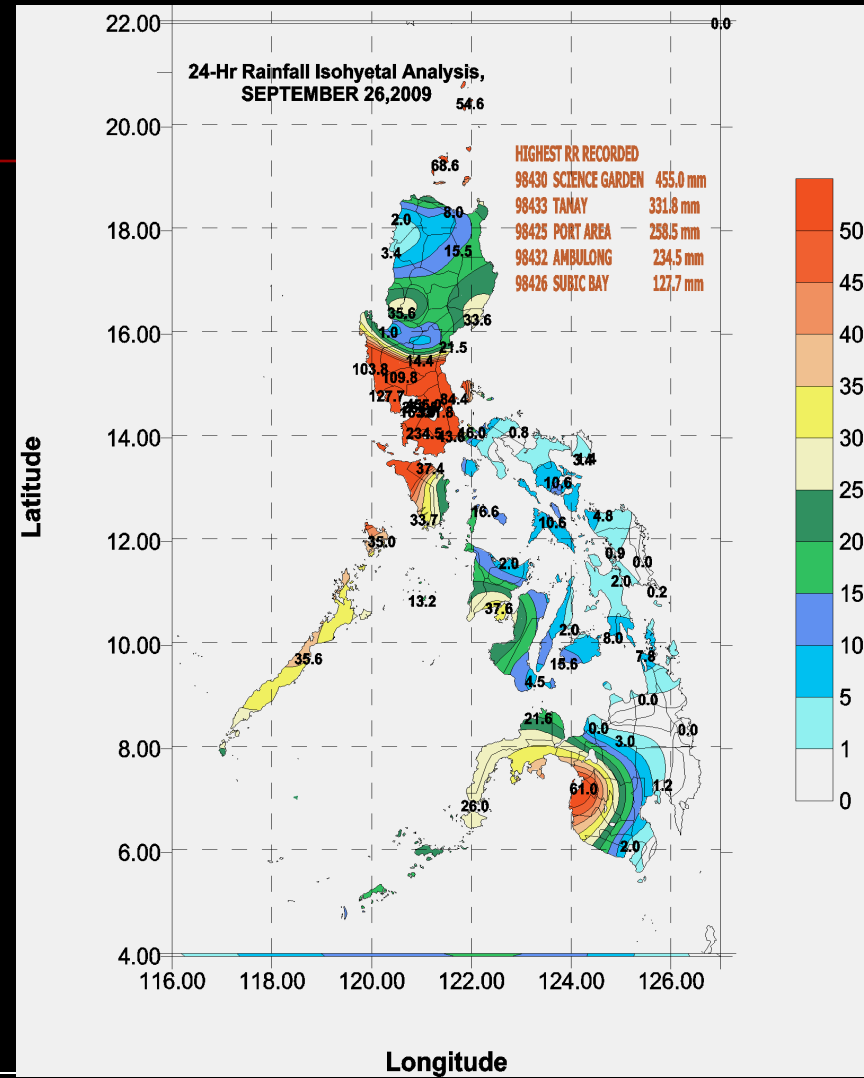
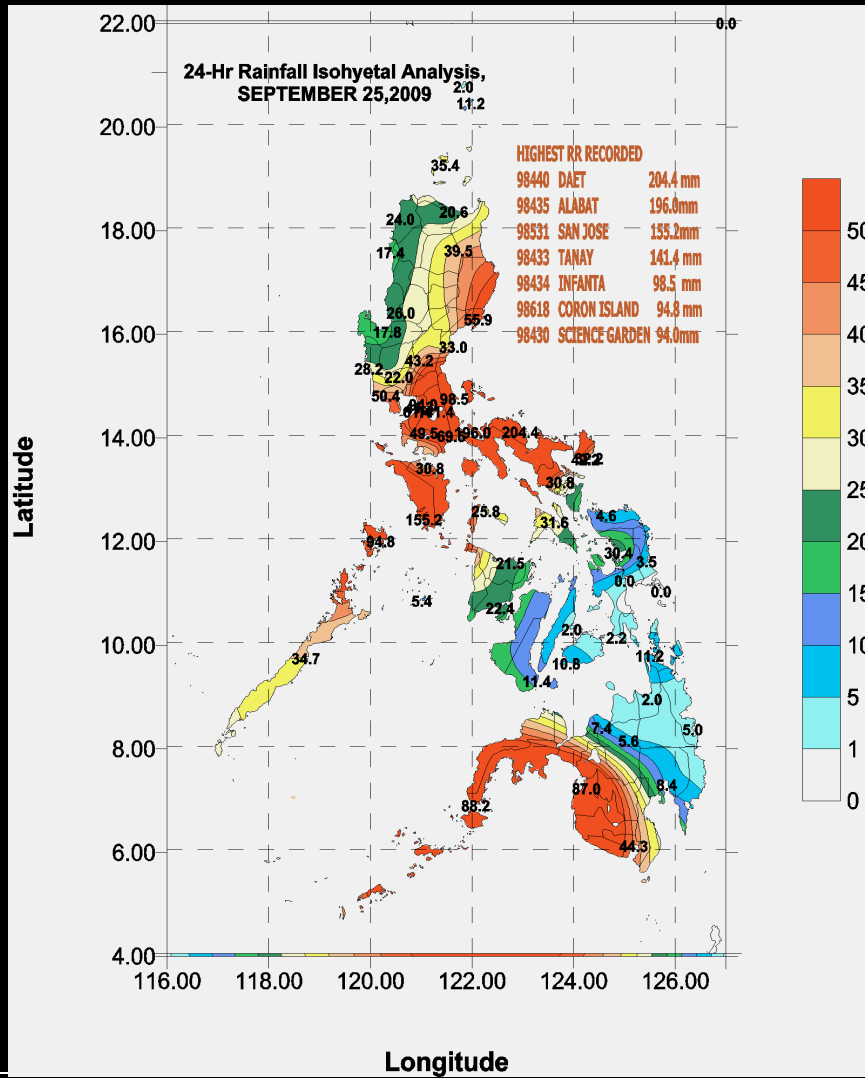
■ Details

Max. Winds : 105 kph, Gust : 135 kph

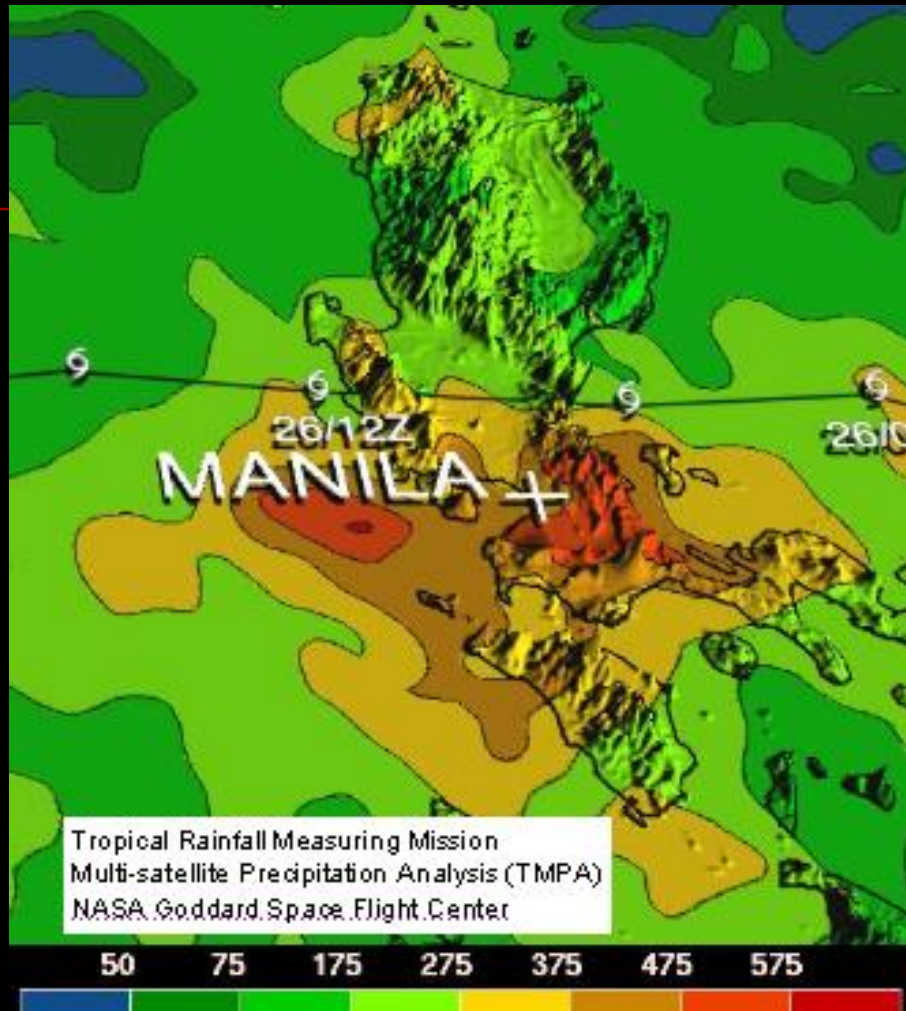
Duration : Sept. 24 – 27, 2009

Highest recorded RR : **455.0 mm** (Science Garden, QC, Sept. 26)

Rainfall Recorded on Sept. 25 & 26, 2009



Tropical Storm Ketsana

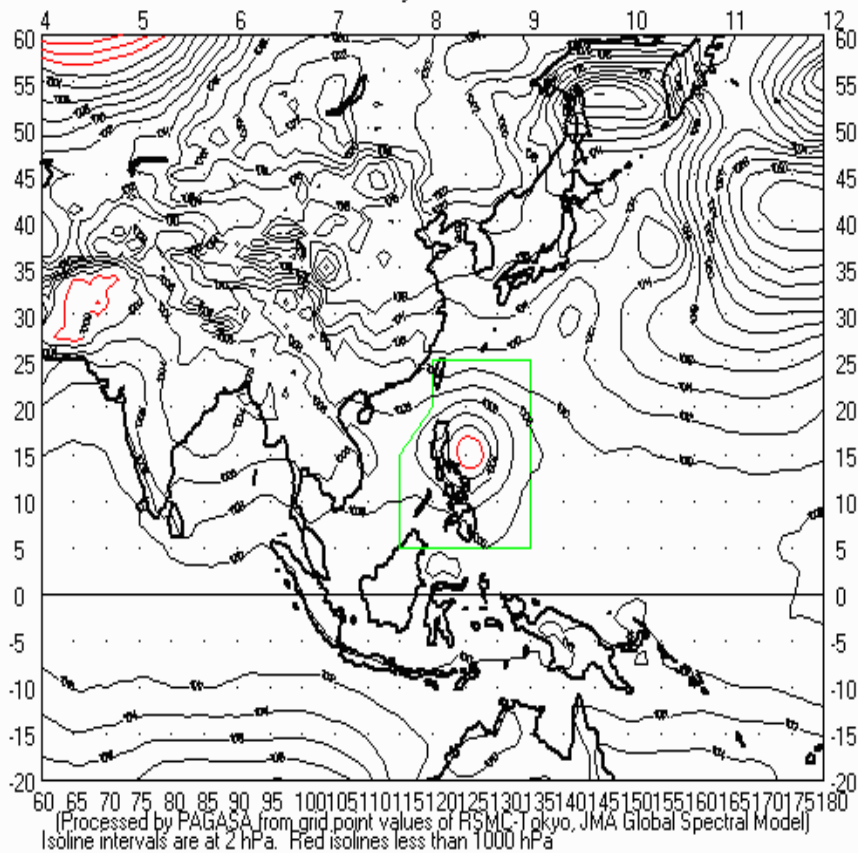


On 26 Sep 2009, TS Ketsana dumped record breaking rainfall over Metro Manila. The highest rainfall occurred south of the storm's track (indicated by the thin black line) in an east-west band over central Luzon that includes Manila. Amounts in this region are in the order of 375 mm (~15 inches, shown in dark yellow) to over 475 mm (~19 inches, shown in orange). The highest recorded amount from the TMPA around Manila was 585.5 mm (almost 24 inches).

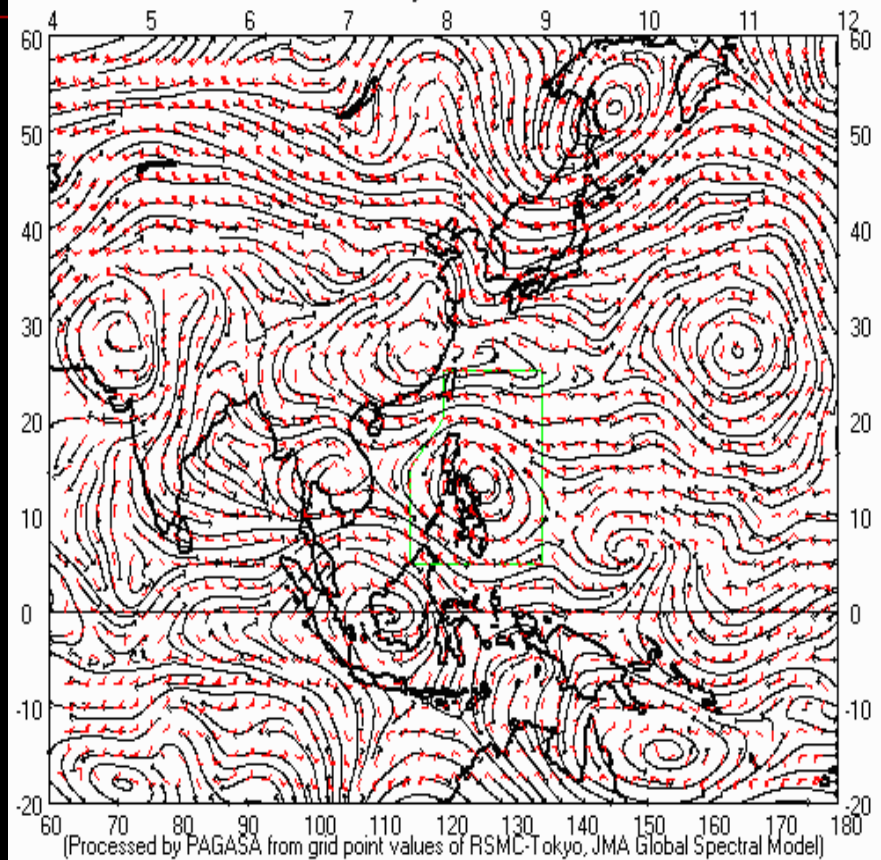
24-hour Rainfall @ Science Garden, Quezon City: 455 mm (18.2 inches) ~ 100- year return period
8AM 26 Sep – 8Am 27 Sep 2009

What happened

Initial-hour analysis of MSL pressure for Friday, September 25, 2009
Friday afternoon



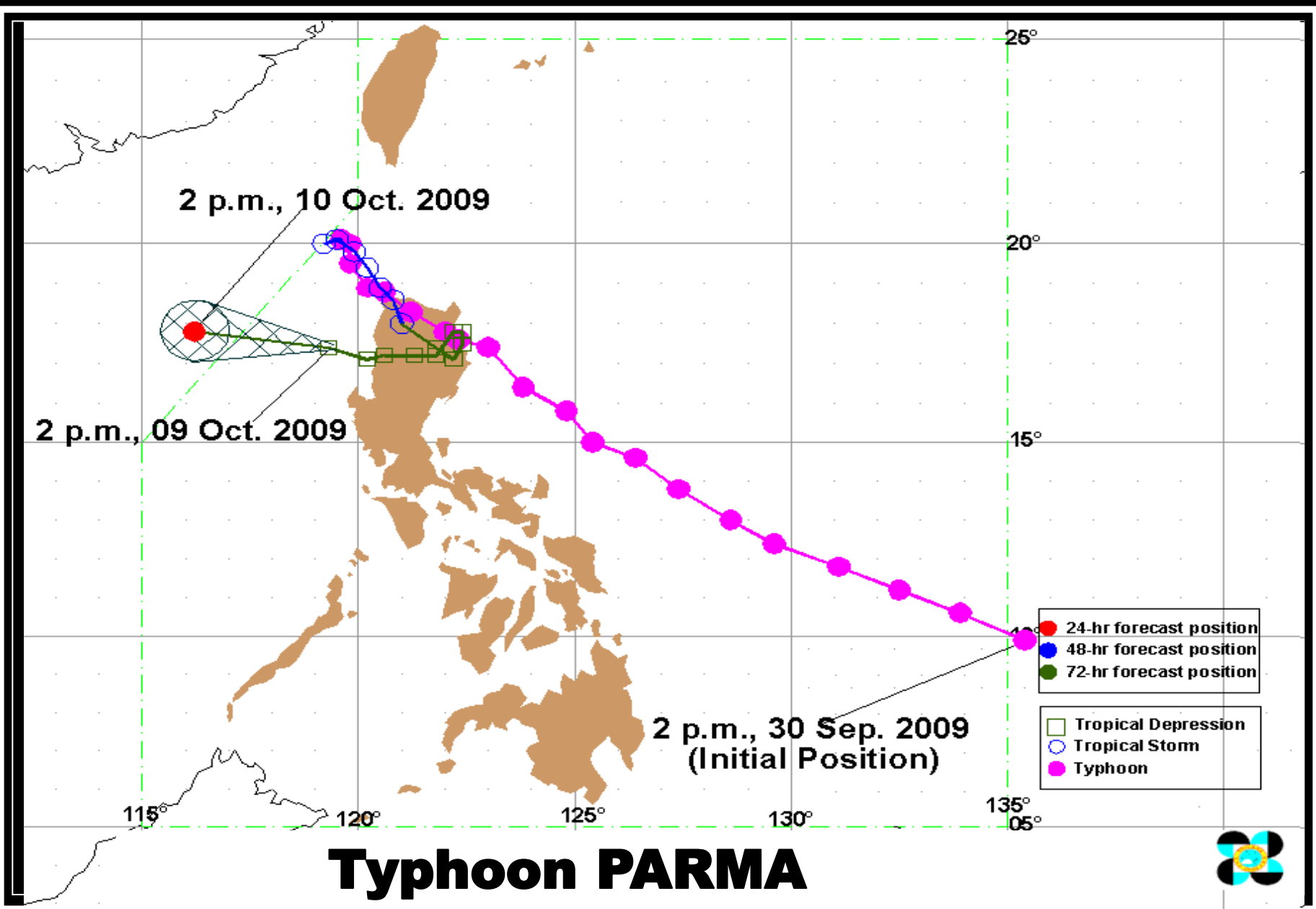
Initial-hour analysis of 500-hPa Streamline for Friday, September 25, 2009
Friday afternoon



Aftermath of TS KETSANA



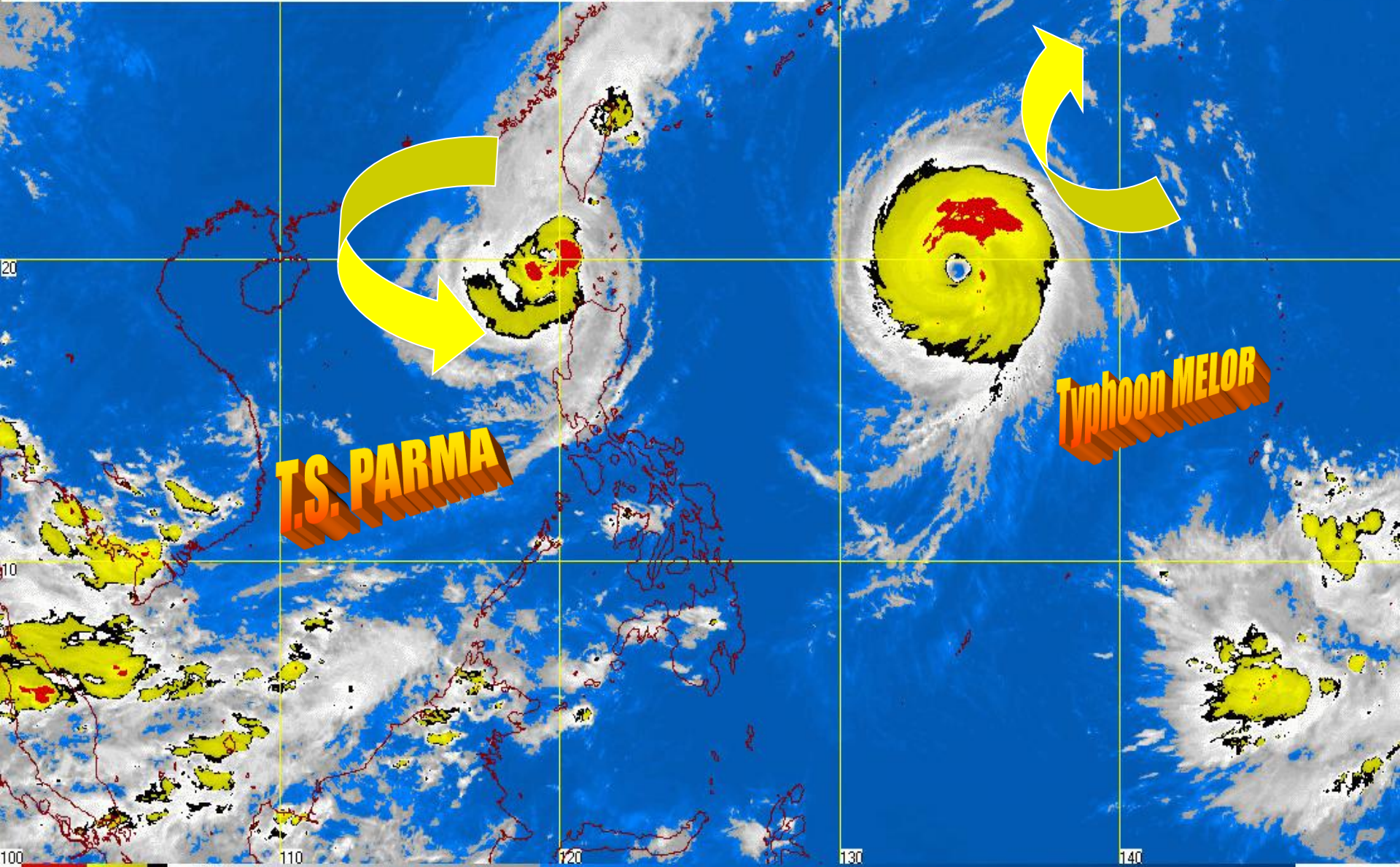
Marikina area



Typhoon PARMA



DOST PAGASA MTSAT IR1 08:30:00 05/10/2009



T.S. PARMA

Typhoon MELOR



Chronology of Events

- 11am Sept 29 – issued initial advisory for TD about 1,330 km east of Mindanao (still over Caroline Islands).
- 11am Sept 30 – 2nd advisory for TS PARMA
- 5pm Sept 30 – T PARMA entered PAR with maximum wind / gust : 120 / 150 kph.
- 5pm Oct 03 – made landfall over eastern coast of Cagayan (1st landfall)

Chronology of Events

- 5am Oct 04 – weakened after crossing extreme northern Luzon (120 kph / 150 kph).
- 11am Oct 04 – started interacting with another intense typhoon (MELOR) coming from the Pacific Ocean (195 kph / 250 kph).
- Oct 04-06 – remained almost stationary in Luzon Sea bringing rains and gusty winds over Ilocos region

Chronology of Events

- 11pm Oct 06 – Made its 2nd landfall over Ilocos Norte (105 kph / 135 kph).
- 5pm Oct 08 – made its 3rd landfall in the eastern coast of Cagayan then crossed Northern Luzon and brought heavy rains and gusty winds as tropical depression. While Ty MELOR has moved further away from the country.

Typhoon PARMA

■ Details

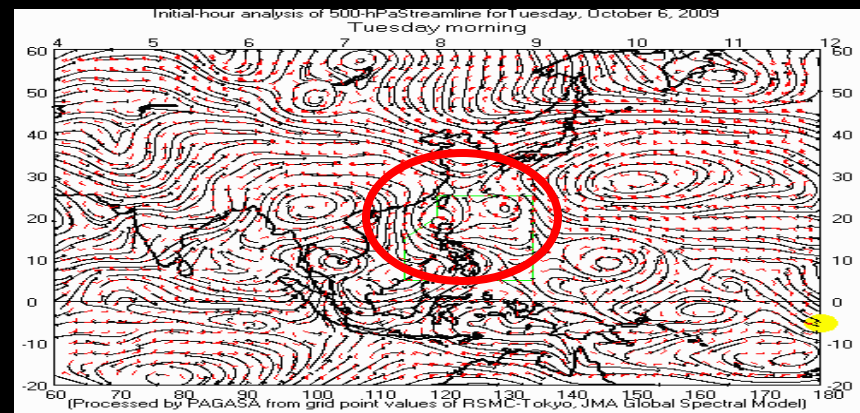
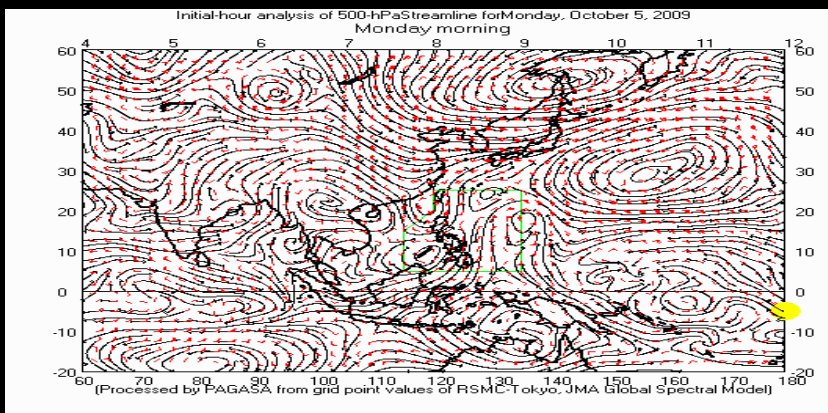
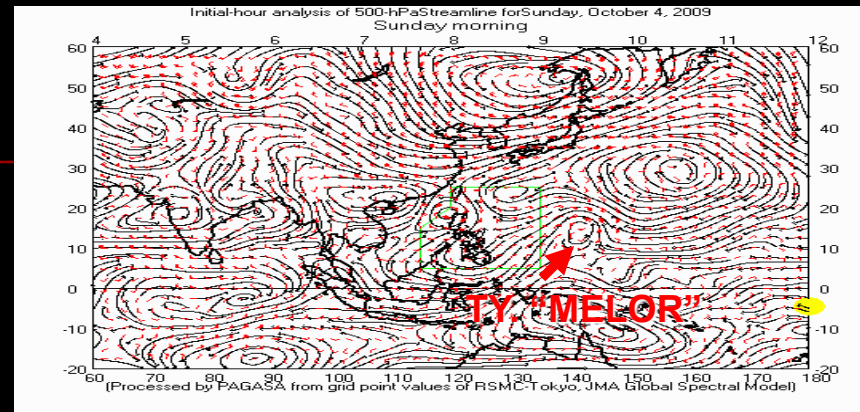
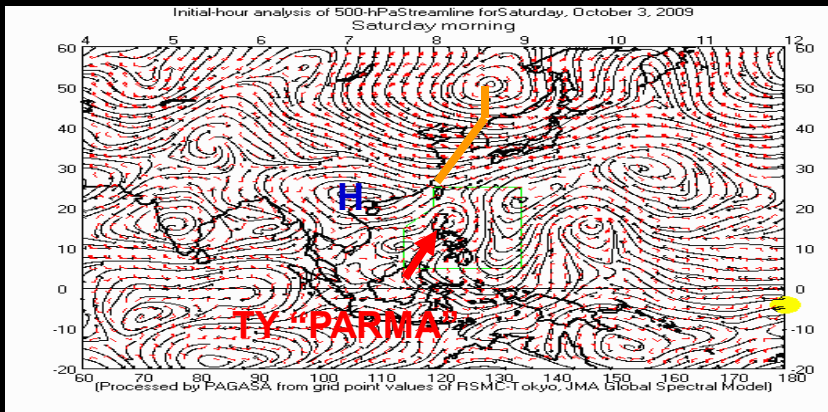
Max. Winds : 195 kph, Gust : 230 kph

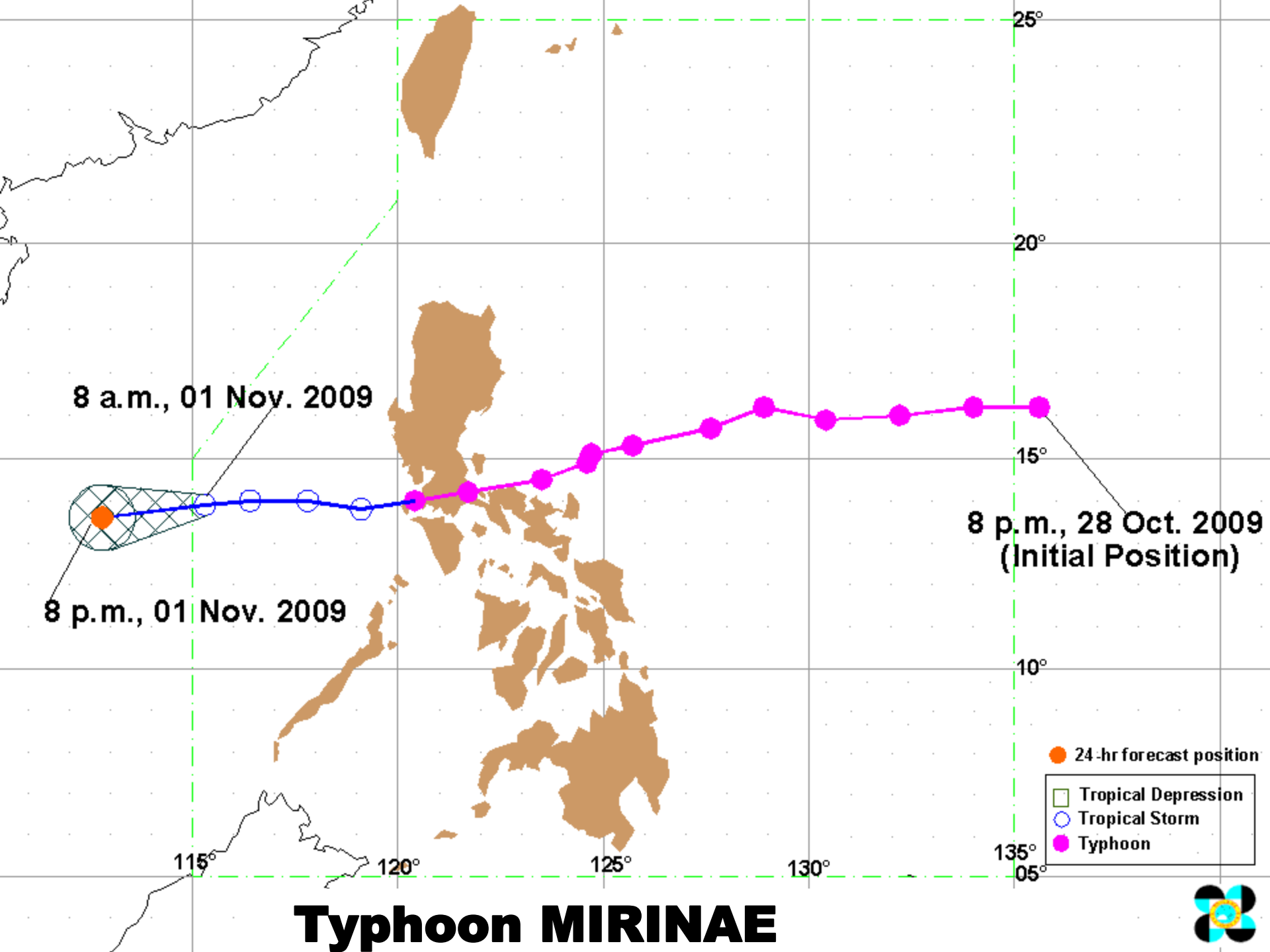
Duration : Sept. 30 – Oct. 10, 2009

Highest recorded RR (mm)

Station/Date	Oct. 03	Oct. 04	Oct. 05	Oct. 06	Oct 07	Oct. 08
Laoag	90.6	402.6	197.3	47.5	60.0	33.0
Vigan/Sinait	168.9	417.3	126.2	75.4	68.6	111.8
Baguio	531.0	38.2	4.6	260.0	276.0	685.0
Dagupan	159.5	8.0	T	36.2	52.0	443.5

What happened





8 a.m., 01 Nov. 2009

8 p.m., 28 Oct. 2009
(Initial Position)

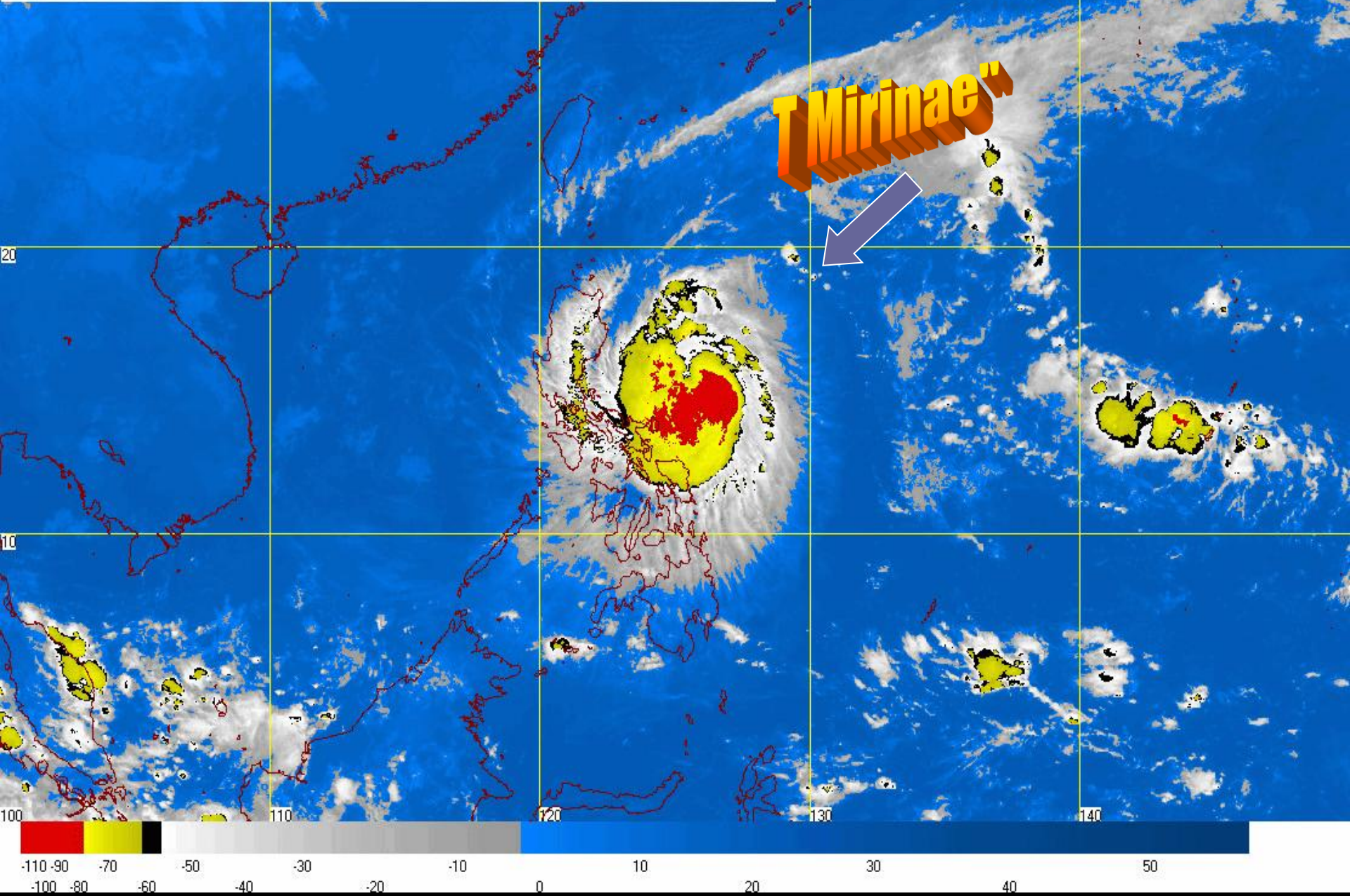
8 p.m., 01 Nov. 2009

- 24-hr forecast position
- Tropical Depression
- Tropical Storm
- Typhoon

Typhoon MIRINAE



DOST PAGASA MTSAT IR1 23:30:00 29/10/2009



Chronology of events

- October 26 11 am – advisory # 1 for TD while over Marianas Islands
- October 27 11 am – advisory # 2 for TS MIRINAE (upgraded to TS)
- October 28 11 am – advisory # 3 (upgraded to STS)
- October 28 11 pm – issue initial Bulletin Alert (upgraded to typhoon)
- October 29 5 am – Bulletin Warning # 2 (intensified further)
- October 31 – between 1-2 am made landfall over southern Aurora-Quezon area.

Typhoon MIRINAE

■ Details:

Maximum Sustained winds: 150 kph Gust: 185 kph

Duration : Oct. 28 – November 02, 2009

Highest 24-hr Recorded Rainfall: (Oct 30-31, 2009)

Alabat	350 mm
Tanay	157 mm
Tayabas	154 mm
Daet	150 mm
Port Area	85 mm
Science Garden	79 mm

Thank You!