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Exercises: Real-time example

Open a web browser : CIRA (images), JTWC, ADT, NRL for microwave

What Dvorak pattern is it? (if possible attempt to apply step 2)

What is the 24 h trend?

What was the Dvorak FT rating 24h ago?

What would the MET be then?

What is the official Dvorak estimate? How does it compare?

What would the max wind speed be for this Dvorak rating using the table?

How does this compare to ADT? Official Vm estimate?



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Exercises: Gita (use viewer)

Vis and IR

a. 12UTC 12 Feb. position 21.3S 175.9E:

24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____(use flowchart)

Comments: _____



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Exercises: Gita (use viewer)

Vis and IR

a. 12UTC 12 Feb. position 8S 100.5

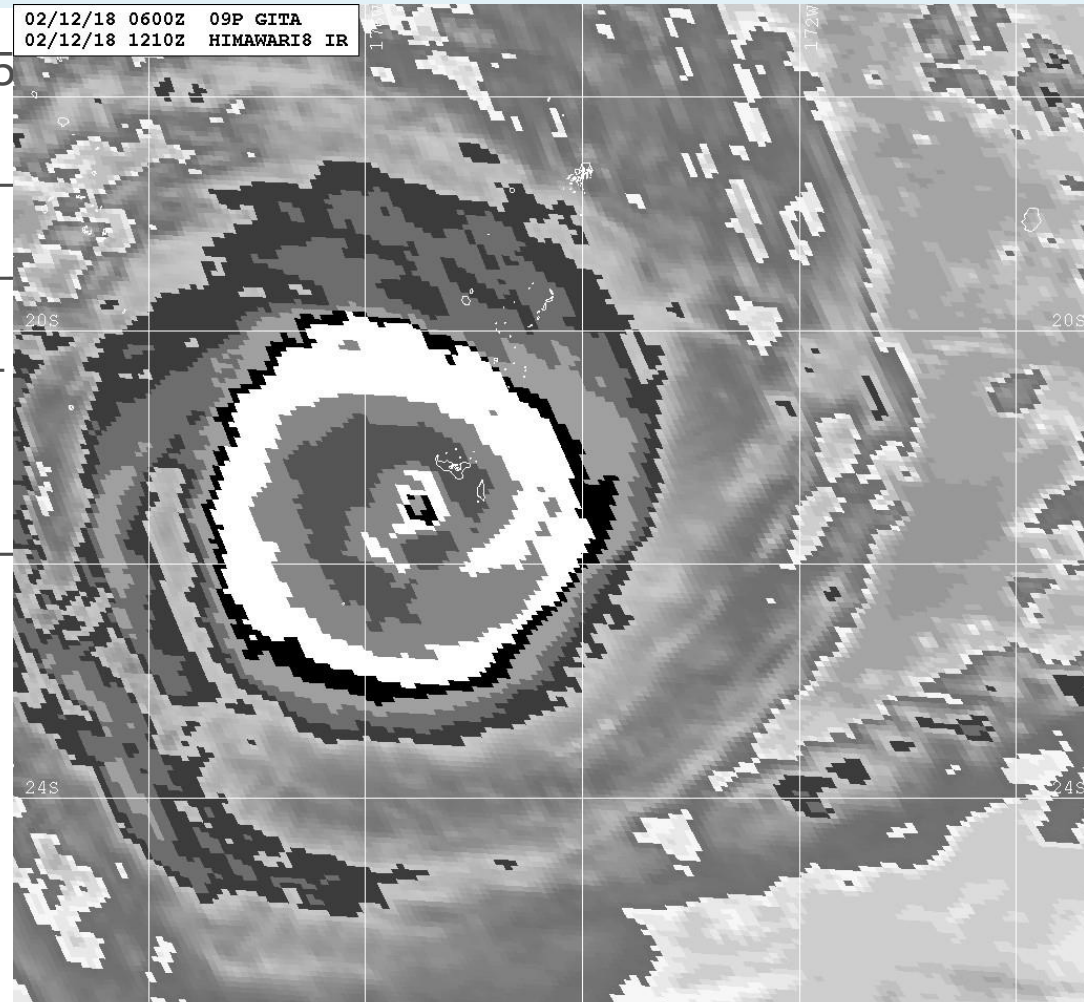
24h change ? _____

24h change of microwave ? _____

Pattern? _____

DT? _____

Comments: _____



Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->





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Exercises: Gita (use viewer)

Vis and IR

b. 18UTC 11 Feb. position 21.6S 178.35E:

24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____(use flowchart)

Comments: _____



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Exercises: Gita (use viewer)

Vis and IR

b. 18UTC 11 Feb. position 21.6S 178.35E:

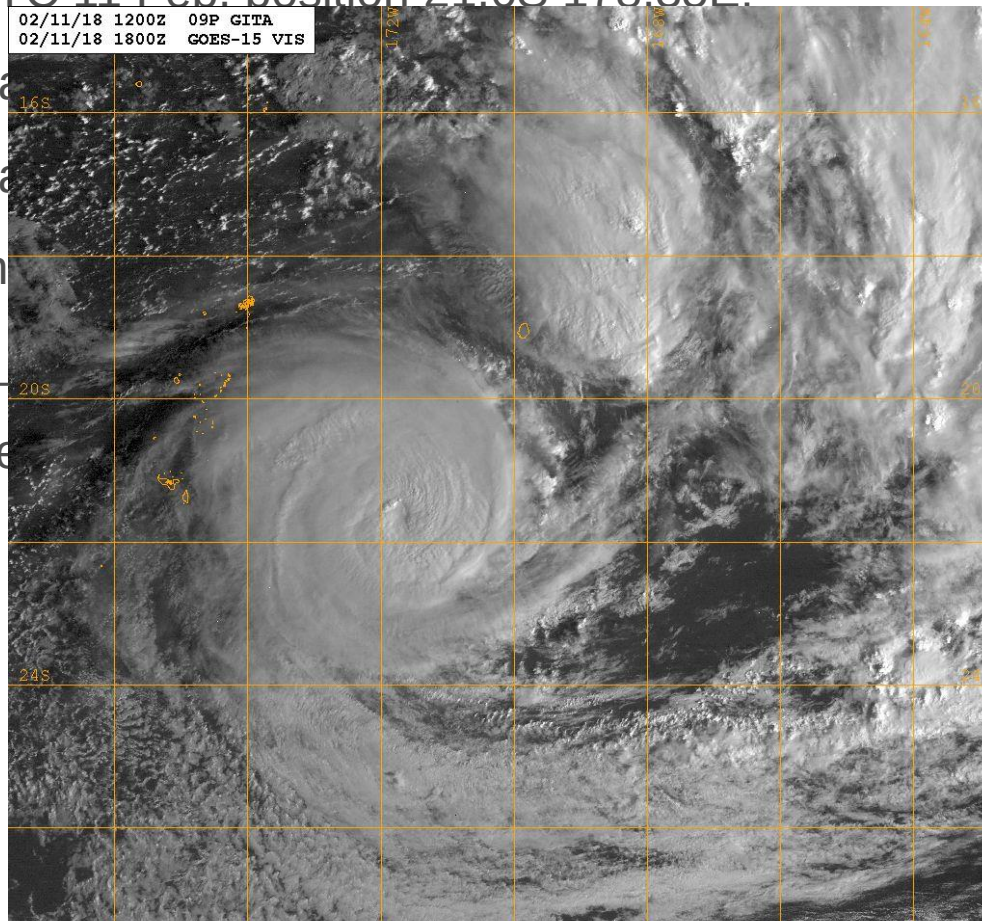
24h cha

24h cha

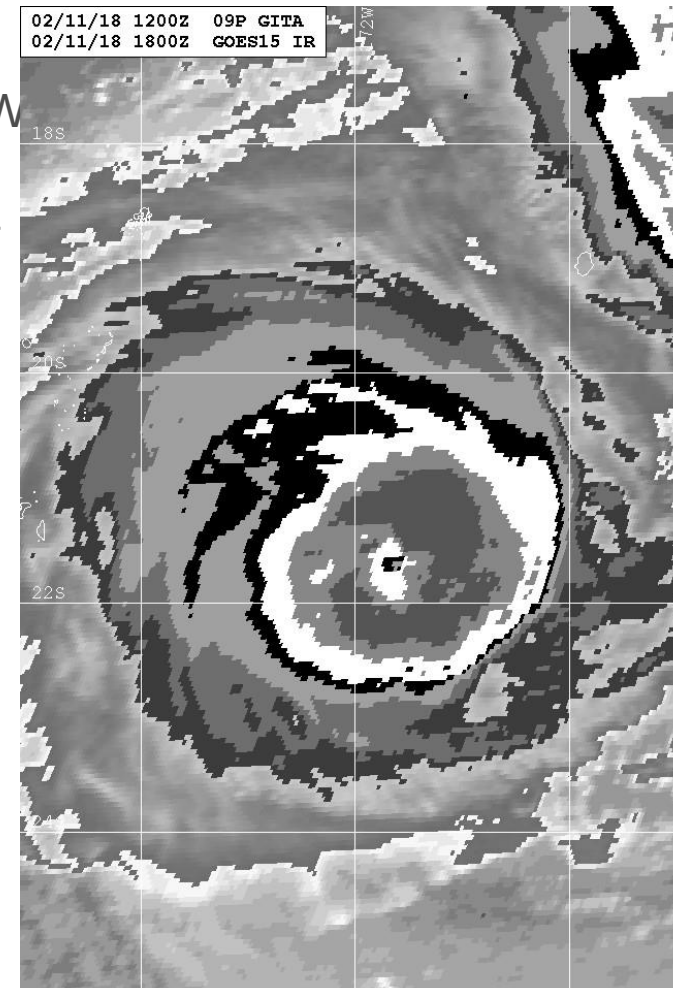
Pattern

DT? —

Comme



Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 15 degrees) -->



Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->



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Exercises: Gita (use viewer)

Vis and IR

c. 03UTC 10 Feb. position 16.5S 169.3W:

24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____(use flowchart)

Comments: _____



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Exercises: Gita (use viewer)

Vis and IR

c. 03UTC 10 Feb. position 16.5S 169.3W:

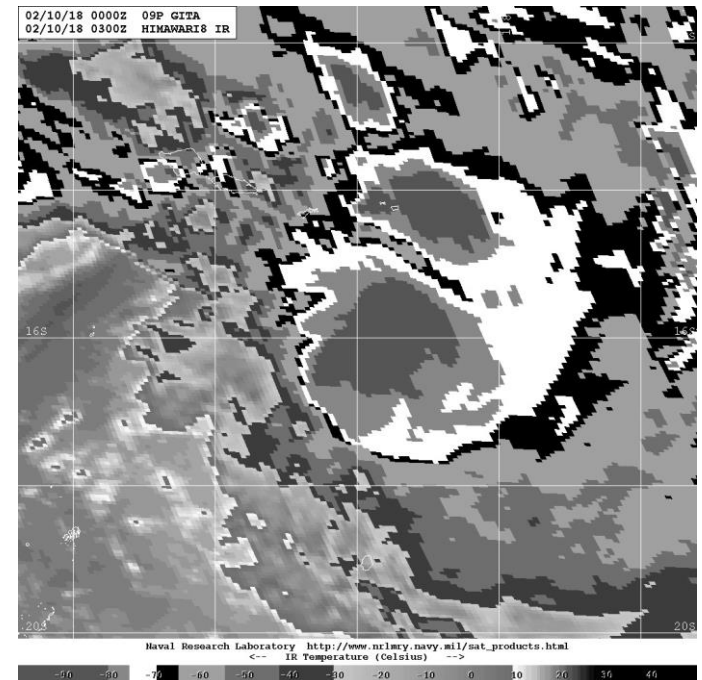
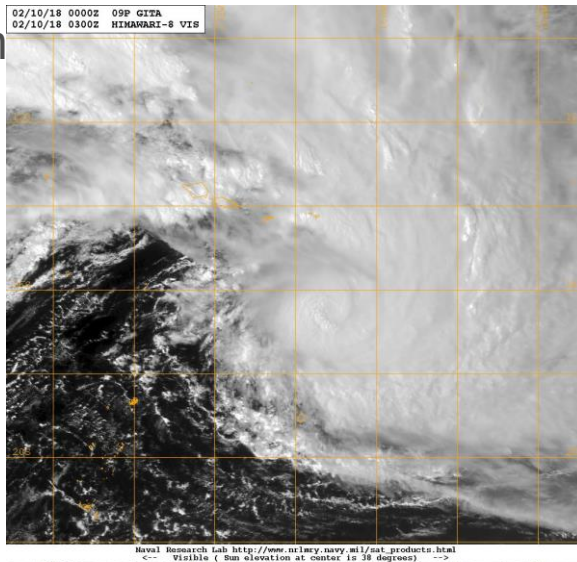
24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____ (use flowchart)

Comm _____



Exercises: Gita (use viewer)

Vis and IR

d. 03UTC 10 Feb. position 14.6S 172.3W :

24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____(use flowchart)

Comments: _____

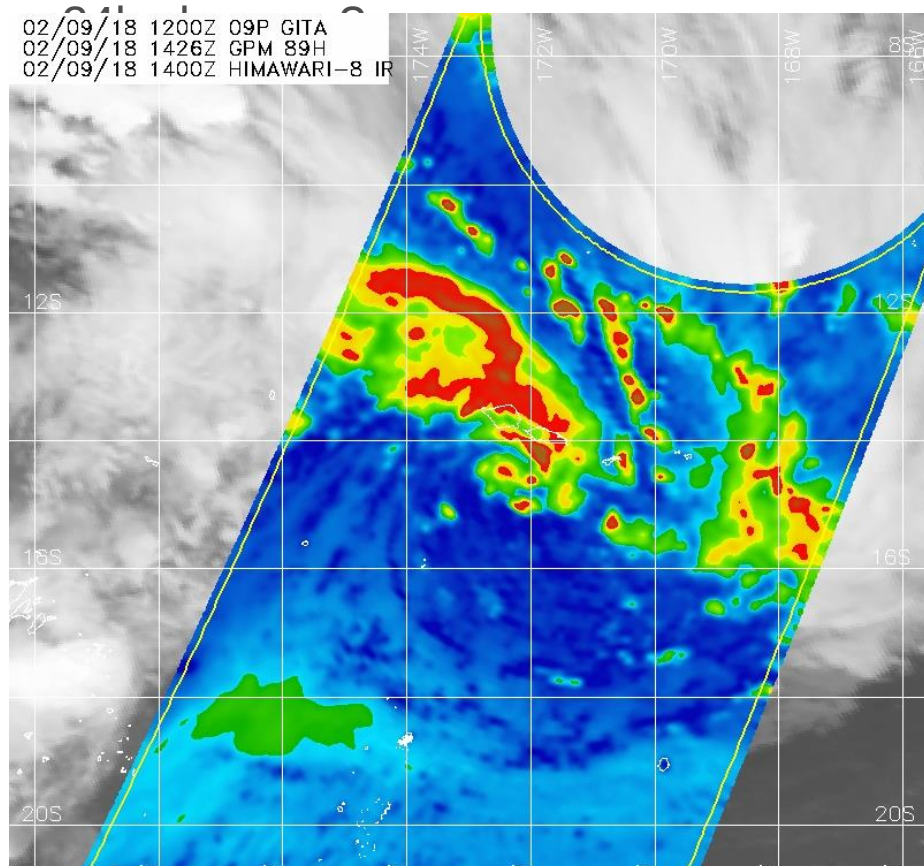


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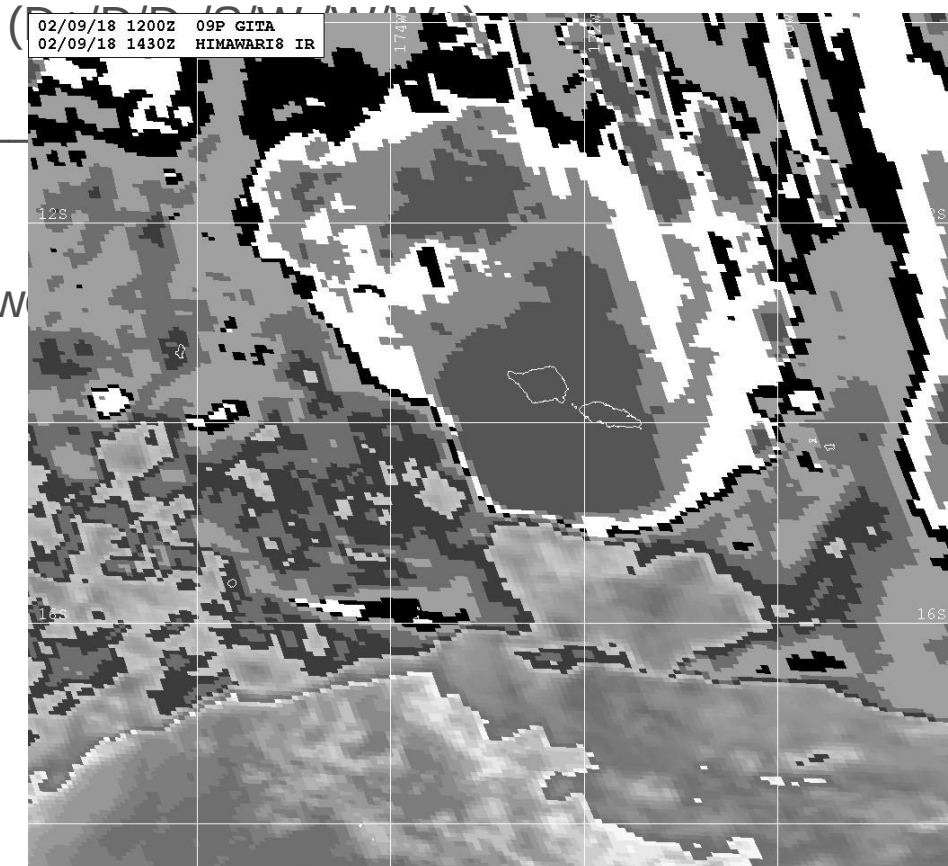
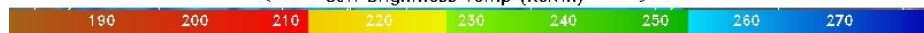
Exercises: Gita (use viewer)

Vis and IR

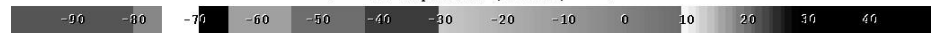
d. 03UTC 10 Feb. position 14.6S 172.3W :



Naval Research Lab www.nrlmry.navy.mil/sat_products.html
--- 89H Brightness Temp (Kelvin) ---



Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html
--- IR Temperature (Celsius) ---





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Exercises: Gita (use viewer)

Vis and IR

e. 03UTC 10 Feb. position 15.6E 179.1W :

24h change ? _____ (D+/D/D-/S/W-/W/W+)

24h change of microwave ? _____

Pattern? _____

DT? _____(use flowchart)

Comments: _____



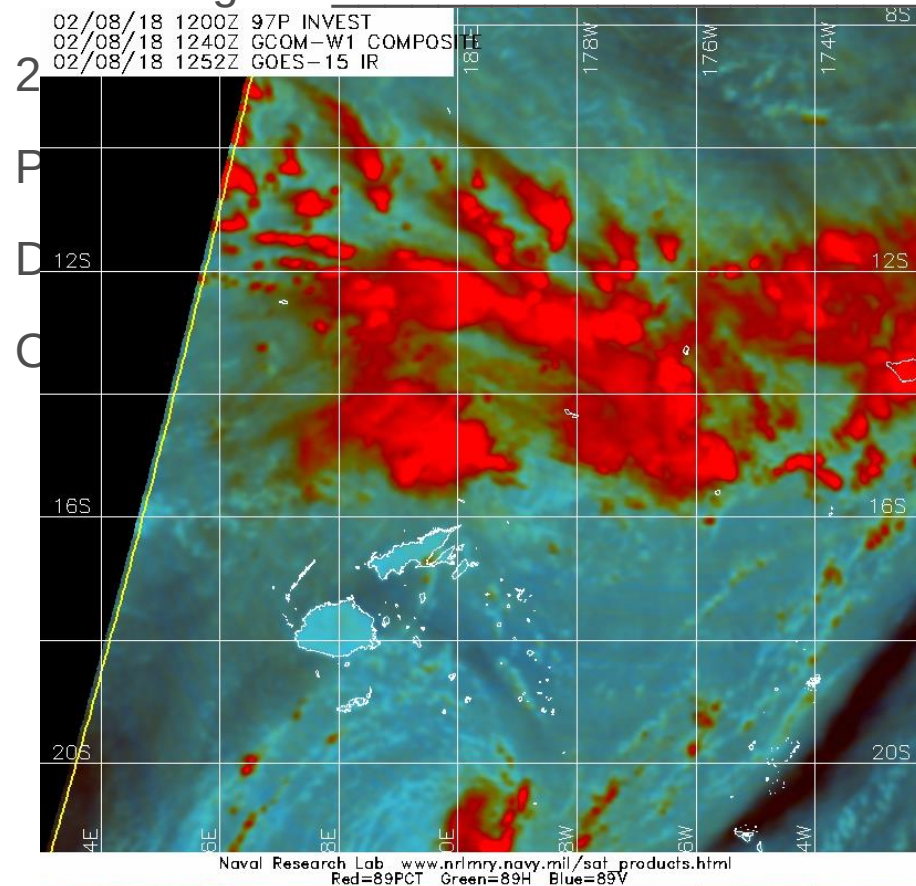
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Exercises: Gita (use viewer)

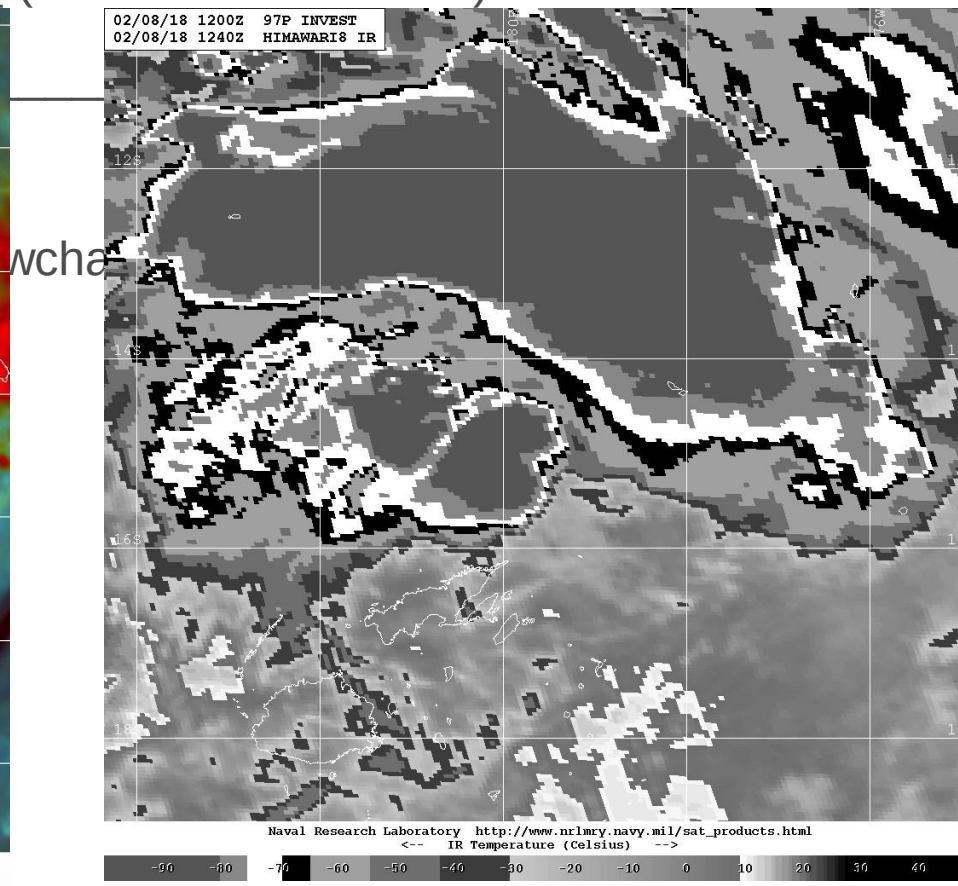
Vis and IR

e. 03UTC 10 Feb. position 15.6E 179.1W :

24h change ?



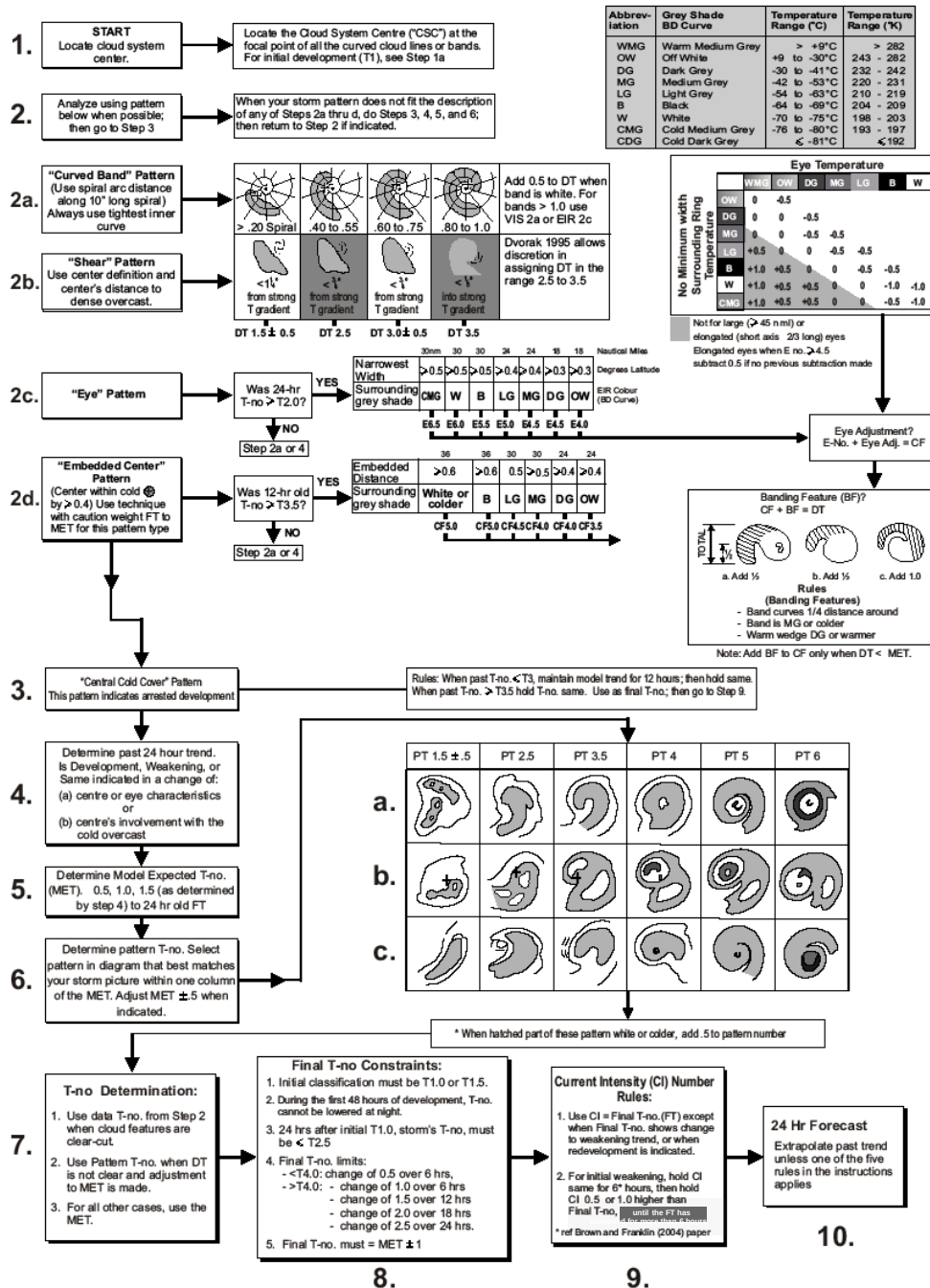
(D+/D-/D-/S/W-/W/W+)





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Dvorak Enhanced Infrared (EIR) Analysis Diagram

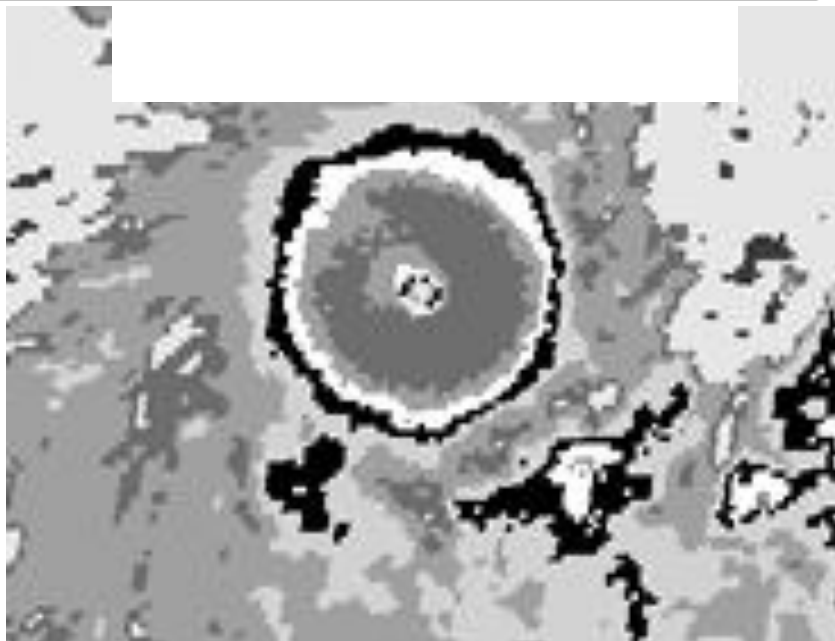




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2C Eye patterns (EIR)

Abbreviation	Grey Shade BD Curve	Temperature Range (°C)	Temperature Range (°K)
WMG	Warm Medium Grey	> +9°C	> 282
OW	Off White	+9 to -30°C	243 - 282
DG	Dark Grey	-30 to -41°C	232 - 242
MG	Medium Grey	-42 to -53°C	220 - 231
LG	Light Grey	-54 to -63°C	210 - 219
B	Black	-64 to -69°C	204 - 209
W	White	-70 to -75°C	198 - 203
CMG	Cold Medium Grey	-76 to -80°C	193 - 197
CDG	Cold Dark Grey	≤ -81°C	≤ 192



24h ago
was the T
number > T2 ?

NO

Step 2a
or
Step 4

YES

E-no: Eye number							
Minimal width	≥ 0.5	≥ 0.5	≥ 0.5	≥ 0.4	≥ 0.4	≥ 0.3	≥ 0.3
Surrounding colour	CMG	W	B	LG	MG	DG	OW
E	6.5	6.0	5.5	5.0	4.5	4.5	4.0

E-adj: Eye number adjustment							
EYE TEMPERATURE							
	WMG	OW	DG	MG	LG	B	W
WMG	0	-0.5					
OW	0	0	-0.5				
DG	0	0	-0.5	-0.5			
MG	+0.5	0	0	-0.5	-0.5		
LG	+1.0	+0.5	0	0	-0.5	-0.5	
B	+1.0	+0.5	+0.5	0	0	-1.0	-1.0
W	+1.0	+0.5	+0.5	0	0	-0.5	-1.0
CMG							

E-no + E-adj = CF

Is CF < MET ?

NO

DT = CF

YES

Addition of the band structure				
+0.5	+1.0	+1.5	+2.0	

BF

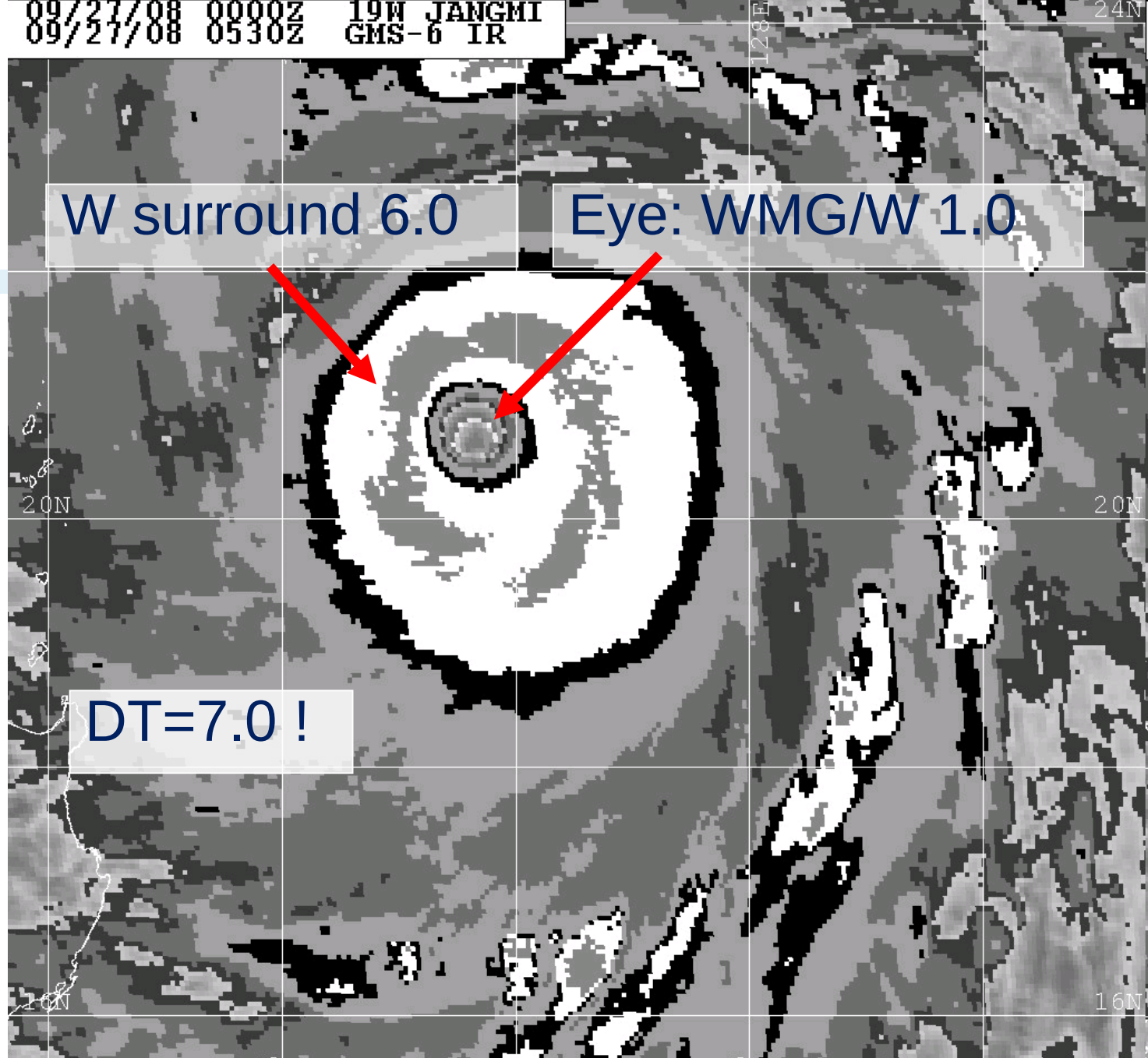
DT = CF + BF



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Jangmi



Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->

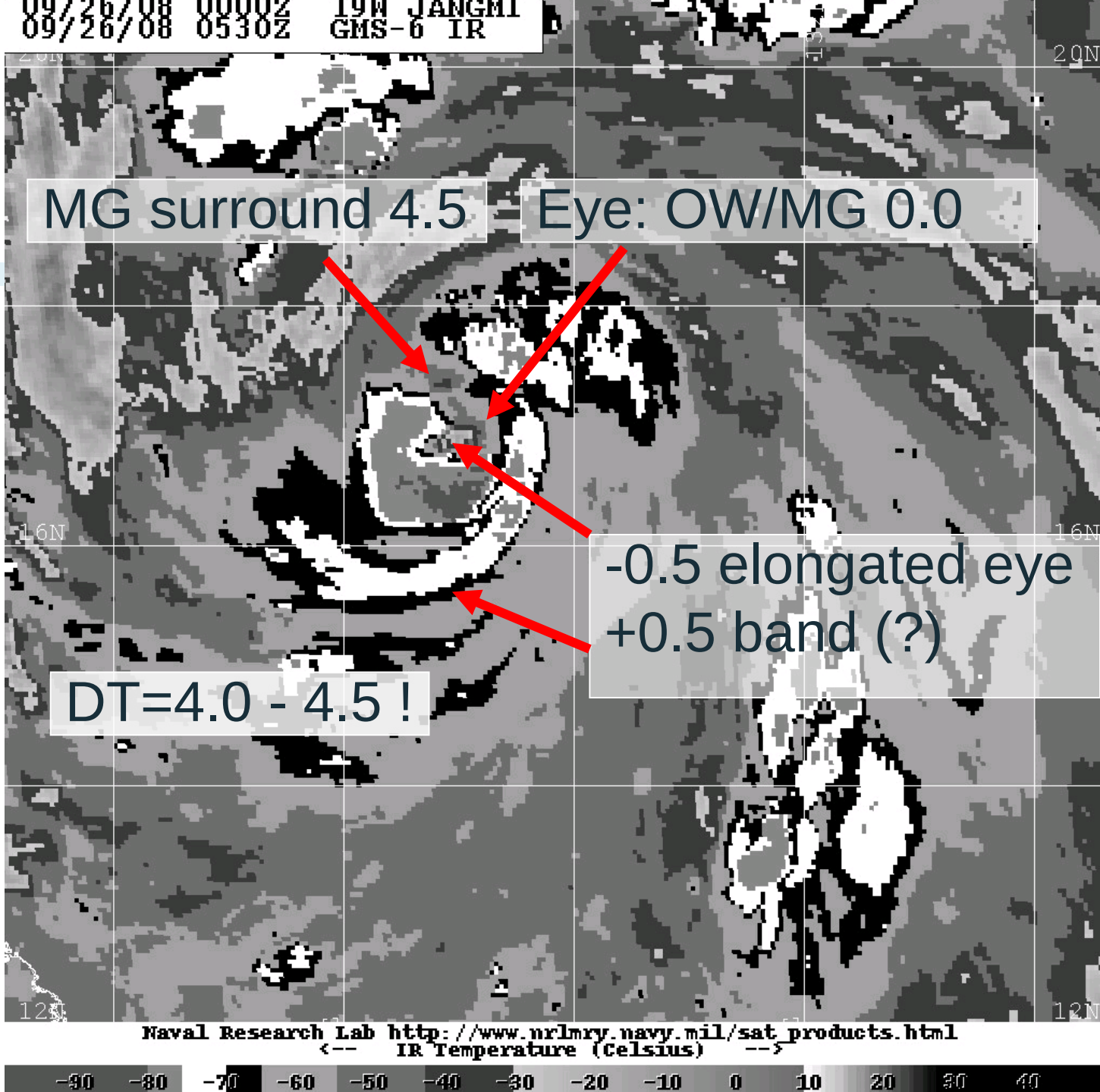


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More difficult
eye pattern



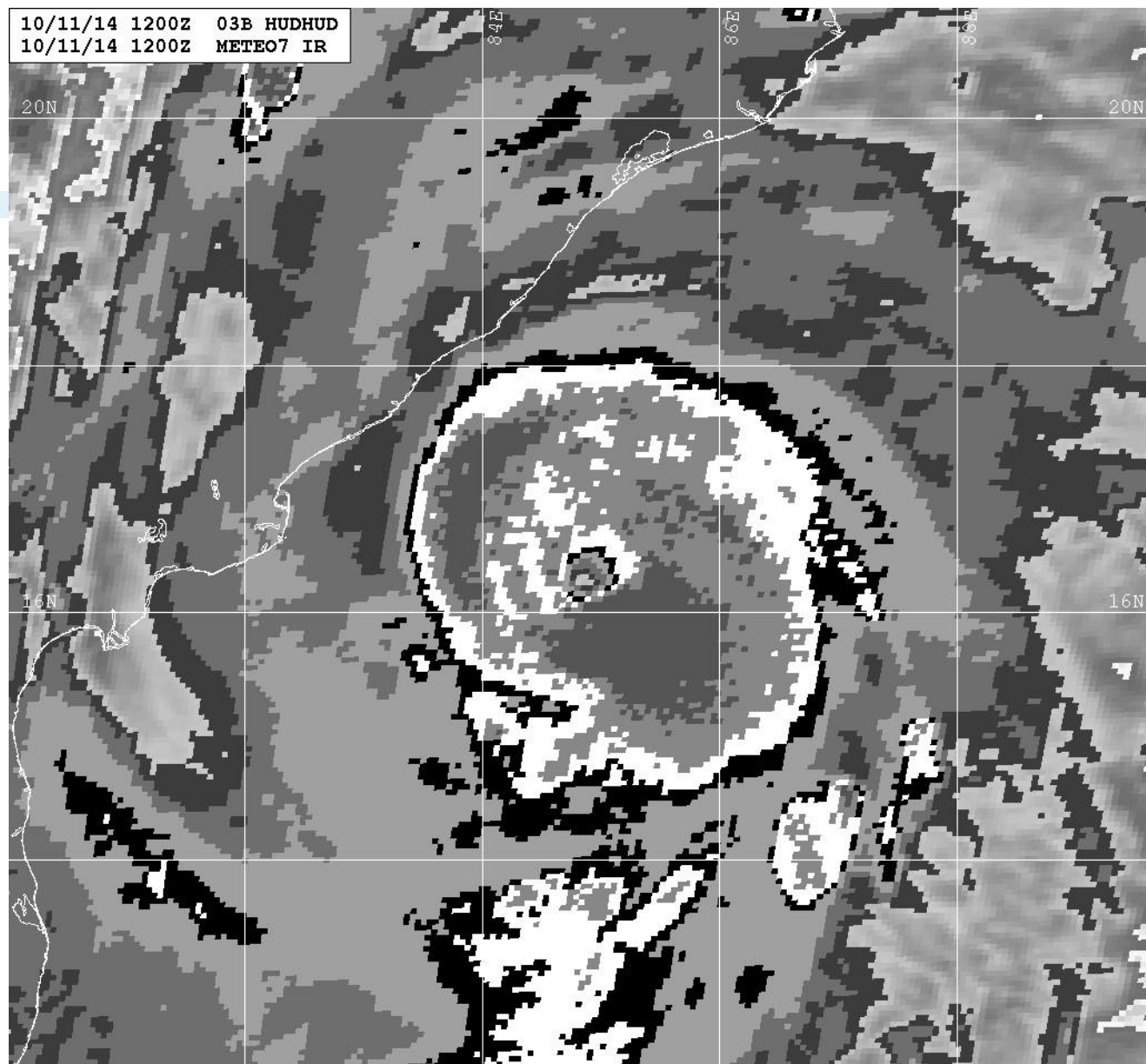


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Hudhud

12UTC 11/10/14

Use image viewer



Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->





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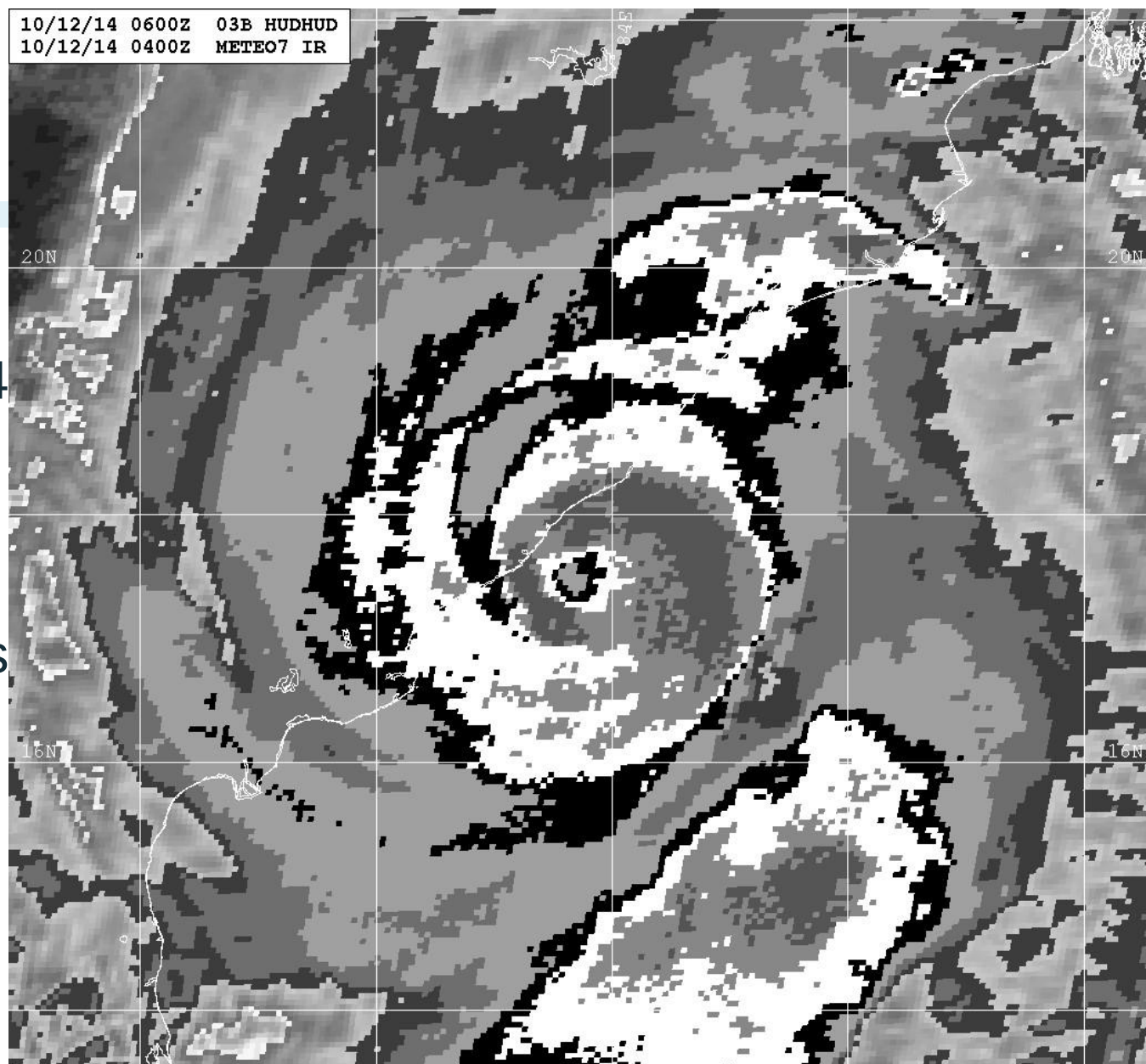
Bureau of Meteorology

Hudhud

04-06UTC 12/10/14

Use image viewer

For three
consecutive images
prior to landfall



Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html

<-- IR Temperature (Celsius) -->

-80 -60 -40 -20 0 20 40



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Hudhud

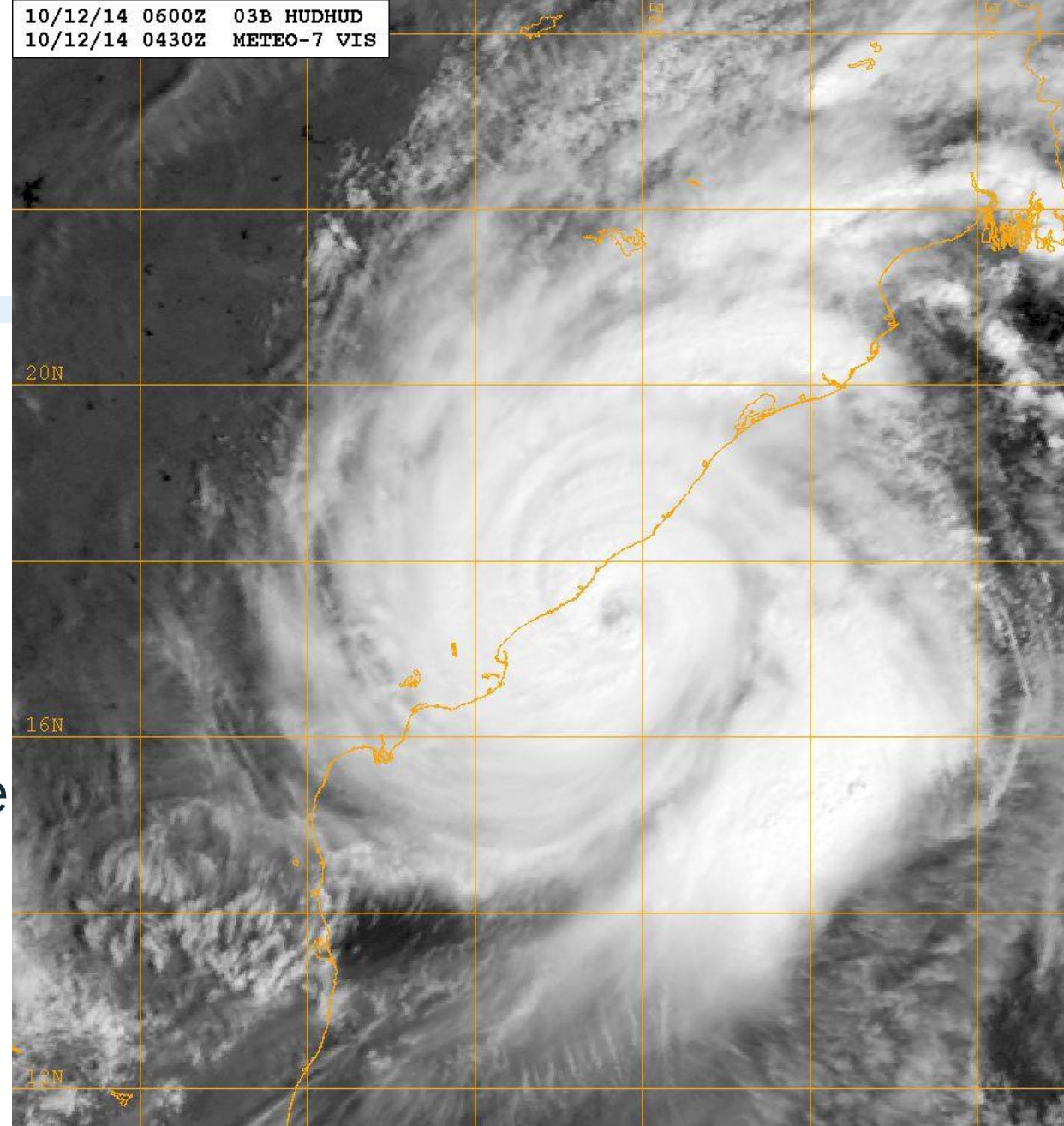
Vis

05UTC 12/10/14

Use image viewer

How does this compare
with IR?

10/12/14 0600Z 03B HUDHUD
10/12/14 0430Z METEO-7 VIS



Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 57 degrees) -->



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STEP 2C. Eye Pattern (Visible)

Determine if Eye is banding type or not.

Measure the embedded distance of the eye, or the average band width if eye is a banding type.

For small eyes, measure distance from center.

For large eyes (≥ 30 nm) measure from edge.

Apply Values to E# Table

E# for Visual								
Embedded Distance	$>1^\circ$ 60nm	$\approx 1^\circ$ 60nm	$\approx \frac{1}{2}^\circ$ 45nm	$\approx \frac{1}{3}^\circ$ 30nm	$\approx \frac{1}{4}^\circ$ 15nm	Banding Eyes		
Average Band Width						$1\frac{1}{2}^\circ$ 75nm	$\frac{1}{2}^\circ$ 45nm	$\frac{1}{4}^\circ$ 15nm
	7	6	5	4	3	5	4	3

Visible Eye

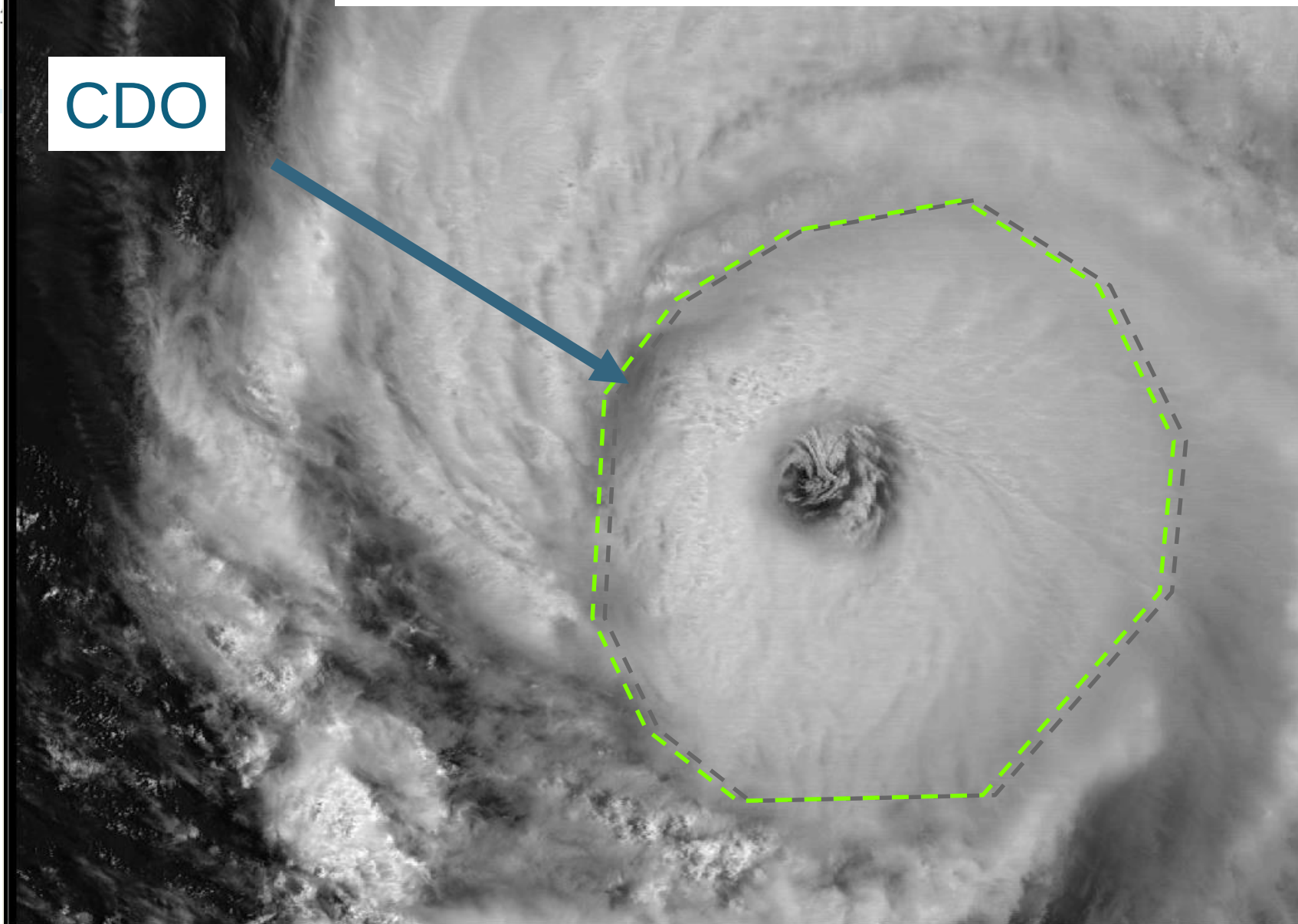
[CDO Central Dense overcast]



Visible Eye

[CDO Central Dense overcast]

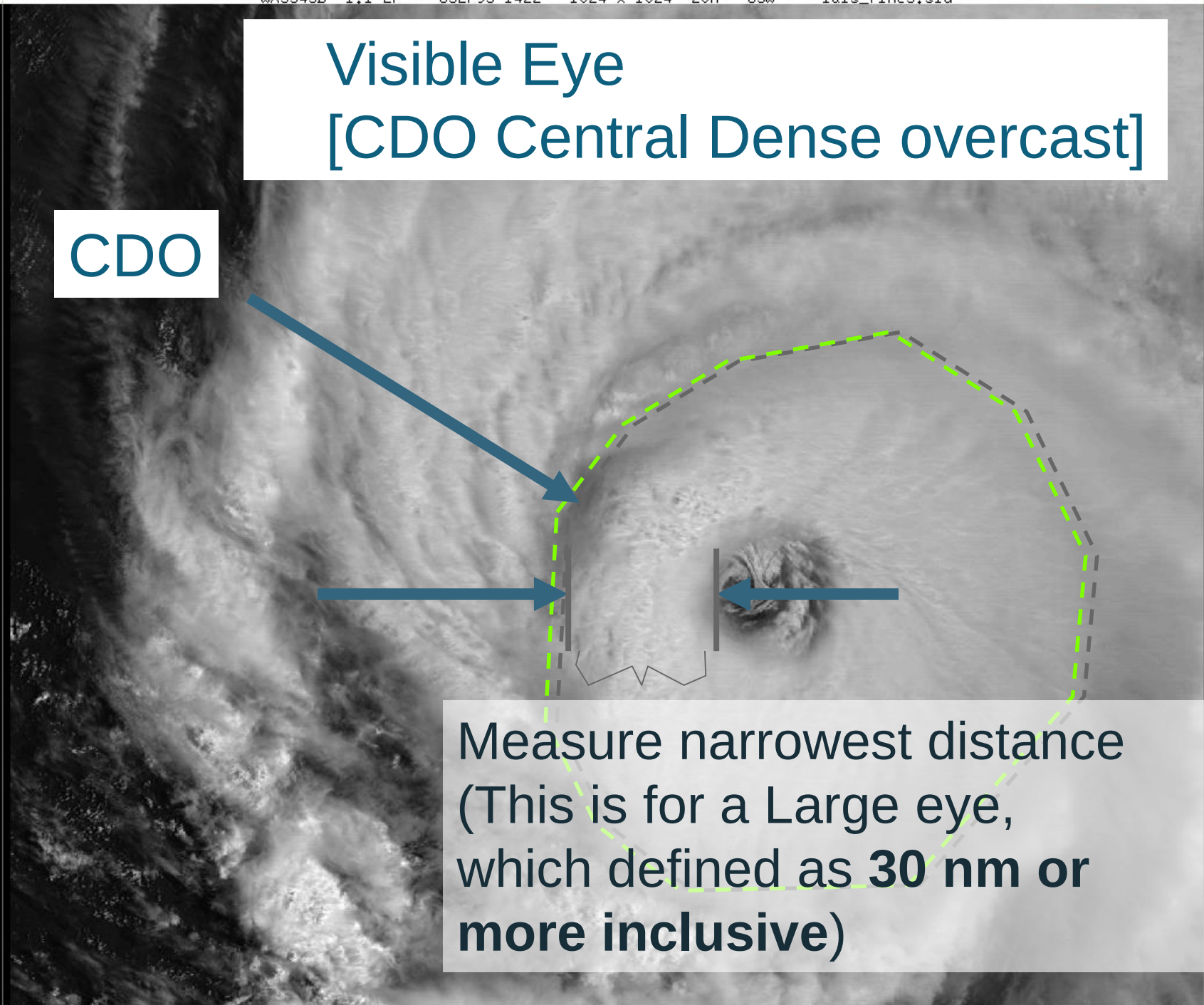
CDO



Visible Eye

[CDO Central Dense overcast]

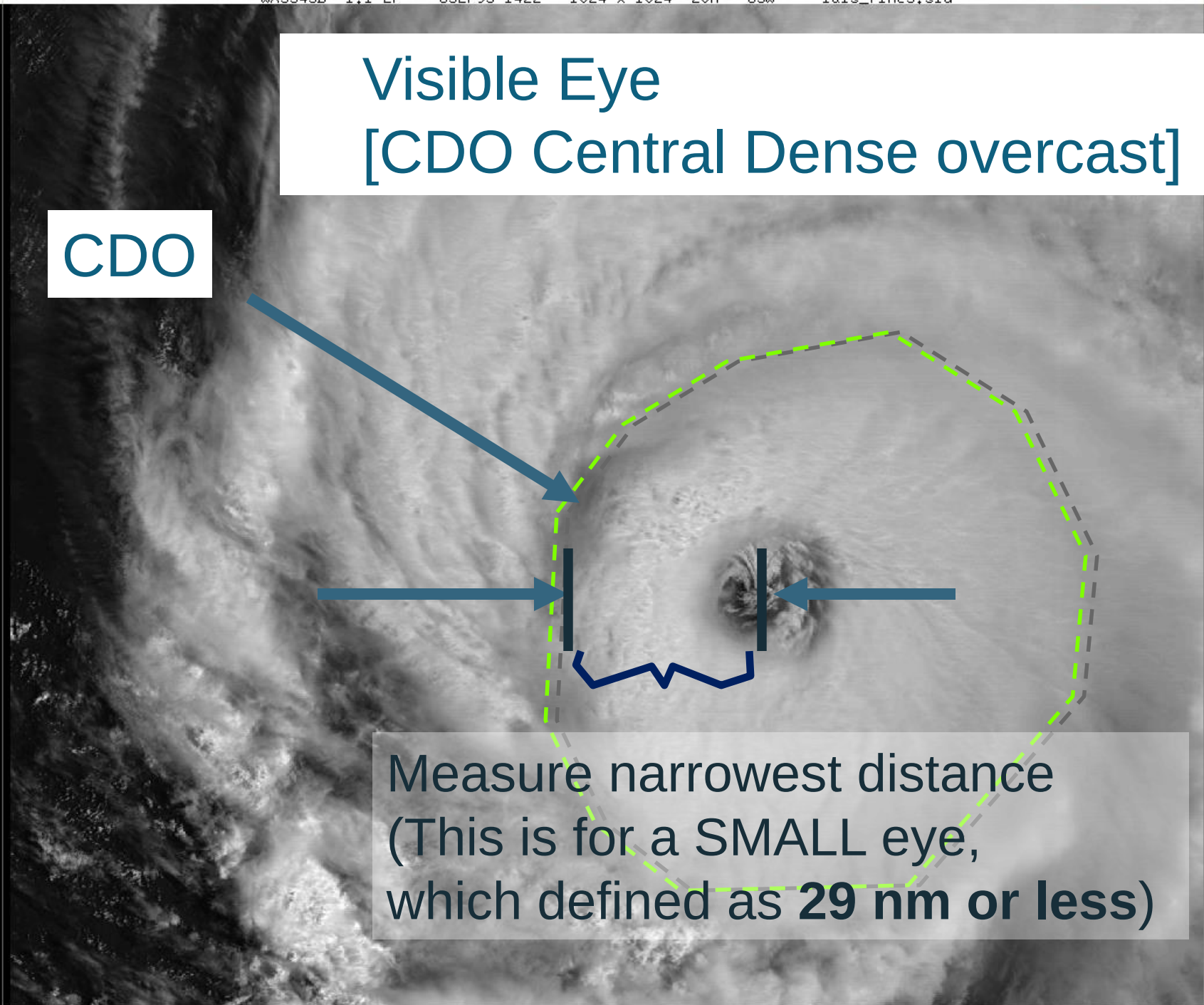
CDO

A satellite image of a hurricane's eye. A dashed green line outlines the eye's perimeter. A dashed black line follows the inner edge of the eye wall. Three blue arrows point to the narrowest gap between the eye wall and the inner edge of the eye wall. A bracket indicates the distance between two vertical lines drawn at the narrowest point. A text box at the bottom right explains the measurement.

Measure narrowest distance
(This is for a Large eye,
which defined as **30 nm or
more inclusive**)

Visible Eye [CDO Central Dense overcast]

CDO

A satellite image of a hurricane's eye. A dashed green line outlines the central dense overcast (CDO). A solid blue line traces the inner edge of the eye. Three blue arrows point to the narrowest gap between the eye wall and the CDO. A text box at the bottom explains that this distance is measured for a small eye, defined as 29 nm or less.

Measure narrowest distance
(This is for a SMALL eye,
which defined as **29 nm or less**)

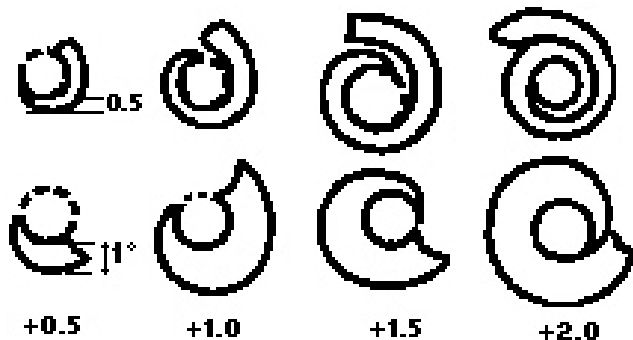


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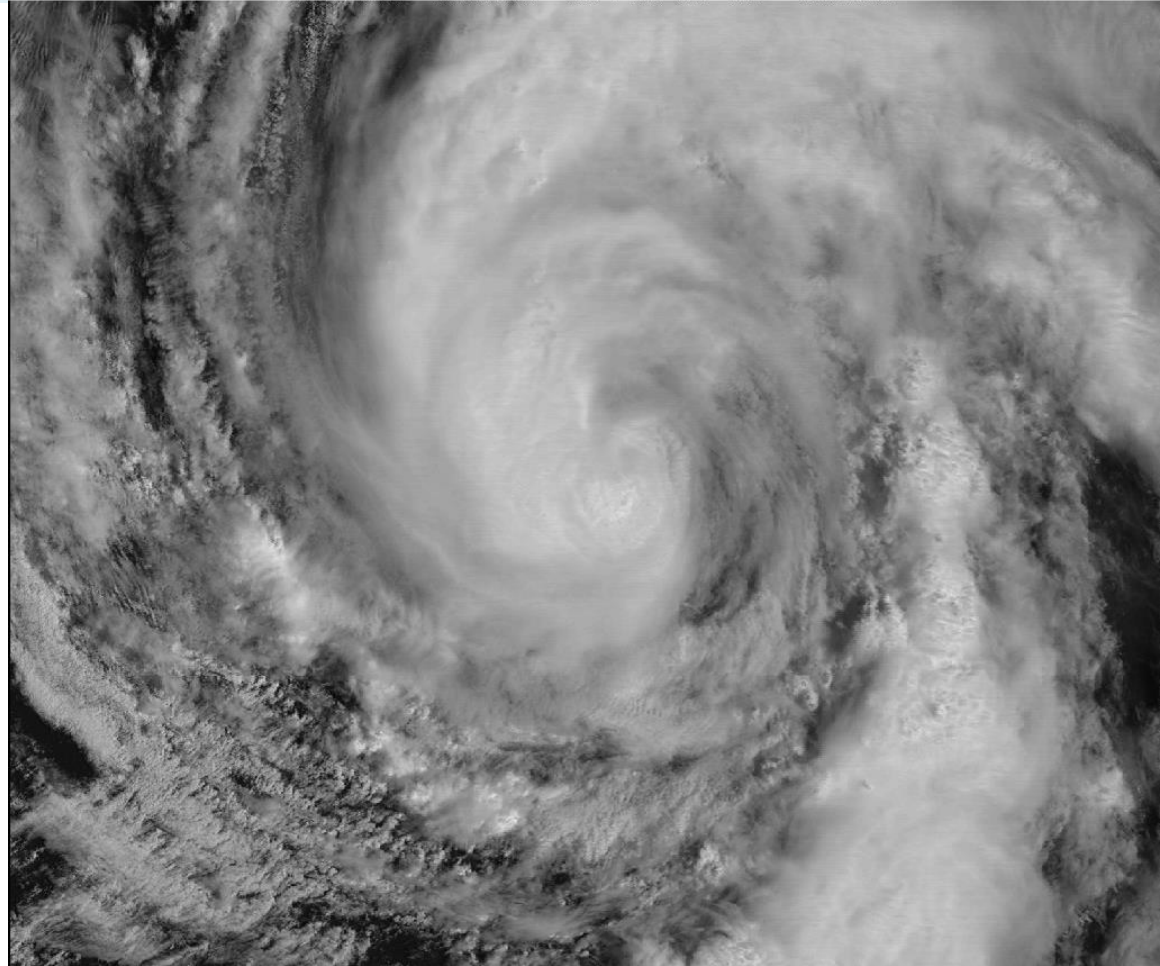
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Visible Banding Eye

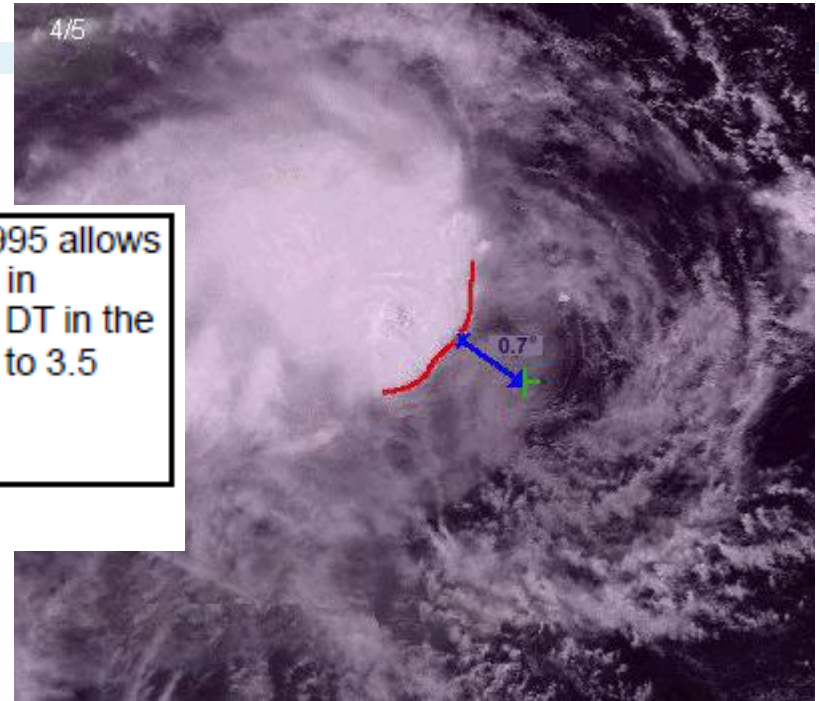
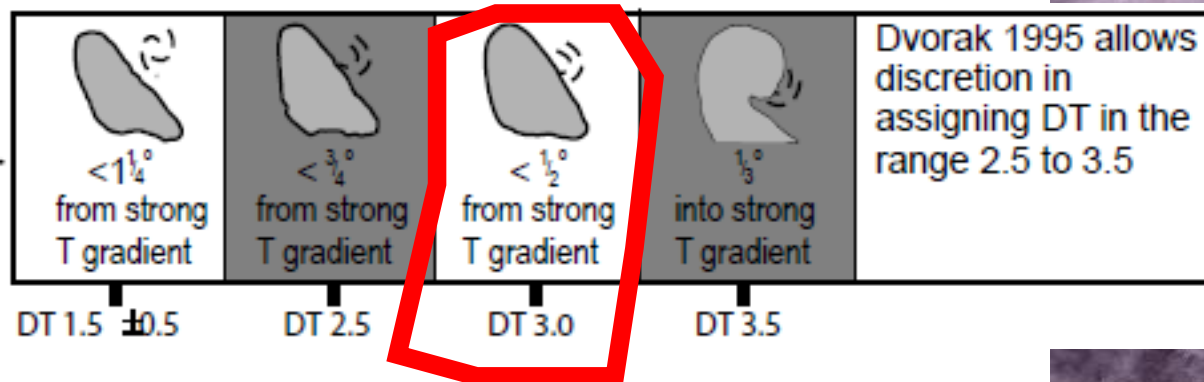
Treat the central coil
(once around the eye)
as the **CF** and add the
BF as indicated



WX3545D 1:1 LF 16AUG95 1507 1024 x 1024 34N 73W felixfine2.sid



Step 2B Shear pattern



Method: Measure the distance from the low level centre to the edge of the “dense overcast”

Step 2B Shear pattern

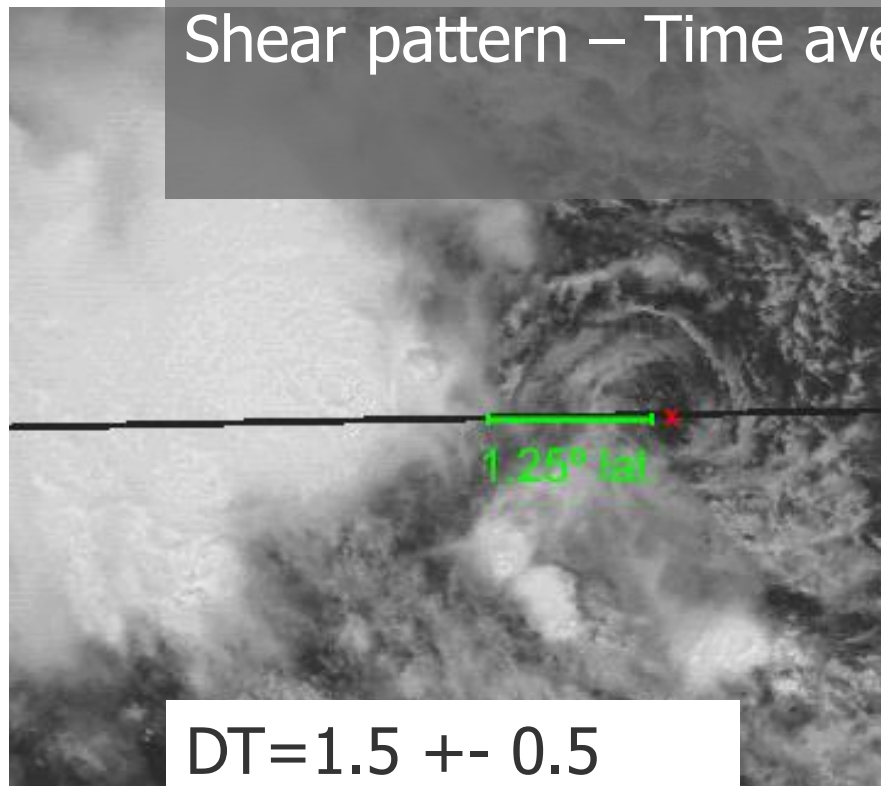
Size of dense overcast $> 1.5^\circ$

Low level cloud definition (circular)

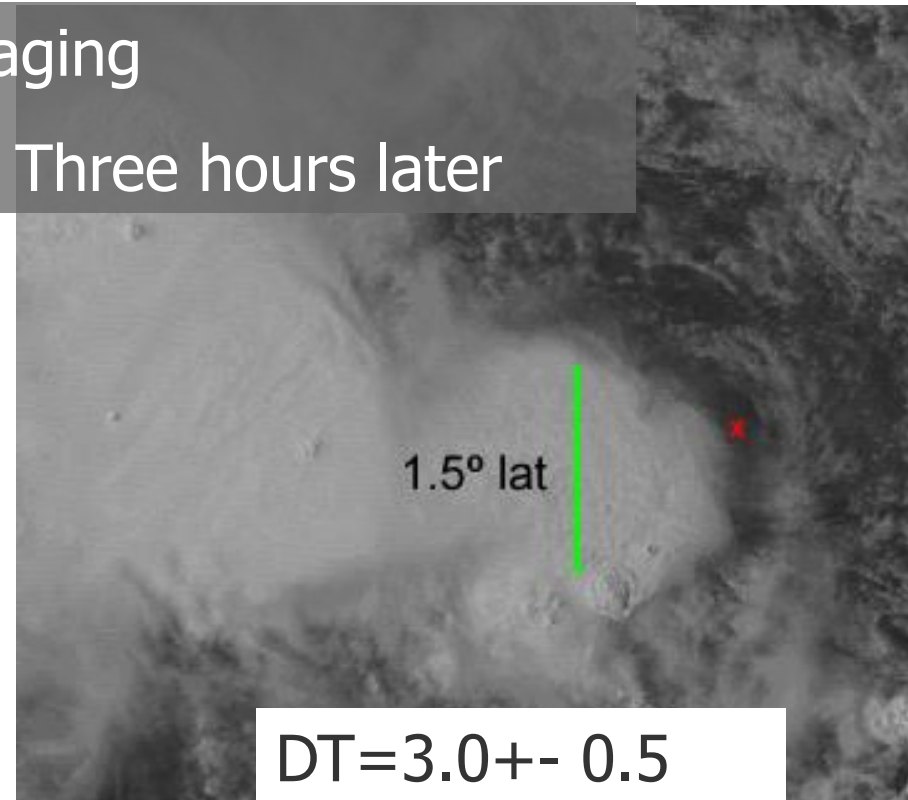
Distance LLCC to dense overcast or strong T gradient (IR)

Shear pattern – Time averaging

Three hours later



DT=1.5 $\pm$ 0.5



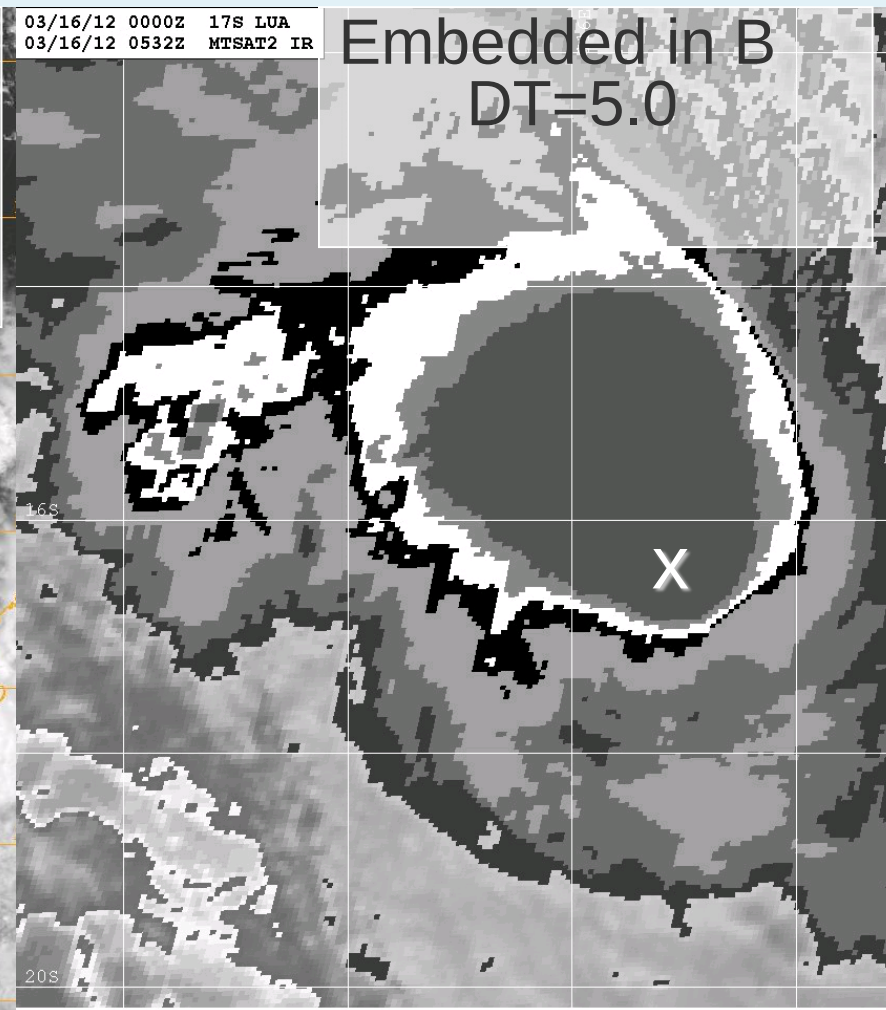
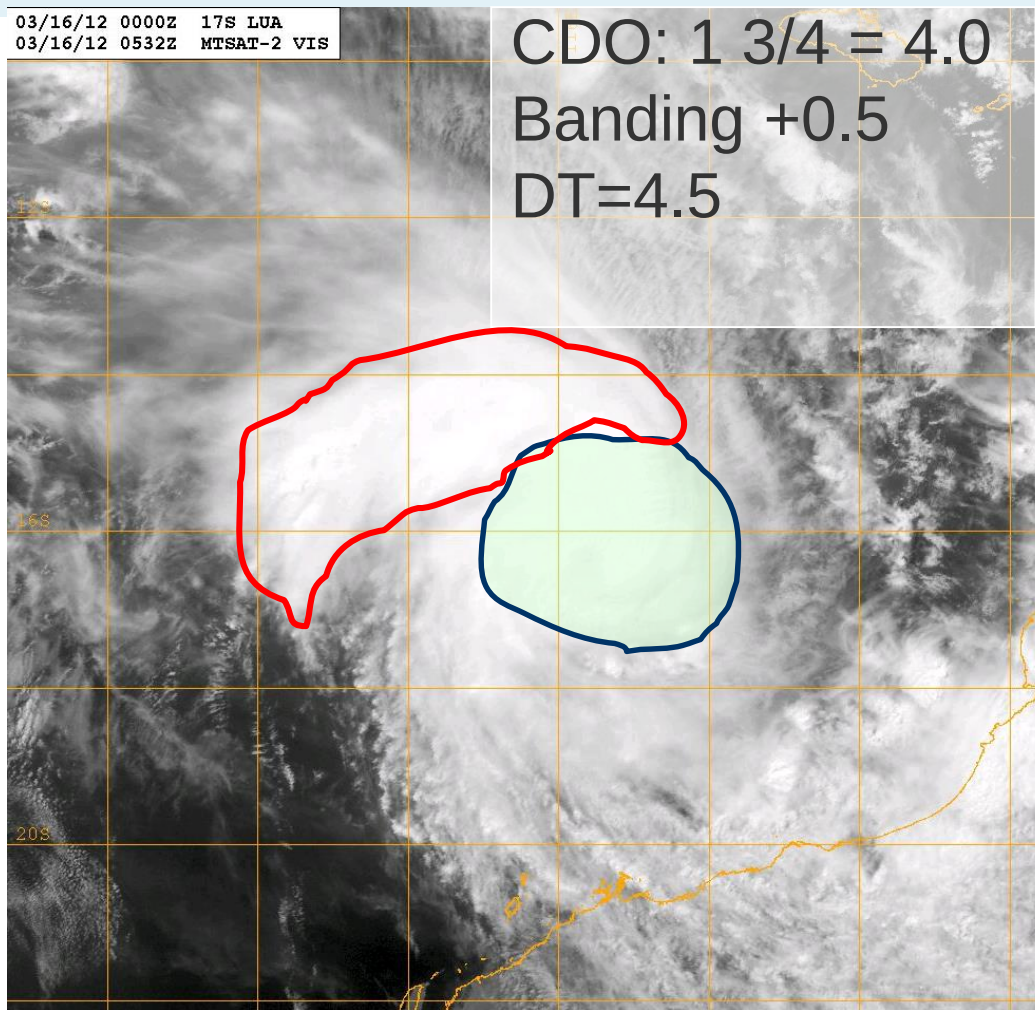
DT=3.0 $\pm$ 0.5



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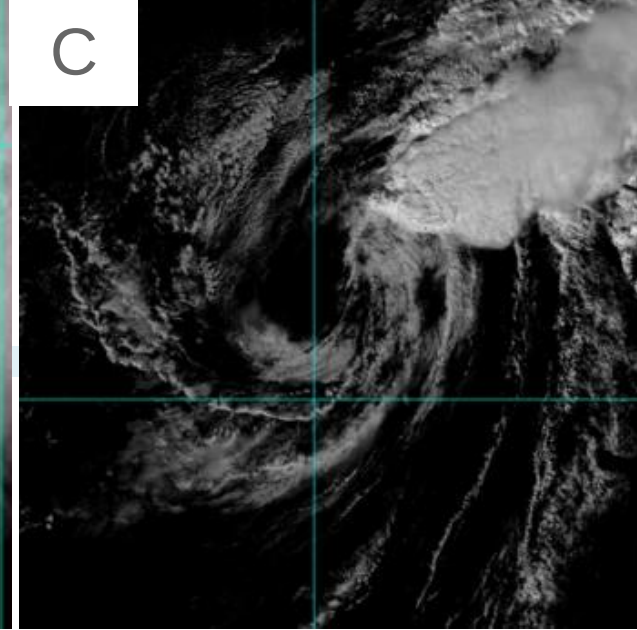
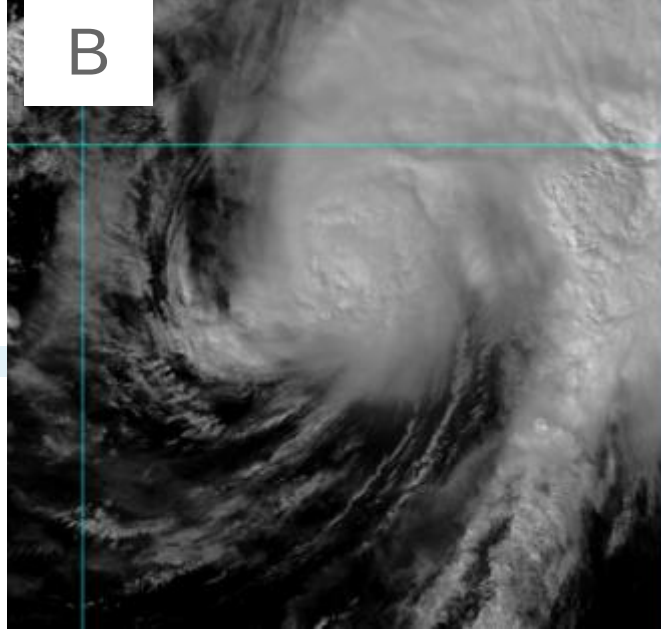
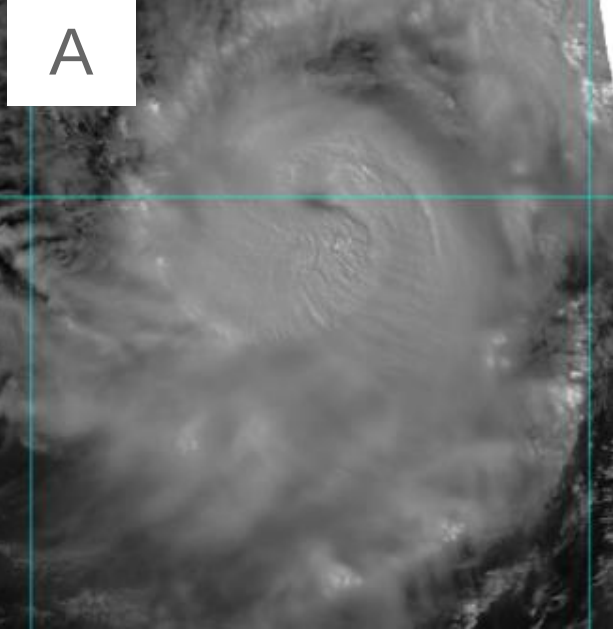
Covered Centre patterns



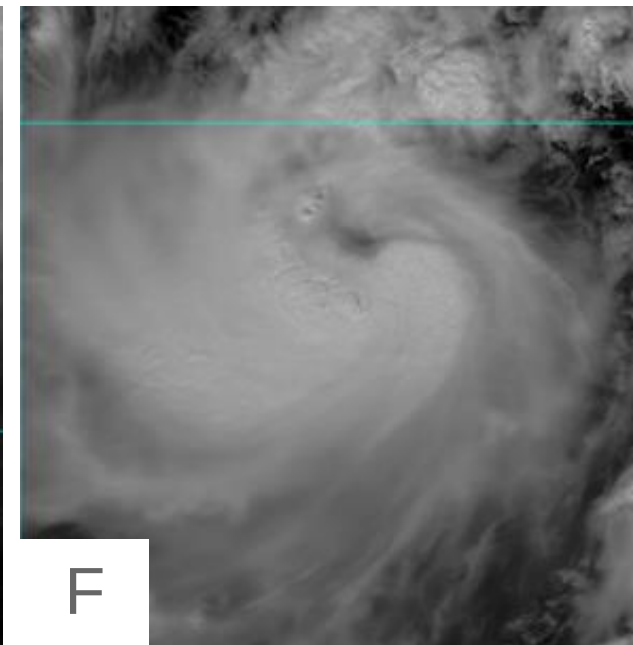
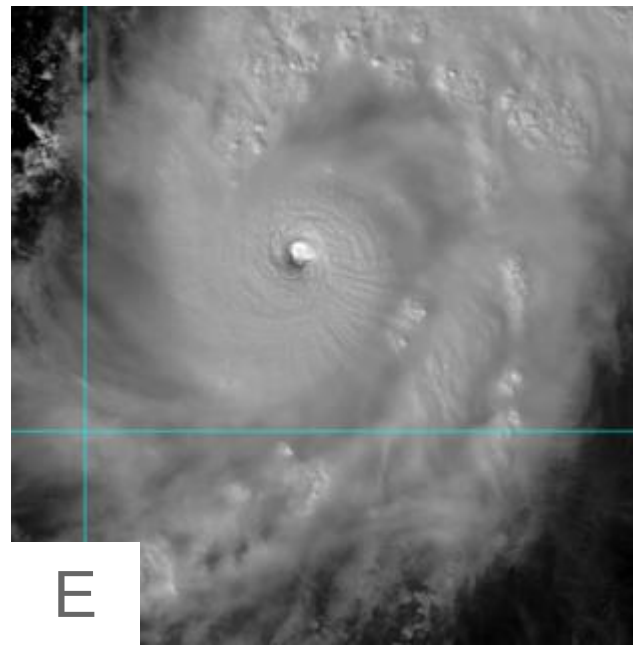
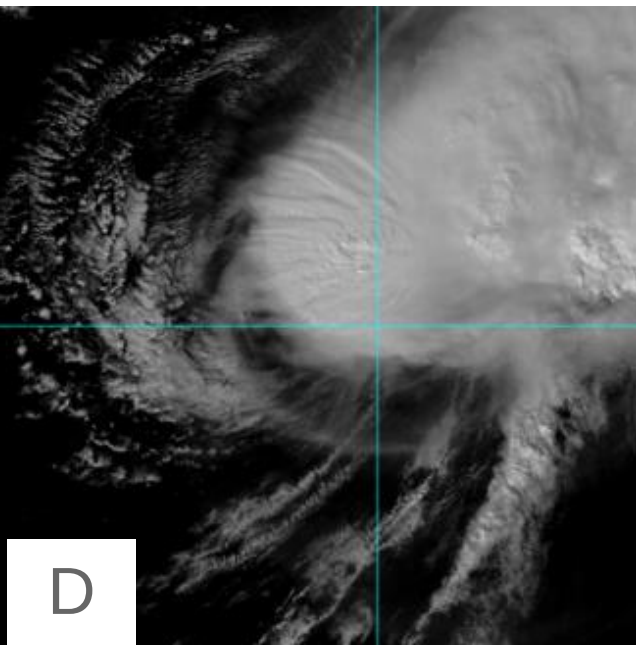
Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 65 degrees) -->

Naval Research Laboratory http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->

-90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20



Rank these TC Vis images in order of intensity: 1 weakest to 6 strongest

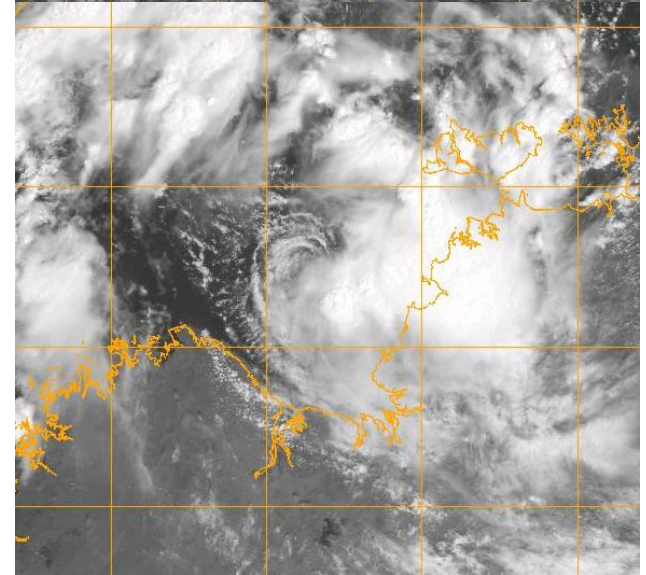
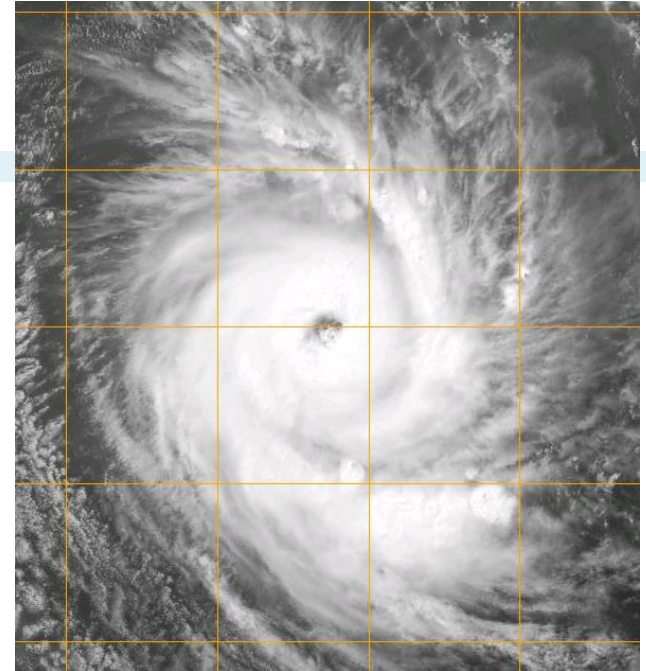
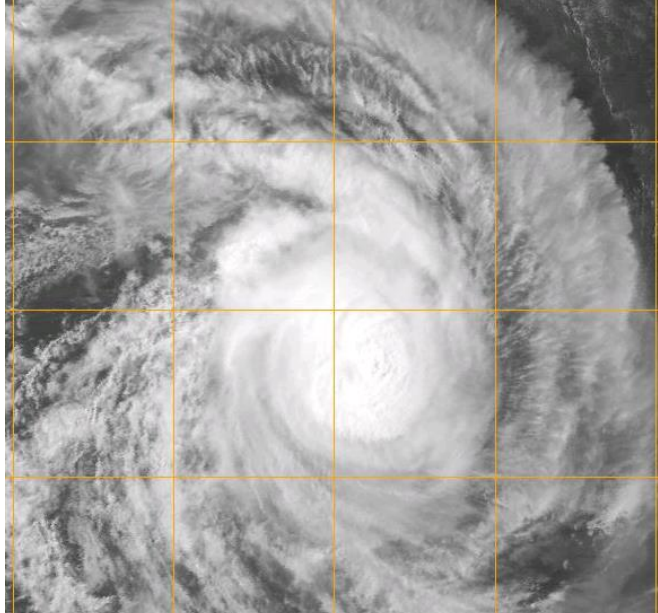
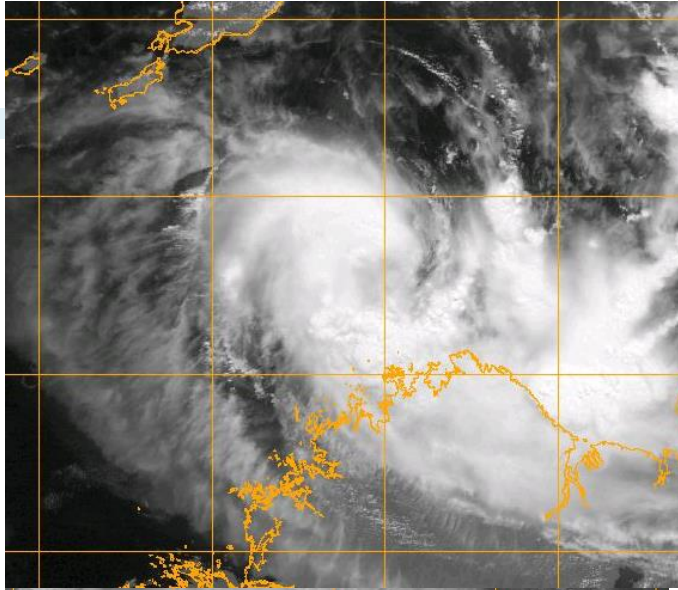


Review: What patterns are these?



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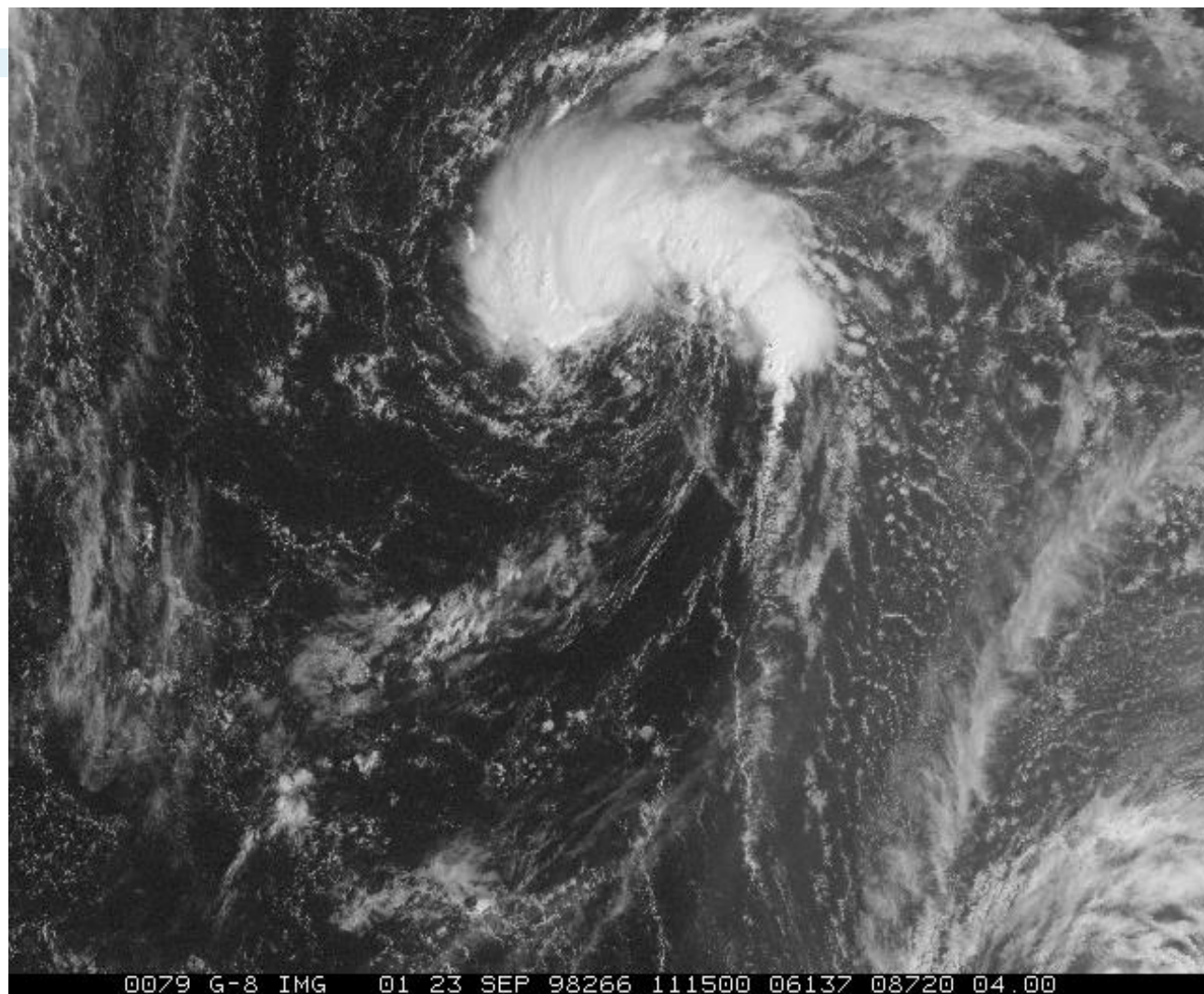


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STEP 2A Curved bands

Where is the
curved band
here?



TS Ivan 23/9/98 11:15 UTC

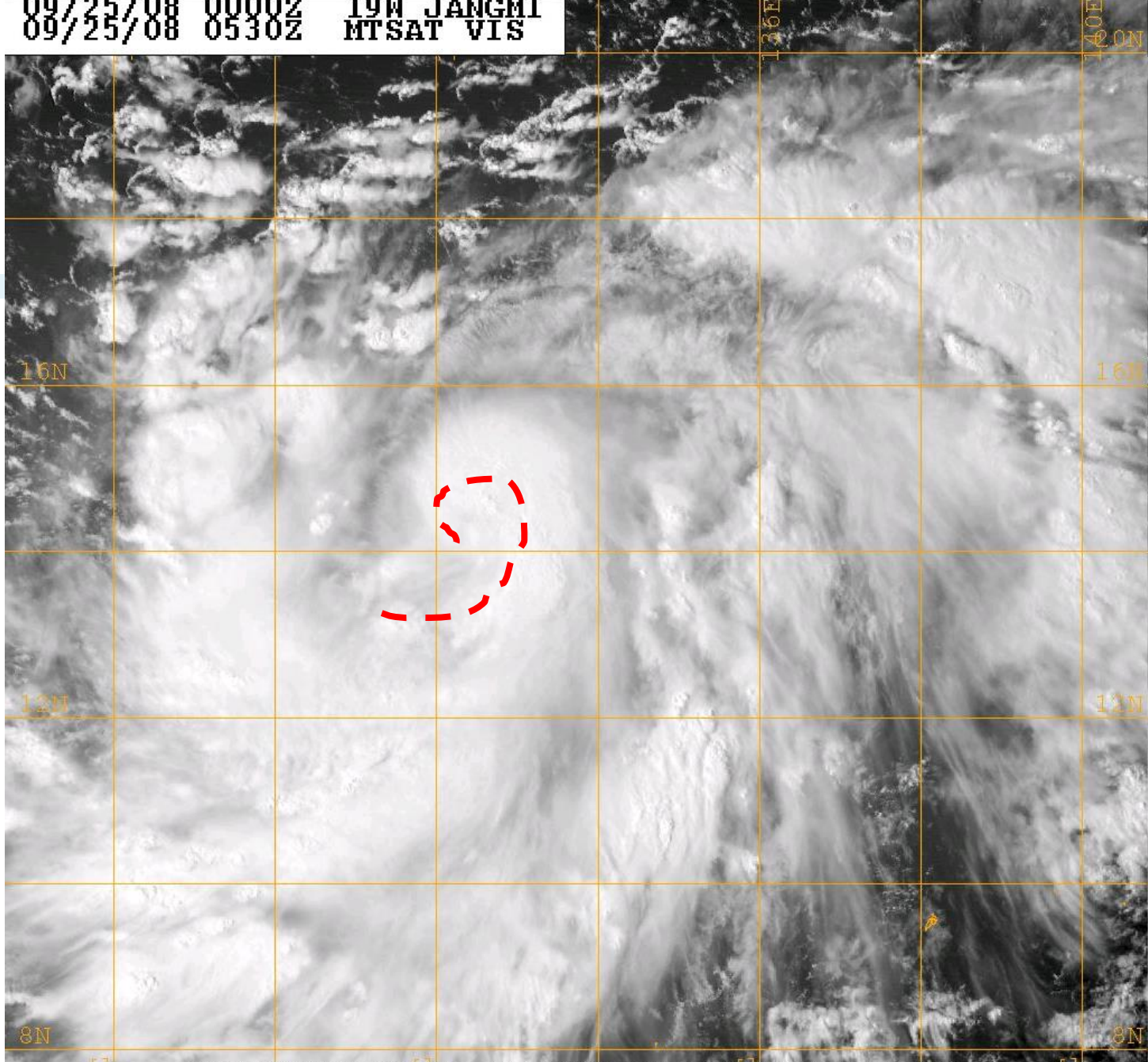


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Where is the
curved band
here?

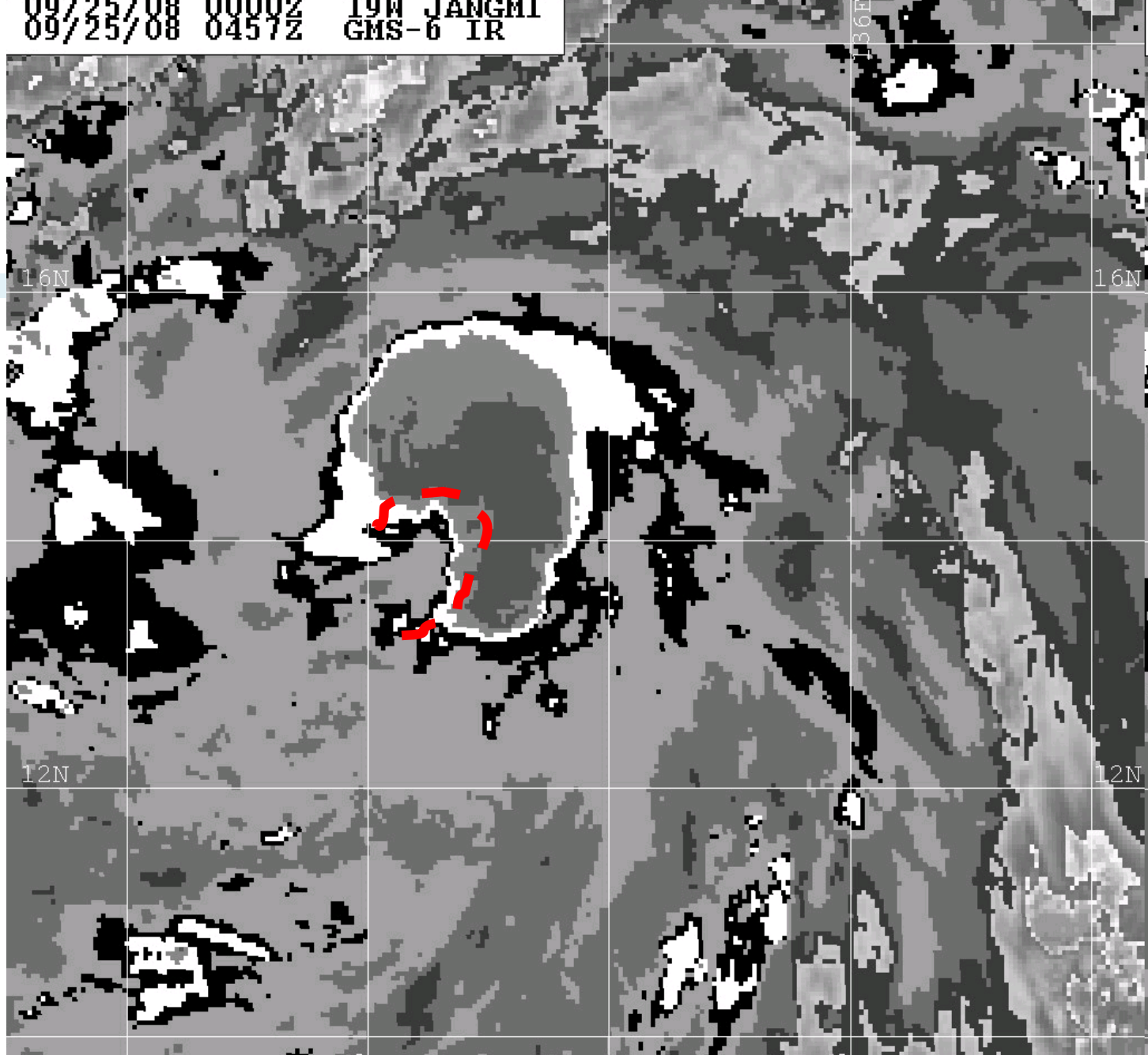


Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 47 degrees) -->



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09/25/08 0000Z 19W JANGMI
GMS-6 IR



Jangmi

IR:

Where is the
curved band
here?

Often IR is
more difficult
to resolve CB
than vis

Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->





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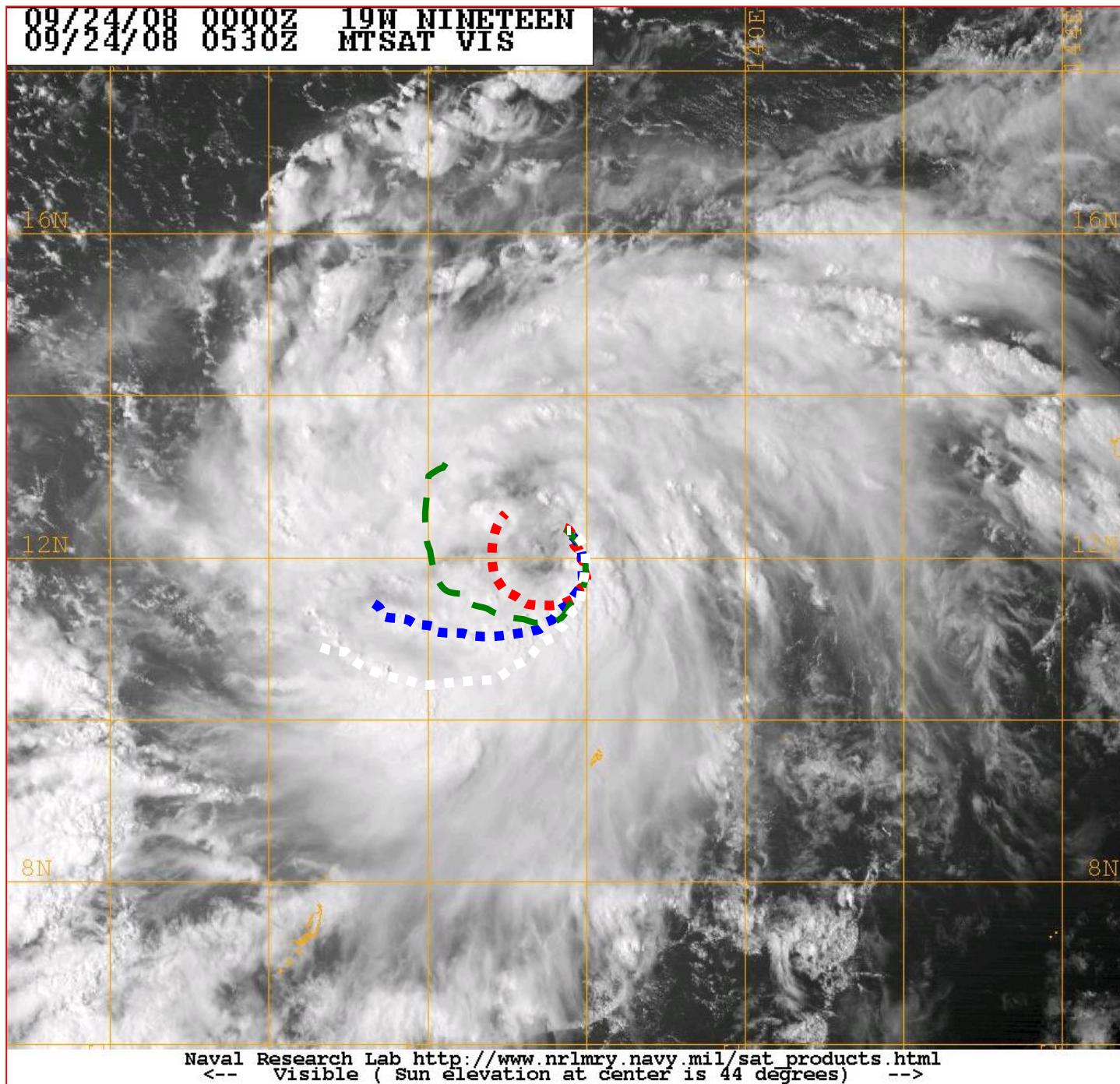
Where is the
curved band
here?

more difficult!

Multiples

Ranges

Changes
from hour to
hour >> loop





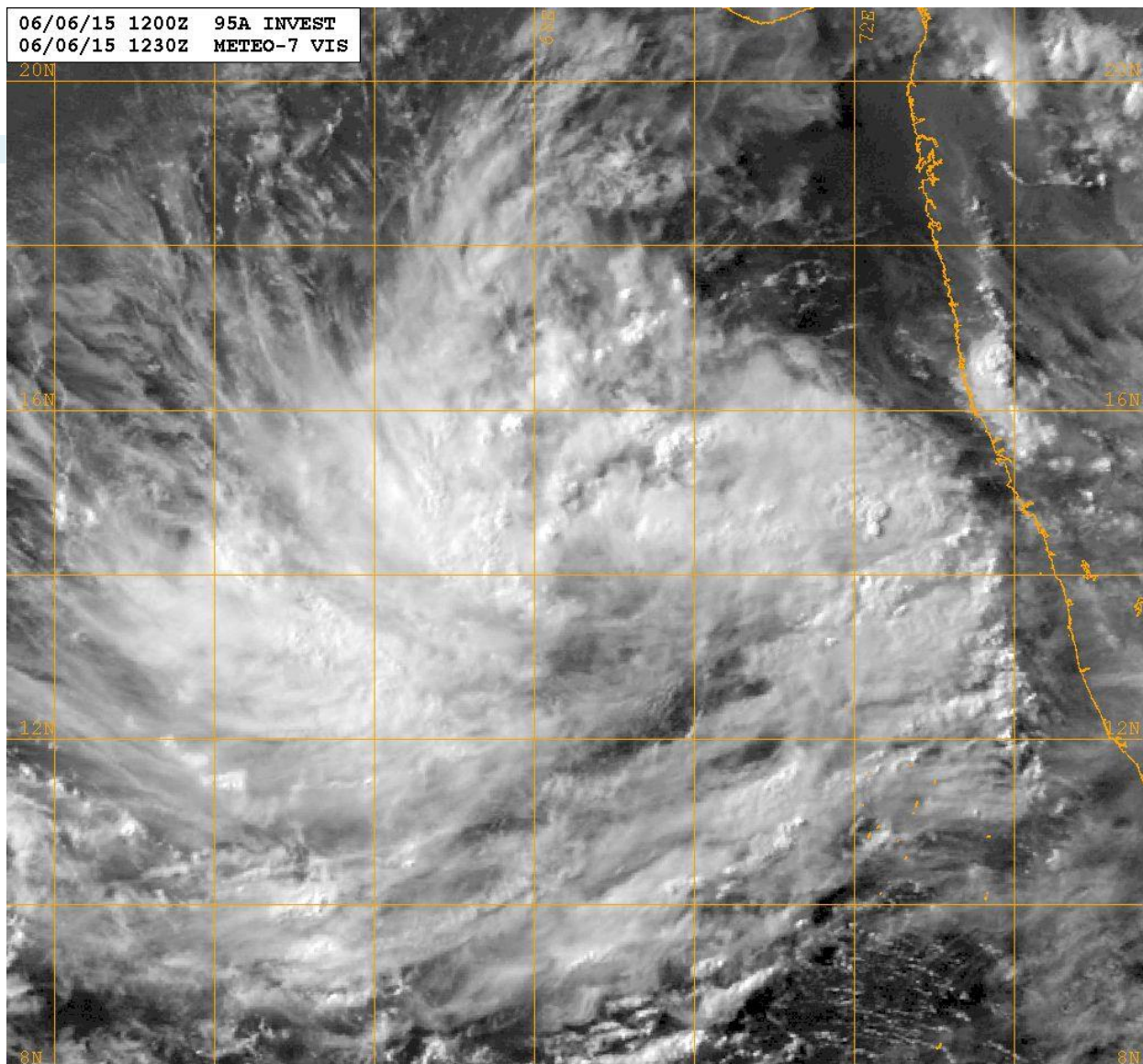
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Curved Band pattern:

95A

NH



06/06/15 1200Z 95A INVEST
06/06/15 1230Z METEO-7 VIS

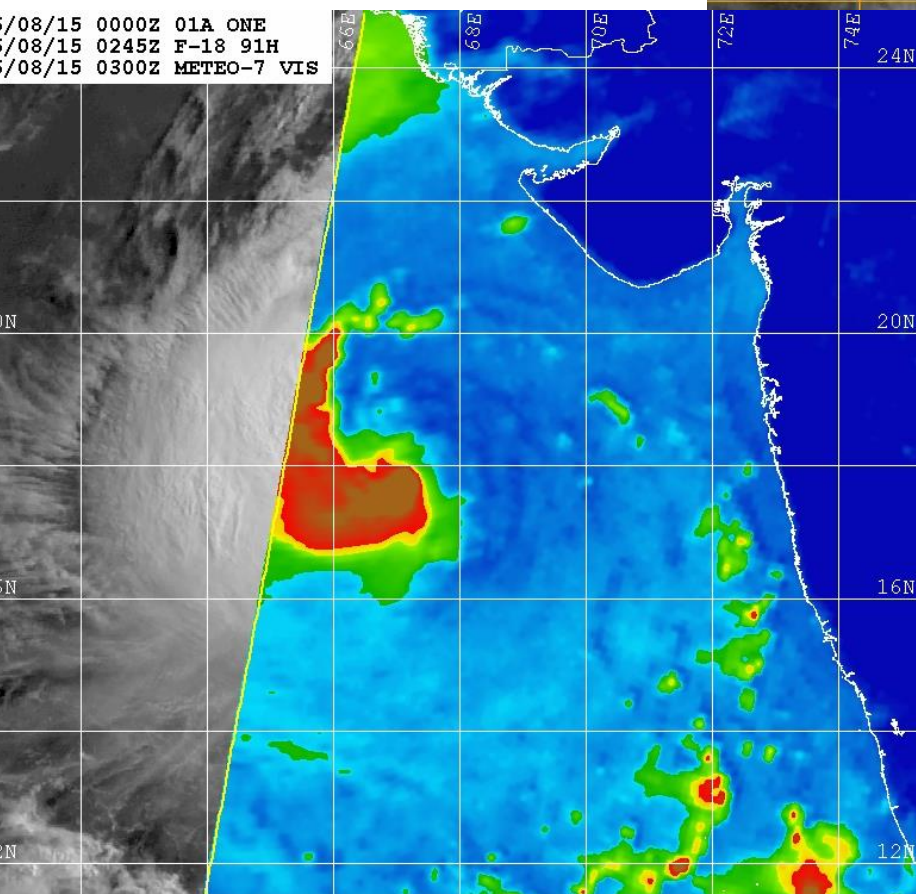
Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 14 degrees) -->



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01A Ashobaa

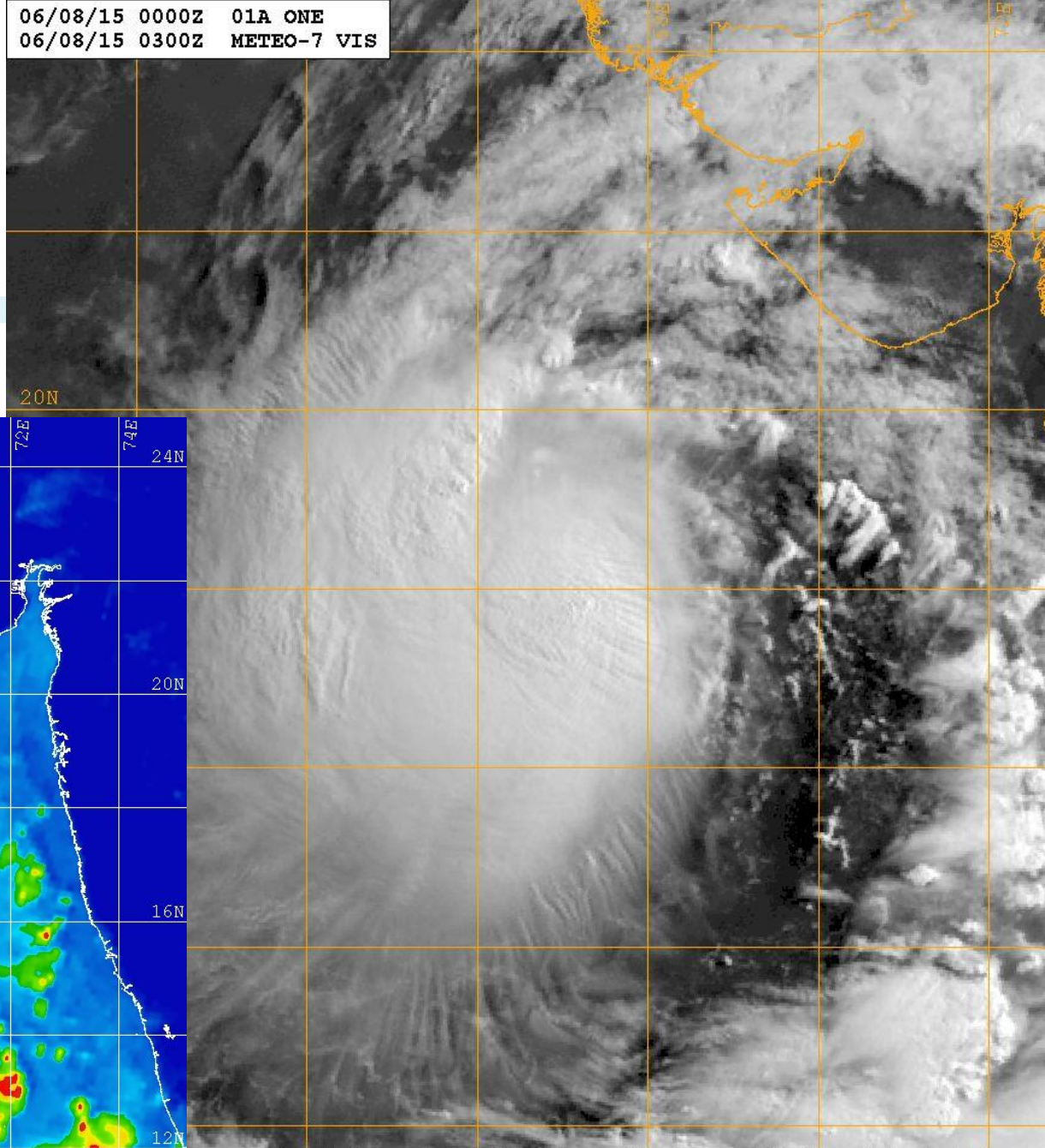
06/08/15 0000Z 01A ONE
06/08/15 0245Z F-18 91H
06/08/15 0300Z METEO-7 VIS



Naval Research Lab www.nrlmry.navy.mil/sat_products.html
<-- 85H Brightness Temp (Kelvin) -->

190 200 210 220 230 240 250 260 270

06/08/15 0000Z 01A ONE
06/08/15 0300Z METEO-7 VIS



Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 31 degrees) -->