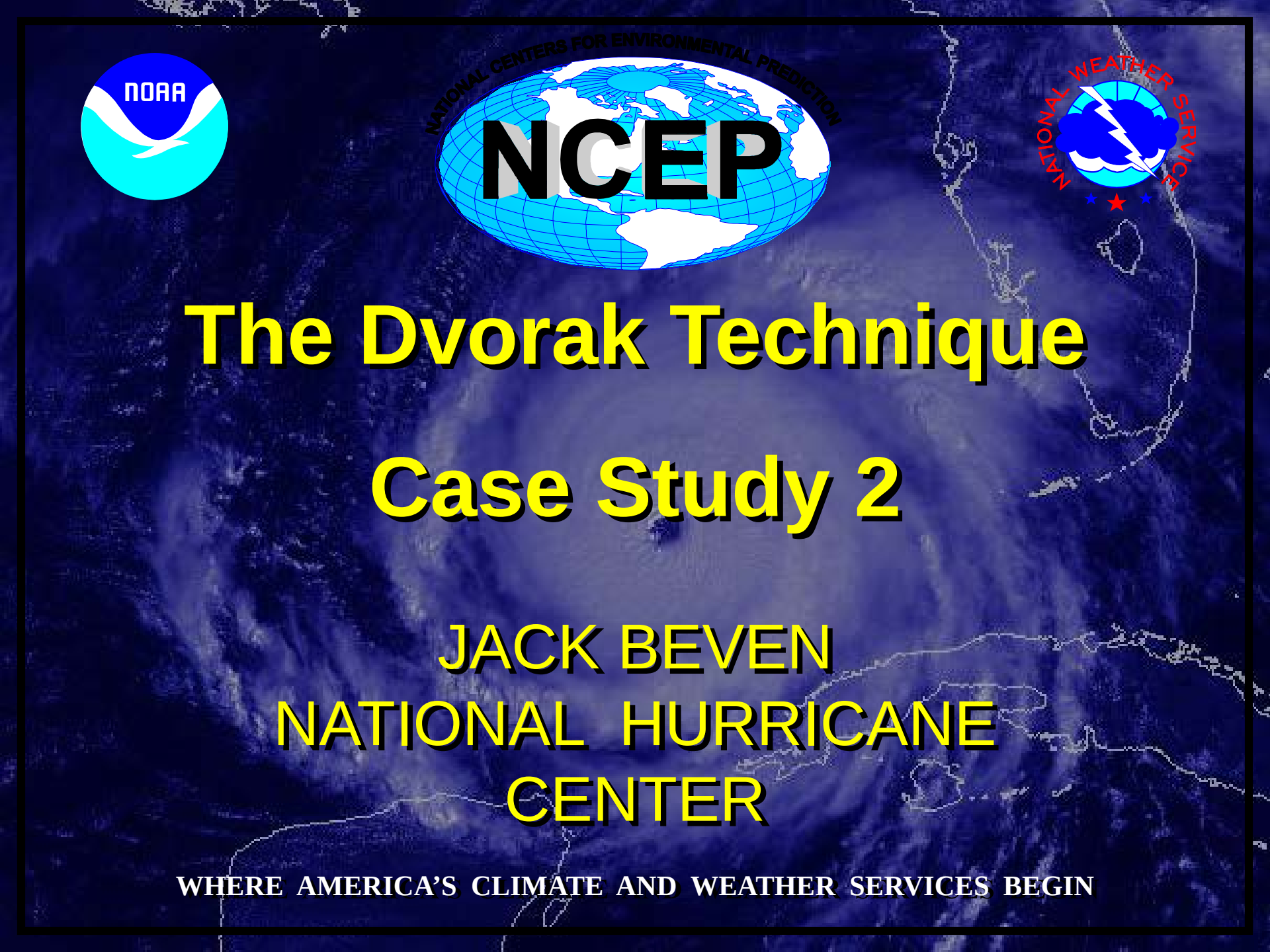


The Dvorak Technique

Case Study 2

JACK BEVEN
NATIONAL HURRICANE CENTER

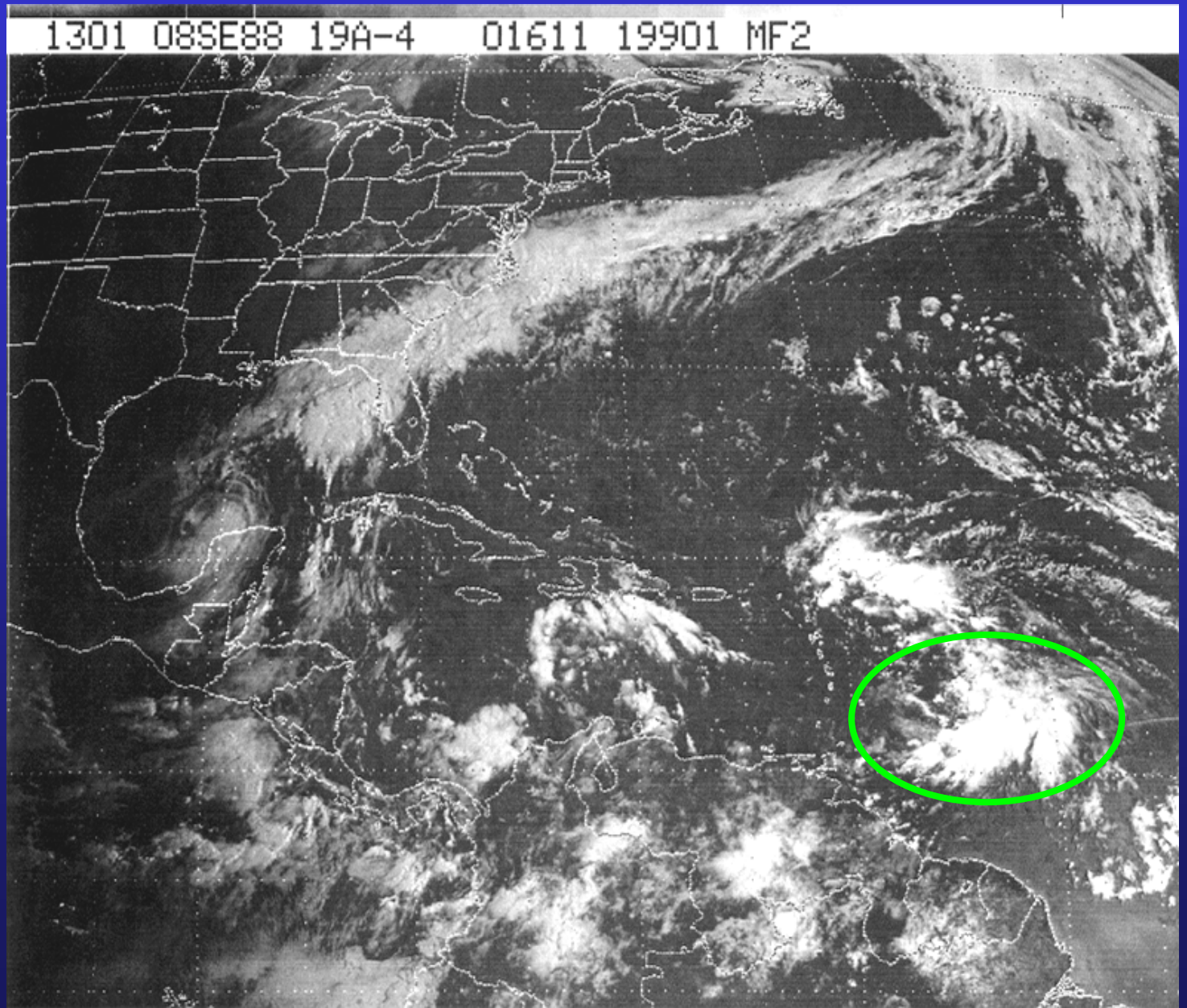
WHERE AMERICA'S CLIMATE AND WEATHER SERVICES BEGIN

Objective:

To perform Dvorak intensity analyses on the complete life cycle of a tropical cyclone.

Note: The answers you get may differ somewhat from the solutions in this case study. This represents some of the normal subjectivity and uncertainty associated with the Dvorak technique.

1301 UTC 8 Sep 1988



Issues for 1301 UTC 8 Sep 1988

This is the first classification - assume the system is developing and the MET=1.0

What cloud pattern does it have?

Is the DT representative of the true strength of the system?

What are the constraints on the first classification?

TROPICAL CYCLONE ANALYSIS WORKSHEET

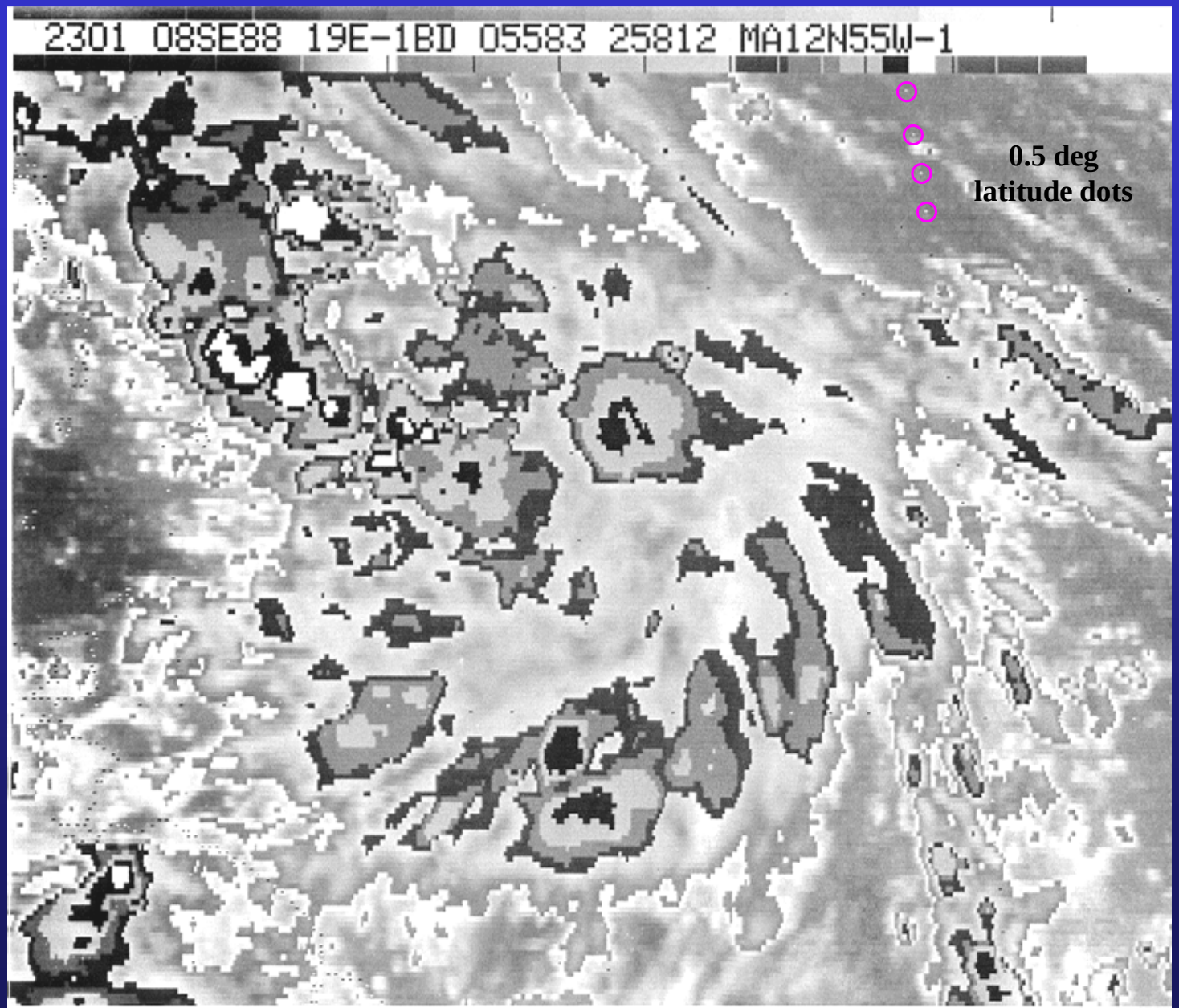
From Vernon F. Dvorak
May 1982

T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB

2301 UTC 8 Sep 1988



Issues for 2301 UTC 8 Sep 1988

Assume the system is developing and the MET=1.5

What cloud pattern does it have and can it be measured?

If no DT number can be determined, what do you do?

TROPICAL CYCLONE ANALYSIS WORKSHEET

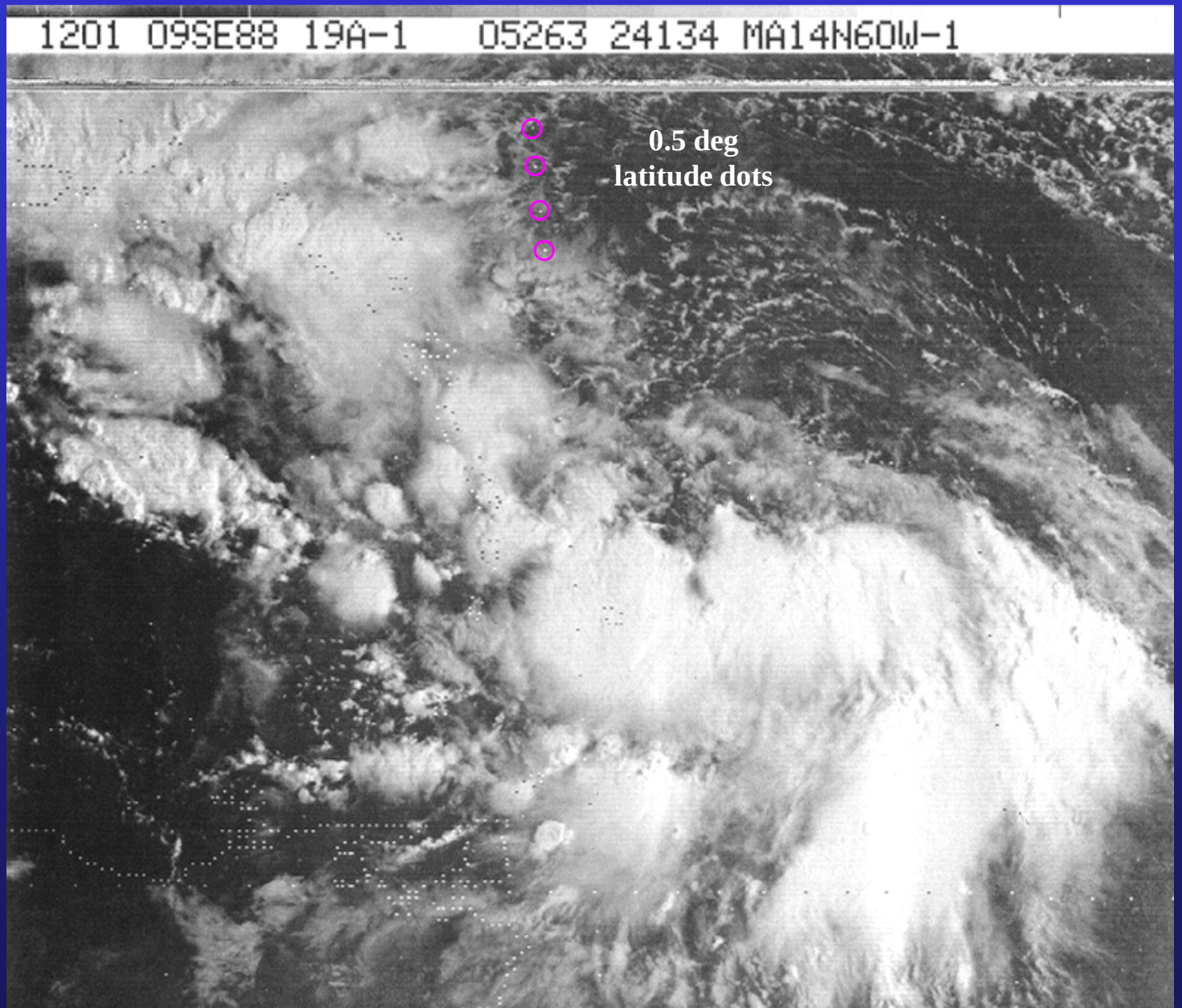
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T-Number Estimates from Model and DT Constraints

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Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB

1201 UTC 9 Sep 1988



Issues for 1201 UTC 9 Sep 1988

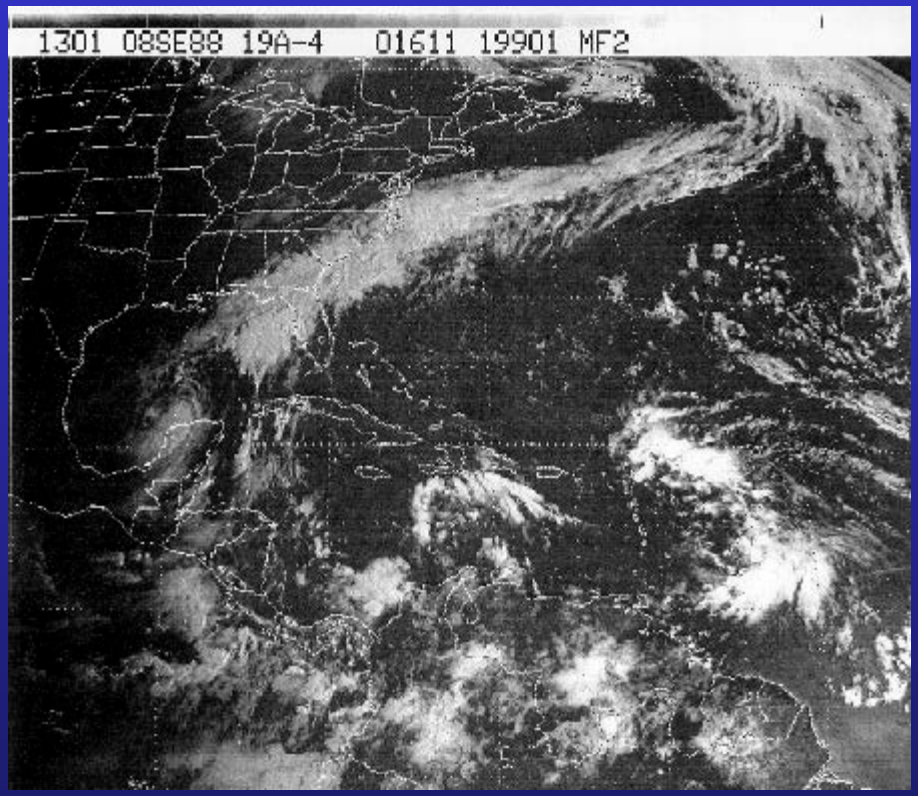
How has the system changed during the last 24 hours?

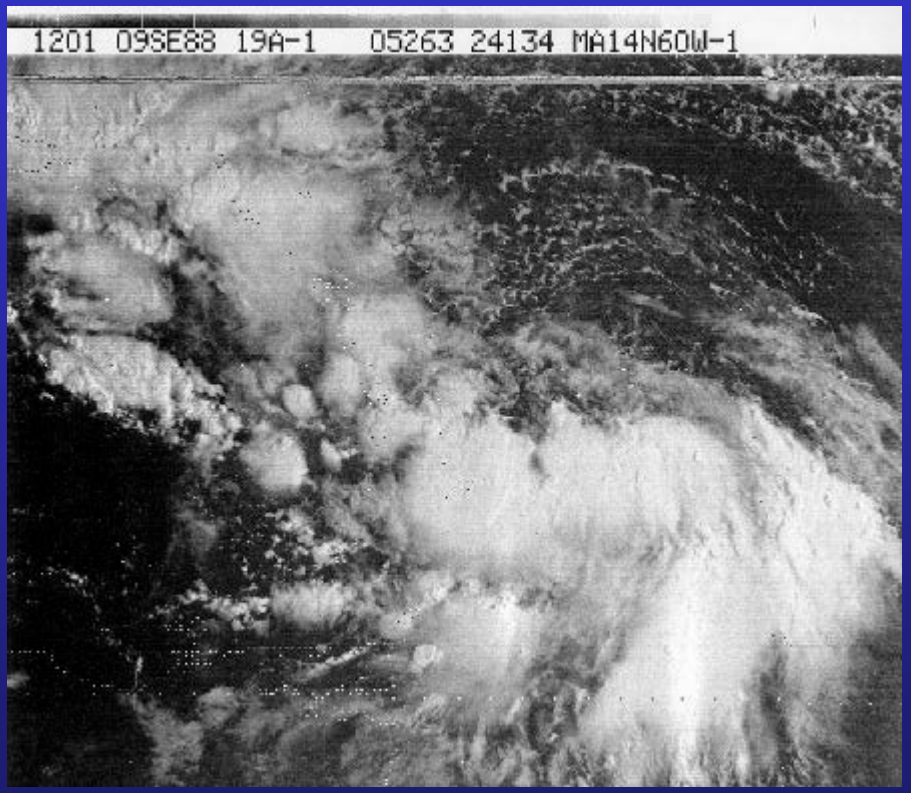
What clues are there of this in the imagery?

What cloud pattern can be used to measure this system?

Is the cloud pattern clear cut?

24 hr change?





D

TROPICAL CYCLONE ANALYSIS WORKSHEET

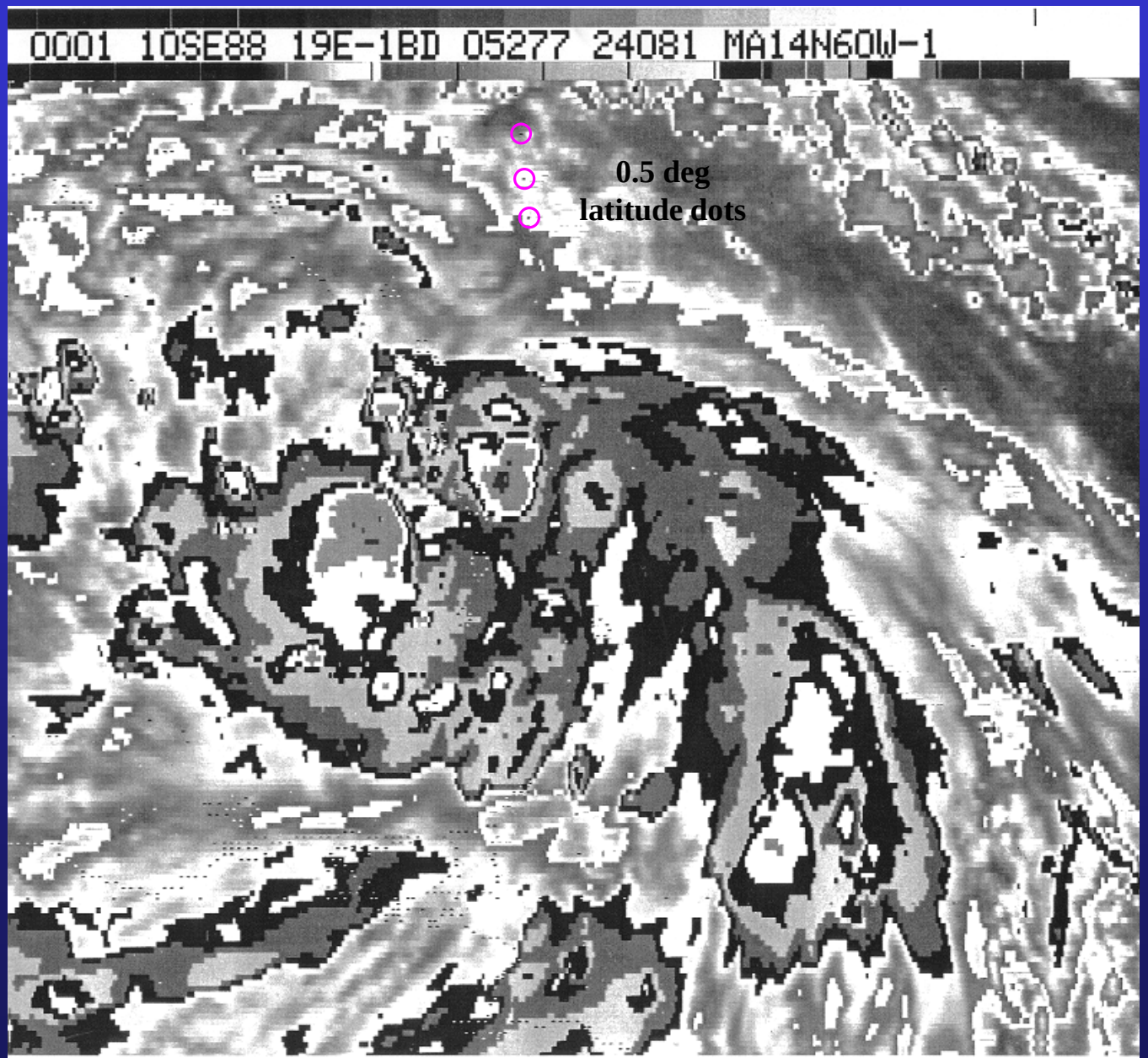
From Vernon F. Dvorak
May 1982

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T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB

0001 UTC 10 Sep 1988



Issues for 0001 UTC 10 Sep 1988

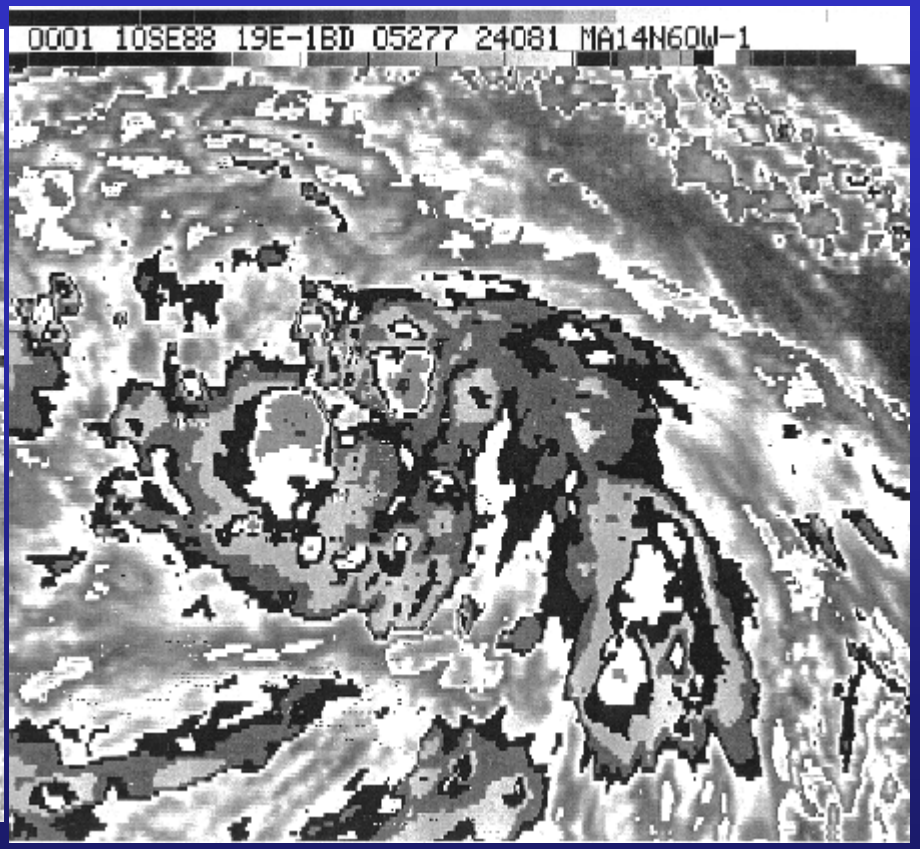
How has the system changed during the last 24 hours?

What cloud pattern can be used to measure this system?

Is the cloud pattern clear cut?

24 hr change?





D

TROPICAL CYCLONE ANALYSIS WORKSHEET

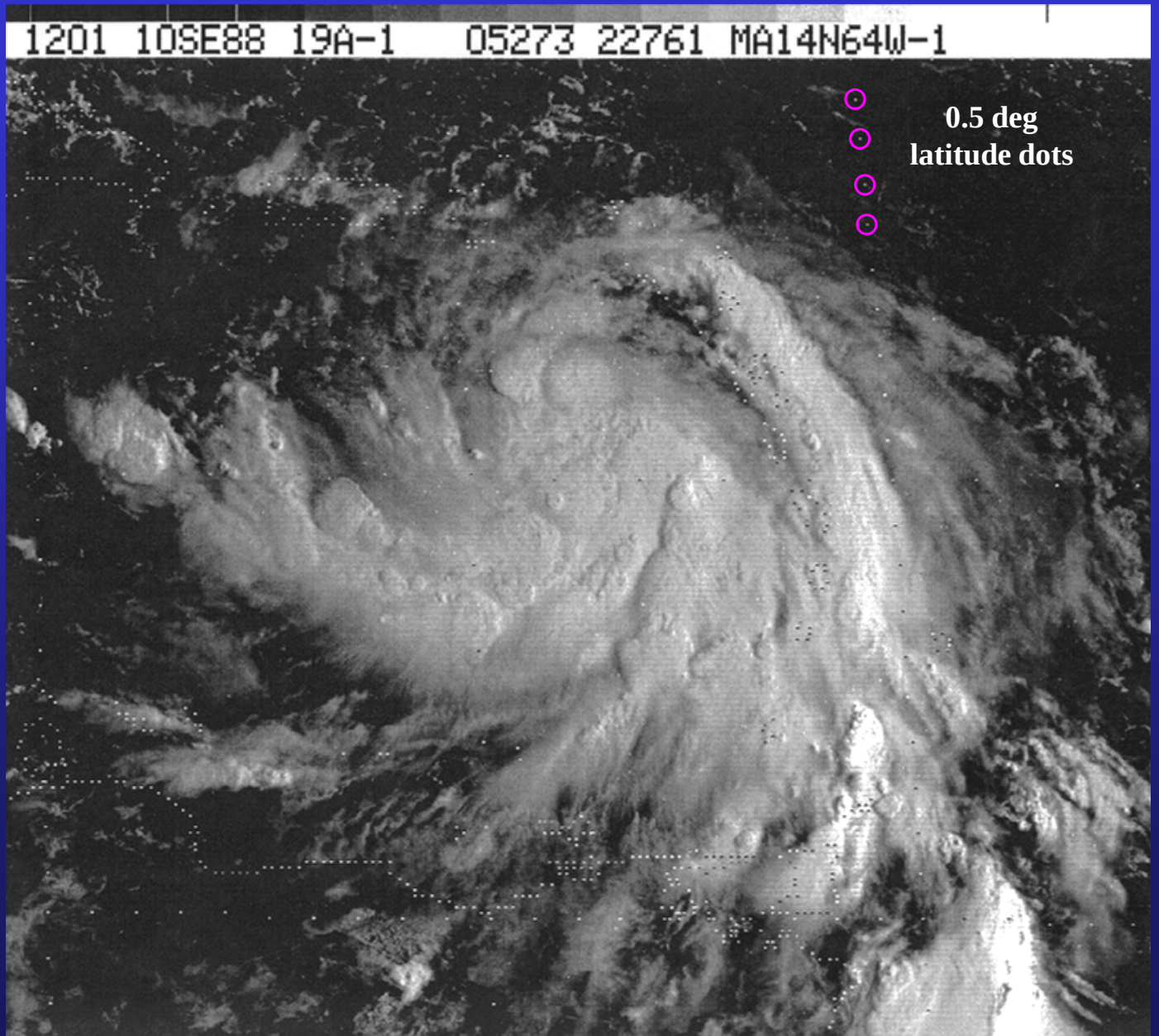
From Vernon F. Dvorak
May 1982

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T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB

1201 UTC 10 Sep 1988



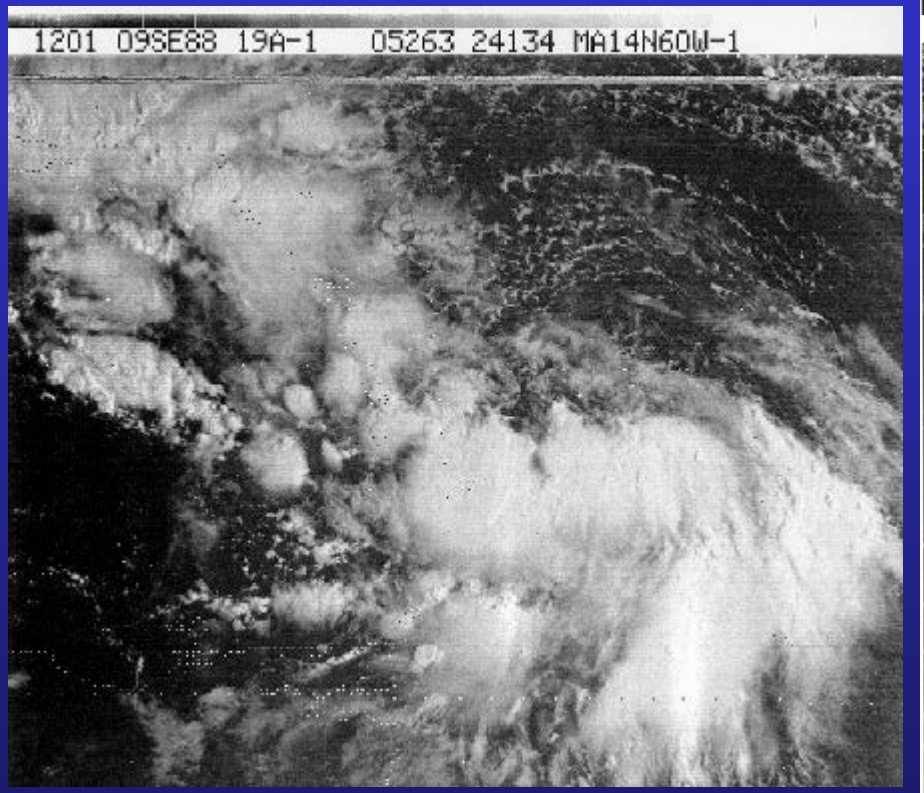
Issues for 1201 UTC 10 Sep 1988

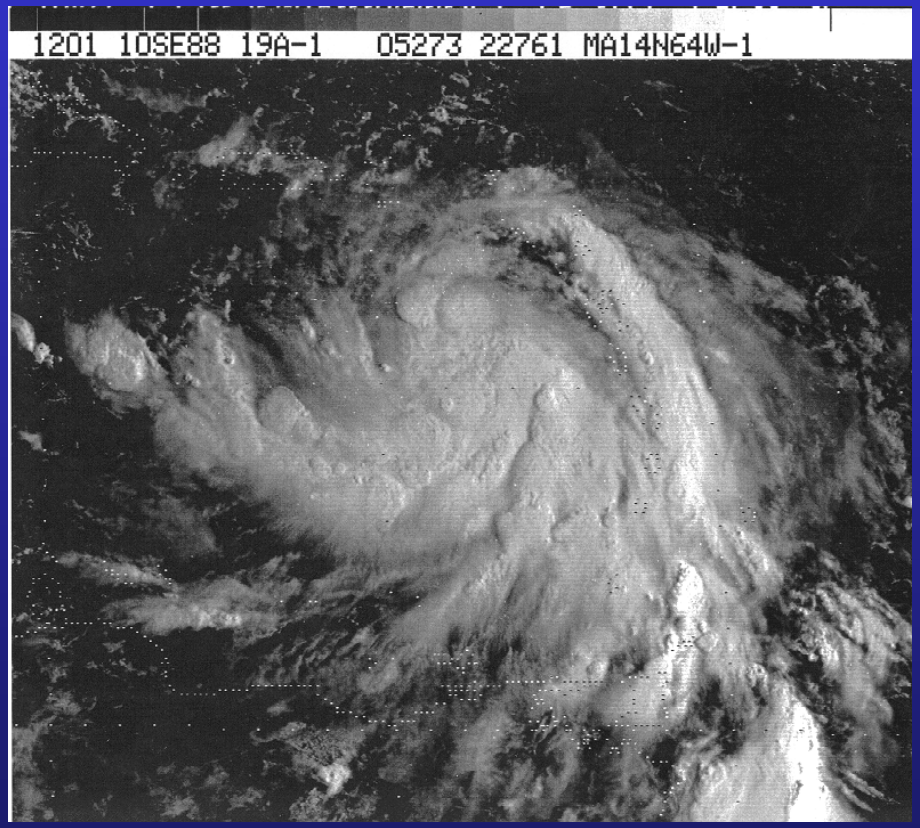
How has the system changed during the last 24 hours?

What cloud pattern(s) can be used to measure this system?

Is the cloud pattern(s) clear cut? If you tried multiple cloud patterns, do they give the same DT?

24 hr change?





D

TROPICAL CYCLONE ANALYSIS WORKSHEET

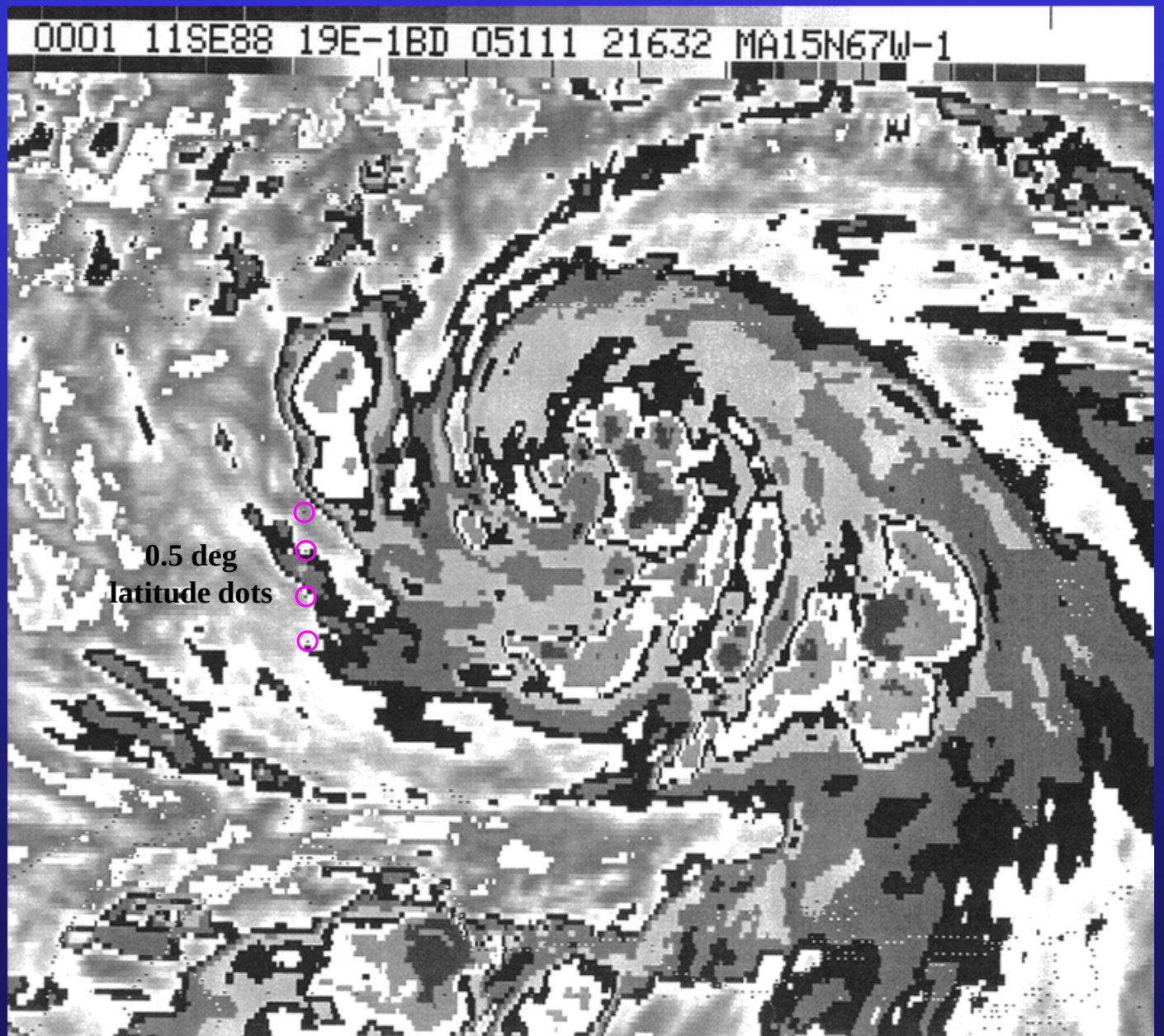
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May 1982

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T-Number Estimates from Model and DT Constraints

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Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+									

0001 UTC 11 Sep 1988



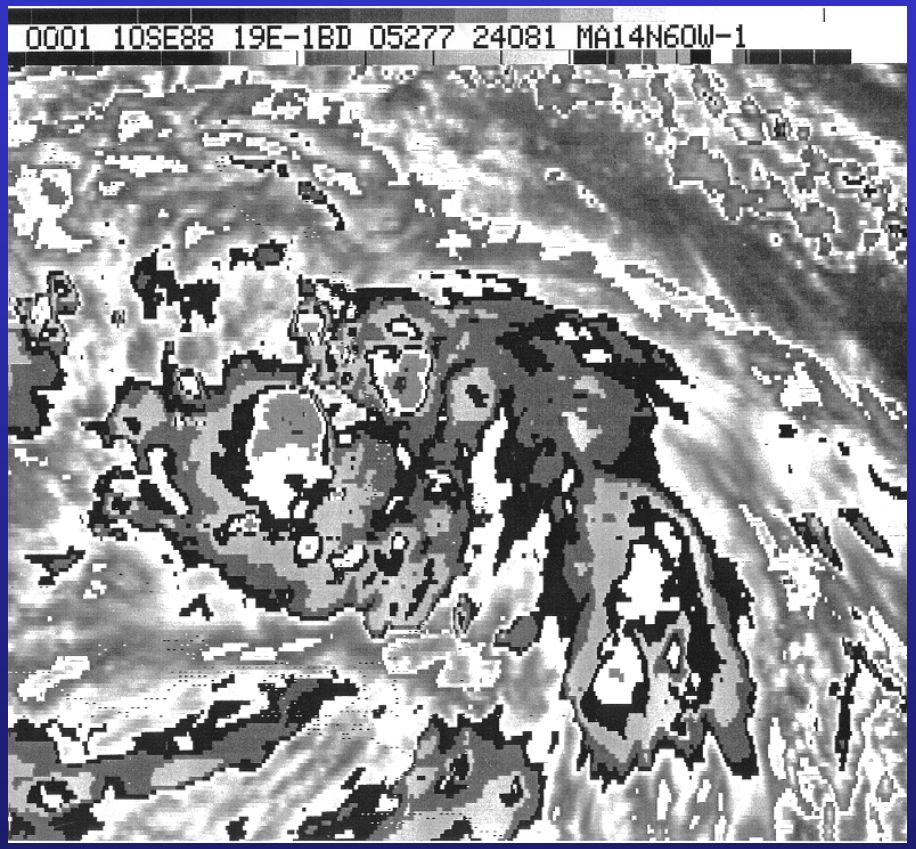
Issues for 0001 UTC 11 Sep 1988

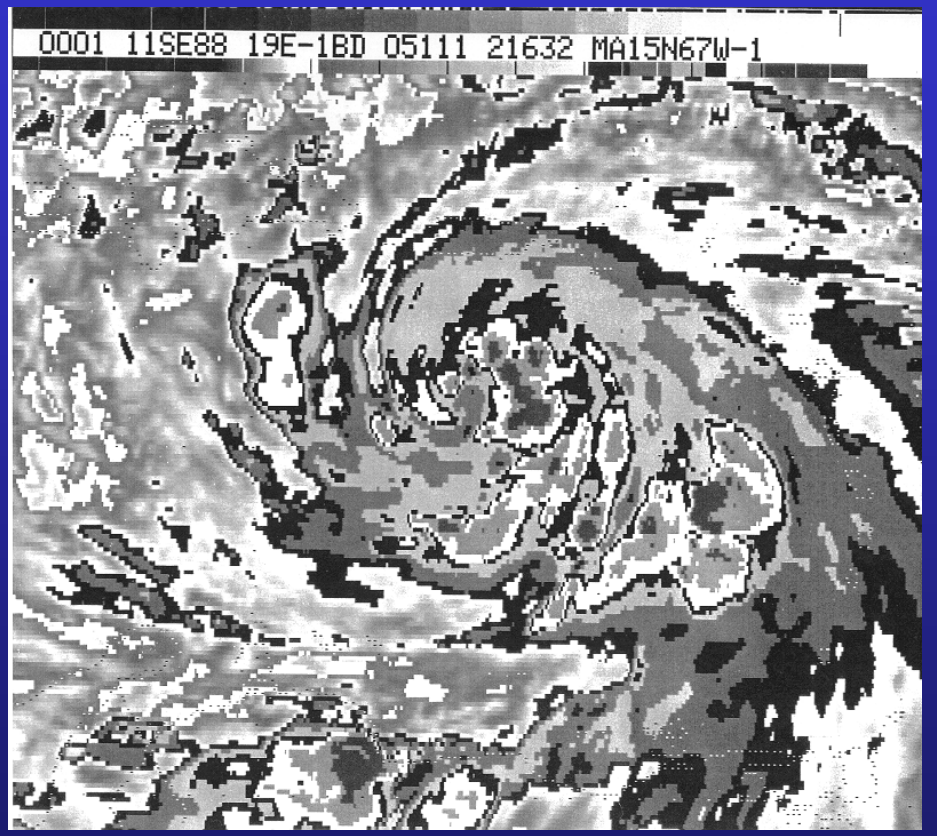
How has the system changed during the last 24 hours? Is it time to change the model development rate?

What cloud pattern(s) can be used to measure this system? What cloud patterns cannot be used?

Is the cloud pattern(s) clear cut? If you tried multiple cloud patterns, do they give the same DT?

24 hr change?





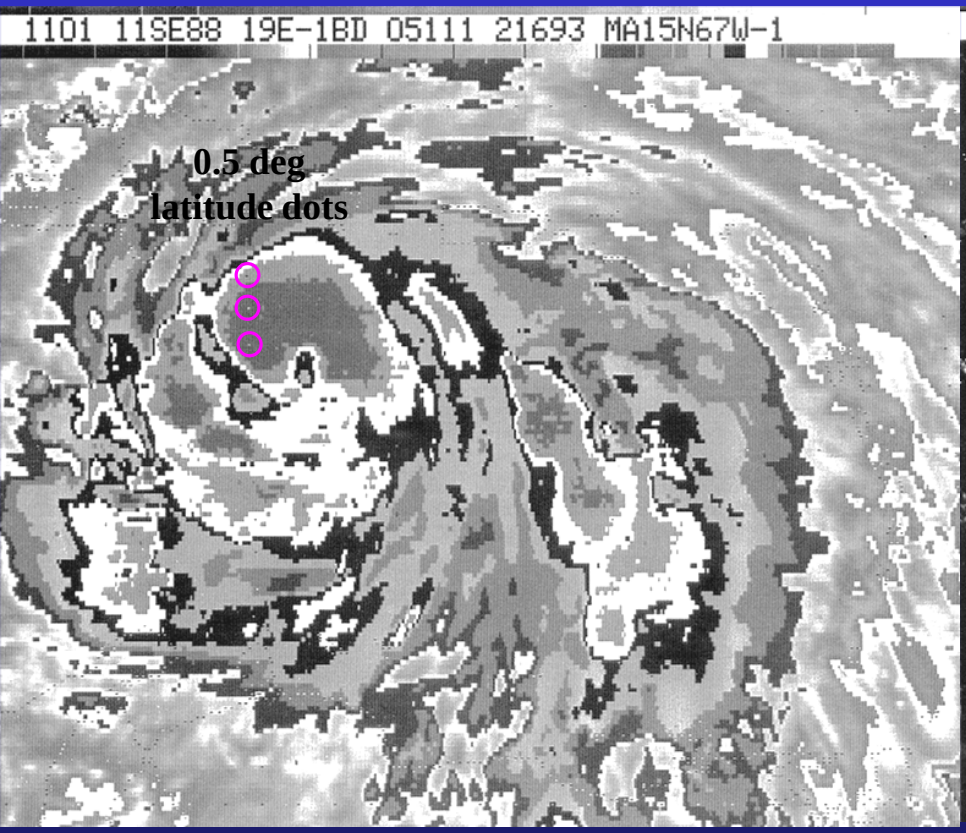
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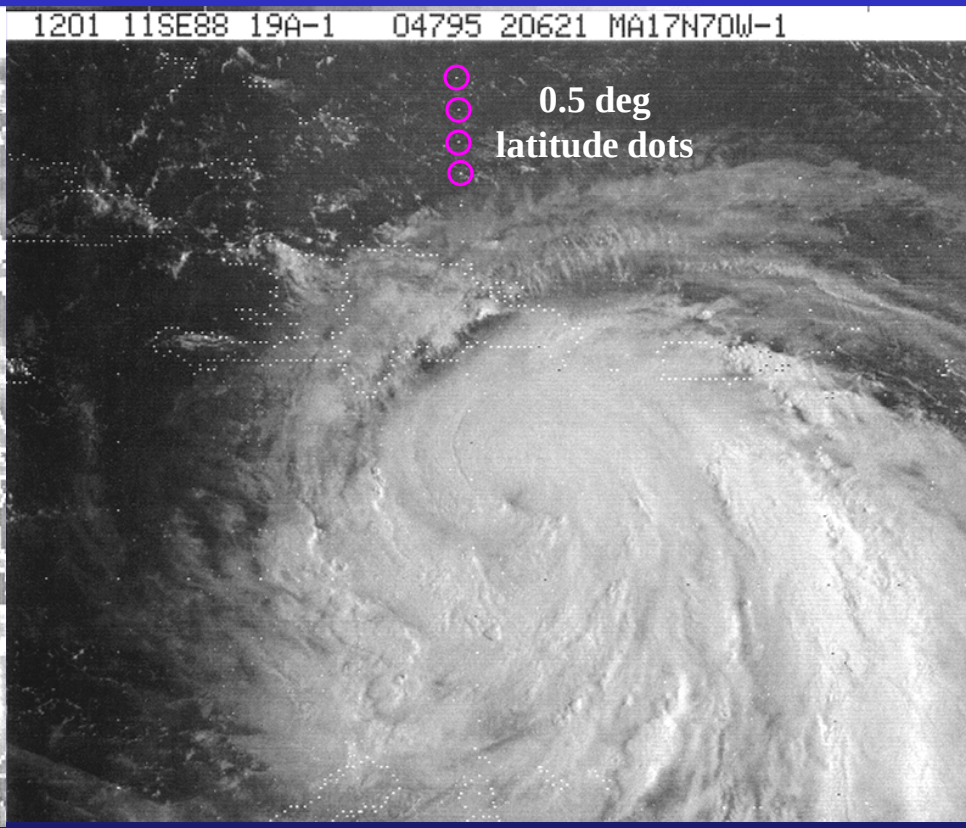
TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak
May 1982

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Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									

1101/1201 UTC 11 Sep 1988





Issues for 1101/1201 UTC 11 Sep 1988

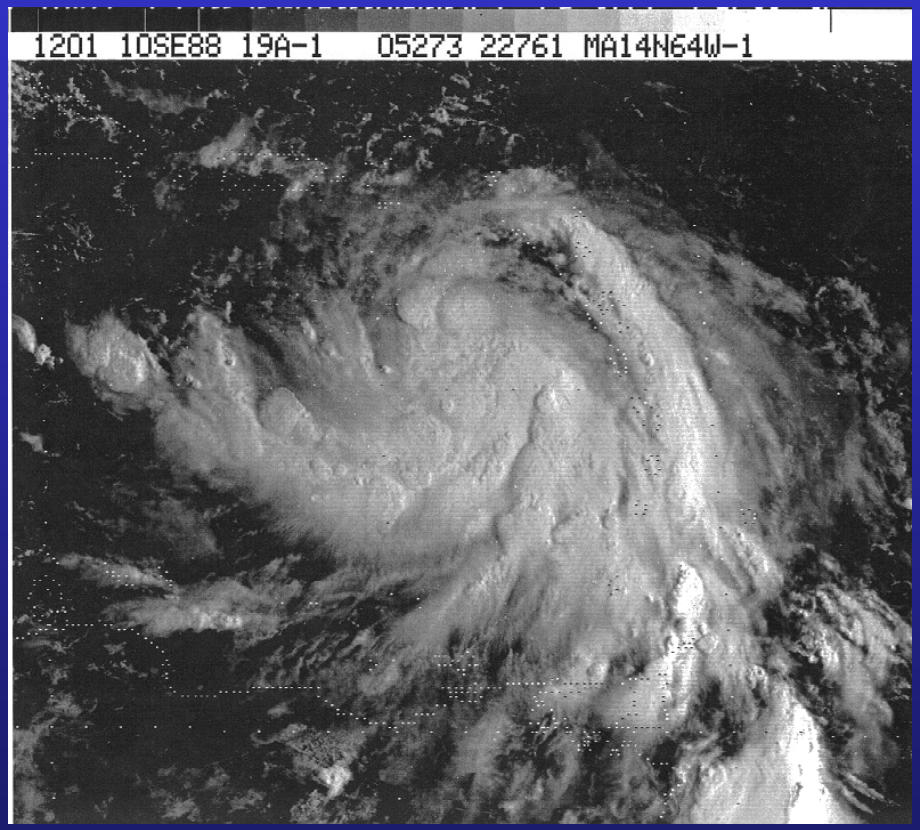
How has the system changed during the last 24 hours? Is it time to change the model development rate?

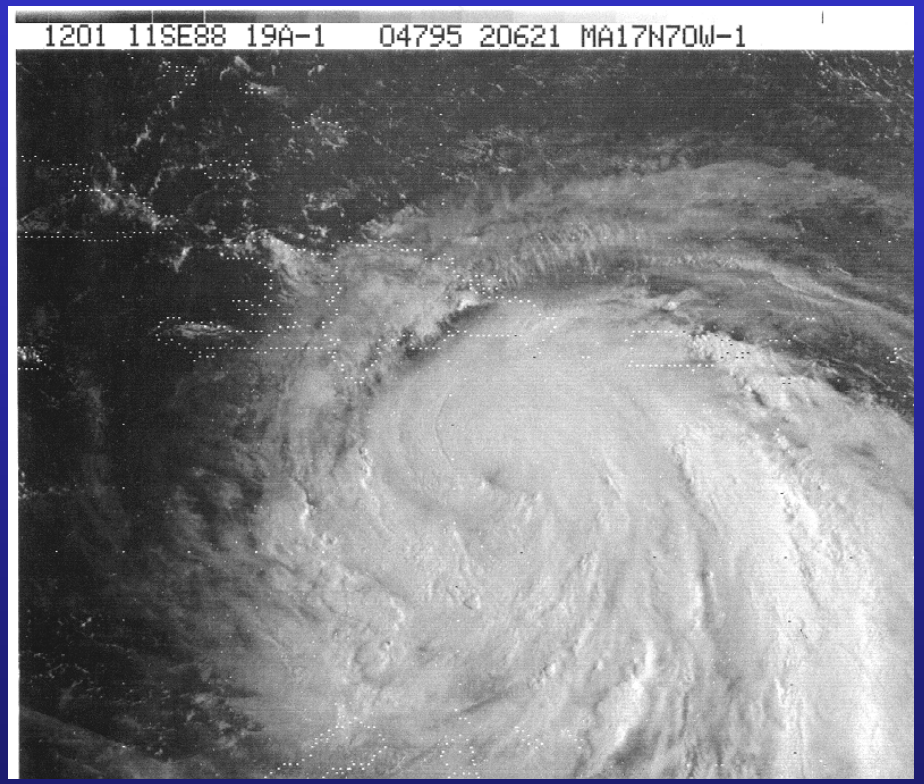
What cloud patterns can be used to measure this system? What cloud pattern might be best?

If you tried multiple cloud patterns, do they give the same DT?

Beware constraints?

24 hr change?





D

TROPICAL CYCLONE ANALYSIS WORKSHEET

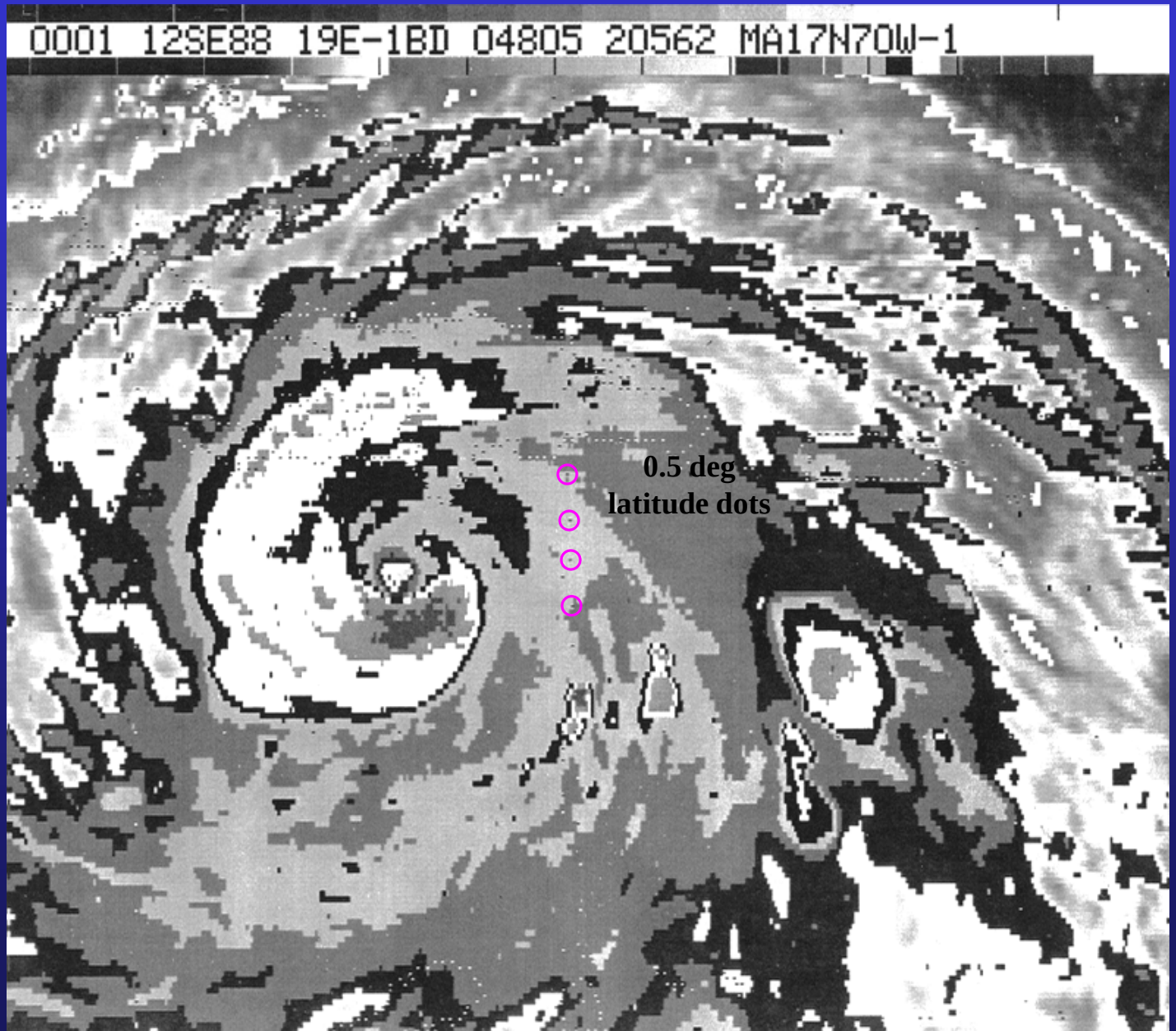
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T-Number Estimates from Model and DT Constraints

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Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
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08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+									
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									

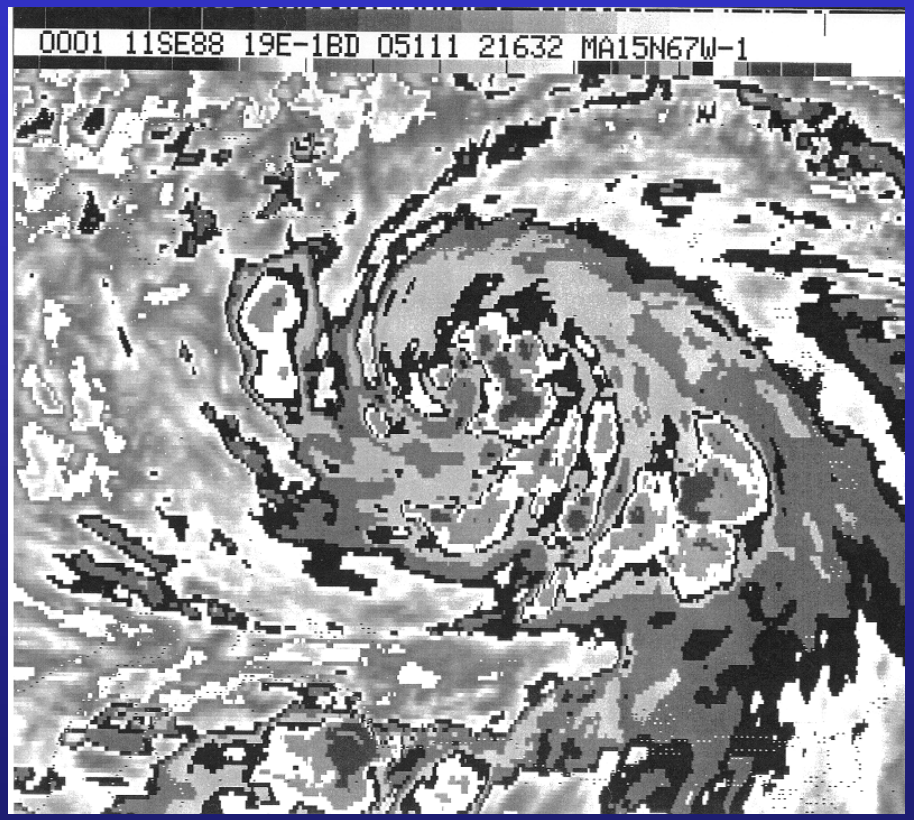
0001 UTC 12 Sep 1988

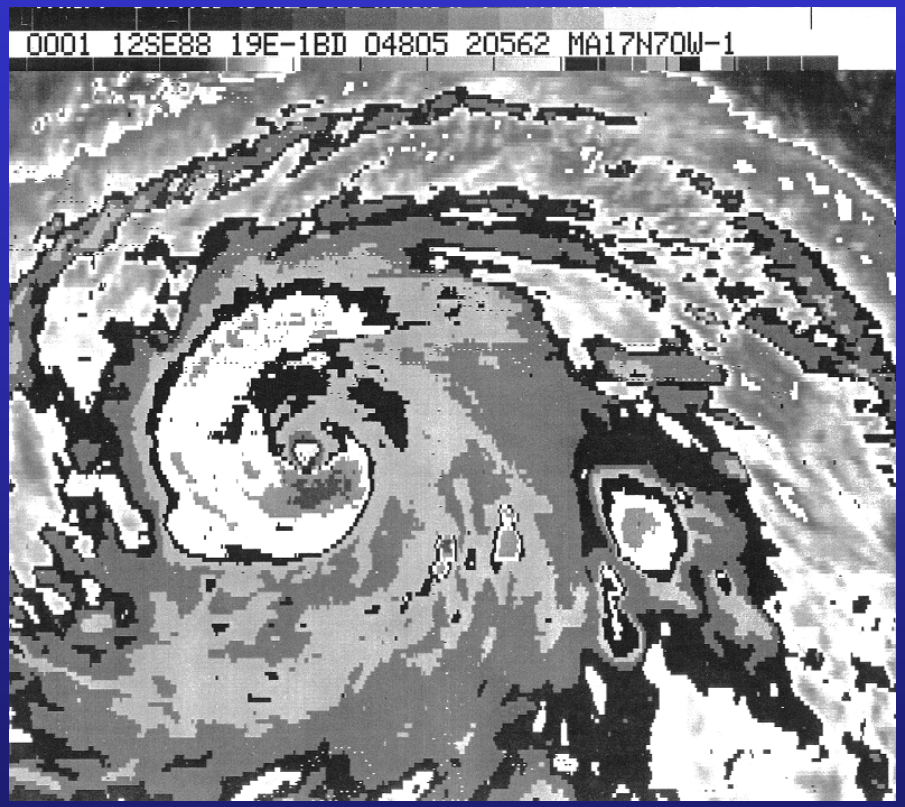


Issues for 0001 UTC 12 Sep 1988

- How has the system changed during the last 24 hours? Do we need to change the model development rate?
- What cloud pattern is best to measure this system?
- Is there a need for infrared banding?
- Which T-number should be the FT?
- Beware constraints?

24 hr change?





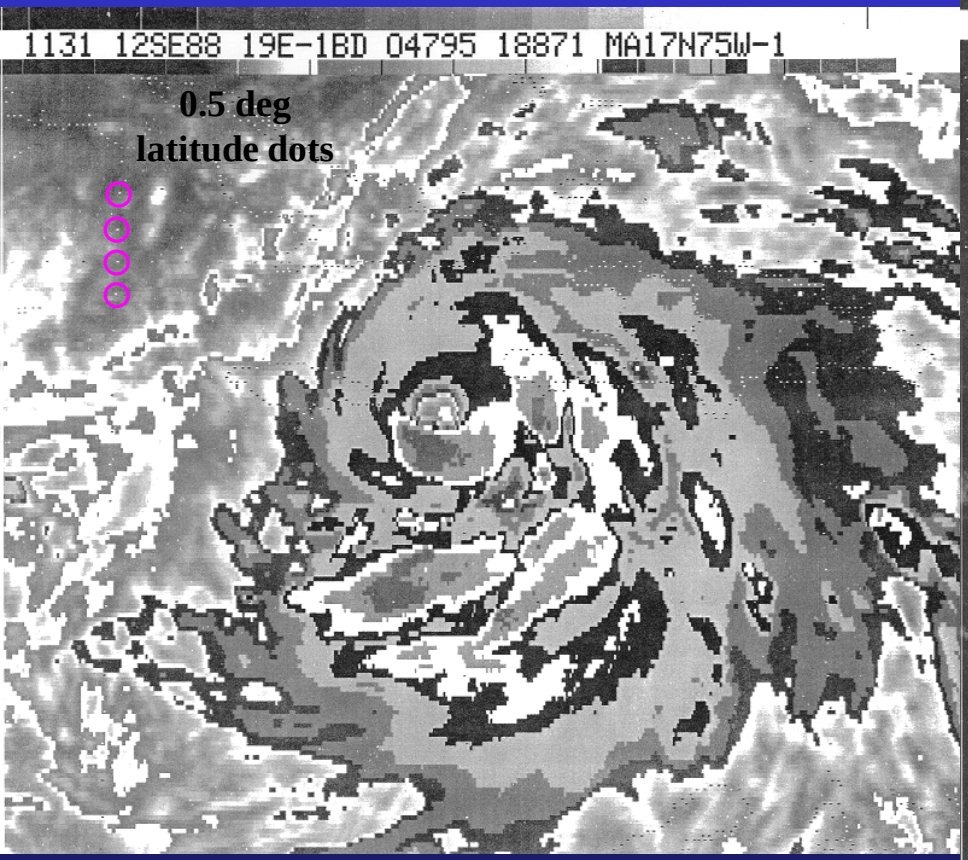
D+

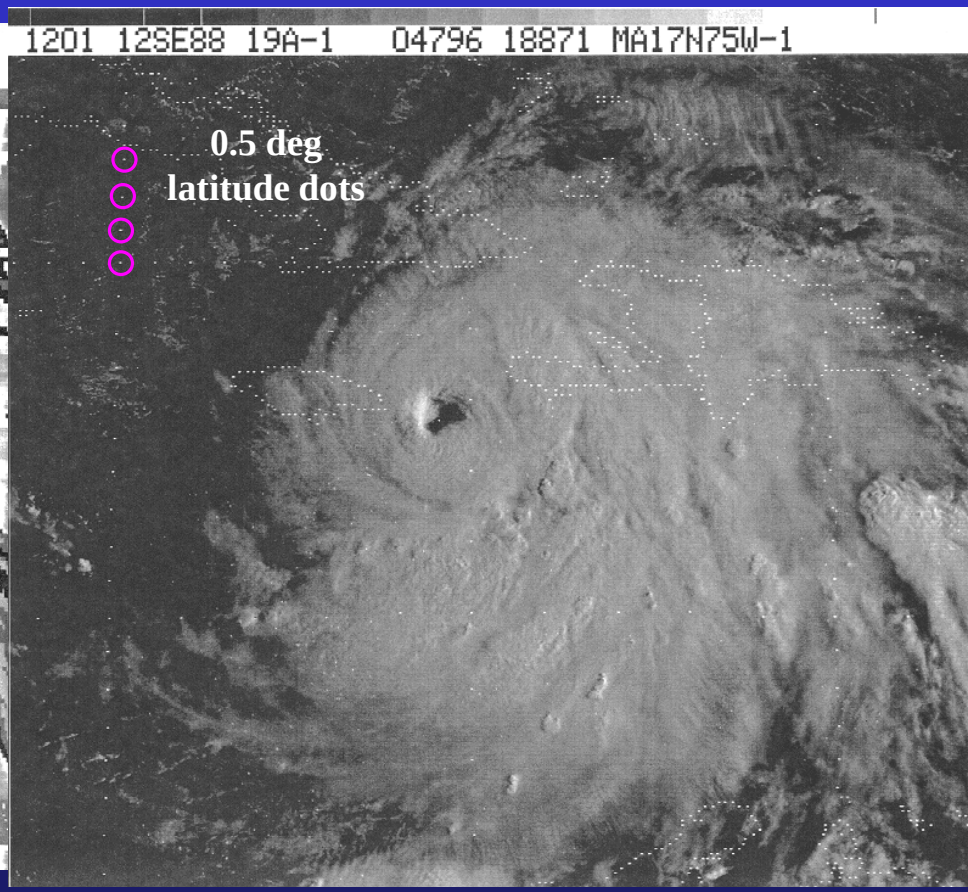
TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

	T-Number Estimates from Measurements for Data-T (DT) Computation																T-Number Estimates from Model and DT Constraints								
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB

1131/1201 UTC 12 Sep 1988





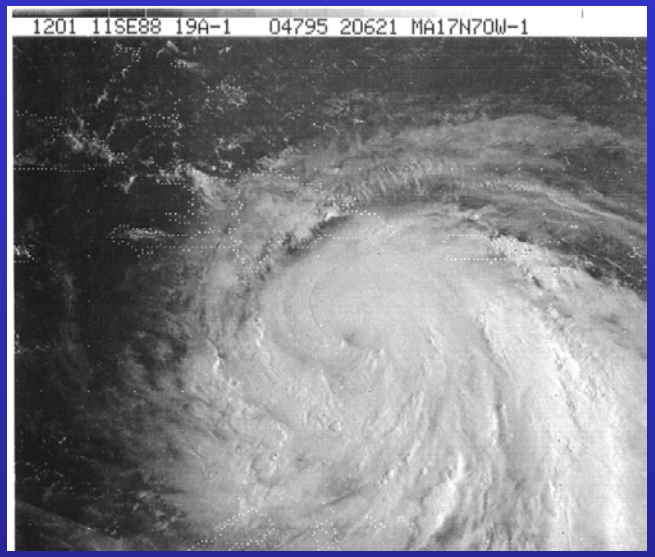
Issues for 1131/1201 UTC 12 Sep 1988

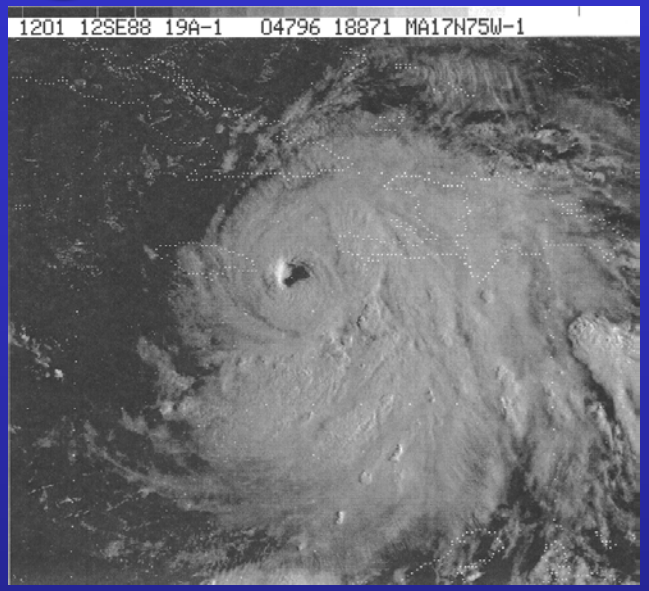
How has the system changed during the last 24 hours? Is it time to change the model development rate?

Is there anything unusual about the eye number and eye adjustment? How about the eye size?

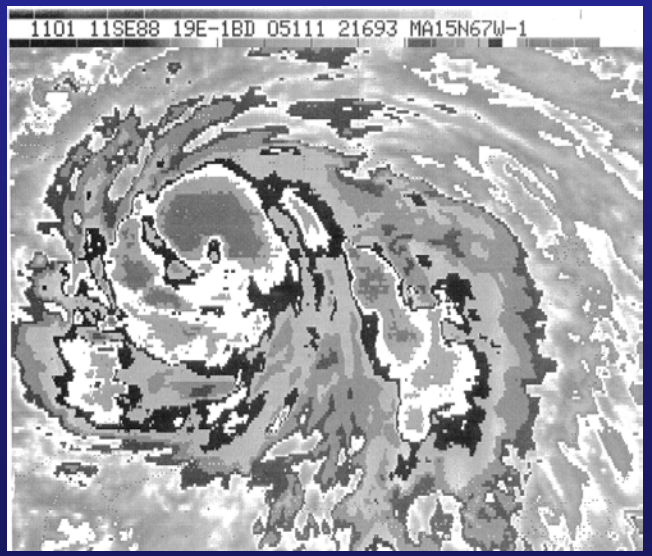
Beware constraints?

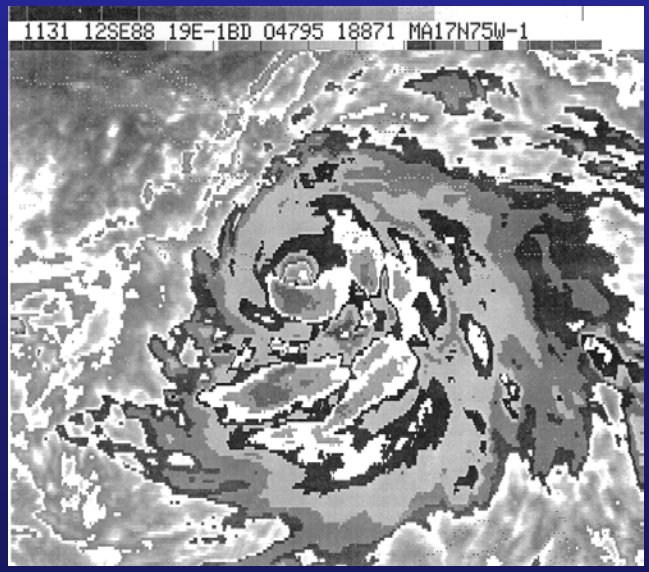
24 hr change?





D+



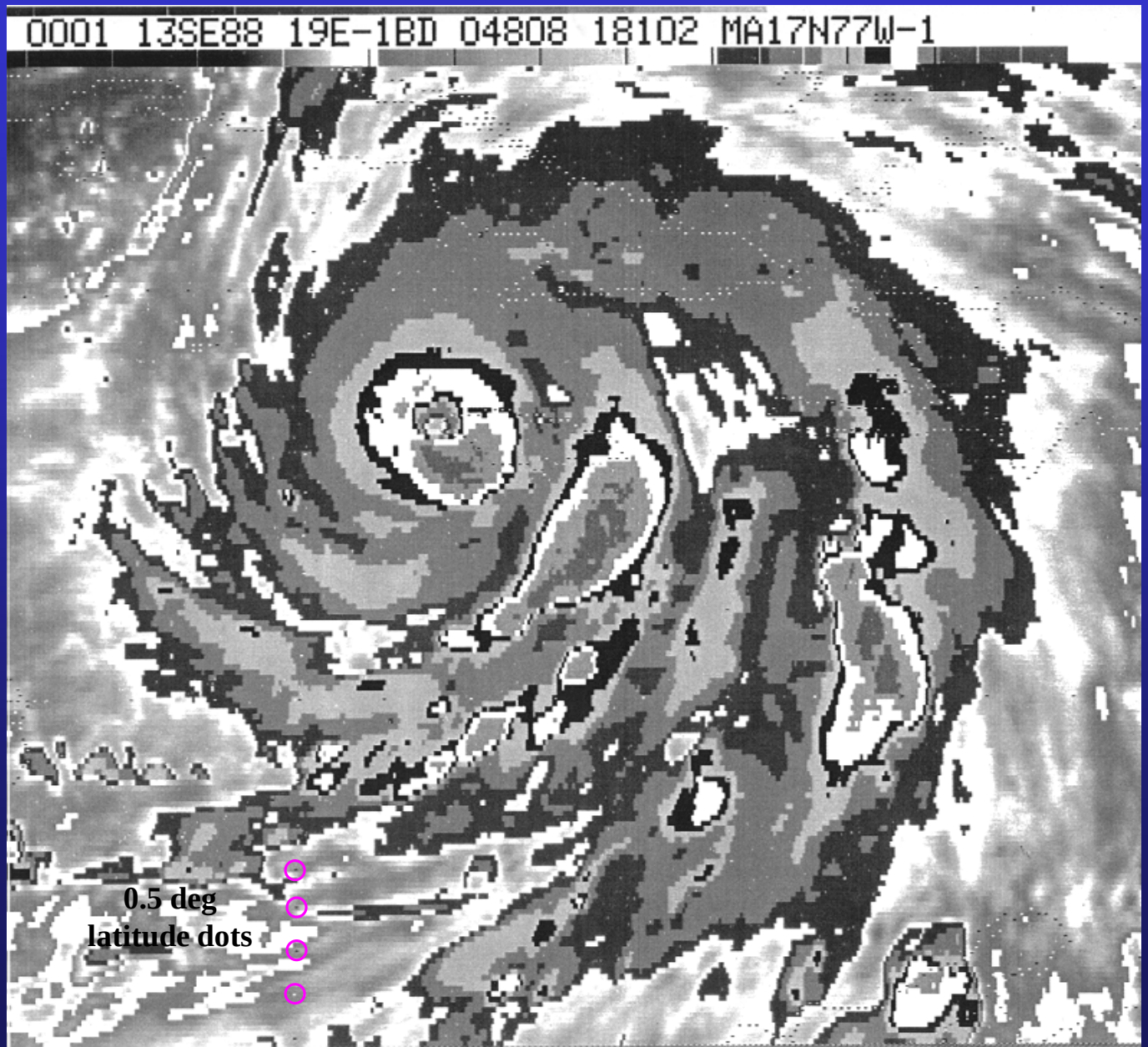


TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak
May 1982

	T-Number Estimates from Measurements for Data-T (DT) Computation																T-Number Estimates from Model and DT Constraints								
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB

0001 UTC 13 Sep 1988



Issues for 0001 UTC 13 Sep 1988

How has the system changed during the last 24 hours? Any change in development rate?

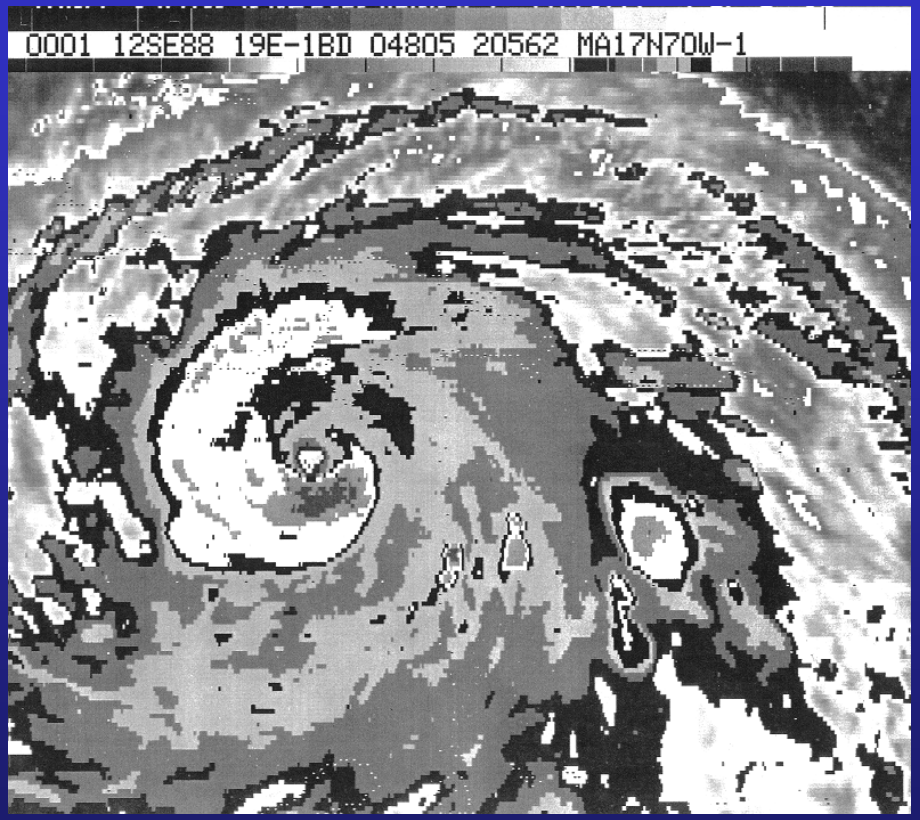
The system has passed over Jamaica during the last 12 hours. Should that affect the analysis?

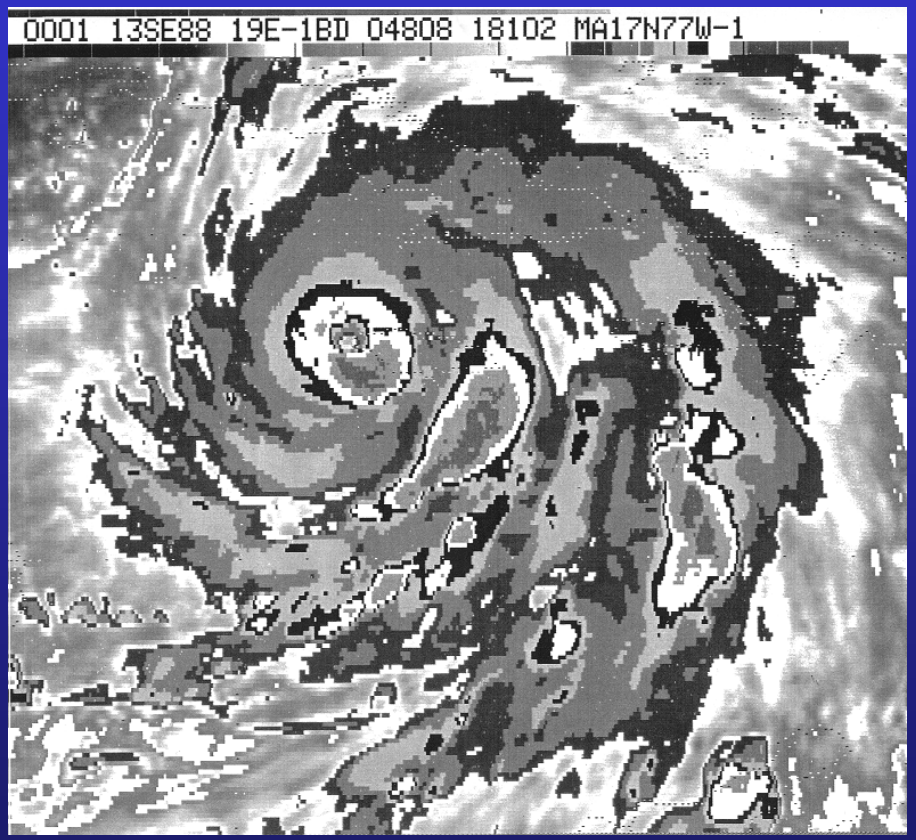
Is there anything unusual about the eye number and eye adjustment?

Is there a need for infrared banding?

What about the PT?

24 hr change?





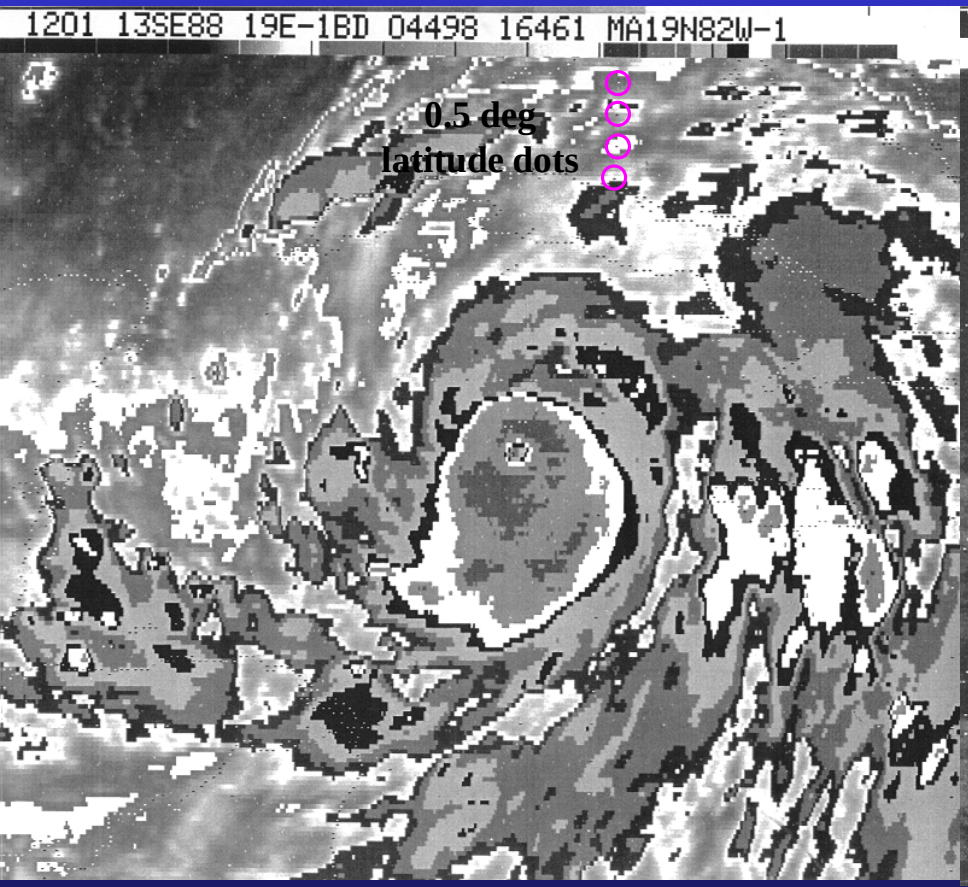
D+

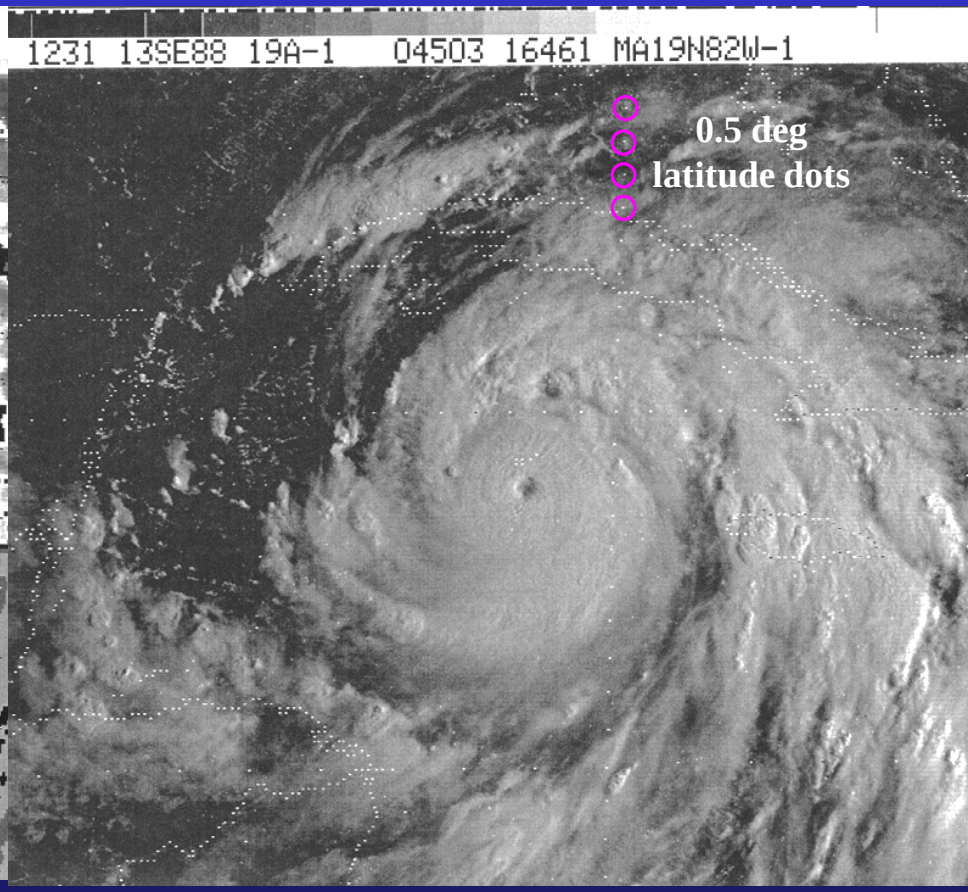
TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak
May 1982

	T-Number Estimates from Measurements for Data-T (DT) Computation																T-Number Estimates from Model and DT Constraints								
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB

1201/1231 UTC 13 Sep 1988





Issues for 1201/1231 UTC 13 Sep 1988

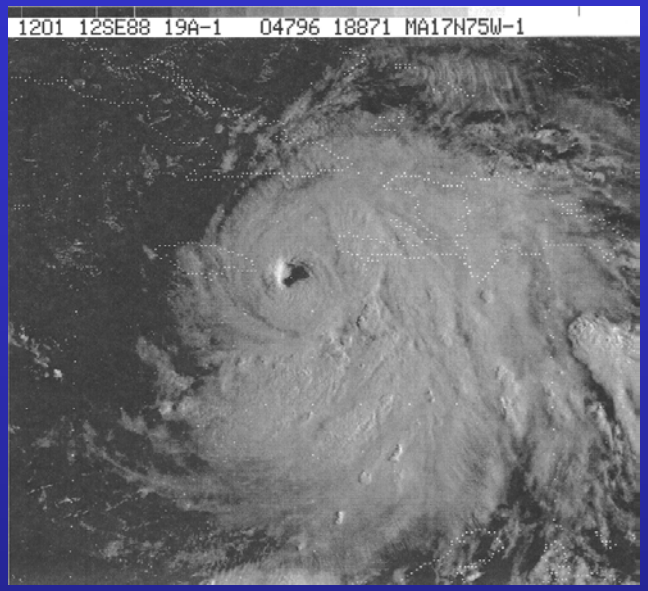
How has the system changed during the last 24 hours? Any change in development rate?

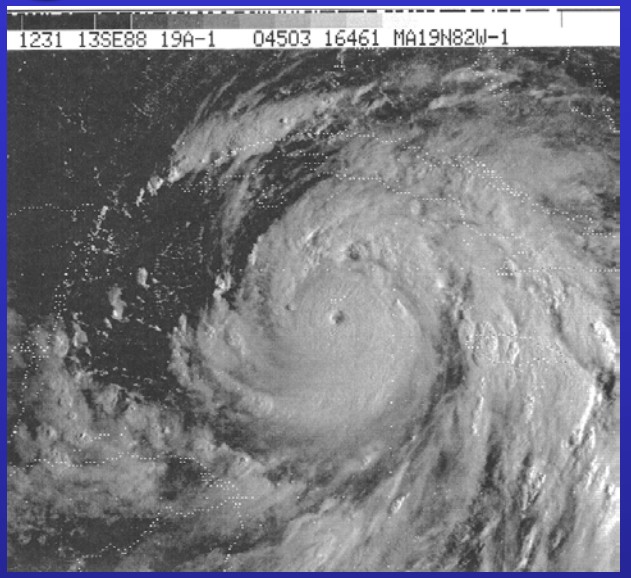
Is there anything unusual about the eye number and eye adjustment? How about the eye size? Can we see to the bottom of the eye?

Is there a need for infrared banding?

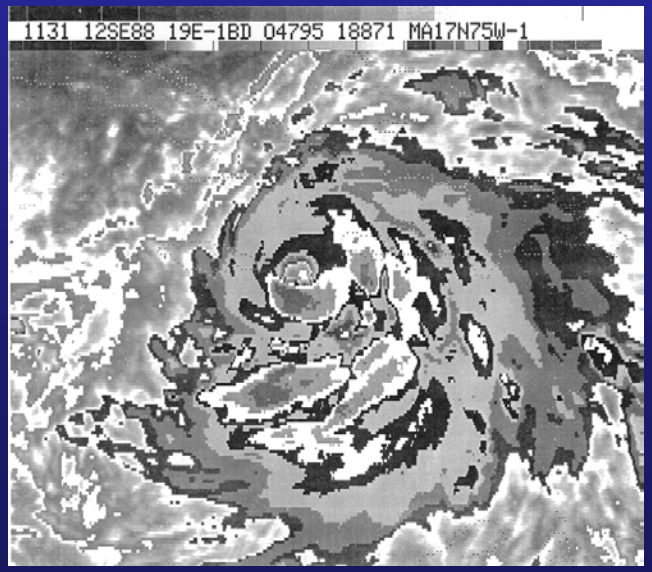
What about the PT?

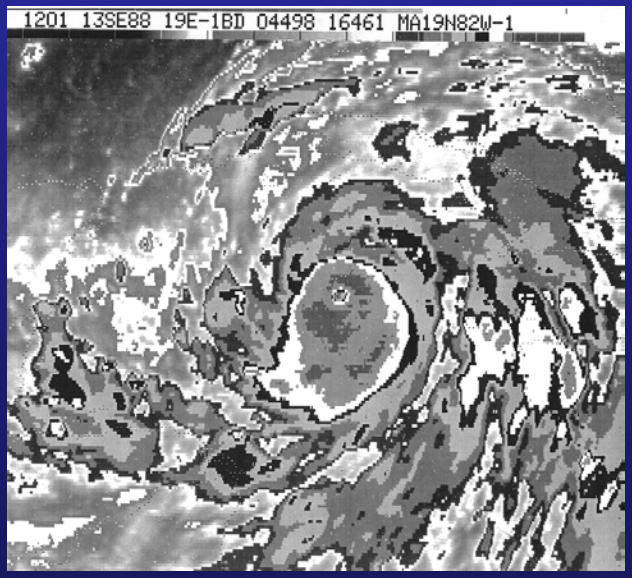
24 hr change?





D+





TROPICAL CYCLONE ANALYSIS WORKSHEET

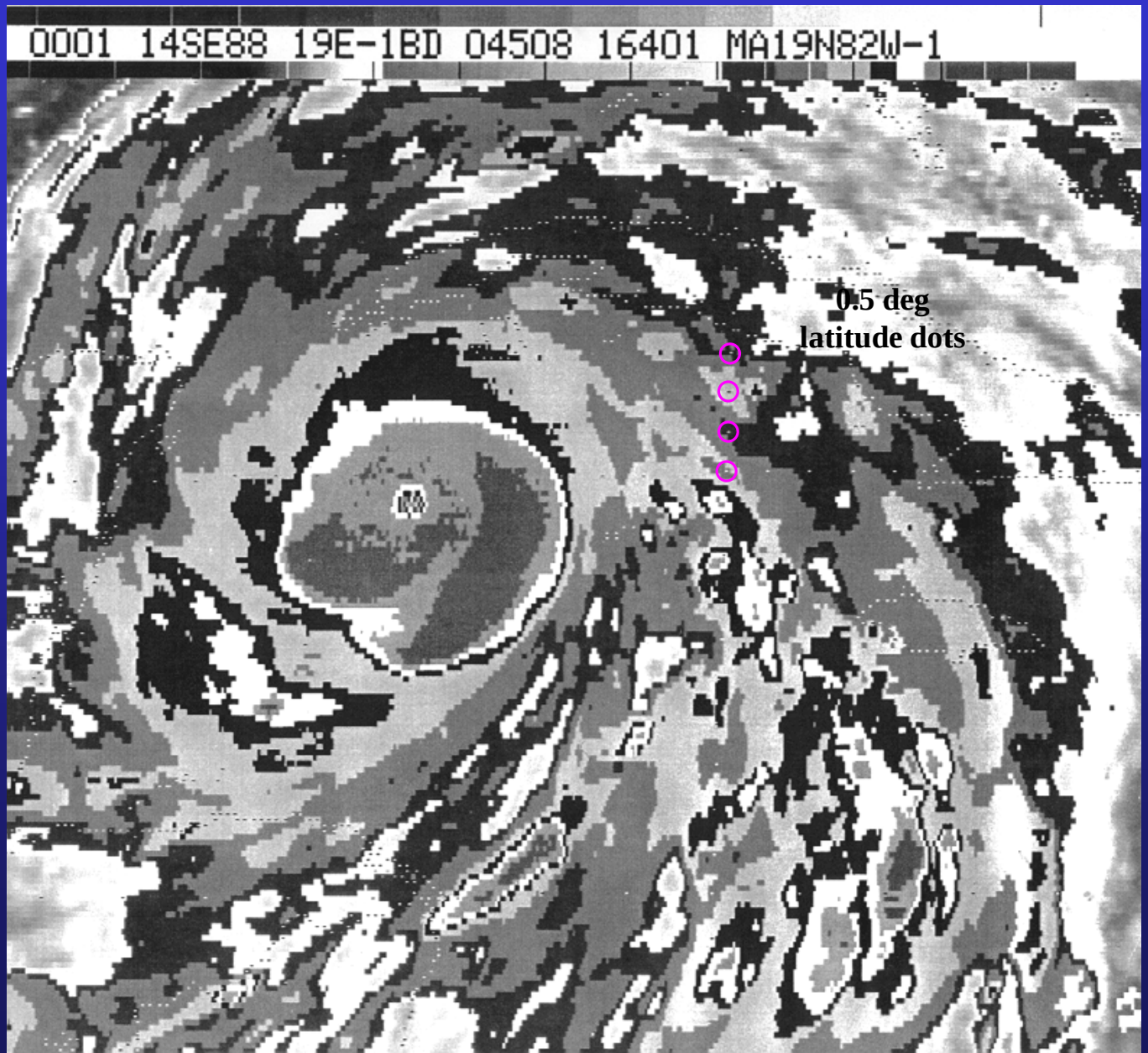
From Vernon F. Dvorak
May 1982

T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+									
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB

0001 UTC 14 Sep 1988



Issues for 0001 UTC 14 Sep 1988

How has the system changed during the last 24 hours? Any change in development rate?

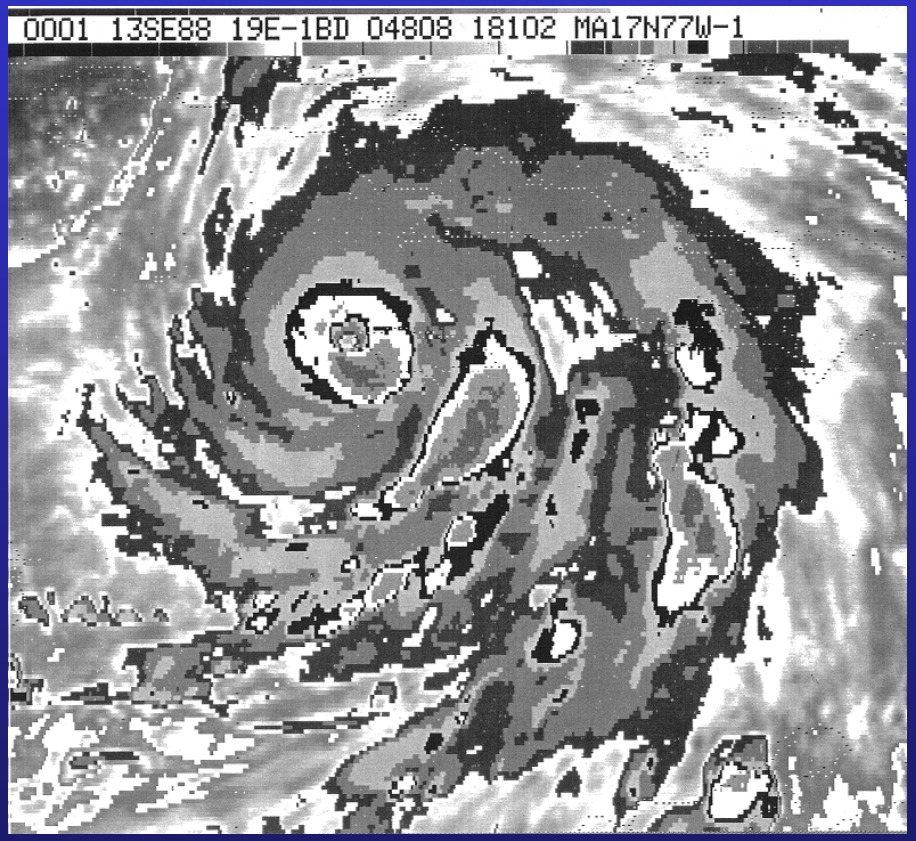
Is there anything unusual about the eye number and eye adjustment? How about the eye size? Can we see to the bottom of the eye?

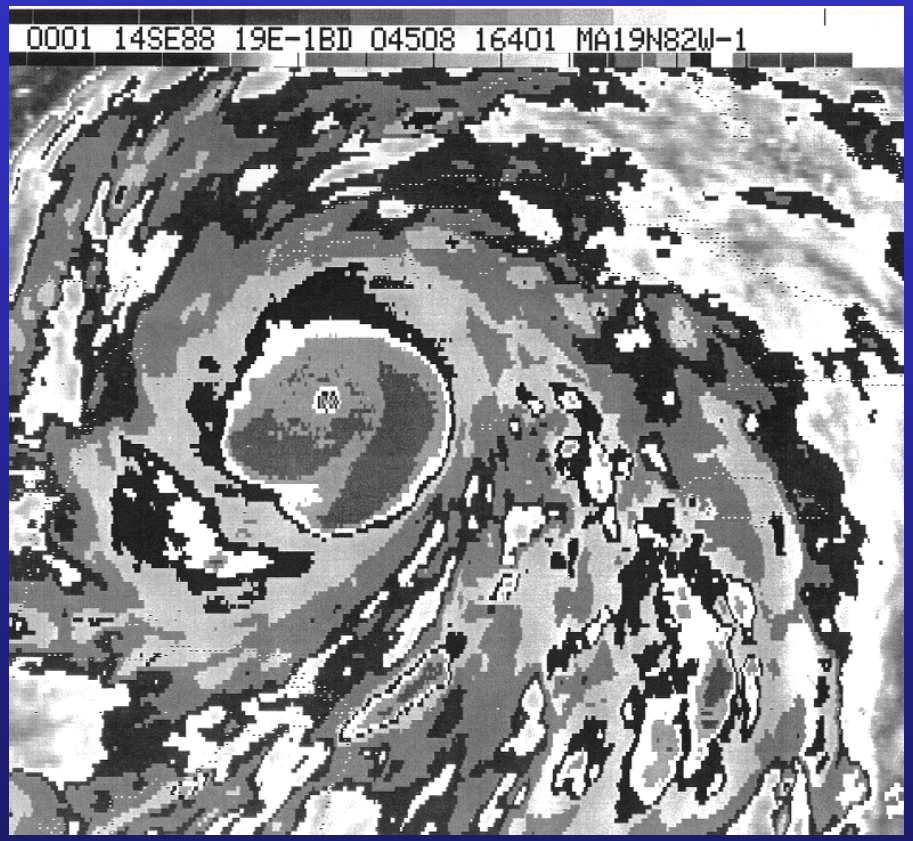
Is there a need for infrared banding?

What about the PT? The FI?

Assume the eye temperature is Warm Medium Gray (WMG)!

24 hr change?





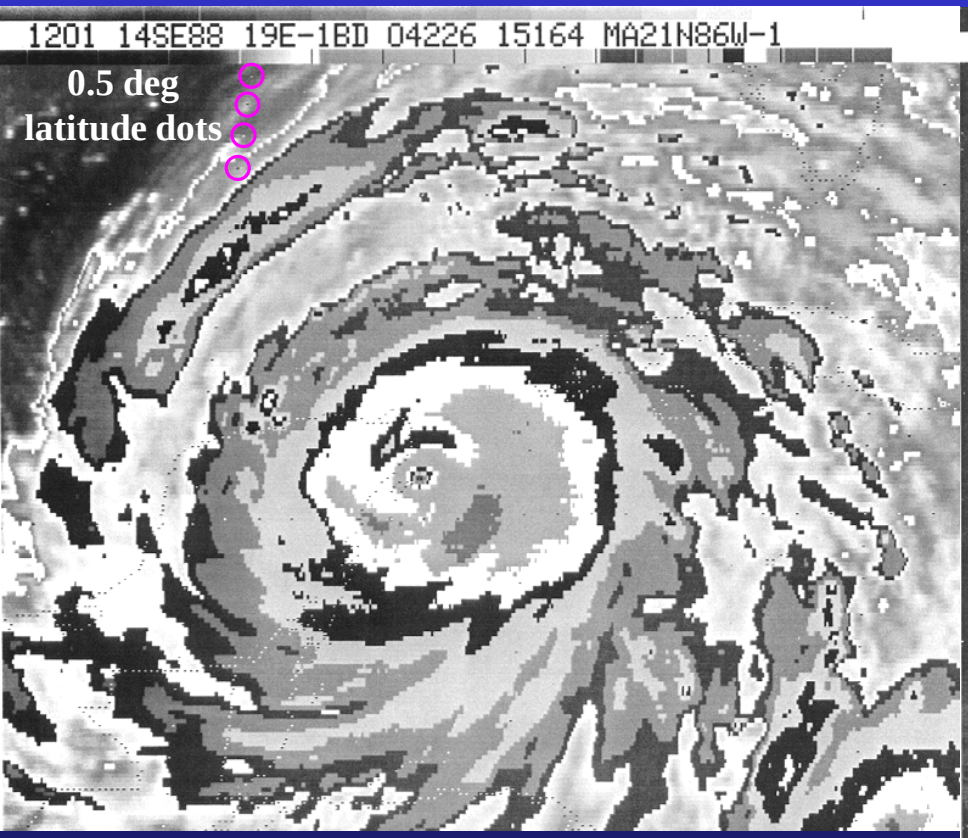
D+

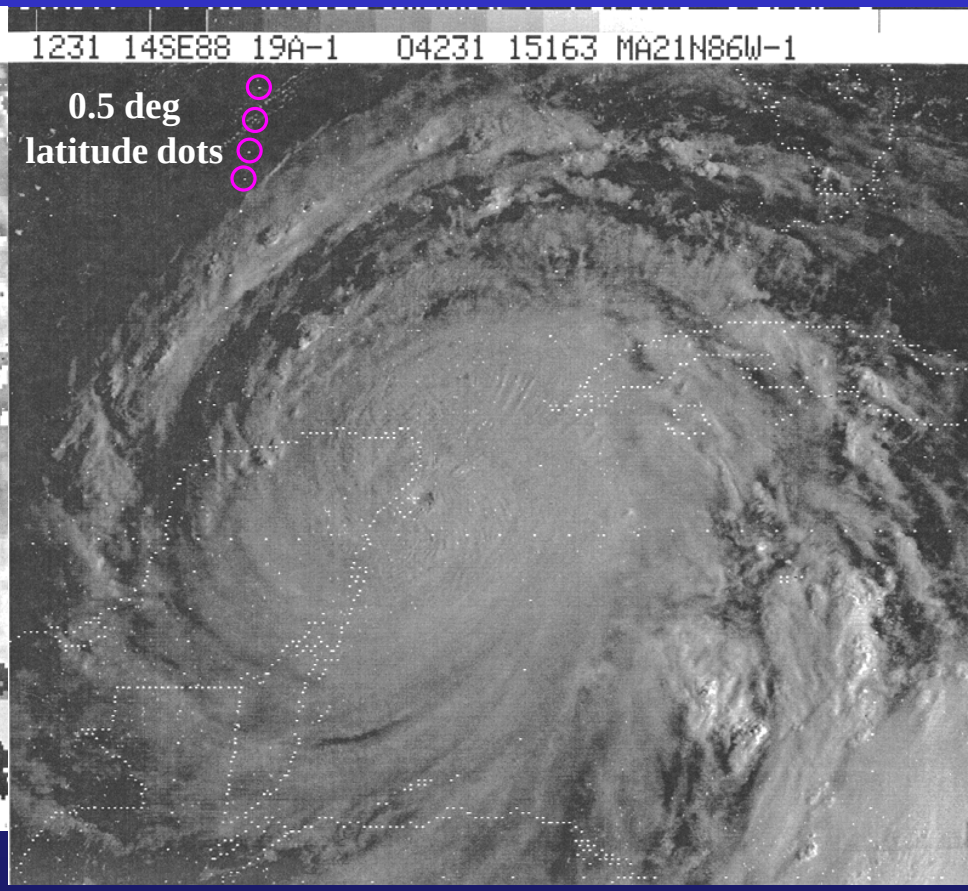
TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB

1201/1231 UTC 14 Sep 1988

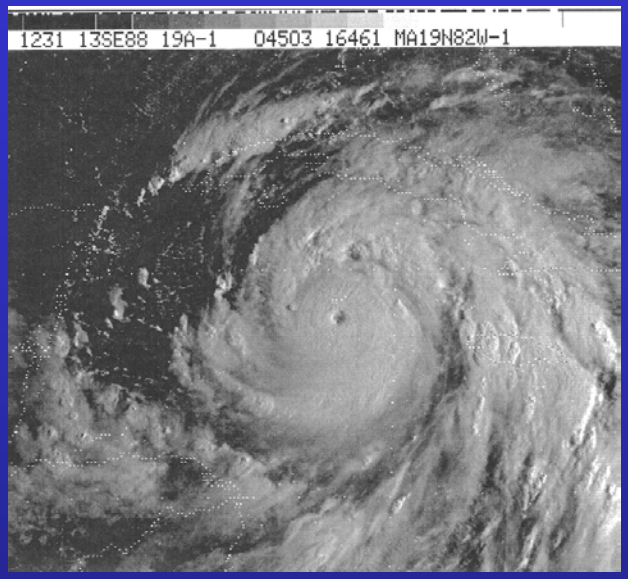


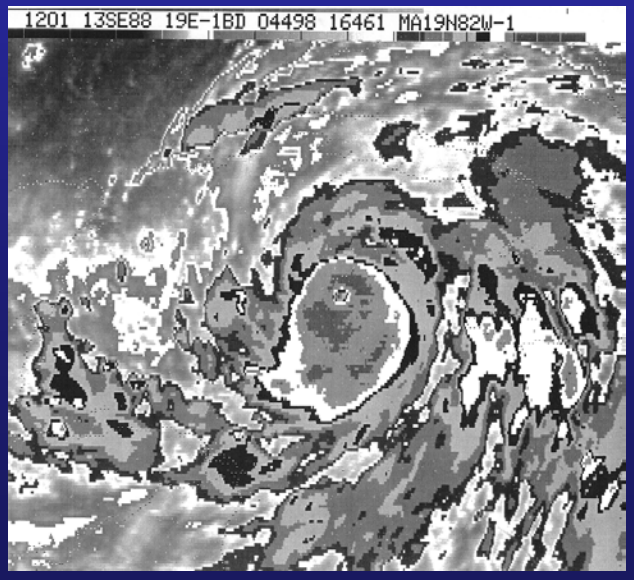


Issues for 1201/1231 UTC 14 Sep 1988

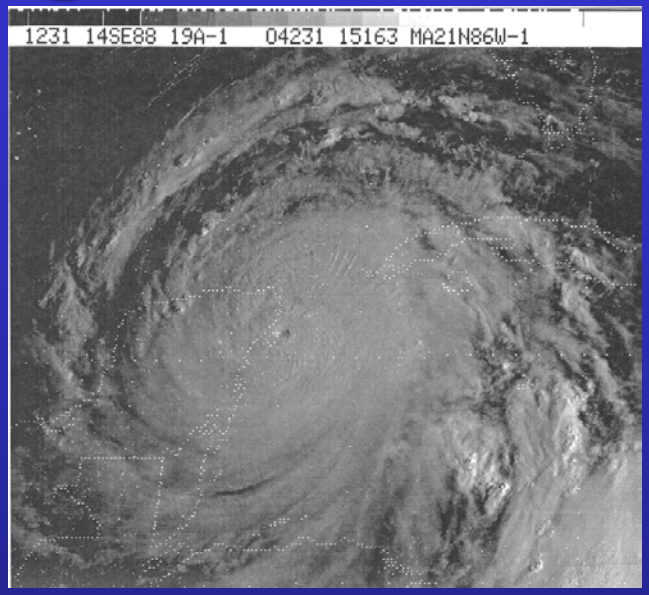
- Is there any change in development trend?
- Is there anything unusual about the eye number and eye adjustment? How about the eye size? Can we see to the bottom of the eye?
- Can infrared banding be used?
- What about the PT? The FI?
- What physically might be happening to the storm?

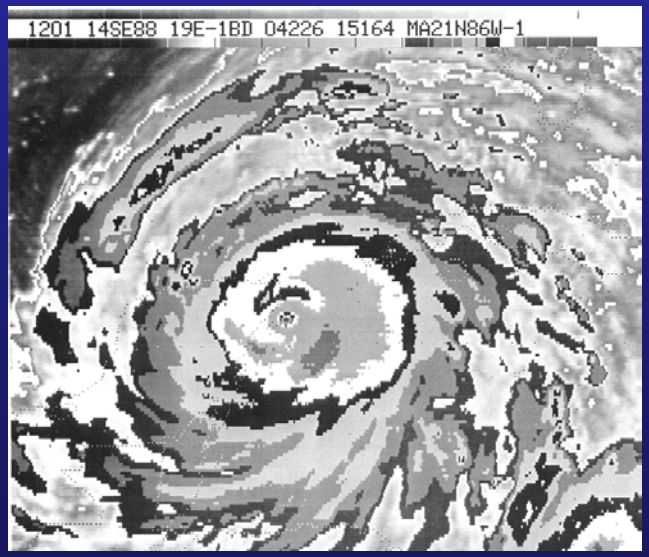
24 hr change?





w



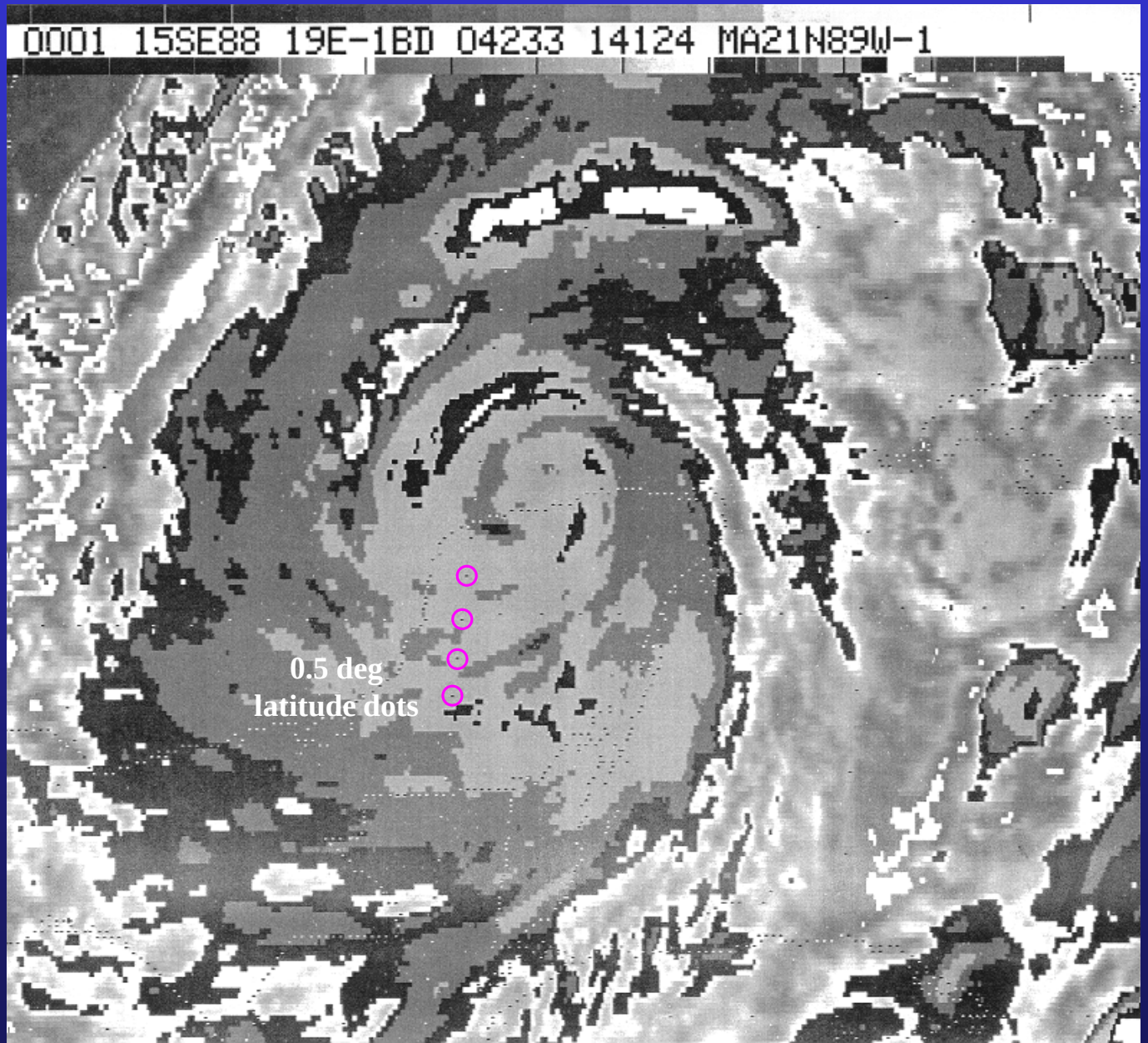


TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB
14/1201								DG	EYE IN	W/CMG	6.0	0.5***			6.5	0.0	6.5		W	6.5	7.0	6.5	7.5	B	???	JLB
14/1231									0.7°		5.0	0.0			5.0	2.0	7.0		W	6.5	7.0	6.5	7.5	B	???	JLB

0001 UTC 15 Sep 1988

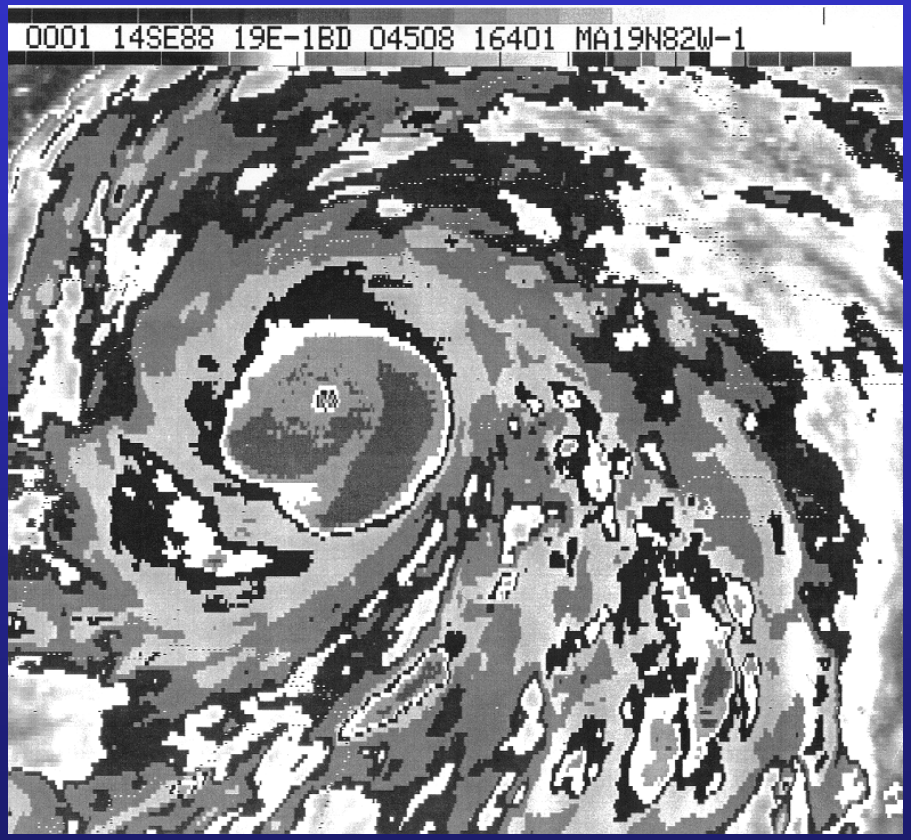


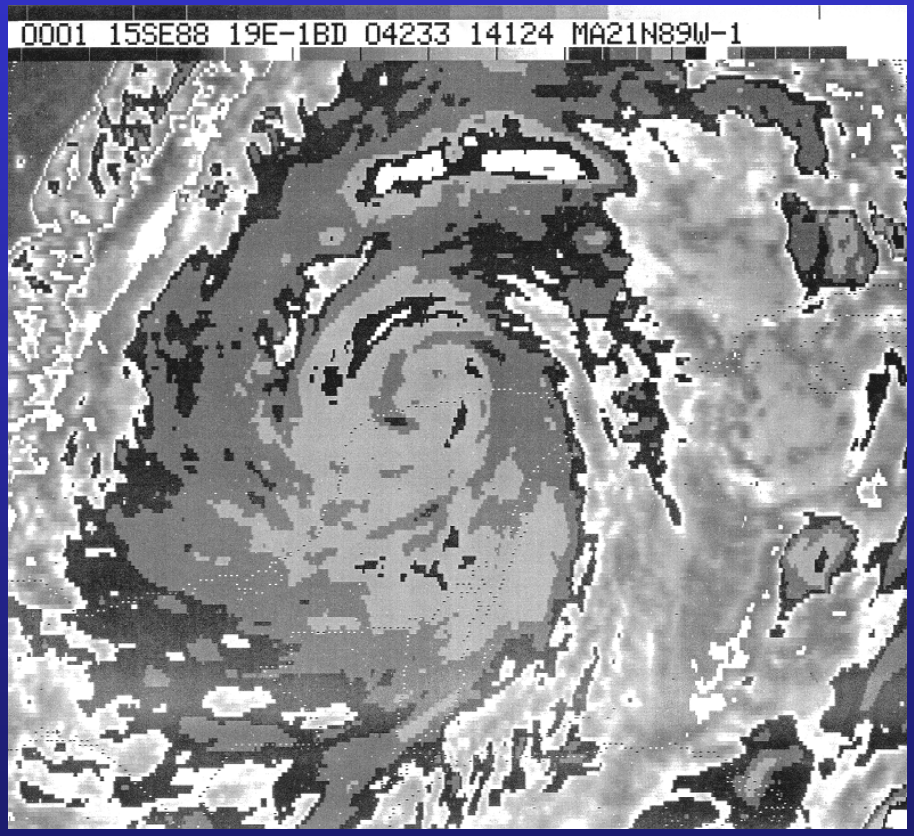
Issues for 0001 UTC 15 Sep 1988

The hurricane has been over land for most of the last 12 hours. How does this affect the analysis? How does this affect the MET?

Which cloud pattern could be used for measurements?

24 hr change?





w

TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB
14/1201								DG	EYE IN	W/CMG	6.0	0.5***			6.5	0.0	6.5		W	6.5	7.0	6.5	7.5	B	???	JLB
14/1231									0.7°		5.0	0.0			5.0	2.0	7.0		W	6.5	7.0	6.5	7.5	B	???	JLB

TROPICAL CYCLONE ANALYSIS WORKSHEET

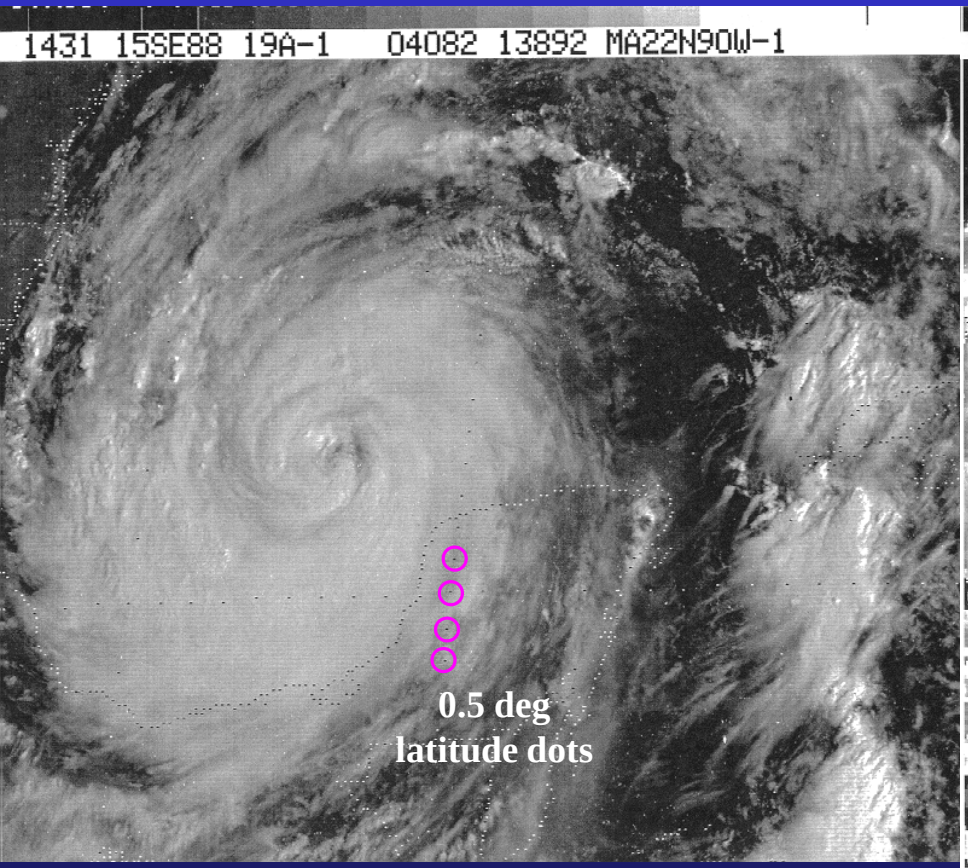
From Vernon F. Dvorak
May 1982

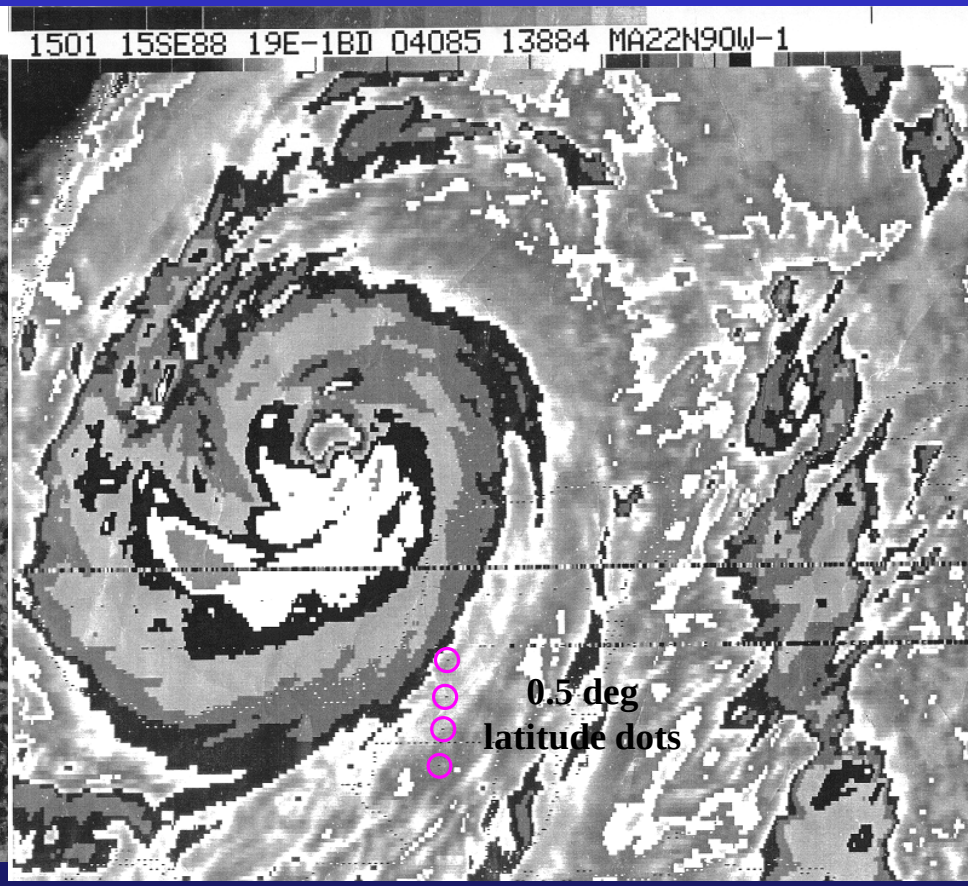
T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
15/0001														LG	4.5	0.0	4.5		W	5.5	5.0	5.0	6.0	D	6.0	JLB
15/0001							1.2										4.0									

1431/1501 UTC 15 Sep 1988





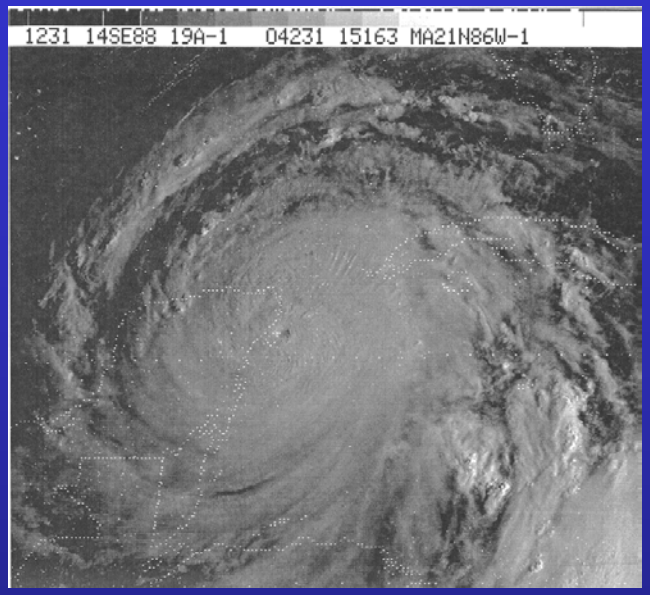
Issues for 1431/1501 UTC 15 Sep 1988

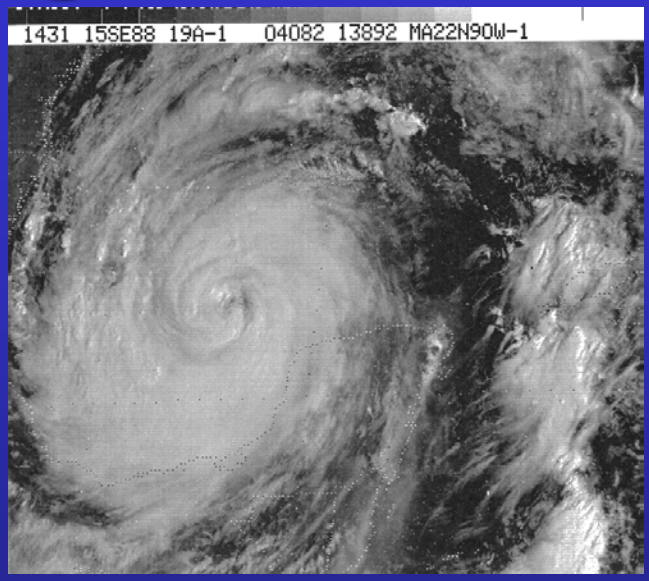
How has the storm changed in the last 24 hours? Is there any change in development trend?

What cloud patterns could be used for measurements? Which one might be the best?

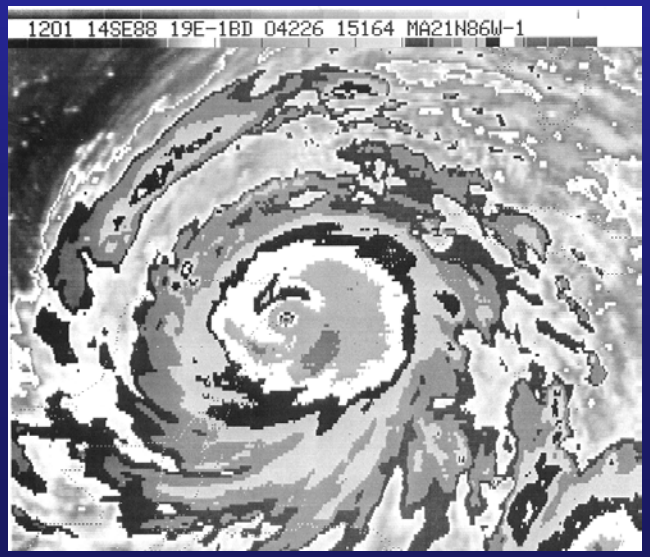
Can infrared banding be used here?

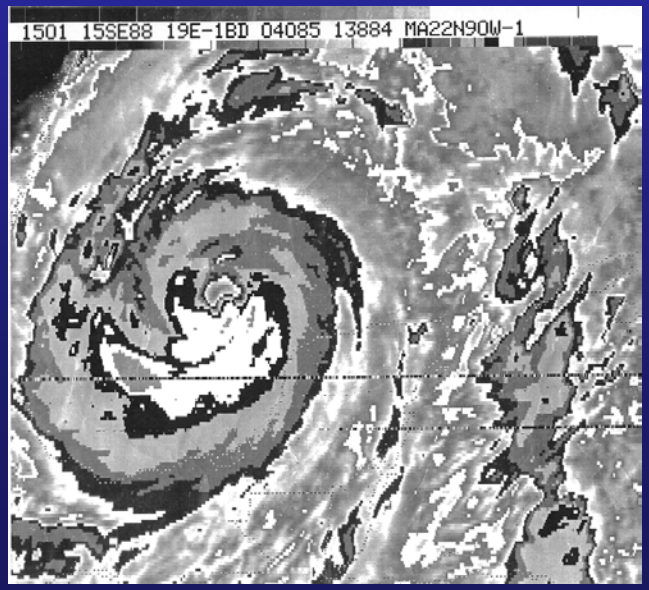
24 hr change?





w





TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB
14/1201								DG	EYE IN	W/CMG	6.0	0.5***			6.5	0.0	6.5		W	6.5	7.0	6.5	7.5	B	???	JLB
14/1231									0.7°		5.0	0.0			5.0	2.0	7.0		W	6.5	7.0	6.5	7.5	B	???	JLB

TROPICAL CYCLONE ANALYSIS WORKSHEET

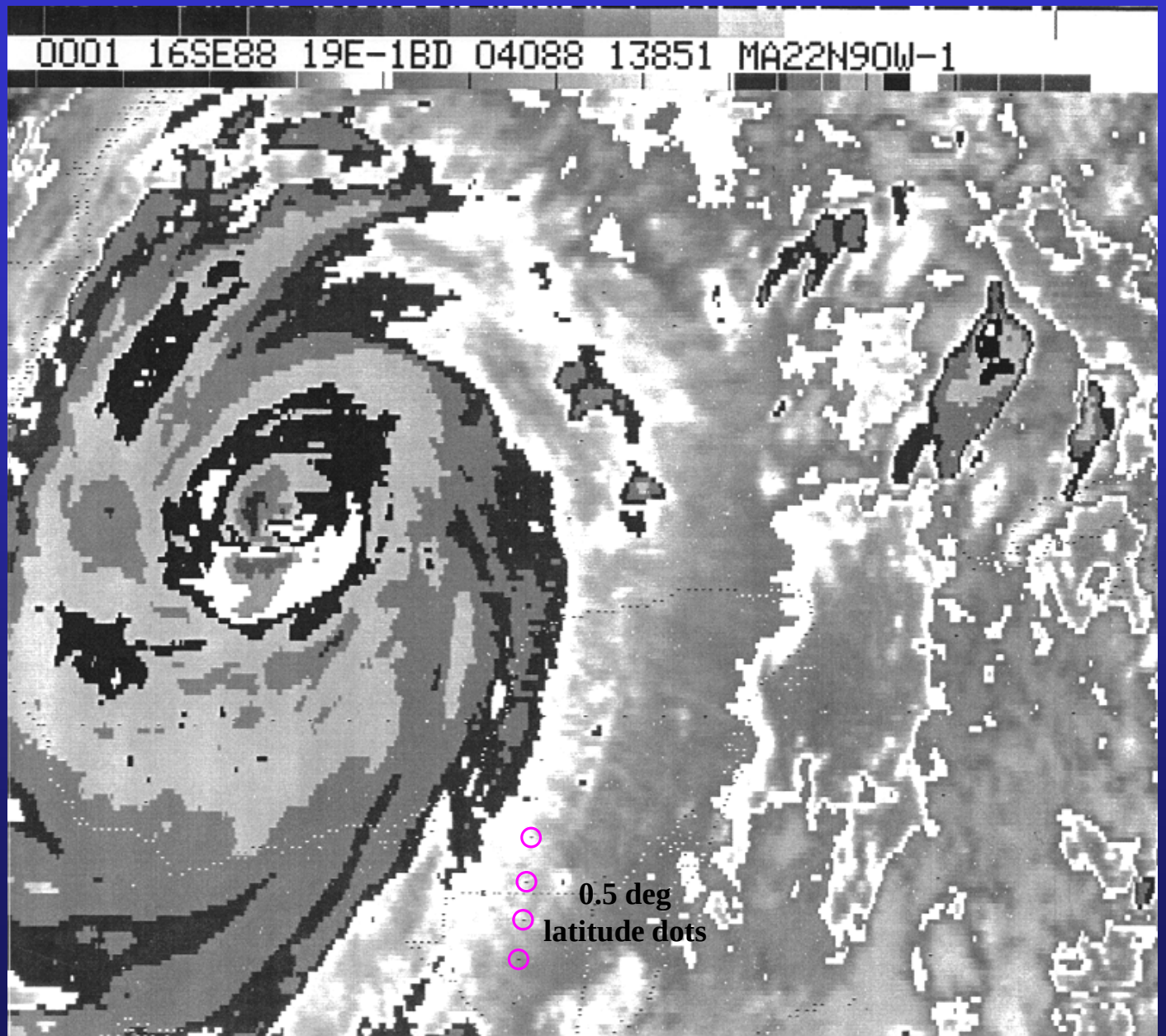
From Vernon F. Dvorak
May 1982

T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
15/0001														LG	4.5	0.0	4.5		W	5.5	5.0	5.0	6.0	D	6.0	JLB
15/0001							1.2										4.0									
15/1431								1.6									4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB
15/1431									0.5°		4.0	-0.5			3.5	1.5	5.0									
15/1500								OW	EYE IN	MG	4.5	0.0			4.5	0.0	4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB

0001 UTC 16 Sep 1988

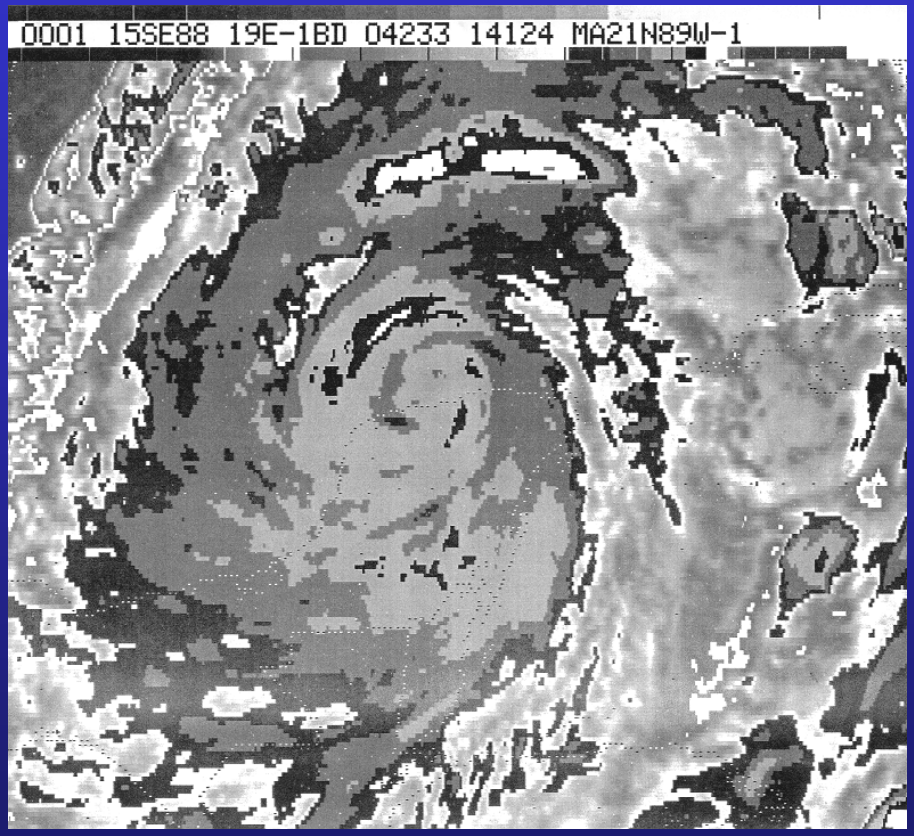


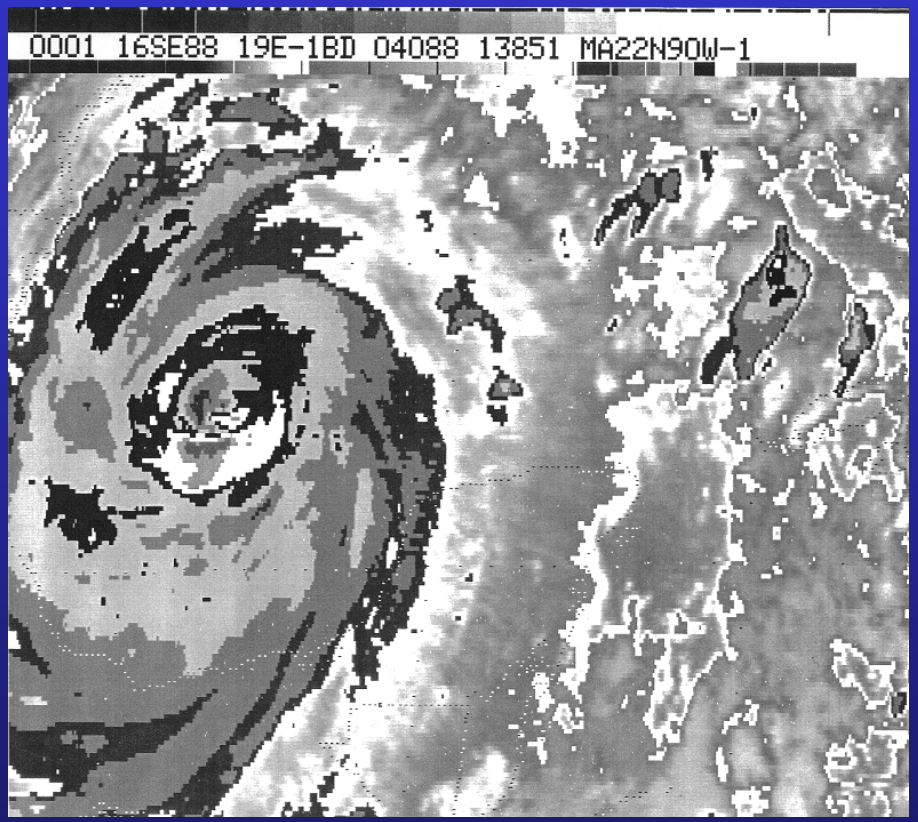
Issues for 0001 UTC 16 Sep 1988

How has the storm changed in the last 24 hours? Is there any change in development trend?

What cloud patterns could be used for measurements? Which one might be the best?

24 hr change?





D

TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB
14/1201								DG	EYE IN	W/CMG	6.0	0.5***			6.5	0.0	6.5		W	6.5	7.0	6.5	7.5	B	???	JLB
14/1231									0.7°		5.0	0.0			5.0	2.0	7.0		W	6.5	7.0	6.5	7.5	B	???	JLB

TROPICAL CYCLONE ANALYSIS WORKSHEET

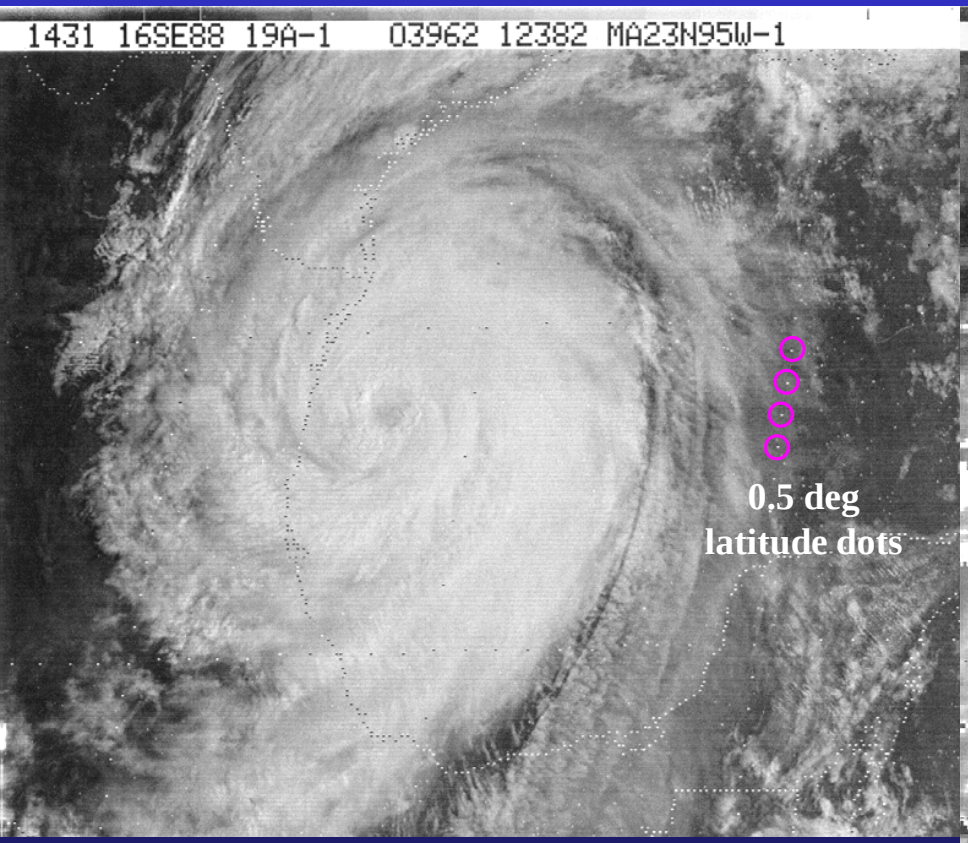
From Vernon F. Dvorak
May 1982

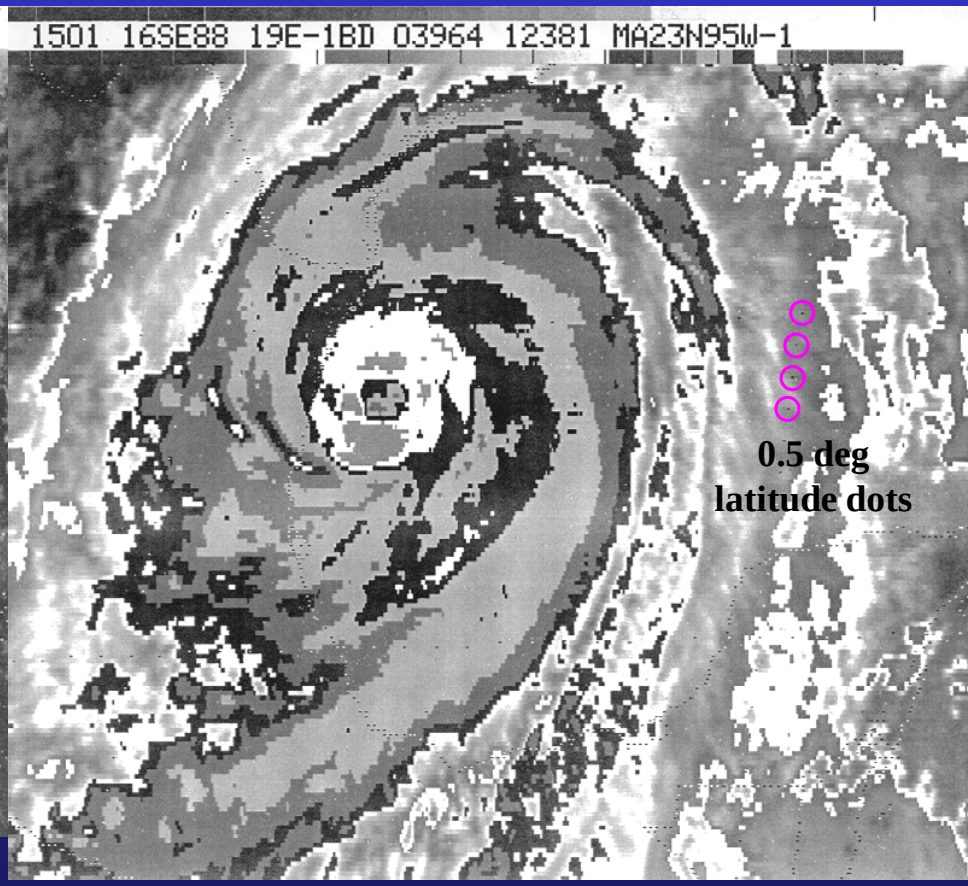
T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
15/0001														LG	4.5	0.0	4.5		W	5.5	5.0	5.0	6.0	D	6.0	JLB
15/0001							1.2										4.0									
15/1431								1.6									4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB
15/1431									0.5°		4.0	-0.5			3.5	1.5	5.0									
15/1500								OW	EYE IN	MG	4.5	0.0			4.5	0.0	4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB
16/0001								DG	EYE IN	LG/B	5.0+	0.0			5.0+	0.0	5.0+		D	6.0	5.5	5.5	5.5	B	???	JLB

1431/1501 UTC 16 Sep 1988



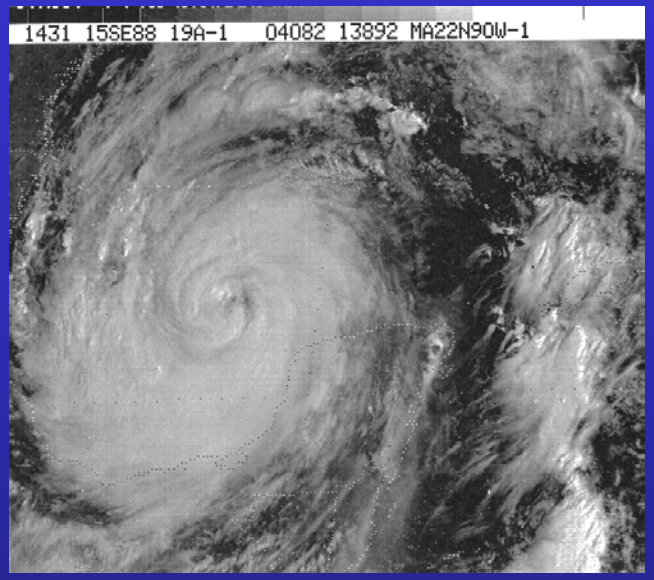


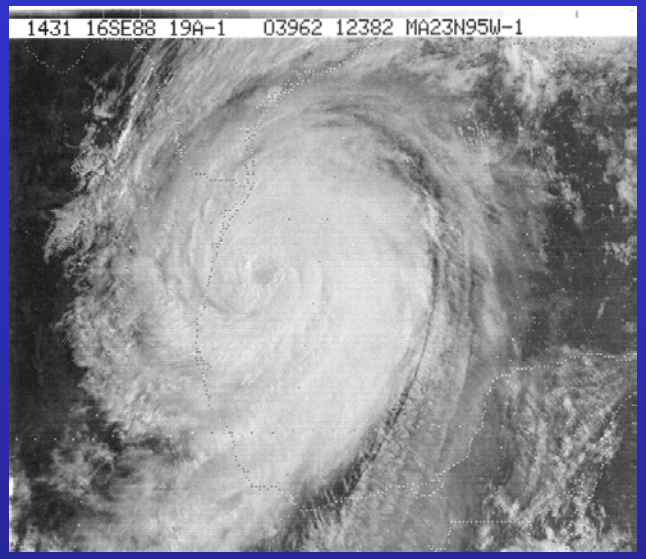
Issues for 1431/1501 UTC 16 Sep 1988

How has the storm changed in the last 24 hours? Is there any change in development rate or trend?

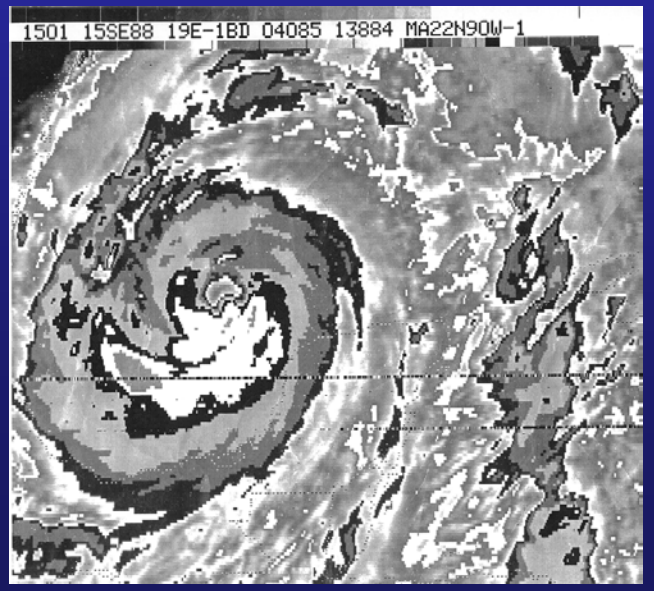
What cloud patterns could be used for measurements? Which one might be the best?

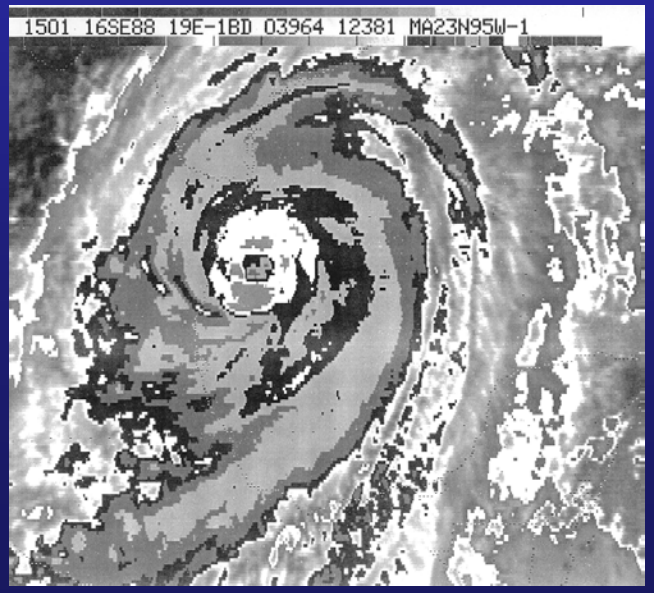
24 hr change?





D





TROPICAL CYCLONE ANALYSIS WORKSHEET

From Vernon F. Dvorak May 1982

			T-Number Estimates from Measurements for Data-T (DT) Computation														T-Number Estimates from Model and DT Constraints							
STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10	
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast	
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
08/1301				0.4													2.5		D	1.0	2.0	1.5	1.5	P	2.5	JLB
08/2301			NO	DT	-	USE	RULES										N/A		D	1.5	1.5	1.5	1.5	P	2.5	JLB
09/1201			0.8°														2.0		D	2.5	2.0	2.0	2.0	P	2.5	JLB
10/0001					0.65												3.0		D	2.5	3.0	3.0	3.0	P	4.5	JLB
10/1201					0.65												3.0		D	3.0	3.0	3.0	3.0	P	4.0	JLB
10/1201												IRREG	1.5°		2.5+	0.5	3.0+								
11/0001							1.20										4.0		D	3.5	4.5	4.0	4.0	P	5.0	JLB
11/0001								DG	EYE IN	MG	4.5	-0.5			4.0	0.0	4.0									
11/1101								LG	EYE IN	LG/W	5.0+	0.0			5.0+	0.0	5.0+		D	4.0	6.0	4.5	4.5	C	6.0	JLB
11/1101														LG	4.5+	0.0	4.5+									
11/1201									0.5°		4.0	-0.5			3.5	1.0+	4.5+		D	4.0	5.0	4.5+	4.5+	C	6.0	JLB
11/1201								1.5									4.5									
12/0001								OW	EYE IN	LG	5.0	0.0			5.0	0.0	5.0		D+	5.5	5.5	5.0	5.0	P	6.0	JLB
12/1131								WMG	EYE IN	LG/B	5.0	1.0			6.0	0.0	6.0		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
12/1201									0.9°		5.5	0.0			5.5	1.0	6.5		D+	6.0	5.5	6.0	6.0	C	7.5	JLB
13/0001								OW	EYE IN	B/W	5.5+	0.5			6.0+	0.5	6.5+		D+	6.5	6.5	6.5+	6.5+	C	8.0	JLB
13/1201								DG	EYE IN	CMG	6.5	0.5***			7.0	0.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
13/1231									0.9°		5.5	0.5***			6.0	1.5	7.5		D+	7.5	7.0	7.5	7.5	C	8.0	JLB
14/0001								WMG	EYE IN	CMG	6.5	1.0			7.5	0.5	8.0		D+	8.0	7.5	8.0	8.0	G?	???	JLB
14/1201								DG	EYE IN	W/CMG	6.0	0.5***			6.5	0.0	6.5		W	6.5	7.0	6.5	7.5	B	???	JLB
14/1231									0.7°		5.0	0.0			5.0	2.0	7.0		W	6.5	7.0	6.5	7.5	B	???	JLB

TROPICAL CYCLONE ANALYSIS WORKSHEET

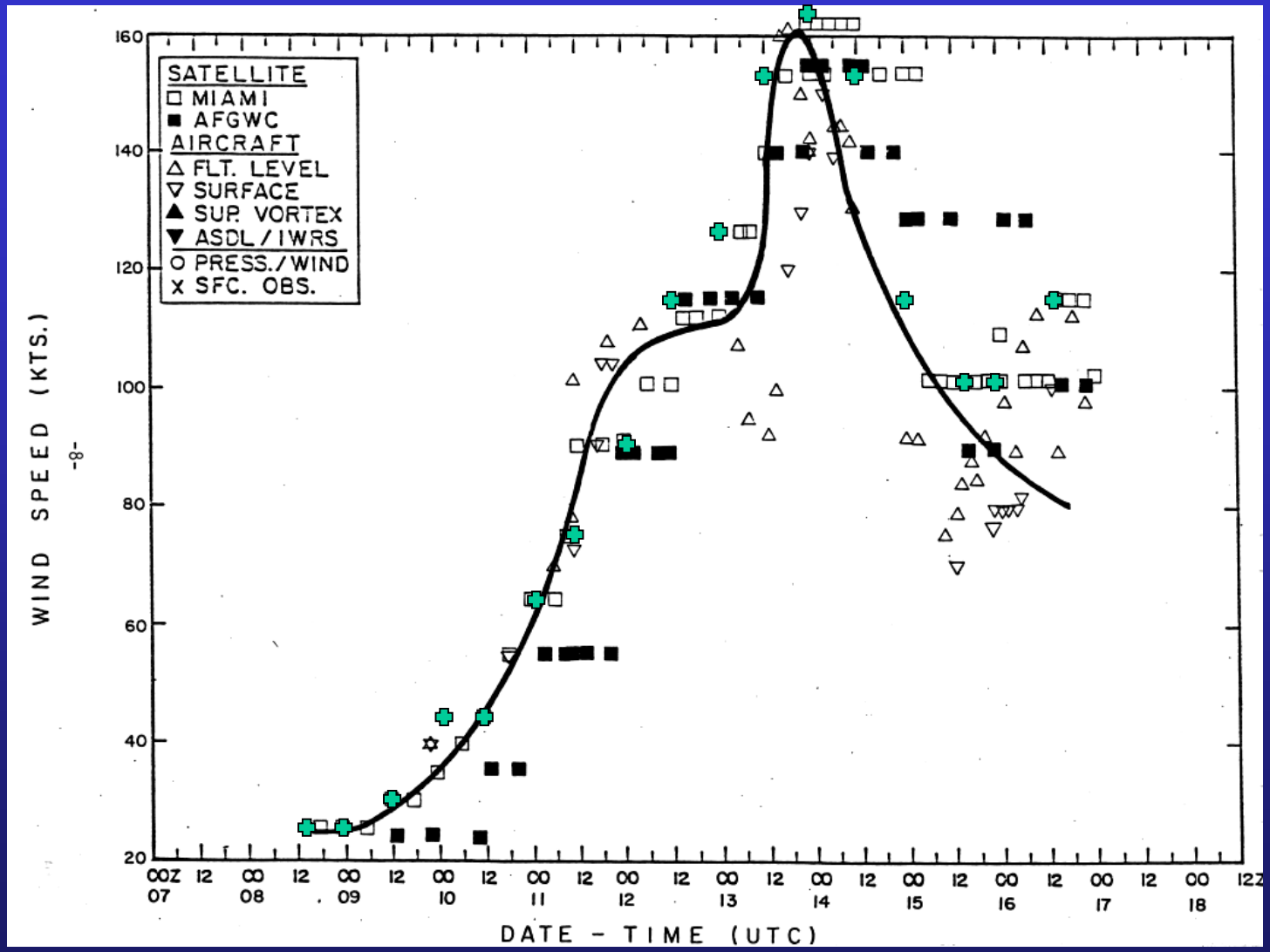
From Vernon F. Dvorak
May 1982

T-Number Estimates from Measurements for Data-T (DT) Computation

T-Number Estimates from Model and DT Constraints

STEP:	1.0		2A, B						2C				2D	2E				3	4	5	6	7, 8	9	10		
Description	Location		Curved Band or Shear						Eye Pattern		Eye # + Eye Adj = Central Feature (CF)		CDO	Embedded Center				CCC	Trend	MET	PAT	FT	CI	24-hour forecast		
Rules:	Locate cloud system center (CSC) at focal point of cloud curvature		Use spiral arc length (tenths) or shear distance (degrees latitude)						(VIS) Use embedded distance (deg. Latitude)	(EIR) Use surrounding temperature (shade on BD curve)	From the VIS and EIR tables and rules		(VIS) Size of Central Dense Overcast (deg. latitude)	(EIR) Embedded temperature (shade on BD curve)	Data T-Number Computation CF + Banding Feature (BF) = DT			Use rules	24-hr change	From 24-hr old FT and Step 4 trend	From pictographs on the flowcharts	Use rules	Use rules	Adjust model forecast if necessary		
Date/Time (UTC)	Lat. (°N)	Lon. (°W)	DT1.5 ±0.5	DT2.5	DT3.0	DT3.5	DT4.0	DT4.5			Eye number	Eye adjustment			CF	BF	DT	Central Cold Cover	D -Developing W - Weakening S – Steady/Same	Model Expected T-Number	Pattern T-Number	Final T-Number	Current Intensity Number	List Rule Used	Forecast Intensity Number	Analyst Initials
15/0001														LG	4.5	0.0	4.5		W	5.5	5.0	5.0	6.0	D	6.0	JLB
15/0001							1.2										4.0									
15/1431								1.6									4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB
15/1431									0.5°		4.0	-0.5			3.5	1.5	5.0									
15/1500								OW	EYE IN	MG	4.5	0.0			4.5	0.0	4.5		W	4.0	4.5	4.5	5.5	D	5.5	JLB
16/0001								DG	EYE IN	LG/B	5.0+	0.0			5.0+	0.0	5.0+		D	6.0	5.5	5.5	5.5	B	???	JLB
16/1431									0.75°		5.0	-1.0			4.0	1.5+	5.5+		D	5.5	6.0	6.0	6.0	B	???	JLB
16/1501								MG	EYE IN	W	6.0	0.0			6.0	0.0	6.0		D	5.5	6.0	6.0	6.0	B	???	JLB

What storm was this?



Hurricane Gilbert, September 1988