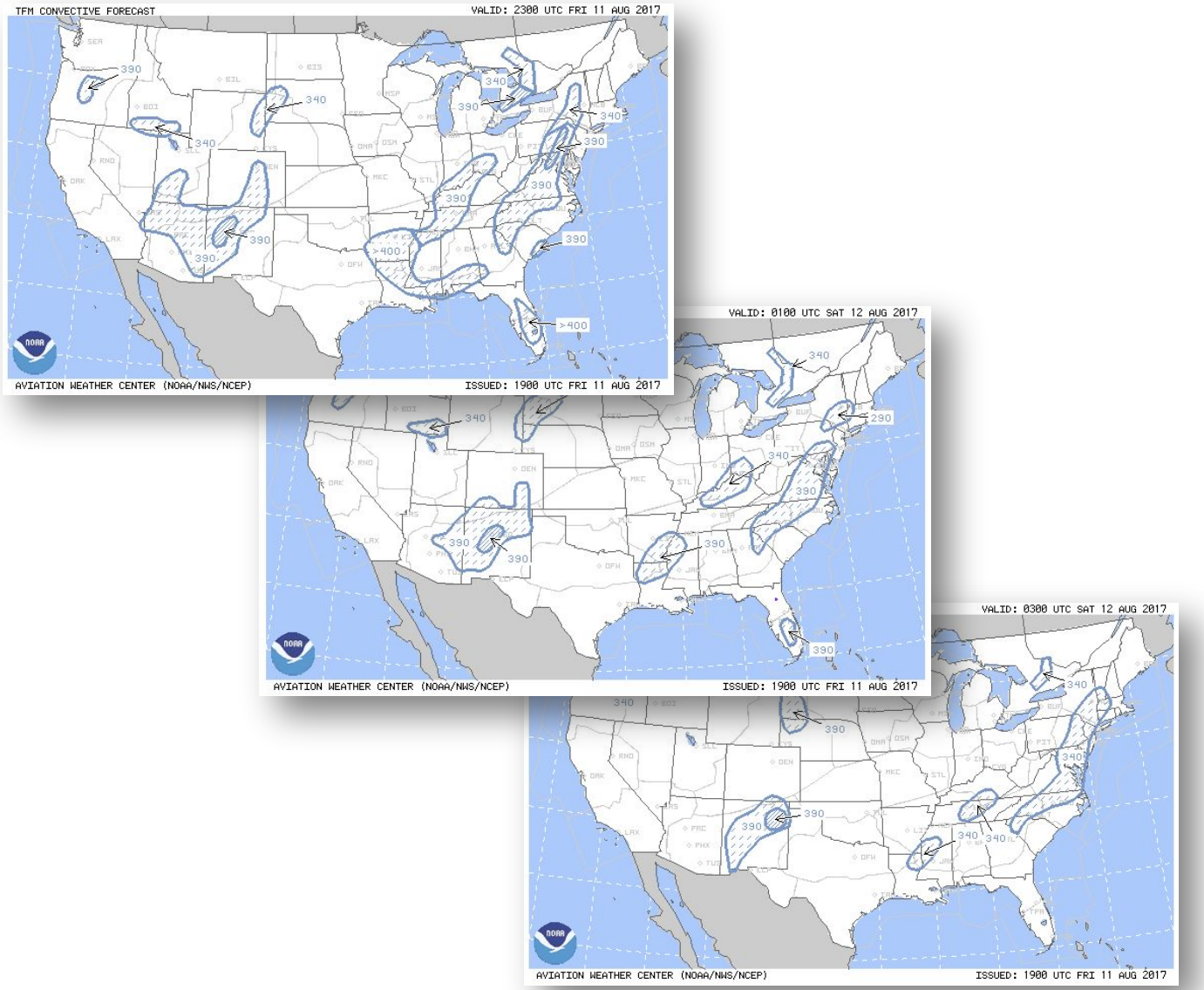
Traffic Flow Management Convective Forecast 2022

NOAA/NWS/Aviation Weather Center
Kansas City, MO

2022 TCF



- Issued 24x7, every 2 hrs
- Forecast for 4-6-8 hours
- High Confidence areas only
- Does NOT account for or depend on lightning
- Available on web, TSD and NOAAPort

When is TCF Available

AutoTCF

- Runs year round
- Is the official forecast during the off season (Nov-Feb)
- Available to meteorologists as first guess before collaborated product is issued

Collaboration

- Seasonal (Mar-Oct)
- NWS & Industry collaborate every 2 hours to produce final
- Refines areas based on meteorologist assessments
- Final forecast may not look like autoTCF after collaboration

The TCF Collaboration Forecast Process

AWC TCF Meteorologist Role

a) Analyze convective weather and produce preliminary forecast using autoTCF as a baseline

b) Facilitate the collaboration in the whiteboard
   - Acknowledge requests
   - Provide meteorological reasoning when changes not made

c) Produce TCF based on feedback from collaboration

TCF Collaborators Role

a) Prepare for collaboration by analyzing convective weather and reviewing the autoTCF

b) Provide feedback during the collaboration in the whiteboard
   - Concurrence with preliminary forecast
   - Meteorological reasoning for requested changes

c) Brief decision makers on TCF

2022 TCF Collaboration Schedule

First Issuance: Tuesday 1 March 0130 CST

Last Issuance: Monday 31 October 1730 CDT

(Southern Ontario/Quebec: 1 Apr-30 Sep)

30 minute Collaboration Sessions

Final Product issued 45 minutes prior to Strategic Planning Webinar

TCF Production Cycle

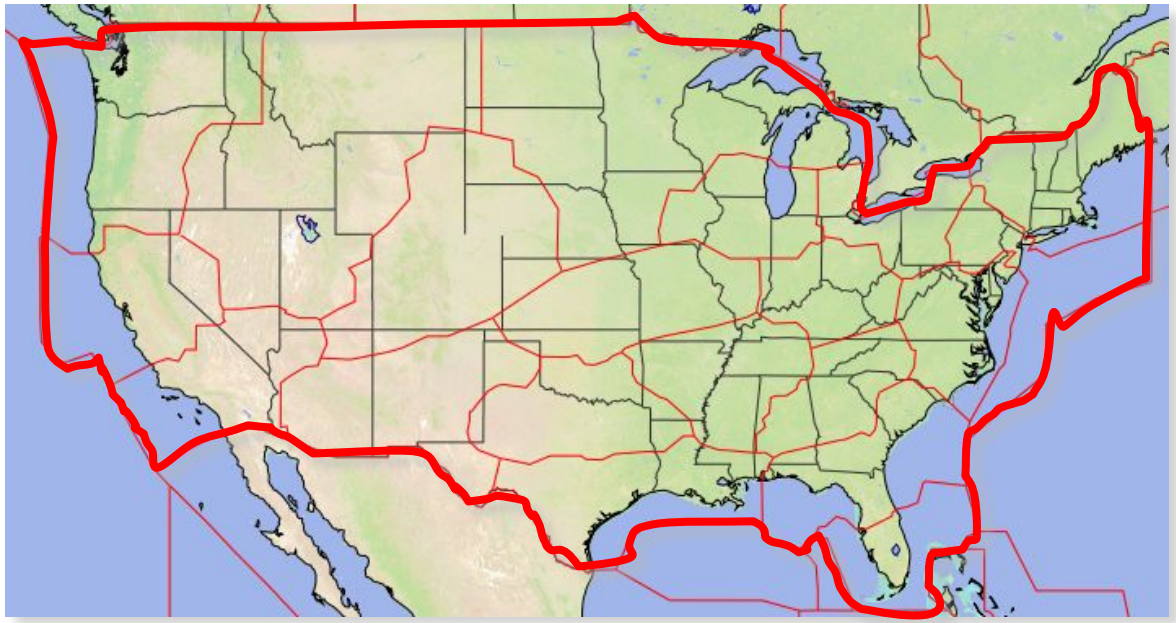
Central Time CDT/CST

	autoTCF made available to NWS Collaborating Meteorologists	prelimTCF Issued/ Whiteboard Collaboration Start	Whiteboard Collaboration End/ finalTCF Edits Begin	AWC Shift Change	finalTCF Issued	Strategic Planning Webinar
t- (min)	120	90	60		45	0
Central Time CDT/CST						
11Z/12Z TCF	**4:15 AM**	**4:45 AM**	**5:15 AM**		**5:30 AM**	**6:15 AM**
13Z/14Z TCF		**6:15 AM**	**6:45 AM**	**7:00 AM**	**7:30 AM**	**8:15 AM**
15Z/16Z TCF	**8:15 AM**	**8:45 AM**	**9:15 AM**		**9:30 AM**	**10:15 AM**
17Z/18Z TCF	**10:15 AM**	**10:45 AM**	**11:15 AM**		**11:30 AM**	**12:15 PM**
19Z/20Z TCF	**12:15 PM**	**12:45 PM**	**1:15 PM**		**1:30 PM**	**2:15 PM**
21Z/22Z TCF		**2:15 PM**	**2:45 PM**	**3:00 PM**	**3:30 PM**	**4:15 PM**
23Z/00Z TCF	**4:15 PM**	**4:45 PM**	**5:15 PM**		**5:30 PM**	**6:15 PM**
01Z/02Z TCF	**6:15 PM**	**6:45 PM**	**7:15 PM**		**7:30 PM**	**8:15 PM**
03Z/04Z TCF	**8:15 PM**	**8:45 PM**	**9:15 PM**		**9:30 PM**	
05Z/06Z TCF		**10:15 PM**	**10:45 PM**	**11:00 PM**	**11:30 PM**	
07Z/08Z TCF	**12:15 AM**	**12:45 AM**	**1:15 AM**		**1:30 AM**	
09Z/10Z TCF	**2:15 AM**	**2:45 AM**	**3:15 AM**		**3:30 AM**	

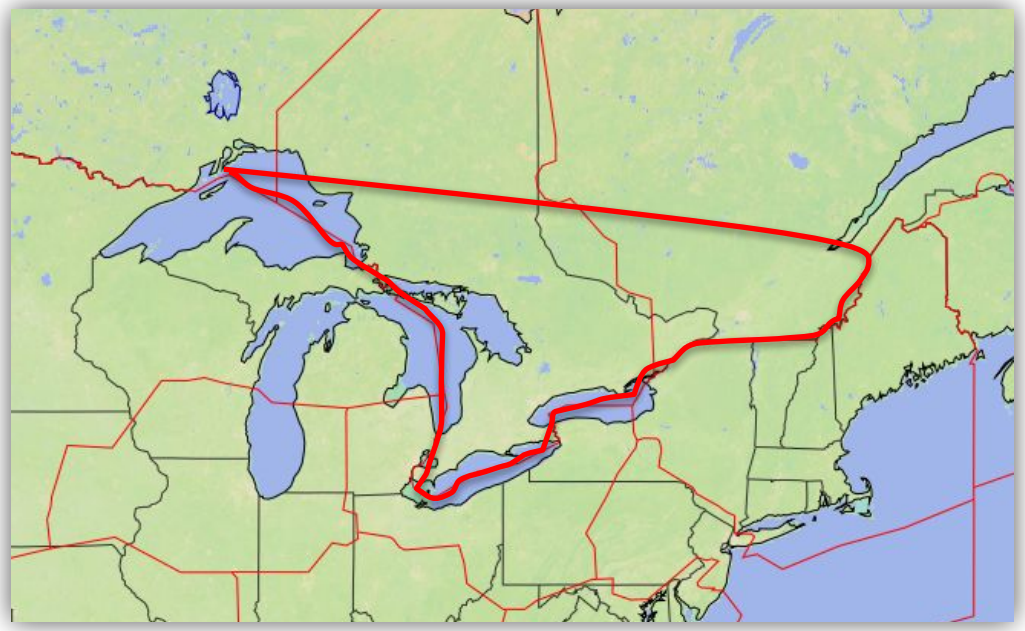
PREVIEW **Web & PREVIEW** **TCF & PREVIEW**

TCF Domain

Covers the Domestic FIRs



Apr 1-Sep 30
*MSC area of responsibility



*Meteorological Services of Canada

TCF Minimum Criteria

Areas of convection:

- Polygon coverage ≥ 25%
- ≥ 40 dBZ reflectivity
- Echo tops ≥ FL250
- Highly confident this will occur

Sparse 25-39% (broken hatching) 

Medium 40-74% (solid hatching) 

Solid Lines of convection:

- Linear coverage of ≥ 75%
- ≥ 40 dBZ reflectivity
- ≥ 100 nautical miles in length
- Echo tops ≥ FL250
- Highly confident this will occur

Solid Line 75-100% 

(Note: Lines can stand alone or be included within areas.)

Important Notes

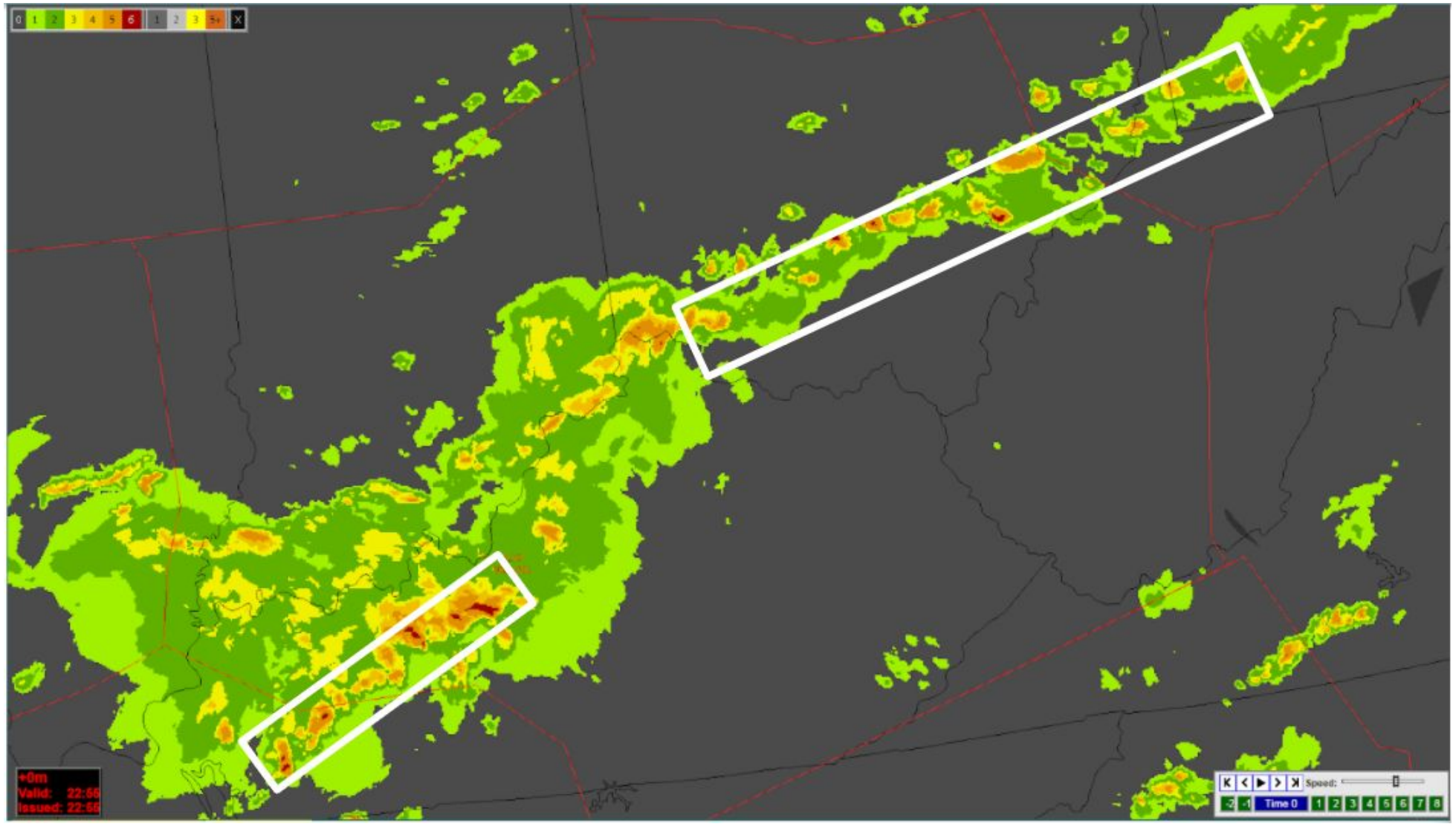
TCF is the primary convective forecast for NAS planning

No TCF areas ≠ No Convection

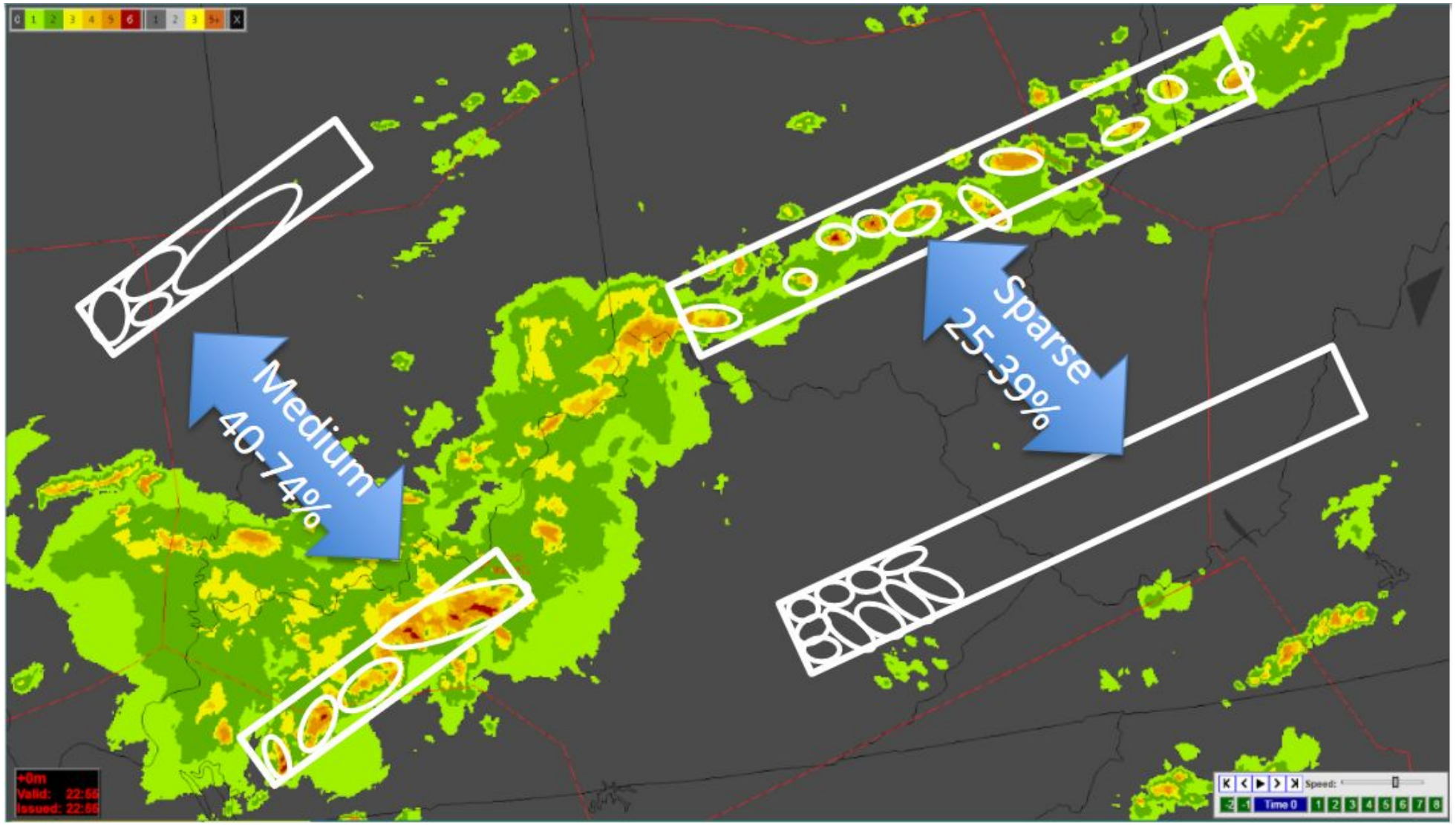
TCF polygons are **high confidence** areas of convection meeting **minimum criteria**. Convection may exist in low confidence areas or in areas that do not meet criteria (e.g. isolated coverage).

Communication is key to successful planning

Is This Sparse or Medium?



Is This Sparse or Medium?

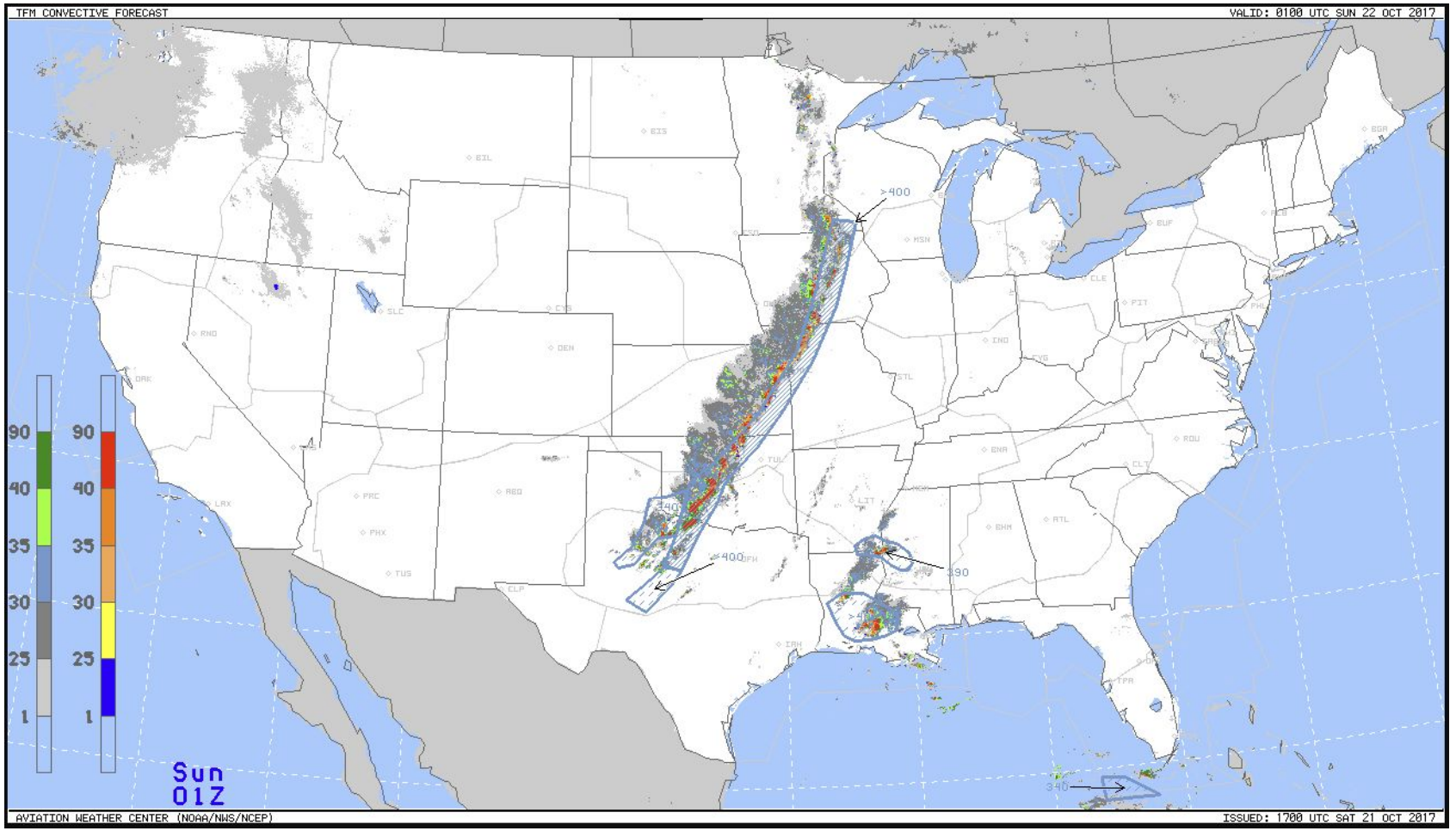


TCF Medium vs Line

Medium Coverage Polygon vs. Solid Line

Medium Coverage
40-74% coverage

Solid Line
≥75% coverage



TCF Echo Tops

Labeled as follows, inside each area:

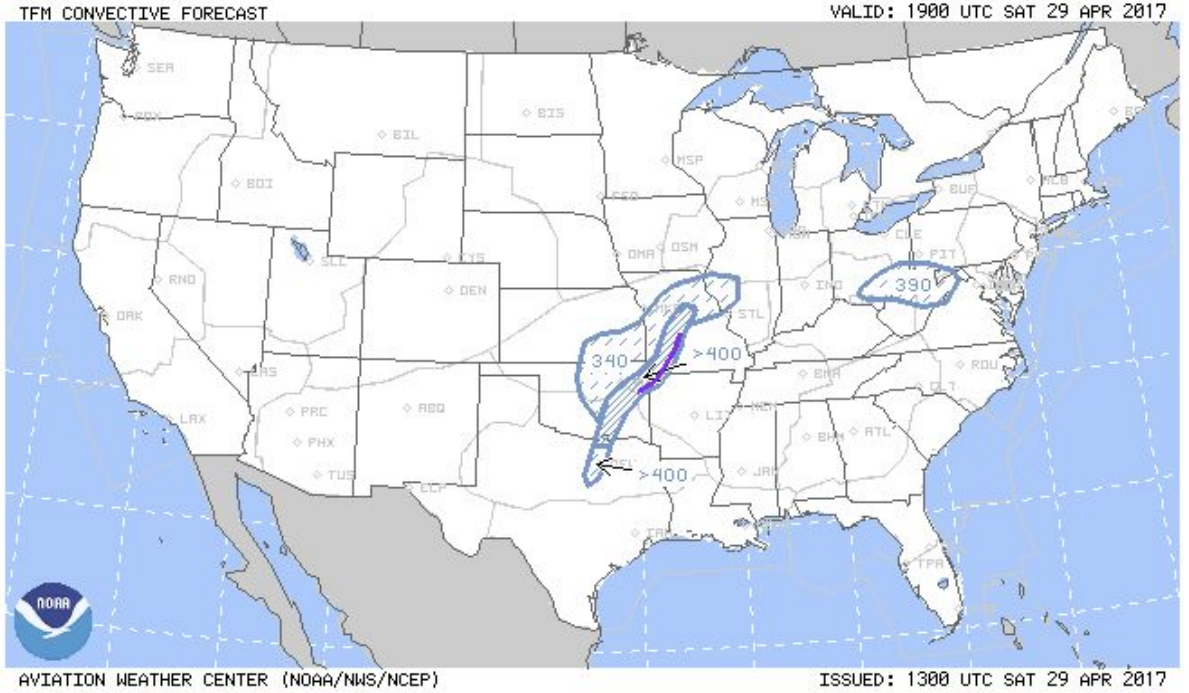
25000→29000 MSL = "290"

30000→34000 MSL = "340"

35000→39000 MSL = "390"

40000+ MSL = ">400"

(Note: Solid lines do not have an Echo Top label)

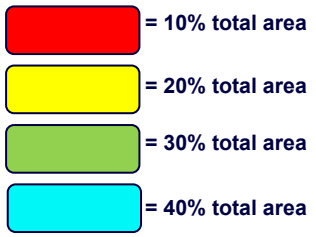


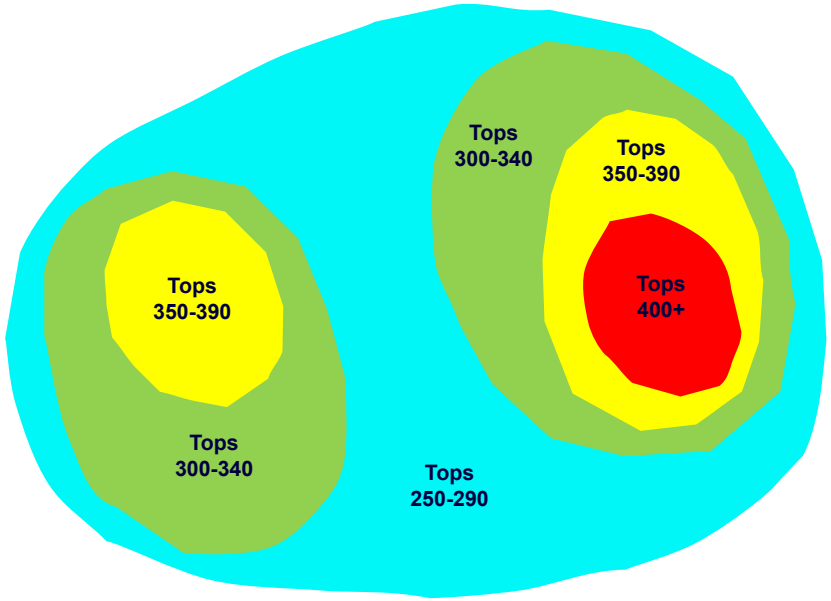
Per FAA feedback, **FL320** is a critical level for operations. Focus is given to this threshold while forecasting tops and during the collaboration sessions.

TCF Echo Tops Example

For example… start at highest tops and work down

Height	Total Area
400+	10%
350-390	20%
300-340	**30%**
250-290	40%





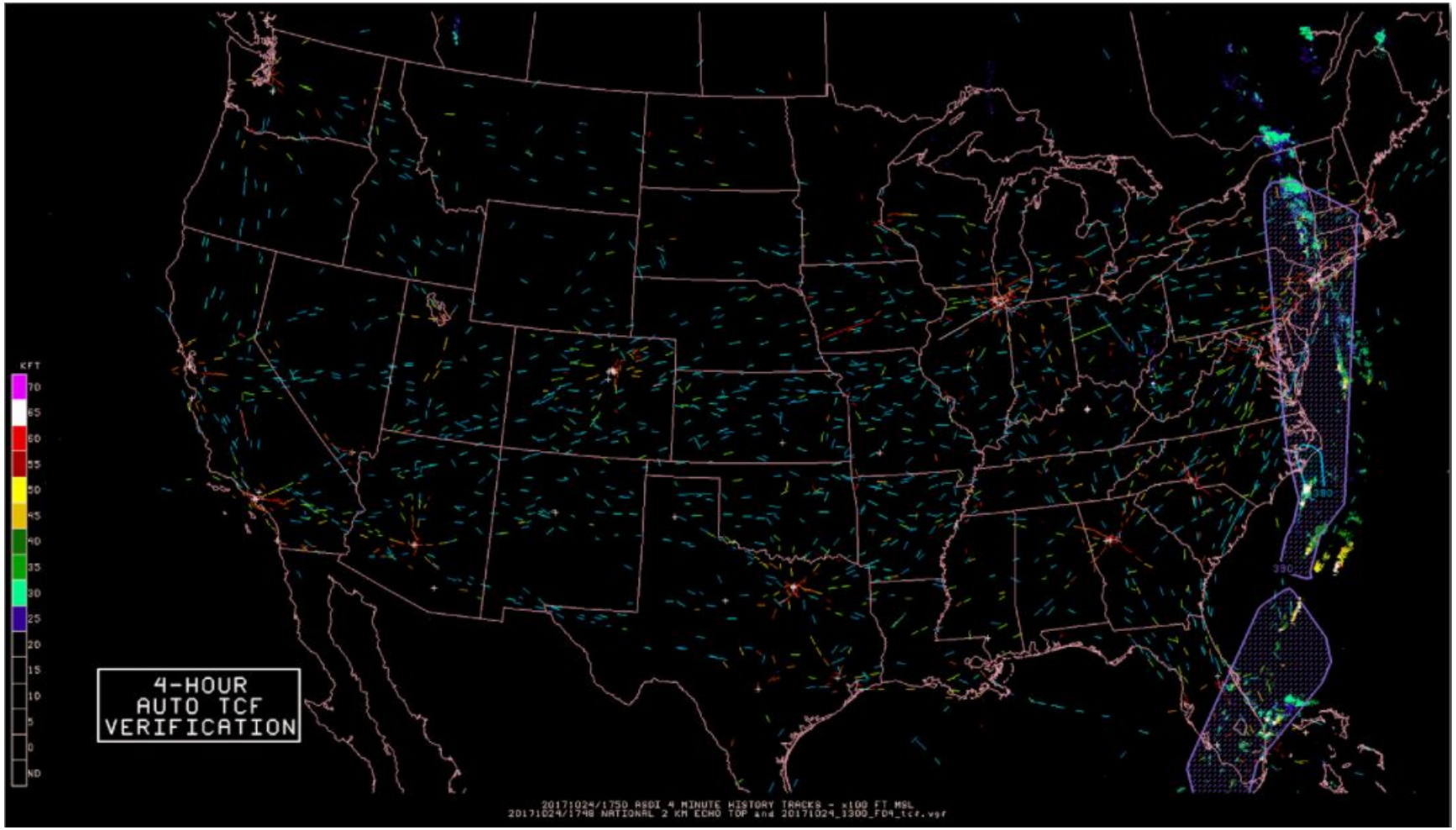
What is the first instance of ≥ 25% total area?

Echo tops forecast is 340

*(TCF tops are **not** MAX* tops)

TCF Impact Areas

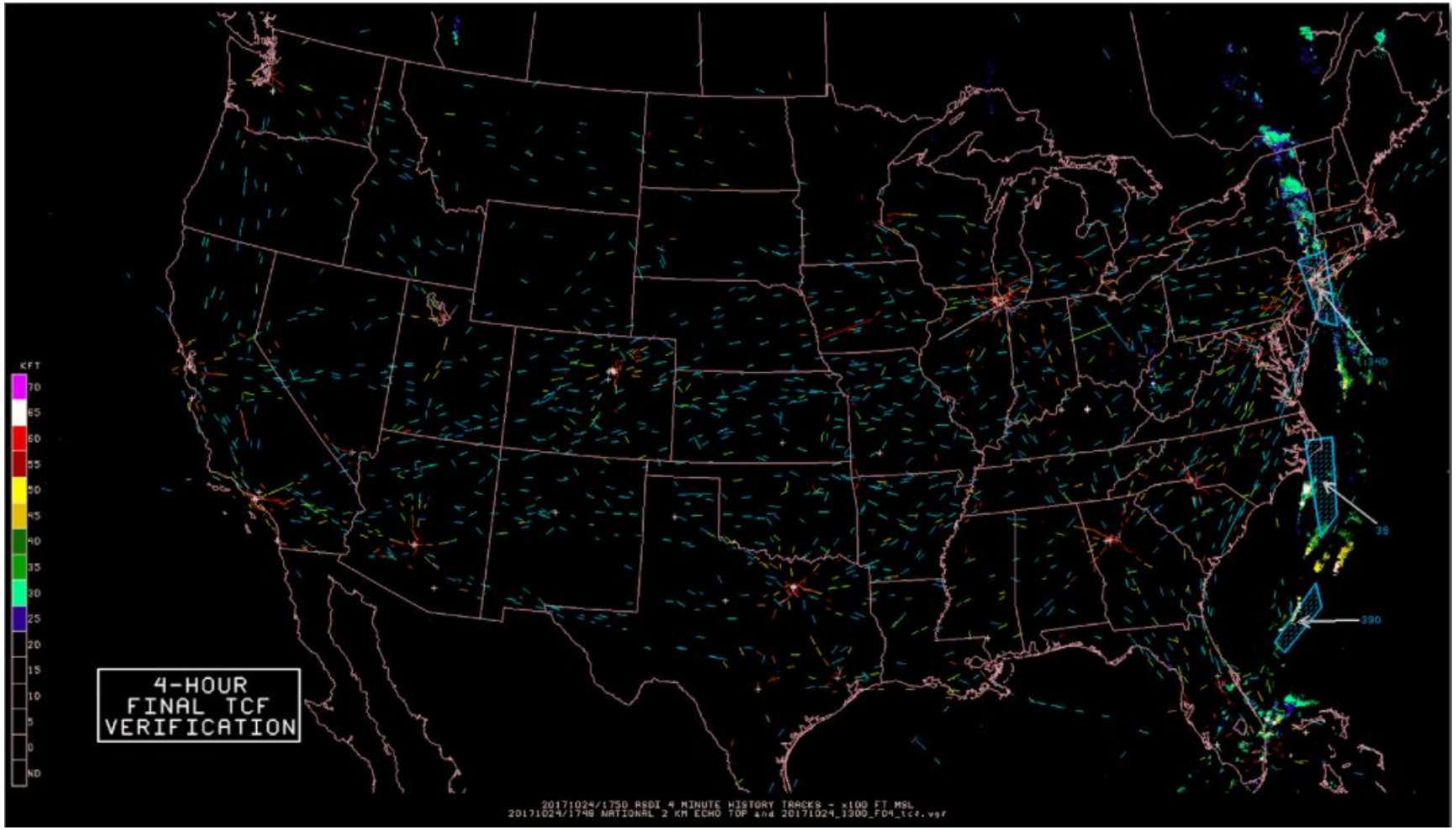
Consider High Impact Areas (Auto)



Automated product based on HRRR^{t-1}, HRRR^{t-2}, HRRR^{t-3}, HiresWARW, HiresWARWm2

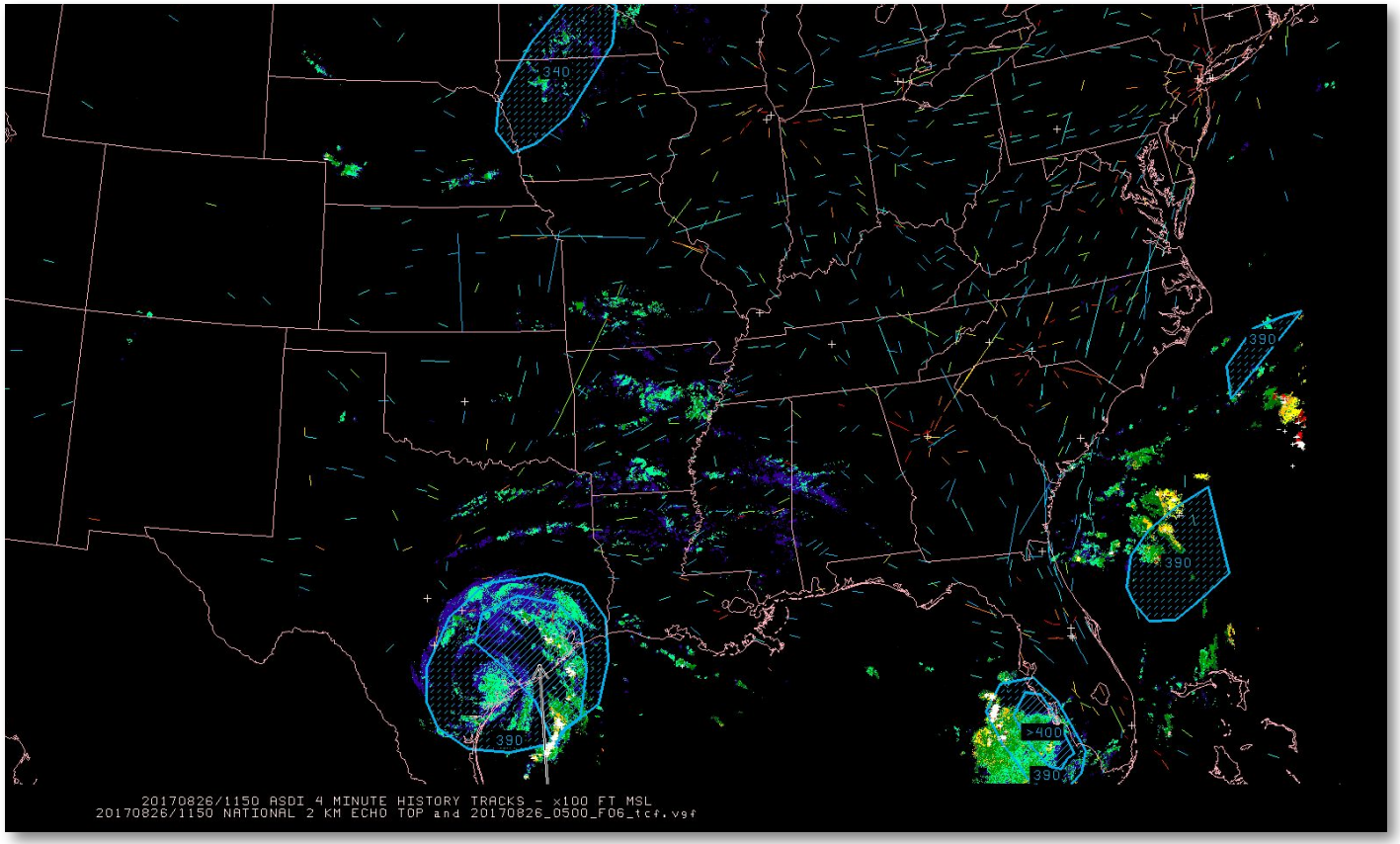
TCF Impact Areas

Consider High Impact Areas (Final)



Collaborators add great value to the forecast over the auto TCF

TCF Hurricane Coverage

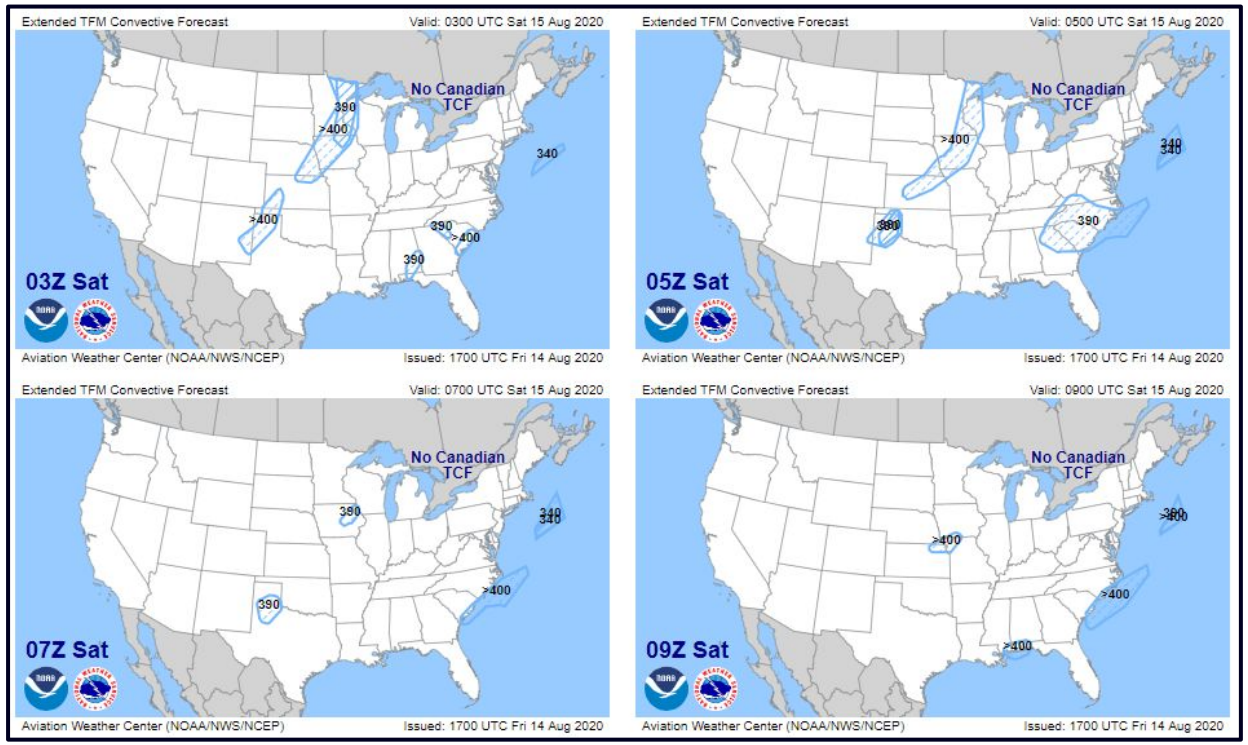


- High Confidence Areas
- 40 dBZ or higher
- Tops ≥ FL250

⇨ May result in only covering the outer bands

Extended TCF (eTCF)

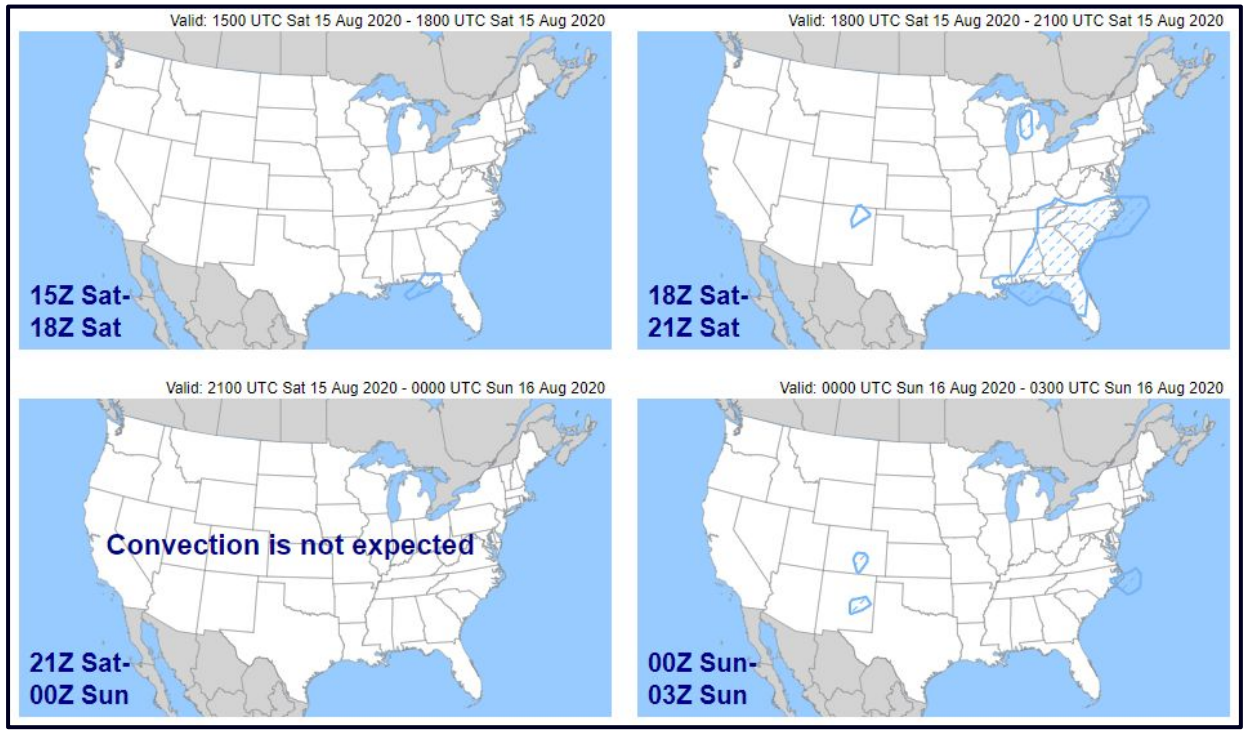
- Forecasts from 10 to 30 hours in 2 hour increments
- Similar look and feel to TCF
- Updated every 2 hours
  - Exception: No solid line!
- Automated product based on HRRR^{t-1}, HRRR^{t-2}, HRRR^{t-3}, HiresWARW, HiresWARWm2



https://aviationweather.gov/tcf/extended

Extended Convective Forecast Product (ECFP)

- Probability forecast from 33 to 72 hours
- Available in 3 hr increments
- Meant to compliment TCF, but is <u>not</u> the same as TCF
- Automated product based on SREF ensemble calibrated thunderstorm probabilities



https://aviationweather.gov/ecfp

TCF Websites

Main TCF Site

https://www.AviationWeather.gov/tcf

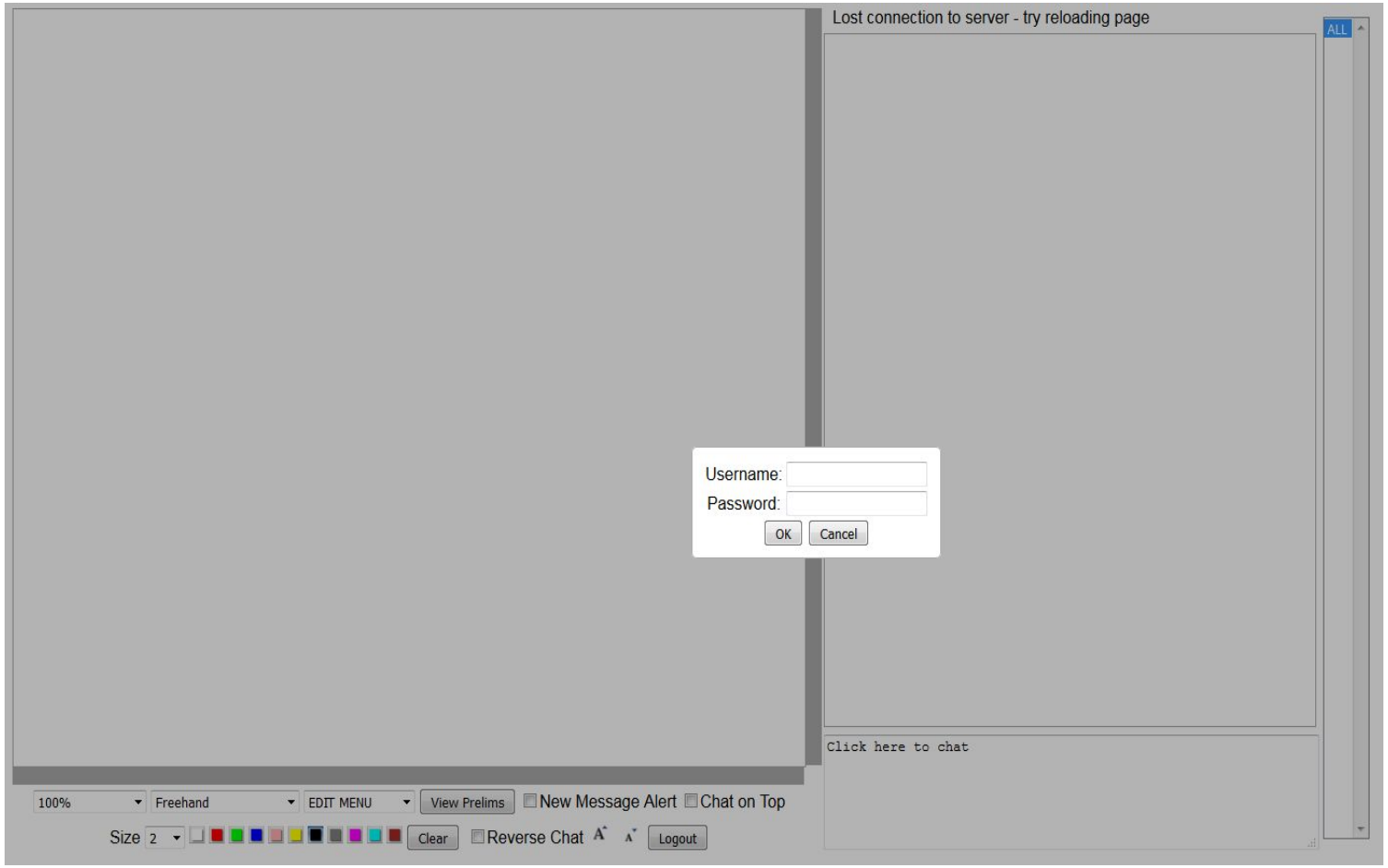
Auto-TCF Preview Site

https://www.AviationWeather.gov/tcf/preview

Restricted to users with AviationWeather.gov account

Whiteboard and Chat

https://cdm.AviationWeather.gov/chat/tcf.html



Request a TCF Whiteboard Account

https://goo.gl/forms/NSFyteeS9nzCR7ga2

- Please fill out the form
  - Individual Accounts Only (Group accounts not allowed)
  - One email with username and another with password
  - This could take several days as it is a manual process for AWC's administrators
  - Your username will look like XXX-FirstinitialLastname (Example: AWC-JDoe)
- Call TCF Desk if you forget your password and need it retrieved (816-584-7269)
- For other chat issues, contact ncep.awc.tcfchat@noaa.gov

Request an AviationWeather.gov Account

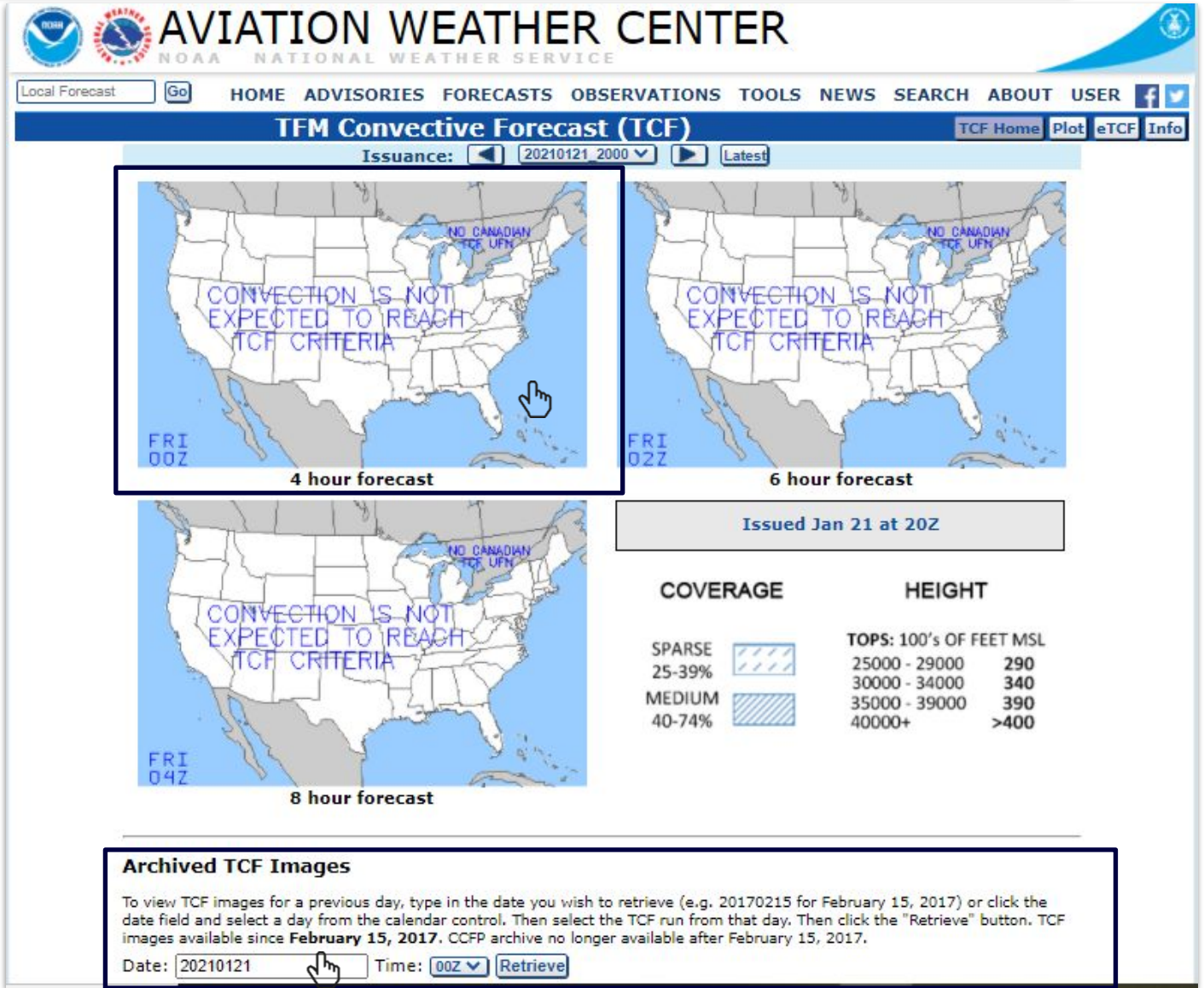
- Visit https://www.aviationweather.gov
- From the top menu select USER and then click Register
  - Please fill out the form
  - Username is your email address
  - Access to the auto-TCF preview and TCF verification could take several days as it is manually granted to people

(Note: the whiteboard is a separate system and different accounts are required)

TCF Verification

To view TCF Verification:

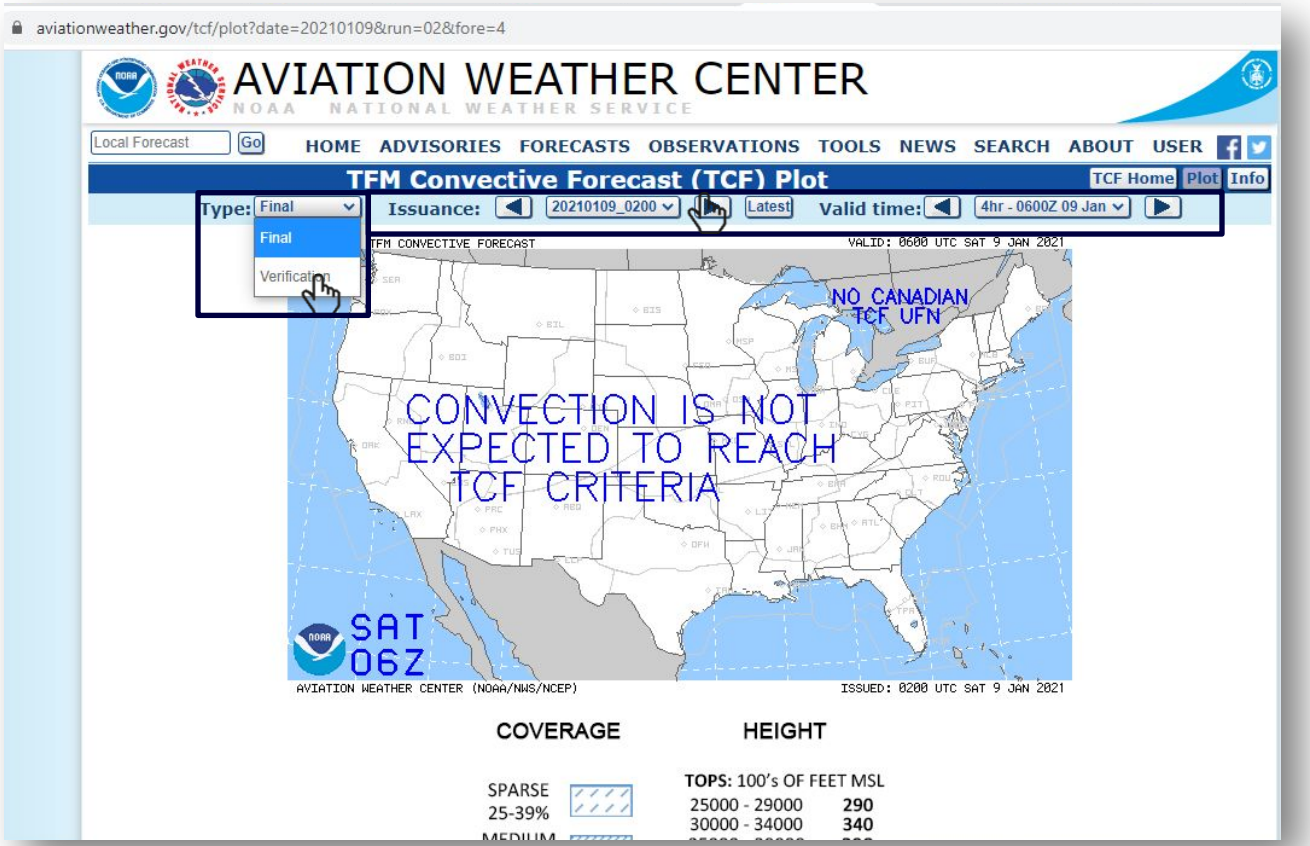
- **Navigate to https://www.aviationweather.gov/tcf**
- **Scroll down and under Archived TCF Images, enter desired date and time cycle issuance. Click Retrieve.**
- **Click on one of the three panels**



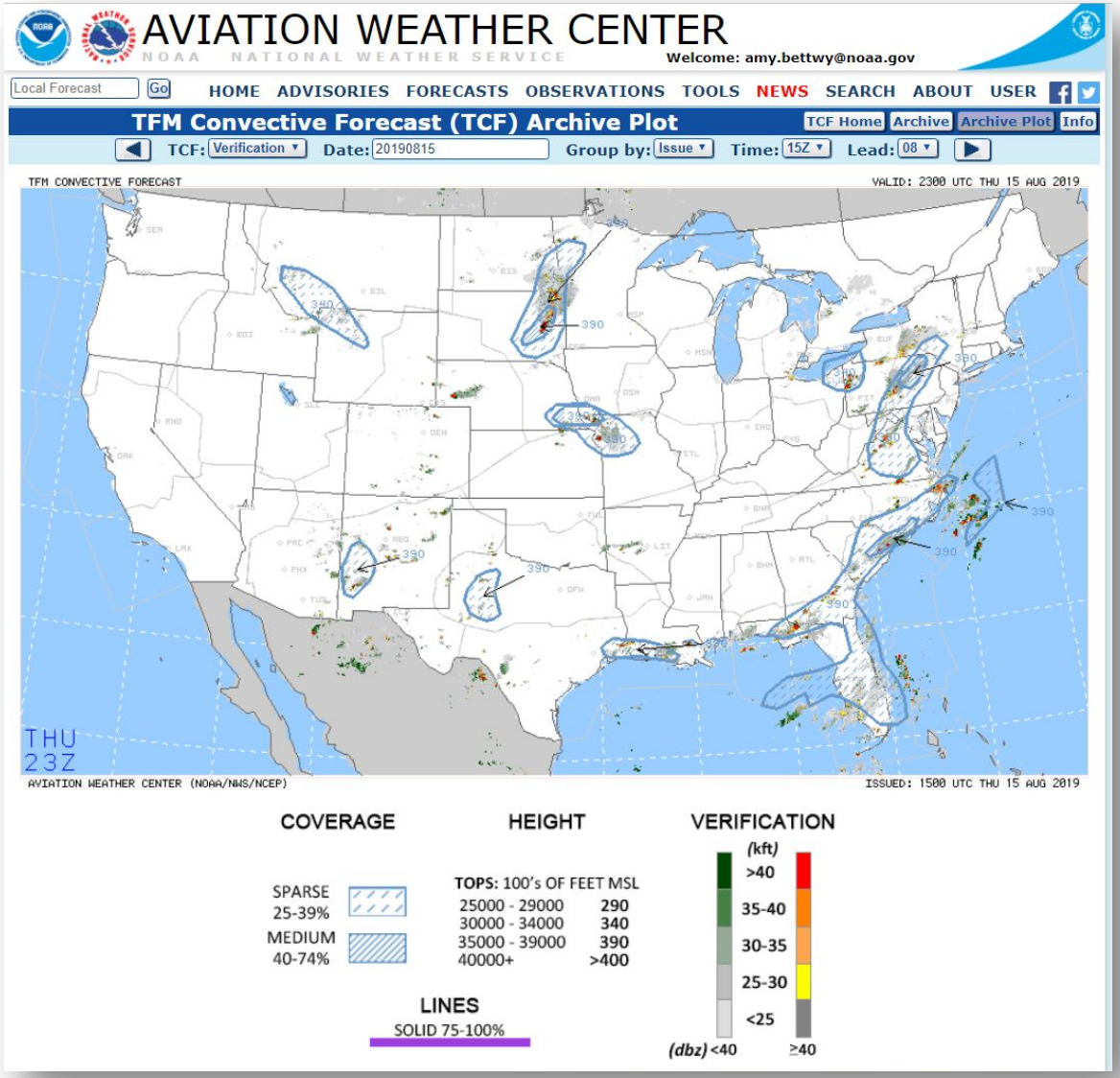
TCF Verification

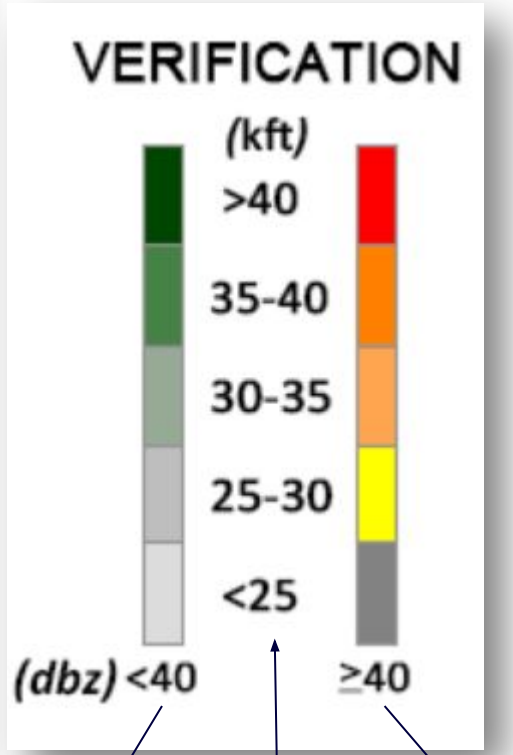
To view TCF Verification:

- **Select Verification on the Type drop down menu**
- **Select Group by Issue time or Valid time**
- **Use arrows to scroll through verification panels**



TCF Verification





Green or "Cool" Areas:

- Reached echo tops criteria but not 40 dbz criteria
- Does not verify polygons

Yellow/Orange/Red or "Hot" Areas:

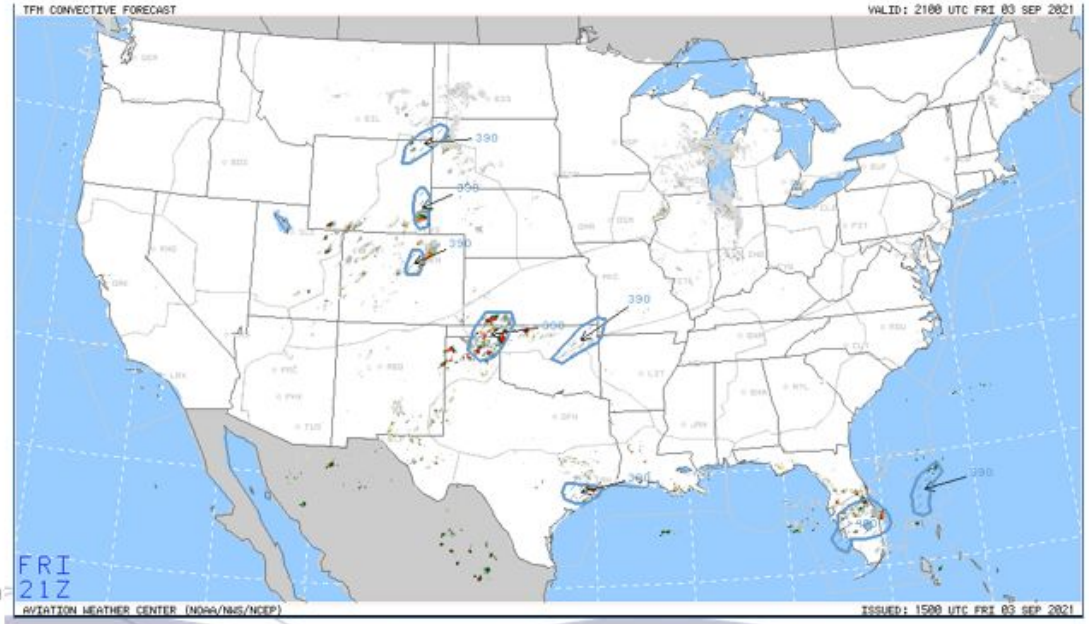
- Reached echo tops and 40dbz criteria
- Verifies polygons

echo tops

below 40 dbz **above 40 dbz**

FAA Command Center
TCF Verification and Daily Review

Fri Sep 3 2021



ATOSysOps

- Verified Well
  - ZMA (FL)
  - ZKC (OK/TX Panhandle)
- Verified Close
  - ZHU
  - ZDV
- Over-forecast
  - ZMA (Offshore)
  - ZKC (NE OK)
- Missed

https://www.aviationweather.gov/tcf/help

Federal Aviation Administration

West - Traffic & Performance (09/03/2021)

ATOSysOps

ASPM-77 Performance Outcomes: Top 25% compared to baseline; Bottom 25% compared to baseline

Location	Traffic Cnt	Flight Operator Based Metrics						FAA Based Metrics					
		Completion	D0*	A0	Avg Taxi-Out	Taxi-Out s >120*	Avg Taxi-In	Diversions	AH Delays	AH Minutes*	TMI Delays*	TMI Minutes	Departure Delays*
West	16,642	97.19%	56.5%	56.9%	16.4	1	8.3	71	72	2,159	203	18,738	19
ANC	1,201	98.55%	82.1%	83.4%	12.9	0	6.5	0	0	0	0	0	0
DEN	1,791	90.45%	35.8%	37.2%	21.3	0	11.4	59	67	2,020	196	18,600	0
LAS	1,809	97.77%	52.6%	51.5%	16.7	1	8.4	2	0	0	2	36	14
LAX	1,659	97.54%	59.9%	67.1%	16.8	0	10.6	0	0	0	3	54	0
SAN	587	99.39%	60.2%	59.2%	16.4	0	5.1	0	0	0	1	17	0
SEA	1,220	98.70%	65.1%	67.3%	17.2	0	9.8	0	0	0	0	0	0
SFO	878	99.35%	63.7%	65.6%	16.8	0	6.0	0	0	0	1	22	0
SLC	1,113	98.59%	65.4%	65.2%	17.2	0	8.6	0	0	0	0	0	0
Other-WE	6,584	98.86%	59.6%	54.8%	13.2	0	6.1	10	5	139	0	0	5

ASPM-77 KPI Trend:

Traffic counts are from OPSNET; other performance data are from ASPM (for the ASPM77 airports)

The KPI (Key Performance Indicator) score is based on the metrics without an asterisk in the data table

If the metric for the given day ranks in the bottom (top) 25% compared to the baseline, then the value is shown in orange (blue)

Federal Aviation Administration

West - Weather & Initiatives (09/03/2021)

ATOSysOps

Weather:

Location	# Hours @ Moderate/High			
	Wind	Ceiling	Viz	Wx
West	1	12	1	1
ANC	0	0	0	0
DEN	0	0	1	1
LAS	0	0	0	0
LAX	0	6	0	0
SAN	0	0	0	0
SEA	1	0	0	0
SFO	0	6	0	0
SLC	0	0	0	0
Other-WE	NA	NA	NA	NA

Initiatives (GS, GDP): Possible | Probable | Expected

Location	Adv Plan Initiatives	Ground Stops			Ground Delay Programs			
		Proposed Duration	Actual Duration	Actual #	Proposed Duration	Actual Duration	Actual #	Revisions
West		2h29m	3h11m	2	7h59m	2h47m	1	2
ANC		0	0	0	0	0	0	0
DEN	GDP/GS	2h29m	3h11m	2	7h59m	2h47m	1	2
LAS		0	0	0	0	0	0	0
LAX		0	0	0	0	0	0	0
SAN		0	0	0	0	0	0	0
SEA		0	0	0	0	0	0	0
SFO		0	0	0	0	0	0	0
SLC		0	0	0	0	0	0	0
Other-WE		0	0	0	0	0	0	0

TAF Accuracy:

The weather and TAF accuracy data are based on TAF/METAR potential impact categories from the Aviation Weather Center

The Advanced Planning TAF is from 18Z the day before; the Day of Operation TAF is from 12Z the morning of

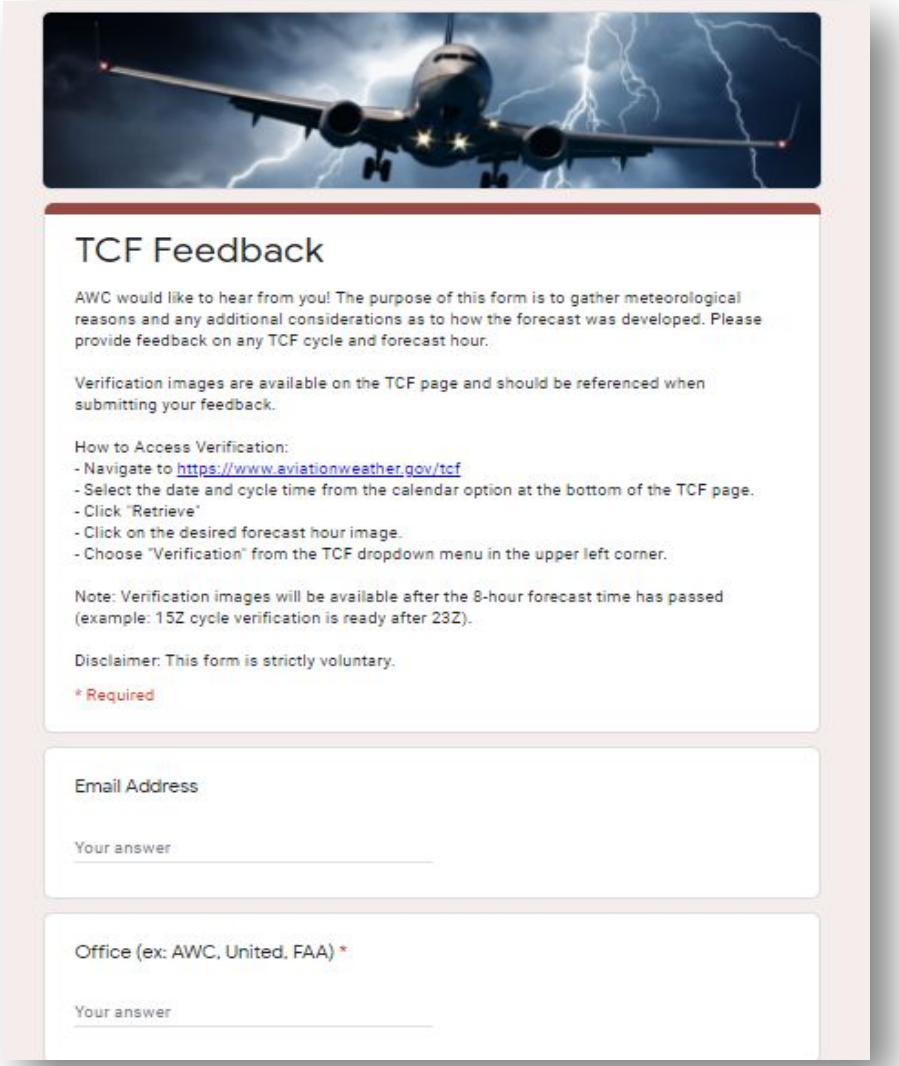
Federal Aviation Administration

TCF Feedback Form

TCF Review Feedback Form

- Voluntary participation
- Encourages daily review of TCF and increases awareness of TCF performance

https://docs.google.com/forms/d/e/1FAIpQLScs94xkRzeKatFeZpfq2Zida9Kh79mfnJjLMDsXsTogihFxdQ/viewform



Questions/Discussion?

For additional information, please contact

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AWC Domestic Operations Branch Chief

jonathan.leffler@noaa.gov

816-584-7239