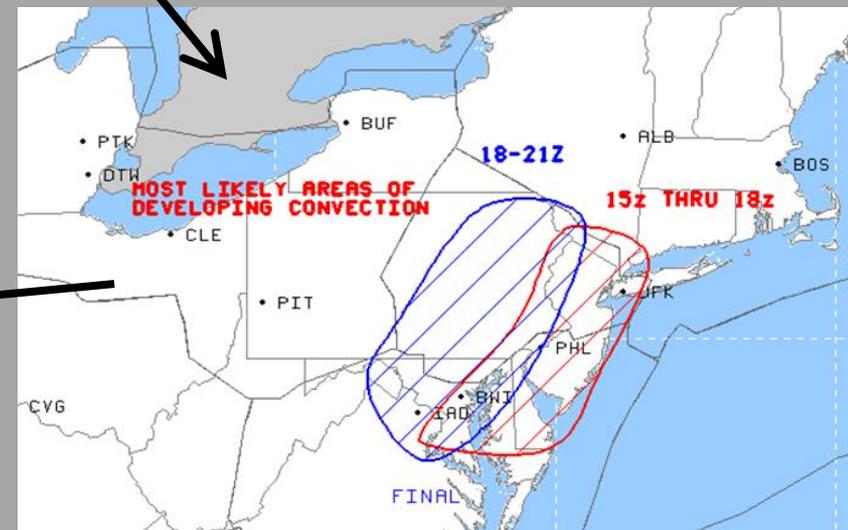
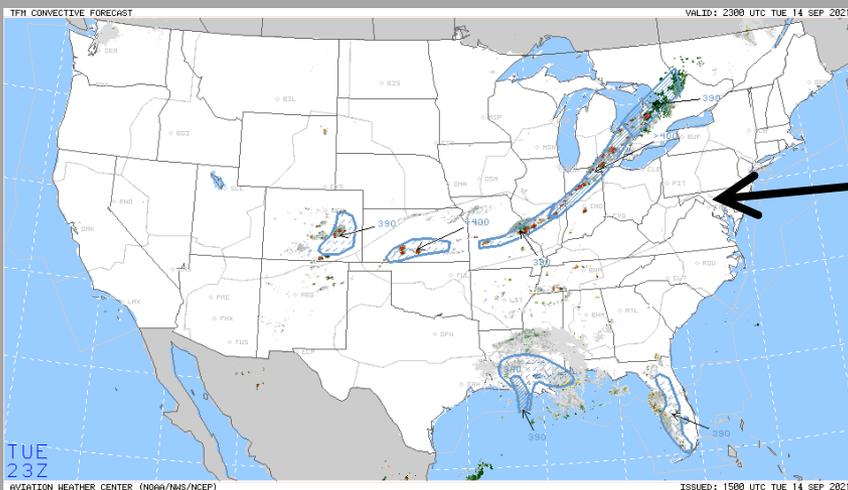




CCFP → CCFP/CAWS → TCF



Michael Eckert
National Aviation Meteorologist

CCFP

COLLABORATIVE CONVECTIVE FORECAST PRODUCT

VALID: 1900 UTC SUN 28 JUL 2013

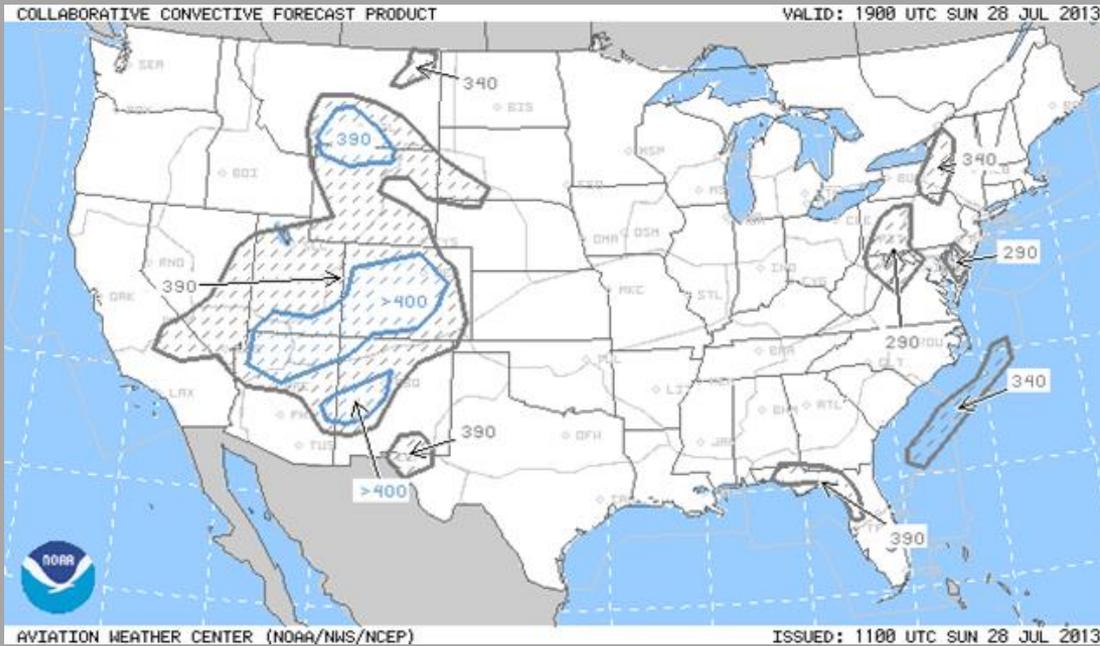


AVIATION WEATHER CENTER (NOAA/NWS/NCEP)

ISSUED: 1100 UTC SUN 28 JUL 2013

- ⚡ Agreement between FAA & NWS in the 1990s
- ⚡ Areal coverage of convection for ENROUTE Air Traffic
- ⚡ Not a terminal impact forecast tool
- ⚡ Low & High confidence Sparse, Medium and Lines
- ⚡ Traditionally very large areas (Can't miss anything syndrome)

CCFP



Components:

- /// a) Composite radar reflectivity of at least 40 dBZ;
- /// b) Echo tops at or above FL250;
- /// c) Sparse Coverage = at least 25-39% of the polygon
- /// c) Medium Coverage = 40-70% of the polygon
- /// Forecaster $\geq 50\%$ confidence (High) that criteria (a, b, & c) will be met (in blue)
- /// Forecaster $< 50\%$ confidence (Low) that criteria (a, b, & c) will be met (in gray)

/// Confidence levels somewhat confusing

/// 2/4/6 hour forecast changed to 4/6/8 hour forecast in 2014

/// **Lightning is not a component**

Traffic Flow Management (TFM) Convective Forecast (TCF) Fell out of the CCFP/CAWS Project

- ✓ 4/6/8 Hour Forecasts
- ✓ Collaborated every 2 hours (Mar-Oct)
- ✓ Removed showing Low Confidence areas on final product
- ✓ Similar to CCFP, but with emphasis on focusing on High Confidence Sparse/Medium areas
 - ✓ FAA did nothing with Low Confidence areas
 - ✓ The large areas of CCFP High/Low confidence did not help the FAA make better decisions
- ✓ More detail of the High Confidence areas helps the FAA plan routes more effectively



TCF Criteria

COVERAGE

SPARSE 25-39%	
MEDIUM 40-74%	

LINES

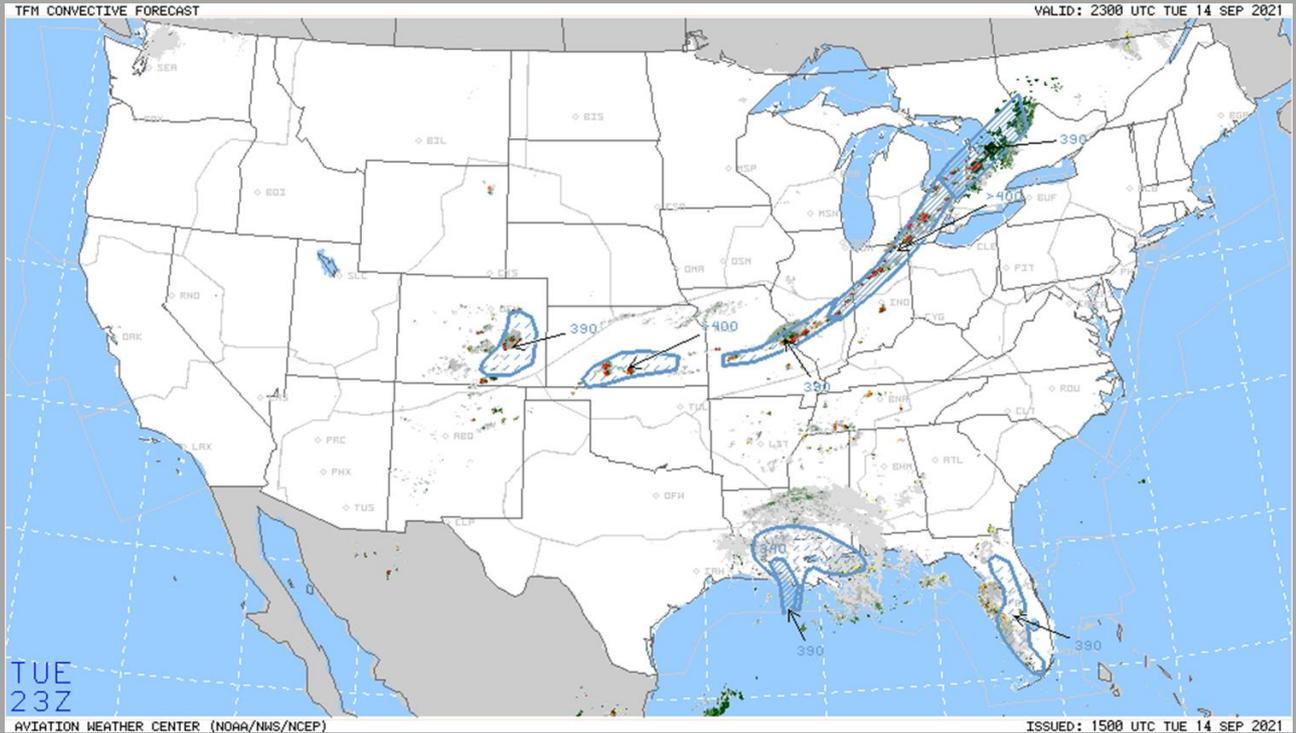
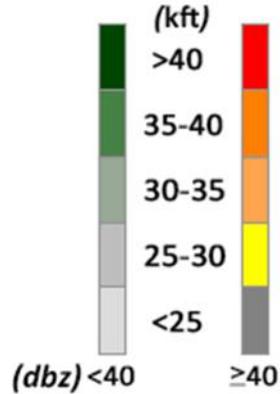
SOLID 75-100%

HEIGHT

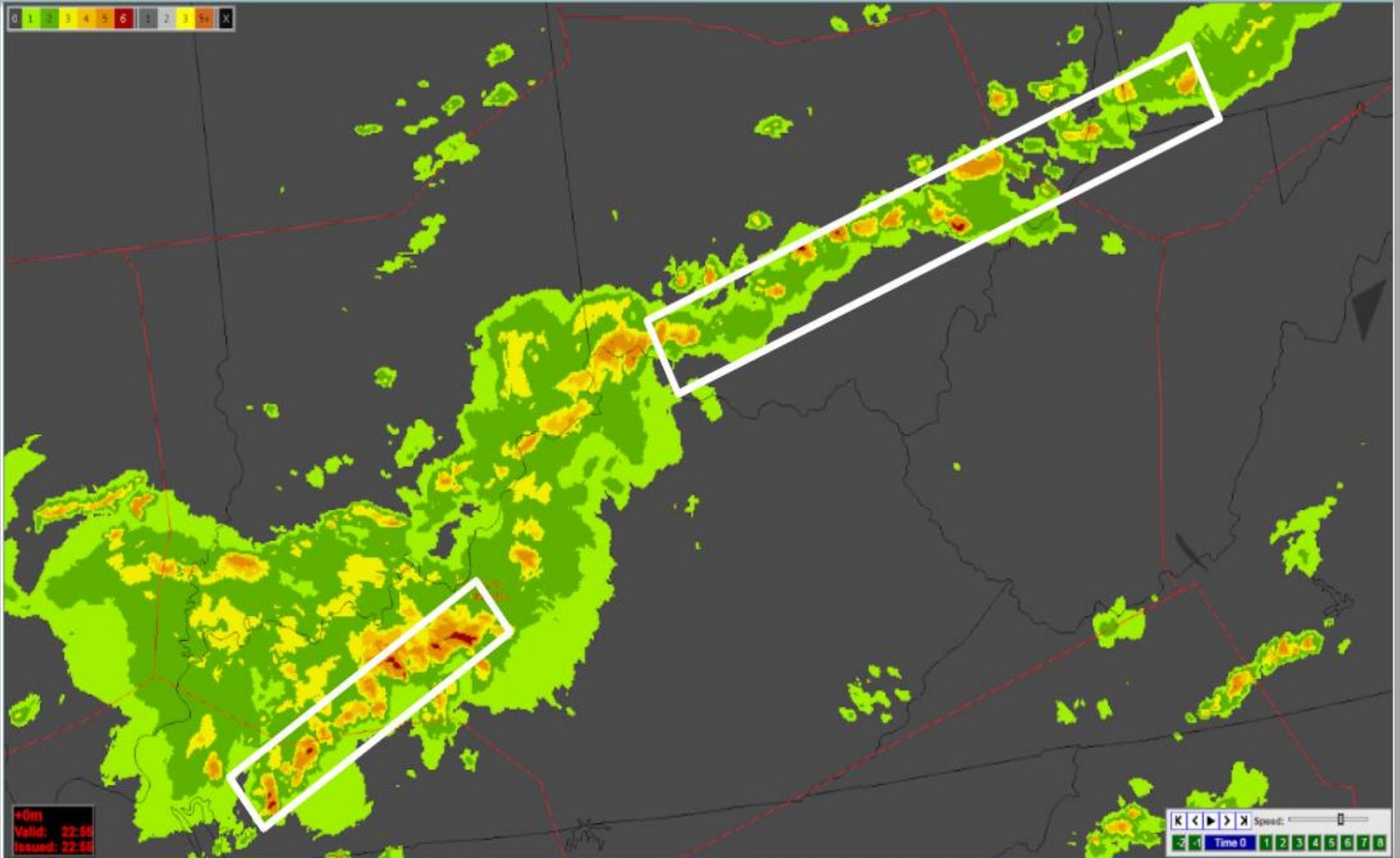
TOPS: 100's OF FEET MSL

25000 - 29000	290
30000 - 34000	340
35000 - 39000	390
40000+	>400

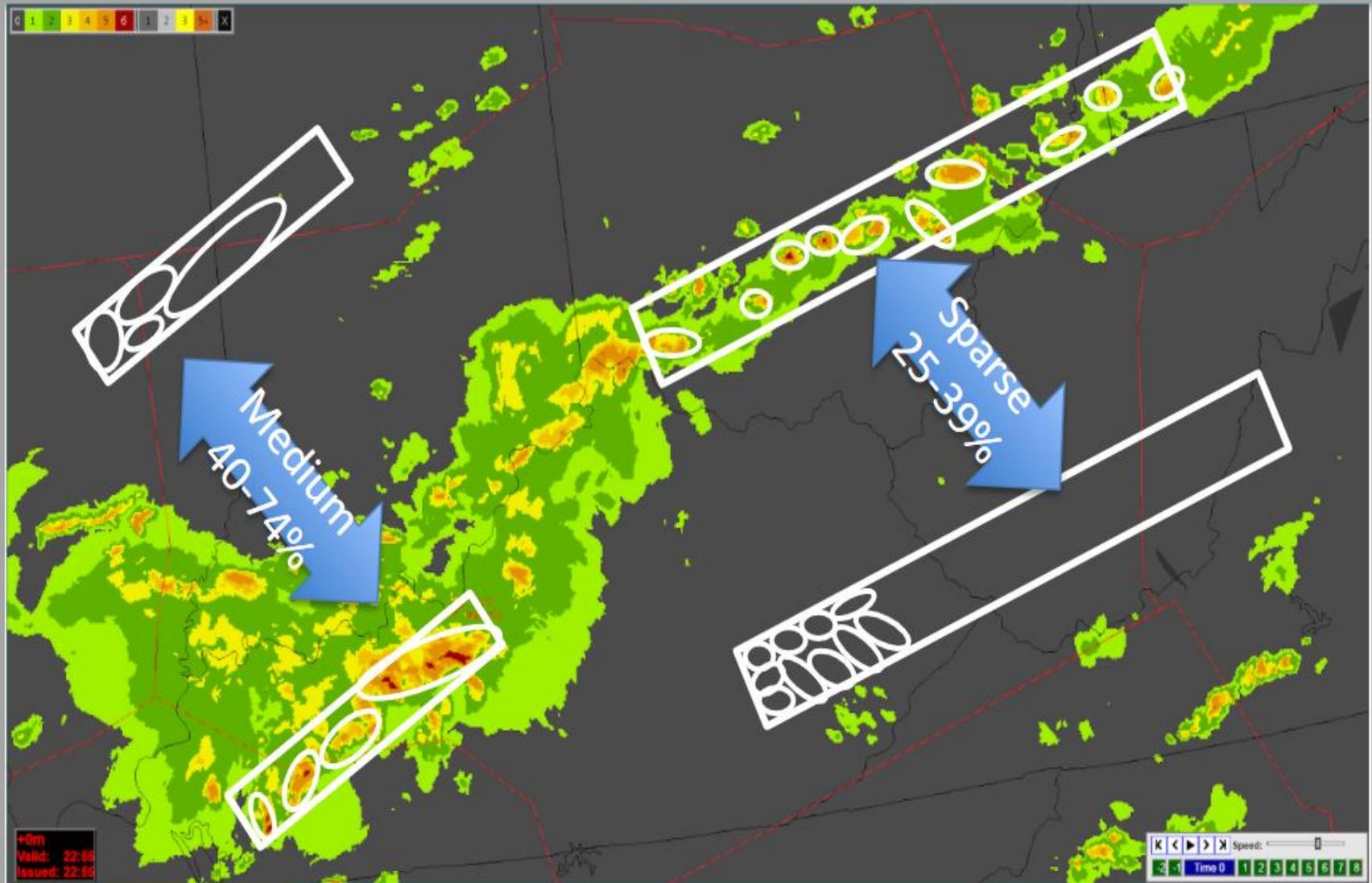
VERIFICATION



Is This Sparse or Medium?

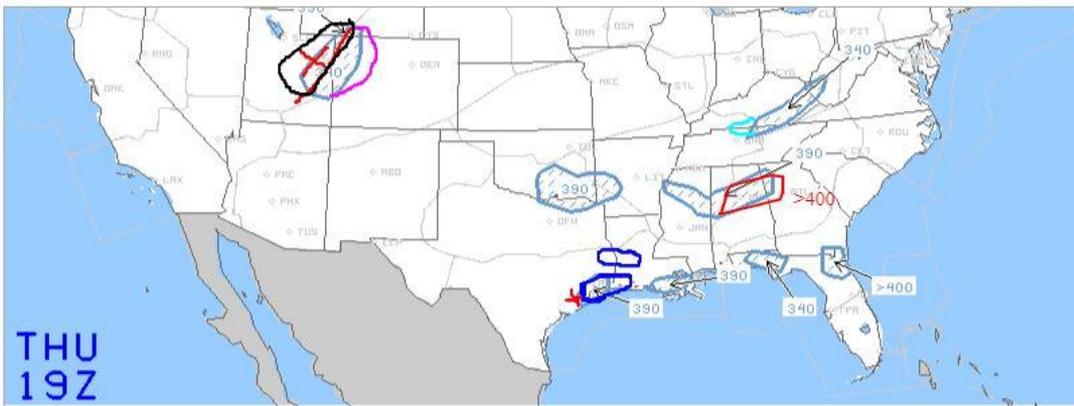


Is This Sparse or Medium?



TCF Collaborators

- ✦ AWC MET (51%)
- ✦ AIRLINE METs
- ✦ CWSU Mets
- ✦ NAM MET
- ✦ Canadian METs (June-Sept)



TCF Collaboration

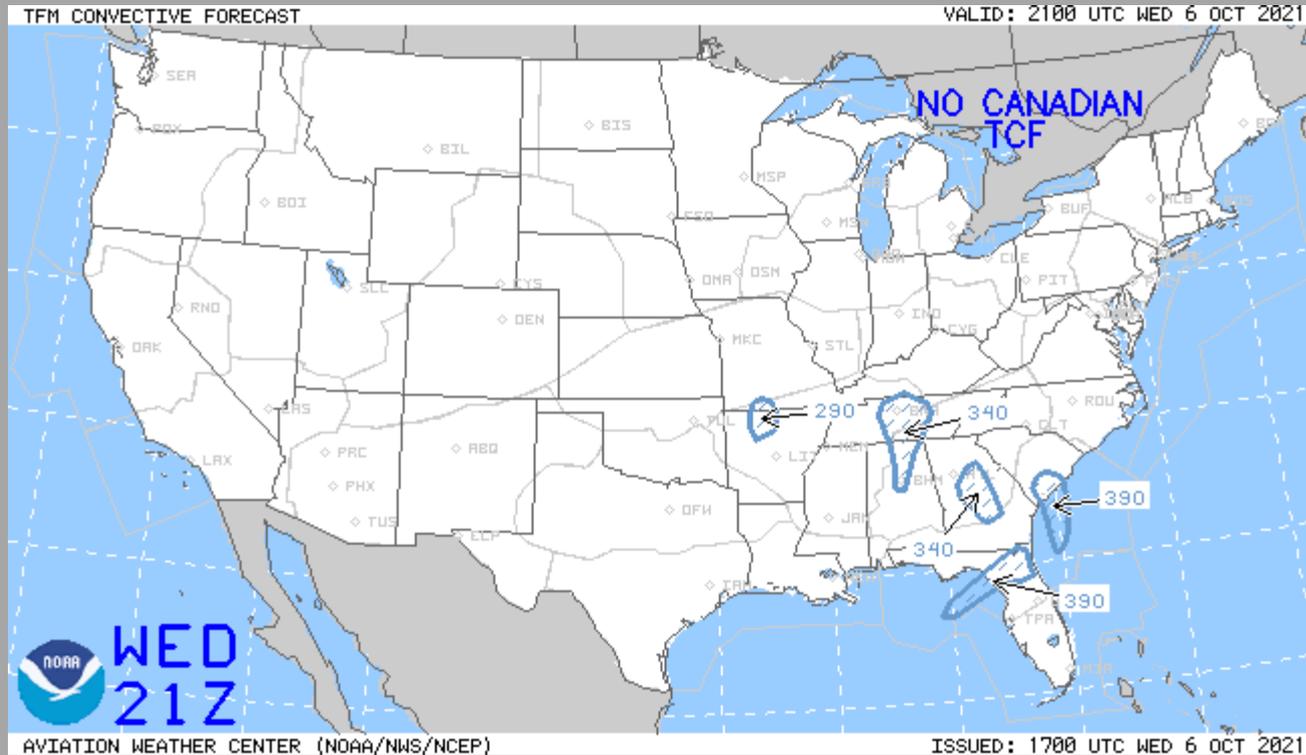
There are 18 other users connected.

<ZJX-PRossmann> 11:18:43Z - Maps look good for ZJX.
<ZNY-CBuccola> 11:19:10Z - Maps are good for ZNY
<ZDV-KPayne> 11:20:24Z - I might extend the area in W CO a little bit further E at 19Z. Otherwise, looks good for ZDV
<ZFW-TAmis> 11:20:27Z - Concur with maps.
<ZDC-RWinther> 11:20:51Z - Looks good - made an edit at 21z? Area on the edge of CAPE gradient along with streamline LL convergence.
<NAM-MEckert> 11:21:24Z - area over the intermtn west is quite lrg... neg tilt trof movg ewd fairly quickly... maybe shld chop off back edge a bit more ovr UT @ 19z... to compensate for the expansion ewd into CO?
<ZOB-KOudeman> 11:21:47Z - good with ZOB
<ZMA-DBednar> 11:22:03Z - Maps look good for ZMA.
<AWC-SLiebl> 11:23:35Z - That works for me Rick...and the NAM Nest and ARW are indicating something in that area.
<ZAU-KKraujalis> 11:24:01Z - Maps are good for ZAU.
<ZHU-EZappe> 11:24:14Z - AWC - some changes requested to 19Z map (namely near TX/LA border)...also a low confidence area requested on the 21Z map.
<ZKC-RKardell> 11:24:49Z - Maps look good for ZKC.
<ZID-MBeerends> 11:27:37Z - maps are good for ZID, and ok with the suggestion by ZDC.
<ZME-NUebelhor> 11:29:51Z - Added a bit to the 19/21z maps near BNA. Otherwise maps look good.
<AWC-SLiebl> 11:30:07Z - Mike and Kathryn. I can do that...although I dont want to chop much...I think there will be plenty of thunderstorm activity under that cold core aloft this afternoon.
<AWC-SLiebl> 11:30:07Z -
<ZTL-MBloemer> 11:31:38Z - ZTL in red.
<AWC-SLiebl> 11:32:33Z - Nick and Matt...those work for me.
<MSC-JPellerin> 11:32:40Z - Good for MSC. Thanks!
<ZTL-MBloemer> 11:33:03Z - for 17z...can we lower the tops to 390
<ZTL-MBloemer> 11:34:01Z - and vice versa increases the tops to 400 at 19-21z?
<ZTL-MBloemer> 11:34:48Z - for reference, all... ATL taf will soon be carrying a tempo group for TSRA 19-23z.
<ZLC-SKrippner> 11:40:31Z - Please keep the area in SE ZLC otherwise, maps look good.

TCF – Air Traffic Impacts –vs- Meteorology

1:27:27Z

ZDC/NAM... any thoughts to include Sparse 340 between CLT and RDU at 19z? It is not my airspace, but the impacts will be significant on the NE arrivals into CLT if it does occur... I have drawn an area on my side of the border that is very slim...but it indicates kindof the area that I am concerned about.



- ✦ We are Meteorologists
- ✦ We do understand the airspace and critical areas in our CWA ... but...
- ✦ **We can't be mixing air traffic decisions with weather decisions**
- ✦ "We do Weather - FAA does Air Traffic"

TCF Reasoning

14:07:20Z

Lookg at current lgtng actvty and IR satl pics... sern KS in MO cvnctn conts to dcrs. instbtly doesn't come back up until arnd 19-20z... shld that area in nern OK be low conf @19z

all 14:10:47Z

NAM, I am fine with that. I was on the fence. thanks

14:11:57Z

I would like to keep the area near Tulsa high conf at 19z. Agree the other areas can be low.

14:12:48Z

ZKC, since it is in your area, i will bump it up again

17:47:59Z - I'd like to extend the sparse coverage area in west ZID at 23Z down a little towards CVG. Also I am pretty confident that the activity in KY will be holding together as it moves into WV (although tops should not be higher than 340). 01/03Z maps are good. Thanks.

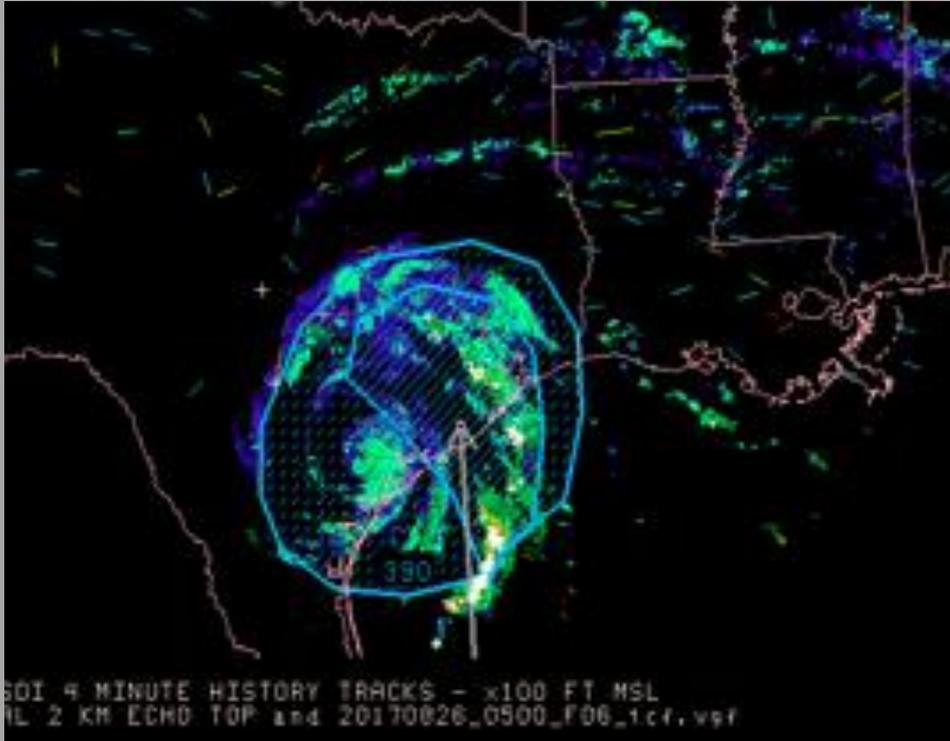
17:48:34Z - Looks rather marginal but I can add in that area at 23Z, thanks

(5:39 AM) AWC-TCF : At this point, I am too tired. Everyone gets their changes.

For ZTL, I suggest making the low conf areas at 15/17z as high conf. 19z looks good

- ✦ What's wrong with these exchanges?
- ✦ Why can't we provide metrological reasoning with our requests?
- ✦ Is this a "High Confidence" Forecast?
- ✦ This is a continuing problem that has been around for many years. Just ask and you will receive seems to be the normal. We can do better than that.
- ✦ ESRL study 2020 states:
 - ✦ Whiteboard chat generally lacks meteorological discussion and reasoning

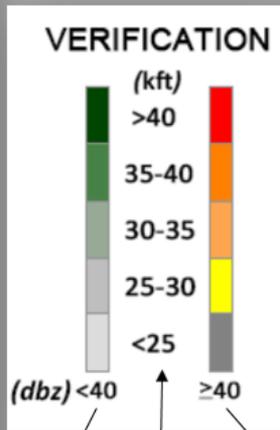
TCF Tropical System Coverage



- /// Tendency to draw around the CDO
- /// Need to focus on banding features
- /// Most landfalling Tropical Systems are relatively dry on the west side (especially ones gaining Latitude)
- /// Focus should be N-E-SE areas where inflow/instability is strongest

Verification

- Without Verification
 - You don't know how you are doing
 - You don't know which way to make adjustments
 - You don't know/understand your **personal biases**
 - Without looking back, you have no guidance on moving forward and improving



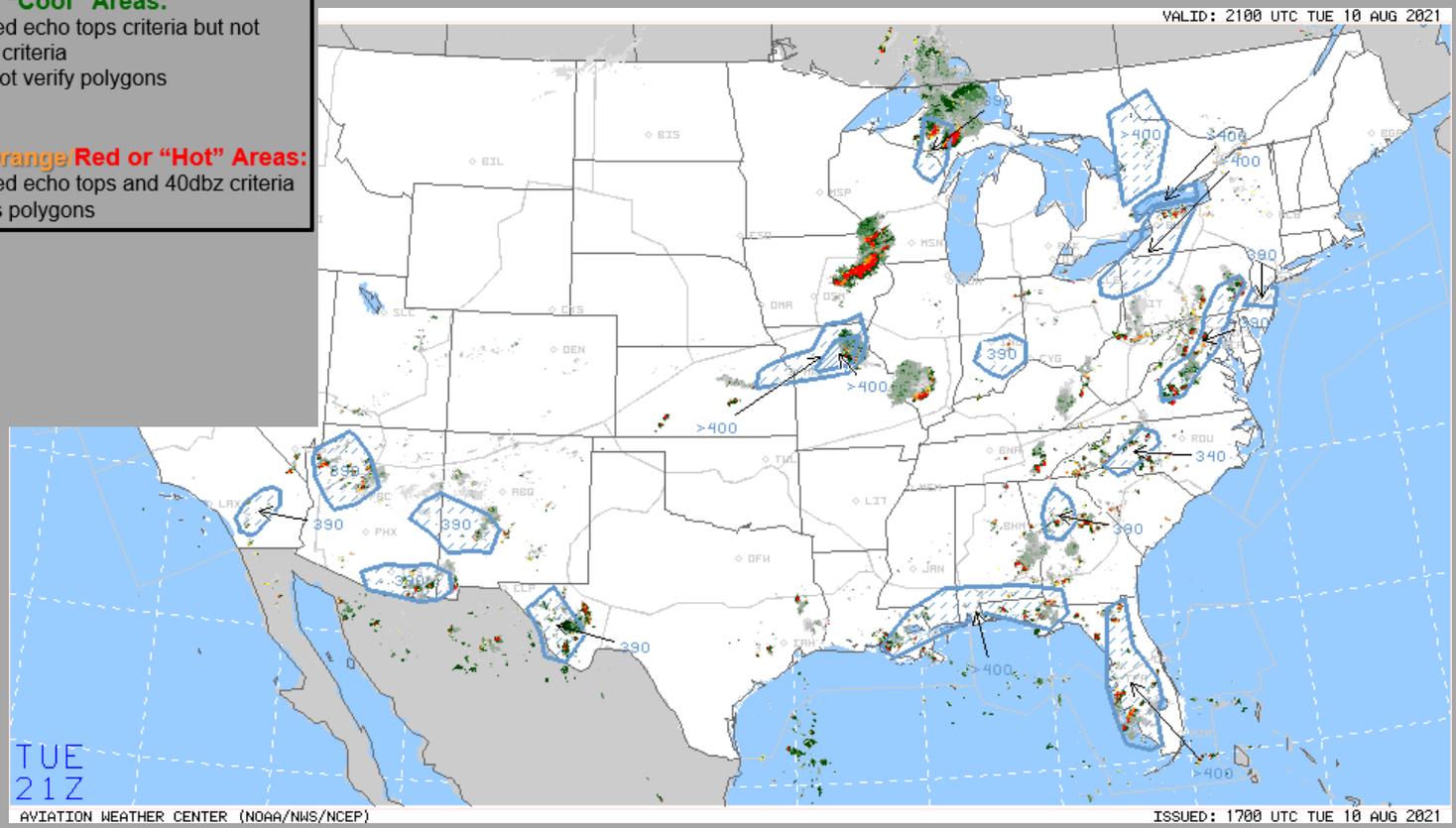
Green or "Cool" Areas:

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

Yellow/Orange Red or "Hot" Areas:

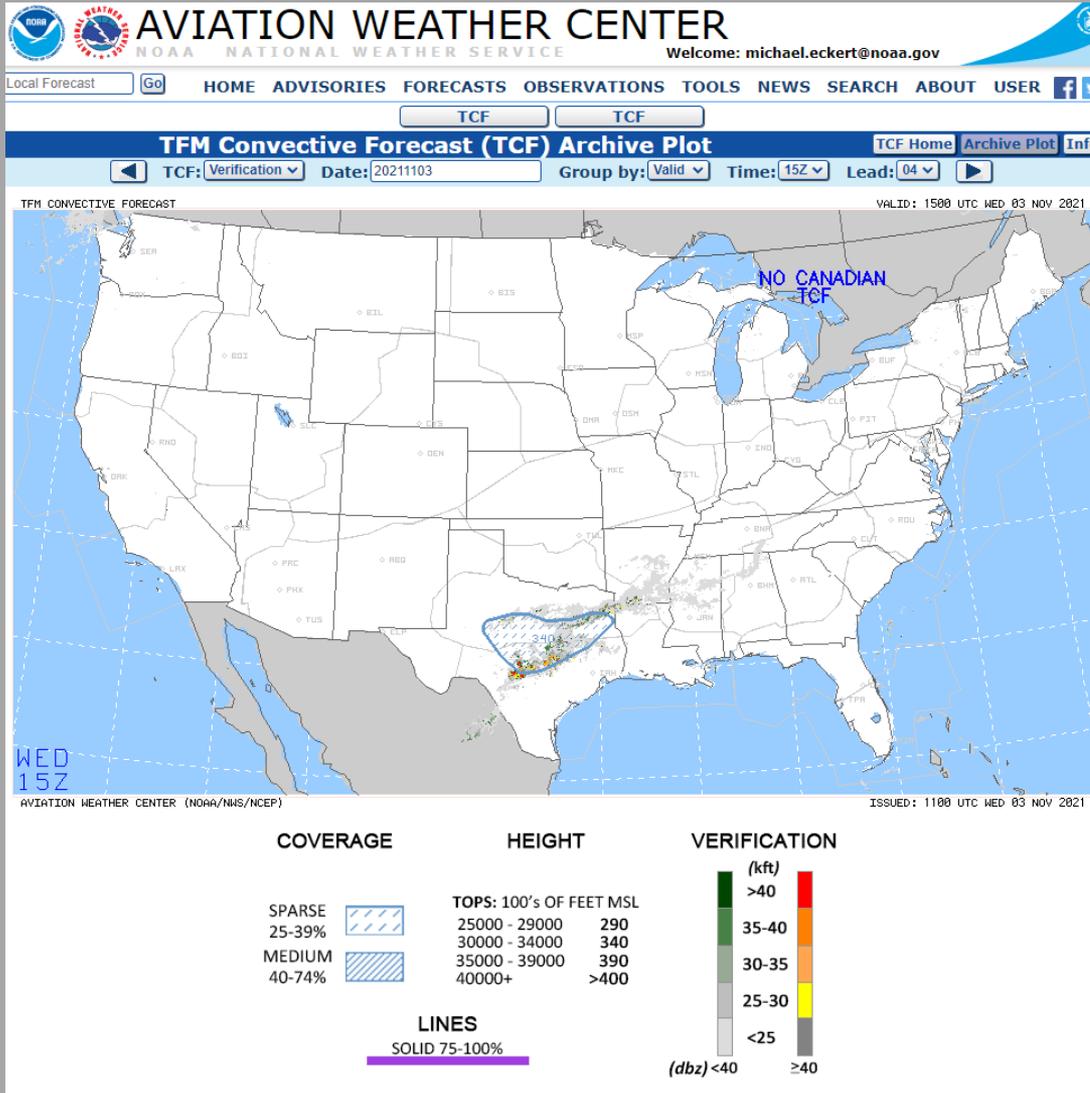
- Reached echo tops and 40dbz criteria
- Verifies polygons

below 40 dbz echo tops above 40 dbz



Verification

https://www.aviationweather.gov/tcf/archiveplot?type=verif&date=20211103&groupby=valid&run=15&fore=20211103_1500_F08_tcf_verif



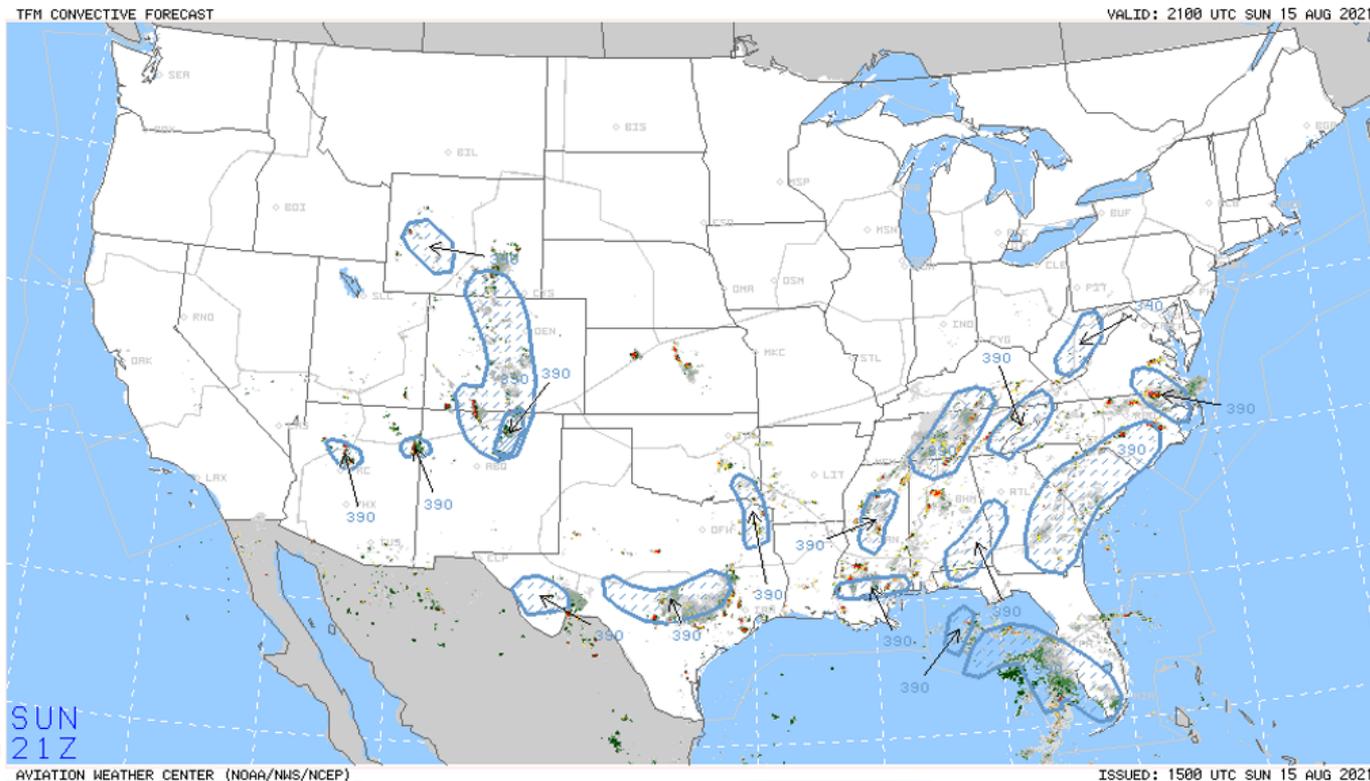
ESRL Study 2020

- ⚡ Sparse ~5%
- ⚡ Medium ~10%

Verification

- ✦ Per Agreement with FAA
 - ✦ NAMs started briefing 6 hour TCF Valid 21z for the country
 - ✦ Areas with convection are general covered well... **but...**
 - ✦ Areas continue to be too large
- ✦ Areas are **subjectively** judged
 - ✦ Verified **Well**, Verified **Close**, **Over-forecast**, **Missed**
- ✦ **We need an automated/objective verification scheme**

Sun Aug 15 2021



- Verified Well
 - ZAB (both in AZ)
- Verified Close
 - ZDC (SE VA/NE NC)
 - ZME/ZTL border
 - ZME (MS)
 - ZHU (LA/MS & south-central TX)
 - ZMA (offshore SW FL)
 - ZDV (Sparse CO/NM)
 - ZFW (NE TX)
- Over-forecast
 - ZID/ZDC border (WV)
 - ZTL (TN/KY & AL/GA)
 - ZDC/ZIX/ZTL (NC/SC/GA coast)
 - ZDV (Medium NM)
 - ZLC (WY)
 - ZIX (Offshore)
 - ZAB (SW TX)
- Missed
 - ZTL (AL)
 - ZKC (KS)



QUESTIONS?

