

# A Perspective of CWSU and WFO Operations



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# Topics of Discussion

- Brief training history
- Comparisons and contrasts of WFO's and CWSU's
- Importance of TAF's from the CWSU perspective.
- Equipment at the CWSU not at a WFO
- Approved Aviation Specific Flag Sites



# Topics of Discussion

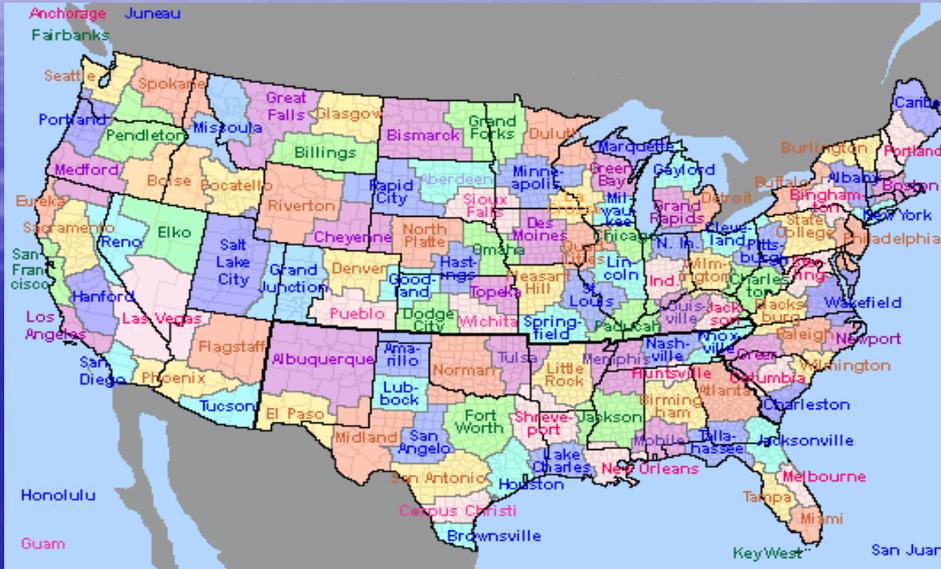
- Products issued exclusively at a CWSU
- STAR's- Standard Terminal Arrival Routes
- CCFP: Collaborative Convective Forecast Product
- CWSU and WFO Coordination and Exchange of Information



# CWSU Training

- Coordinated Training with CWSU MIC beginning Spring 2008. Training shifts continued through summer when time appropriate.
- Began operational shifts late summer/early fall 2008. Periodically worked shifts through spring 2009.

# WFO vs. CWSU



- Much different areas of responsibility
  - 122 WFO's primarily based on WSR-88D coverage
  - 21 CWSU's based on ARTCC boundaries

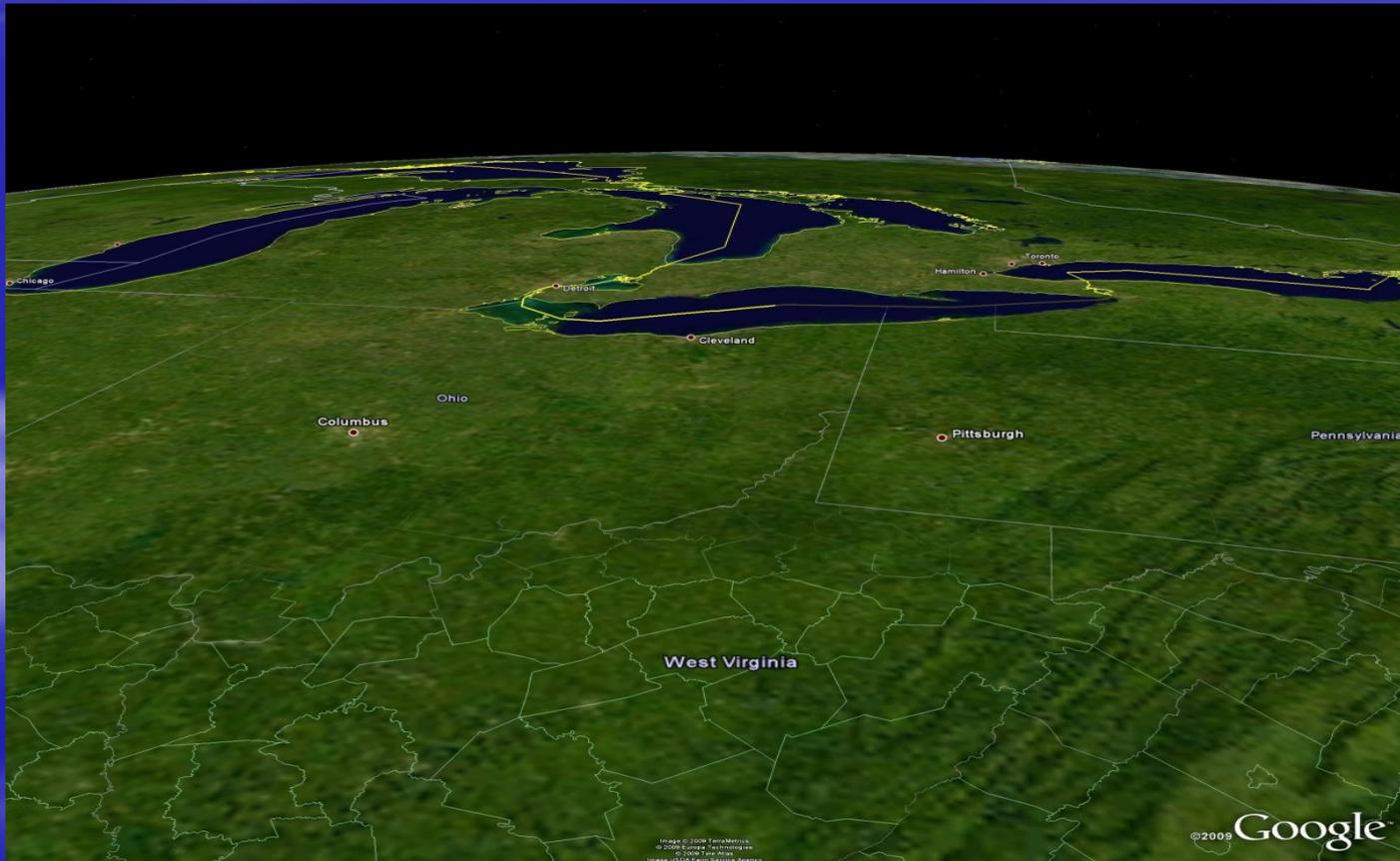
# WFO vs. CWSU

- WFO: Predicting weather conditions primarily for the surface. Range of scope mainly confined to a 2 dimensional scale.



# WFO vs. CWSU

- At a CWSU, a forecaster cannot simply examine weather conditions for the surface. Their perspective must always be considered on a **3 dimensional scale**.



# WFO vs. CWSU

- Turbulence can be forecast at multiple altitudes depending on situation.
  - There can be a forecast for turbulence at 050-120. Over same geographical area you can also have turbulence at FL300-400.
- Icing threats can also occur at several altitudes.
- Thunderstorm Tops: Are they increasing or decreasing in altitude. Location and movement also important.



# WFO vs. CWSU

## Customer Interaction

- WFO aviation forecasters do not provide face to face briefings to aviation users.
  - Weather briefings to air traffic planners done almost always over the phone.
  - Any briefings are generally unscheduled, and occur when there are specific questions about a forecast.
  - There is not a smooth two- way street for providing weather briefings. Users of weather information generally initiate a verbal briefing rather than a forecaster at a WFO.

# WFO vs. CWSU

## Customer Interaction

- CWSU's offer face to face interaction with ARTCC in several forms.
  - Scheduled briefings twice per day.
  - Morning briefings to TMU for thunderstorm possibilities across the airspace and at hubs.
  - Unscheduled briefings; CCFP updates or CWA issuances.
  - Unscheduled briefings for quickly changing weather conditions.

# WFO vs. CWSU

## Importance of TAF's

- At a WFO, initial TAF's are issued 4 times per day and an aviation AFD.
  - Point based forecasts for airports within 5SM of airport's runway complex center.
  - For example at WFO CLE TAF responsibility includes 7 sites:
    - TOL, FDY, MFD, CLE, CAK, YNG, ERI
  - Amendments of TAF's by a WFO aviation forecaster are common procedure when weather conditions change from forecast. Direct feedback on changes can vary.
  - TAF coordination is common between CWSU's and WFO's. However, WFO aviation forecaster has final say over TAF's.

# WFO vs. CWSU

## Importance of TAF's

- At CWSU's, forecasters utilize TAF's as a tool for forecasting and briefing purposes.
  - The perspective at the CWSU is that forecasters and air traffic planners are customers of the TAF's.
  - CWSU forecasters are responsible for interpreting TAF's to ARTCC staff.
  - A CWSU forecaster may be responsible for well over a dozen TAF forecasts.
  - TAF amendments are not possible by CWSU forecasters.
    - While amendments are best course of action by WFO aviation forecaster, a CWSU forecaster may be tasked with providing even additional lead time to changes to suite air traffic planning needs.
  - CWSU forecasters can provide forecast input for initial TAF's.

# Equipment at CWSU

- **AIS-R** – Aeronautical Information System-Replacement
- **ARD** – AWIPS Remote Display
  - Very similar to AWIPS at WFO. Some limitations due to bandwidth
- **CIWS** – Corridor Integrated Weather System
- **ERIDS** – En Route Information Display System
- **ITWS** – Integrated Terminal Weather System
- **WARP** - Weather and Radar Processor

# Site Identifiers

- What is the meaning of this??
  - At WFO's, a forecaster can issue a Severe Thunderstorm Warning and reference any cities relevant to the track of the phenomena.
  - At a CWSU, a forecaster **CANNOT** issue a CWA and reference just any city, METAR or VOR site.
- **Answer:** Approved Aviation Specific Flag Sites

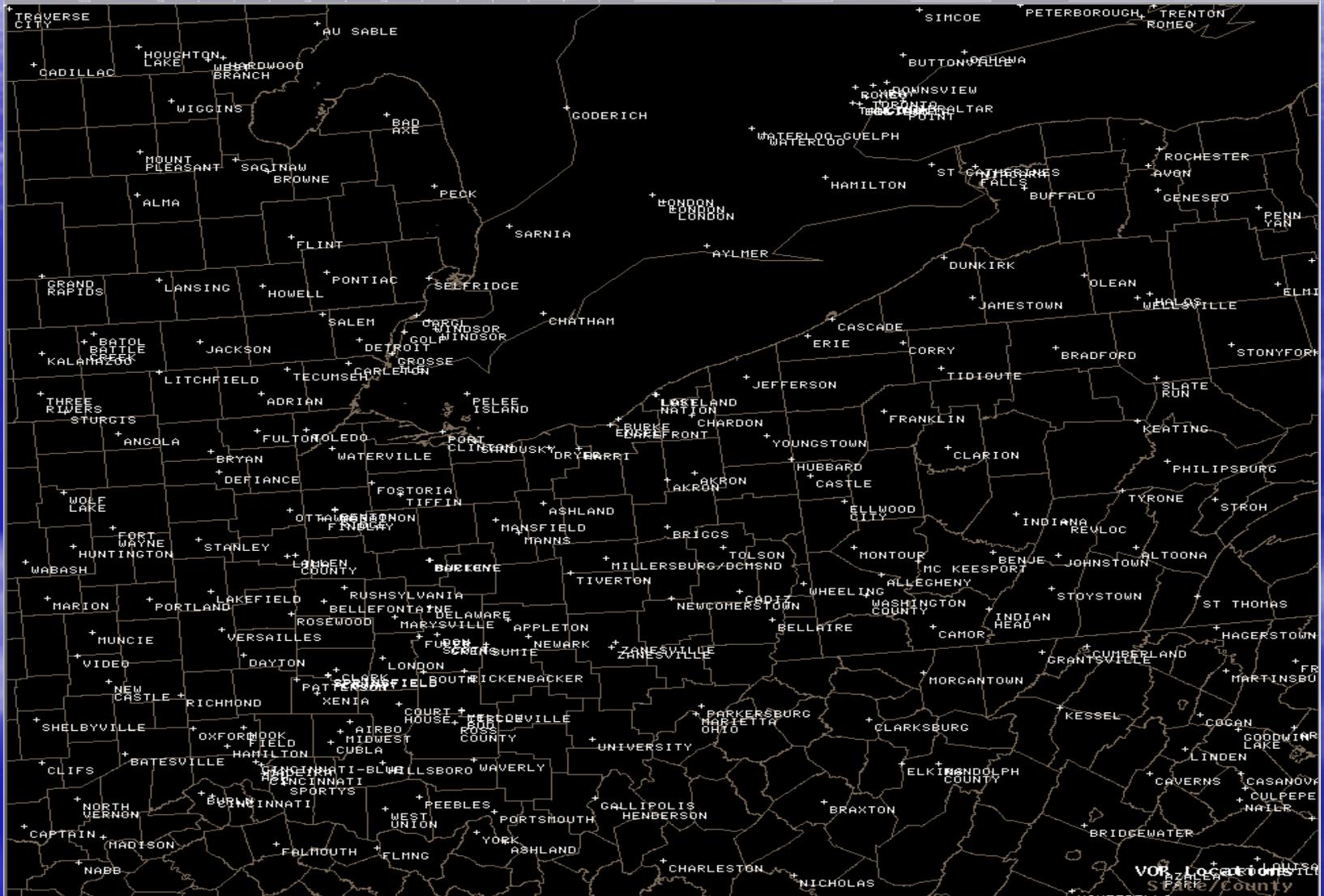
# Approved Aviation Specific Flag Sites

- **NOT** all TAF or VOR sites are approved identifiers.
- These are Approved Sites designated by the FAA and the Aviation Weather Center to reference weather phenomena.
  - SIGMET's, AIRMET's, and CWA's use these designated identifiers. Also can be used in MIS's depending on format.

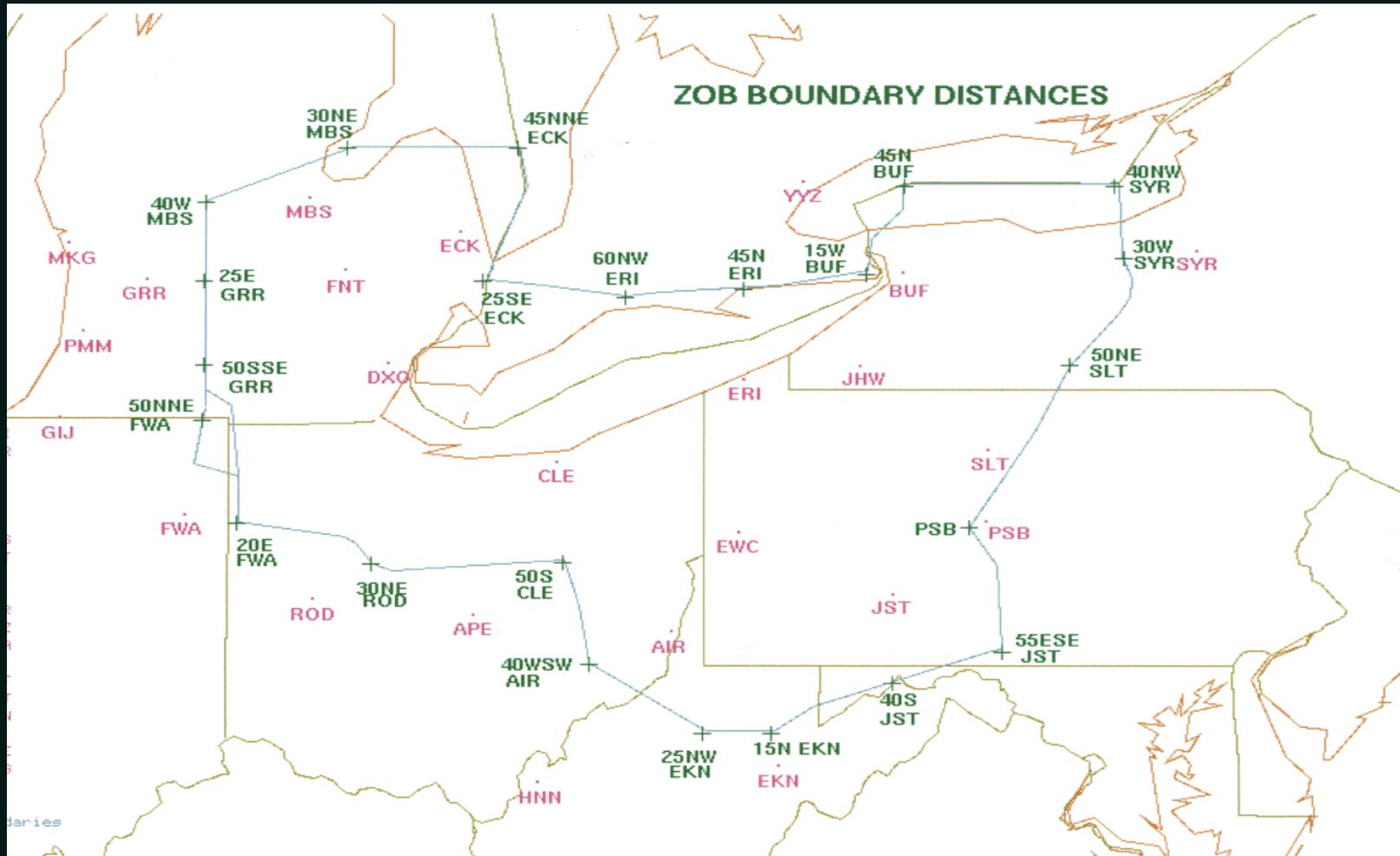
# METAR Sites



# VOR Sites



# Approved Aviation Specific Flag Sites and Boundary Distances



# Reference:

<http://www.rap.ucar.edu/weather/surface/stations.txt>

CD = 2 letter state (province) abbreviation

STATION = 16 character station long name

ICAO = 4-character international id

IATA = 3-character (FAA) id

SYNOP = 5-digit international synoptic number

LAT = Latitude (degrees minutes)

LON = Longitude (degree minutes)

ELEV = Station elevation (meters)

M = METAR reporting station. Also Z=obsolete? site

N = NEXRAD (WSR-88D) Radar site

V = Aviation-specific flag (V=AIRMET/SIGMET end point, A=ARTCC T=TAF U=T+V)

U = Upper air (rawinsonde=X) or Wind Profiler (W) site

A = Auto (A=ASOS, W=AWOS, M=Meso, H=Human, G=Augmented) (H/G not yet impl.)

C = Office type F=WFO/R=RFC/C=NCEP Center

Digit that follows is a priority for plotting (0=highest)

Country code (2-char) is last column

# Center Weather Advisory: CWA

- 2 Types of Center Weather Advisories:
  - **CWA** – Center Weather Advisory
  - **UCWA** – Urgent Center Weather Advisory
- Location Description includes the following:
  - Area polygons
  - Lines
  - Points
- Issuance sequence:
  - There are up to six designators for weather phenomena in the airspace.
  - **CWA 1##, 2##, 3##, 4##, 5##, 6##**
    - ## indicates sequence of number from 01-99. (Hopefully a CWSU forecaster will never get to 99. Busy Day!!)
    - Reset each calendar day.
    - For example, CWA101 for TS in area. CWA201 for Turbulence, CWA301 for TS in another portion of airspace.

# Center Weather Advisory: CWA

- When to issue a Center Weather Advisory
  - Supplementing an existing SIGMET, AIRMET, or area forecast.
  - Provide lead time prior to the issuance of a SIGMET when weather is quickly developing. In this case an UCA will be issued.
  - When conditions do not meet SIGMET or AIRMET criteria, but existing or anticipated weather conditions will adversely impact the safety of air traffic.
  - Cancel an existing CWA when conditions are no longer expected or fail to develop.

# Examples of CWA's

## CONVECTION:

FAUS22 KZOB 161138

ZOB2 CWA 161138

ZOB CWA 201 VALID UNTIL 161240

FROM 40W EWC TO 5NNE EWC TO 32SSW AIR TO 32WSW AIR TO 40W EWC  
AREA OF SCT SHRA WITH ISOL EMBD TS CONTAINING EXTREME RAINFALL  
MOVING FM 23030KT. TOPS TO FL340.

FAUS21 KZOB 271546

ZOB1 UCWA 271546

ZOB UCWA 101 VALID UNTIL 271635

FROM 35SE ECK TO 60NW ERI TO 35NNE ROD TO 40E FWA TO 30NE FWA TO 35SE ECK  
AREA OF DEVELOPING SCT TS WITH EXTRM RAINFALL MOVING FM 23020KT.  
TOPS FL400 AND INCREASING. ALSO SEE ZID CWA 101 AND ZAU CWA  
101 CONCERNING TS TO SW.

FAUS24 KZOB 072335

ZOB4 CWA 072335

ZOB CWA 406 VALID UNTIL 080030

FROM 30SSE ECK TO 30WNW ERI TO 18WNW CLE TO 20S DXO TO 30SSE ECK  
AREA OF SCT TS WITH EXTREME RAINFALL AND RADAR INDICATION OF 1 INCH  
HAIL MOVING FM 33020KT. TOPS TO FL370. THIS AREA IS BETWEEN  
CONVECTIVE SIGMETS 70E AND 71E.

# Examples of CWA's

## CONVECTION:

FAUS26 KZOB 082311  
ZOB6 CWA 082311  
ZOB CWA 601 VALID UNTIL 090005  
FROM 51NW ERI TO 60WNW ERI TO 41S DXO  
LINE OF TS..25 NM WIDE..WITH EXTREME RAINFALL MOVING FROM 31040KT.  
TOPS TO FL390. COVERAGE AND TOPS DCRG. MORE TS BEYOND THIS AREA IN  
ZYZ AIRSPACE. THIS UPDTS CONVECTIVE SIGMET 40E.

FAUS26 KZOB 230025  
ZOB6 UCWA 230024  
ZOB UCWA 601 VALID UNTIL 230054  
10NNW EWC  
TORNADO MOVING FROM 27015KT INDICATED BY RADAR AND  
FUNNEL CLOUD WAS SEEN BY GROUND OBSERVER.

# Examples of CWA's

## TURBULANCE:

FAUS22 KZOB 091547

ZOB2 CWA 091547

ZOB CWA 201 VALID UNTIL 091715

FROM 25WSW JHW TO 30N SLT TO 35WSW EWC TO 25WSW JHW

AREA OF MOD-ISOL SEV TURB 030-170. BE36 OVR FKL INDICATED MOD-SEV  
TURB 080-090. BRIEF INCR IN TURB NEAR 35W SLT...OTHERWISE DCRG.

FAUS23 KZOB 112324

ZOB3 CWA 112324

ZOB CWA 301 VALID UNTIL 120030

FROM 35ESE GRR TO 30NW ERI TO 15N EKN TO 30NE ROD TO 35ESE GRR

AREAS OF MOD TO ISOL SEVERE TURB FL330-360. RPTS OF SEV TURB FL360  
OVER DJB AT FL360...MOD TURB 20E FDY AT FL340 AND 20E VWV AT FL340 BY  
B737S AND B757.

# Examples of CWA's

## ICING:

FAUS24 KZOB 282156

ZOB4 CWA 282156

ZOB CWA 401 VALID UNTIL 282356

FROM 40W CLE TO 30NE CLE TO 40SE CLE TO 40SW CLE TO 40W CLE

MOD-SEVERE RIME/MXD ICE 050-080. REPORT FROM M08 OF MOD-SEV RIME ICE  
060 10E SKY.

FAUS23 KZOB 071551

ZOB3 CWA 071551

ZOB CWA 301 VALID UNTIL 071750

FROM 20SW MSS TO 75E SYR TO 70W SYR TO 90E YYZ TO 40NW SYR TO 20SW MSS

AREA OF MOD CLEAR ICE SFC-065...BUT MORE OFTEN BELOW 035.

ALSO SEE CNDN SIGMETS FOR COND CONT N INTO ONTARIO.

INCLUDES PART OF ZBW AIRSPACE.

# Examples of CWA's

## IFR Conditions:

FAUS23 KZOB 281737

ZOB3 CWA 281737

ZOB CWA 301 VALID UNTIL 281937

FROM 20W SLT TO 80SSW PSB TO 30NNE EKN TO 15SE AIR TO 20W SLT  
AREAS OF IFR DUE TO OCNL VIS BLW 1 SM AND/OR OVC/OBSCURED  
CIG BLW 004 IN SHSN.

# Meteorological Impact Statement: MIS

- In Eastern Region, MIS's are issued as a minimum 3 times per day. See directive for criteria in other regions.
- MIS's cover the following conditions:
  - Weather synopsis and upper level winds
  - Thunderstorms
  - Icing – moderate or greater
  - Turbulence – moderate or greater
  - Heavy precipitation
  - Freezing precipitation
  - Conditions at or approaching IFR
  - Surface winds and gusts 30KT or greater
  - Low level wind shear (within 2000 feet of surface)
  - Volcanic ash, dust storms

# Meteorological Impact Statement: MIS

ZOB MIS 04 VALID 310131-311331

...FOR ATC PLANNING PURPOSES ONLY...

CDFNT FROM SRN ONT-NE IN-SRN IL WL CONT MOVG SE OVERNIGHT...RCHG SRN PA-NRN KY SUN MRNG. HI PRES WL BUILD IN SUN. FL280-360 JET CORE FROM NE WI-MI-NRN OH-PA-CT-ME...WITH WND 90-120KT.

HAZARD SECTION WITHIN ZOB AIRSPACE 12 HRS OR LESS...

TS IMPLY SEV OR GTR TURB..SEV ICING..LLWS AND IFR COND.

1. TS...N OF 40NW SYR-50SE BUF-60NW ERI...WDLY SCT MOV FROM 28035KT. TOPS TO FL350...ENDG BY 03Z. S OF 50S CLE-EWC-40S JST...ISOL MOV FROM 29030KT. TOPS TO FL370. ENDG BY 10Z.

2. ICE...THRUT...PTCHY LGT-MOD ALL TYPES FRZLVL-FL200...ENDG NW-SE. FRZLVL 080 NRN ZOB TO 100 SRN ZOB.

3. TURB...THRUT...PTCHY LGT-MOD FL200-400. N OF PSB-30NE ROD...AREAS LGT-MOD 040-100.

4. STG LOW LEVEL WINDS...LLWS POTENTIAL/COMPRESSION AND SGFNT HUB AIRPORT CROSSWINDS...N OF PSB-30NE ROD...40-50KT WINDS AT 090.

5. IFR COND...NONE OUTSIDE OF TS.

ZOB AIRSPACE OUTLOOK 12 TO 24 HRS OUT...

LGT-MOD LOW LEVEL TURB CONTG NRN HALF ZOB. HIGH LEVEL TURB CONTG ERN HALF ZOB. NO UPDTS.

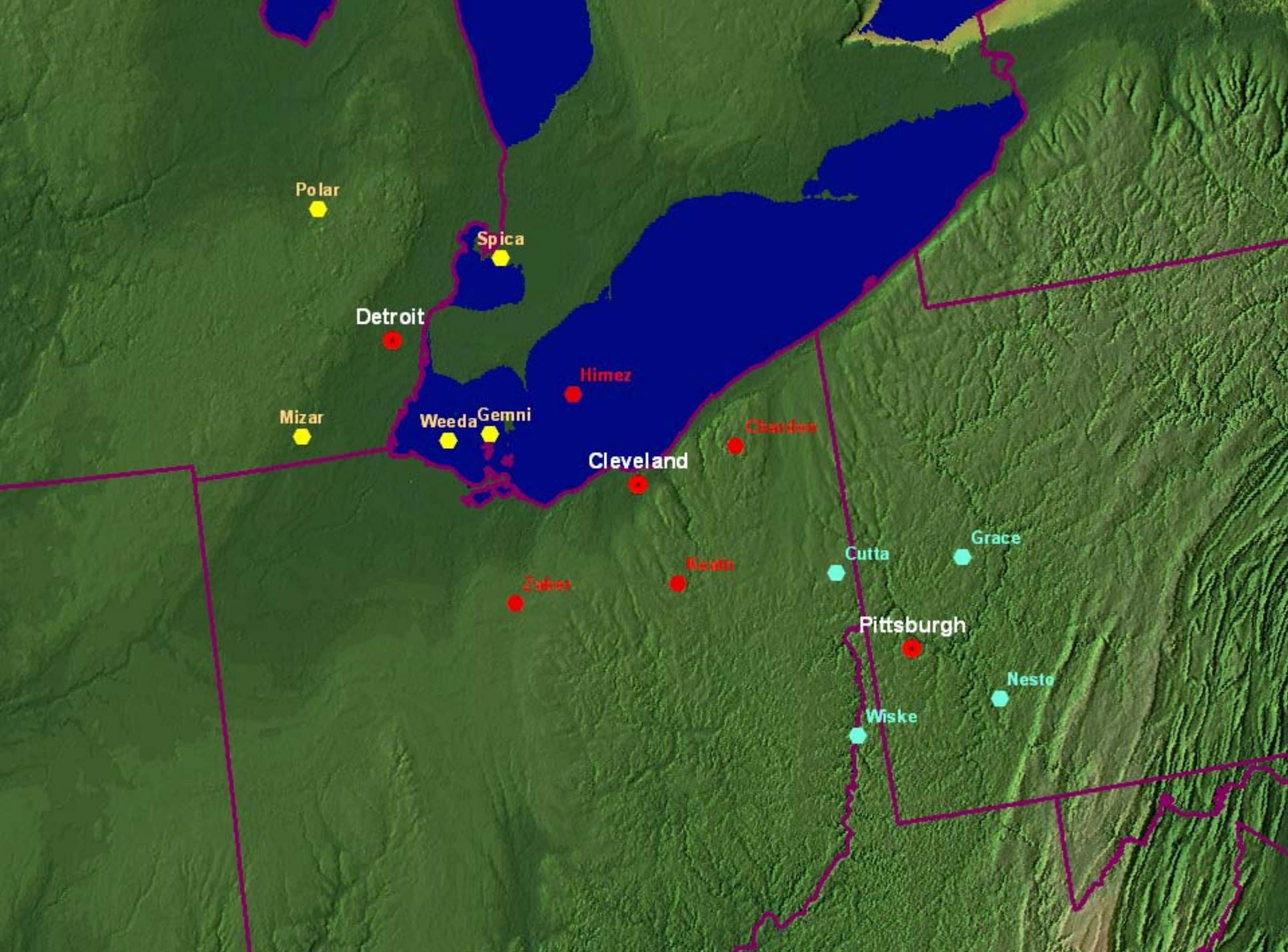
# Meteorological Impact Statement New Format

- Weather synopsis removed
- Jet winds removed
- Valid time adjusted
- Added “En Route” discussion
- Added “Visibility Restrictions and Ceilings Below 5000 Feet”

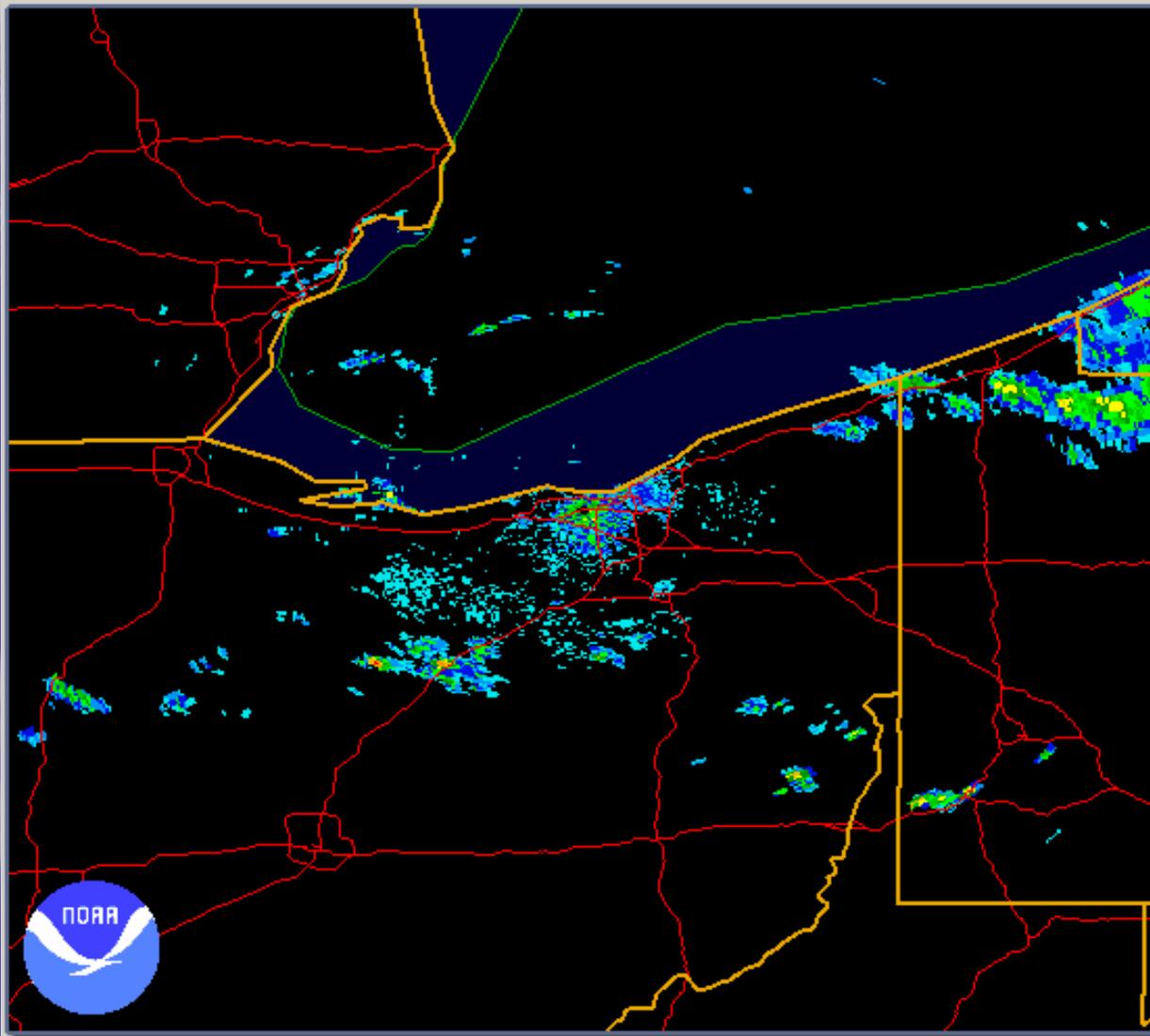
```
ZOB MIS 01 VALID 231205-231800
...FOR ATC PLANNING PURPOSES ONLY...
ISSUED 1205Z TUE JUN 23 2009
NEAR TERM IMPACT 231205-231800
TS...NONE.
EN ROUTE...
ICE...NONE.
TURB...NONE.
TRACON/TERMINALS DTW/CLE/PIT...
VIS RESTRICTIONS AND CIGS BELOW 050...IFR VIS 1-2SM BR 10SE DXO-30SE
DXO-50SW DXO-40WSW DXO-10SE DXO AND 30ENE AIR-60SE AIR-20N EKN-20E
AIR-30ENE AIR...ENDG BY 14Z. VIS RESTRICTIONS NOT AFFECTING
DTW...CLE...OR PIT TRACONS. BRIEF CIGS BKN050 AT CLE THRU 13Z.
SGFNT LOW LVL WNDWS/LLWS...NONE.
COMPRESSION...NONE.
OUTLOOK FROM SIX TO 24 HRS OUT...
NO SGFNT HAZARDS.
```

# STAR- Standard Terminal Arrival Route

- AT WFO's focus for aviation forecaster is to ensure accuracy in their TAF's.
  - Point based forecasts for airports within 5SM of airport's runway complex center.
- However, for operations from ARTCC, TRACONS, and Towers, weather at the STAR's is just as important as what is occurring at the airport.



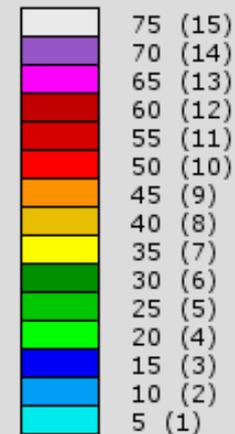
# Convection at or near ZABER and KEATN Arrival Fixes



NEXRAD LEVEL-III  
COMPOSITE REF. 124NM  
KCLE - CLEVELAND, OH  
06/11/2009 00:01:46 GMT  
LAT: 41/24/46 N  
LON: 81/51/35 W  
ELEV: 860 FT  
MODE/VCP: A / 21

MAX: 51 dBZ  
BOT: 0 KFT  
TOP: 0 KFT

Legend: dBZ (Category)



# 10 June 2009 Observations at KCLE

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
						7	8	9	10	11	12											
10	0051	11	SCT044 SCT150 BKN250	9.00		61	16.1	59	14.8	57	13.9	87	0	000		29.11	0	002	29.96	AA		29.97
10	0151	11	BKN044 BKN150 BKN250	9.00		62	16.7	59	15.0	57	13.9	84	0	000		29.10			29.95	AA		29.96
10	0251	11	FEW044 BKN250	7.00		60	15.6	58	14.5	57	13.9	90	0	000		29.10			29.94	AA		29.96
10	0351	11	SCT150 BKN250	7.00		61	16.1	59	14.8	57	13.9	87	0	000		29.08	8	008	29.93	AA		29.94
10	0451	11	FEW120 SCT150 BKN250	7.00		59	15.0	57	14.0	56	13.3	90	5	150		29.09			29.94	AA		29.95
10	0551	11	SCT110 BKN150 BKN250	6.00	BR	61	16.1	59	14.8	57	13.9	87	0	000		29.10			29.94	AA		29.96
10	0651	11	SCT150 BKN250	6.00	HZ	63	17.2	60	15.5	58	14.4	84	3	170		29.07	8	003	29.92	AA		29.93
10	0751	11	FEW075 BKN150 BKN250	8.00		67	19.4	62	16.4	58	14.4	73	0	000		29.09			29.93	AA		29.95
10	0851	11	FEW075 BKN140 BKN250	10.00		69	20.6	62	16.8	58	14.4	68	7	160		29.09			29.93	AA		29.95
10	0951	11	FEW070 BKN140 OVC250	10.00		70	21.1	63	17.4	59	15.0	68	0	000		29.08	0	002	29.93	AA		29.94
10	1051	11	FEW070 BKN140 OVC250	10.00		71	21.7	64	17.9	60	15.6	68	5	250		29.10			29.94	AA		29.96
10	1151	11	BKN034 BKN075 OVC140	10.00		72	22.2	65	18.1	60	15.6	66	6	300		29.10			29.94	AA		29.96
10	1251	11	FEW034 BKN075 OVC150	9.00		72	22.2	65	18.4	61	16.1	68	7	360		29.07	8	002	29.92	AA	T	29.93
10	1351	11	BKN120 OVC150	9.00		70	21.1	64	17.7	60	15.6	71	6	350		29.07			29.92	AA		29.93
10	1451	11	SCT110 OVC150	10.00		70	21.1	63	17.4	59	15.0	68	9	330		29.07			29.92	AA		29.93
10	1551	11	BKN100 OVC150	10.00		70	21.1	63	17.0	58	14.4	66	6	340		29.07	6	002	29.92	AA	T	29.93
10	1651	11	SCT095 OVC150	10.00		70	21.1	63	17.4	59	15.0	68	7	020		29.04			29.89	AA	T	29.90
10	1751	11	BKN100 BKN150 BKN250	10.00		69	20.6	63	17.1	59	15.0	71	7	010		29.03			29.88	AA		29.89
10	1851	11	FEW090 BKN110 BKN150	10.00		68	20.0	62	16.6	58	14.4	71	8	020		29.06	5	003	29.91	AA		29.92
10	1951	11	OVC100	10.00		68	20.0	60	15.7	55	12.8	63	6	060		29.06			29.90	AA		29.92
10	2051	11	OVC110	10.00		69	20.6	60	15.4	53	11.7	57	7	100		29.04			29.89	AA		29.90
10	2151	11	BKN110	10.00		68	20.0	60	15.7	55	12.8	63	0	000		29.03	8	008	29.88	AA		29.89
10	2251	11	SCT042 BKN055 OVC070	10.00		69	20.6	61	16.2	56	13.3	63	3	080		29.03			29.88	AA		29.89
10	2351	11	FEW040 BKN060 OVC090	10.00		68	20.0	61	16.0	56	13.3	66	3	110		29.03			29.88	AA		29.89

# STAR- Standard Terminal Arrival Route

## Trickle up effect

- Weather impacting Arrival Fixes leads to planes not being able to complete approach and land as efficiently. Ultimately, planes may be held in ARTCC airspace and/or an increase in M.I.T.
- Forecasters in all settings should be aware of arrival fixes as planes being delayed in the air due to potentially hazardous weather could create safety issues.

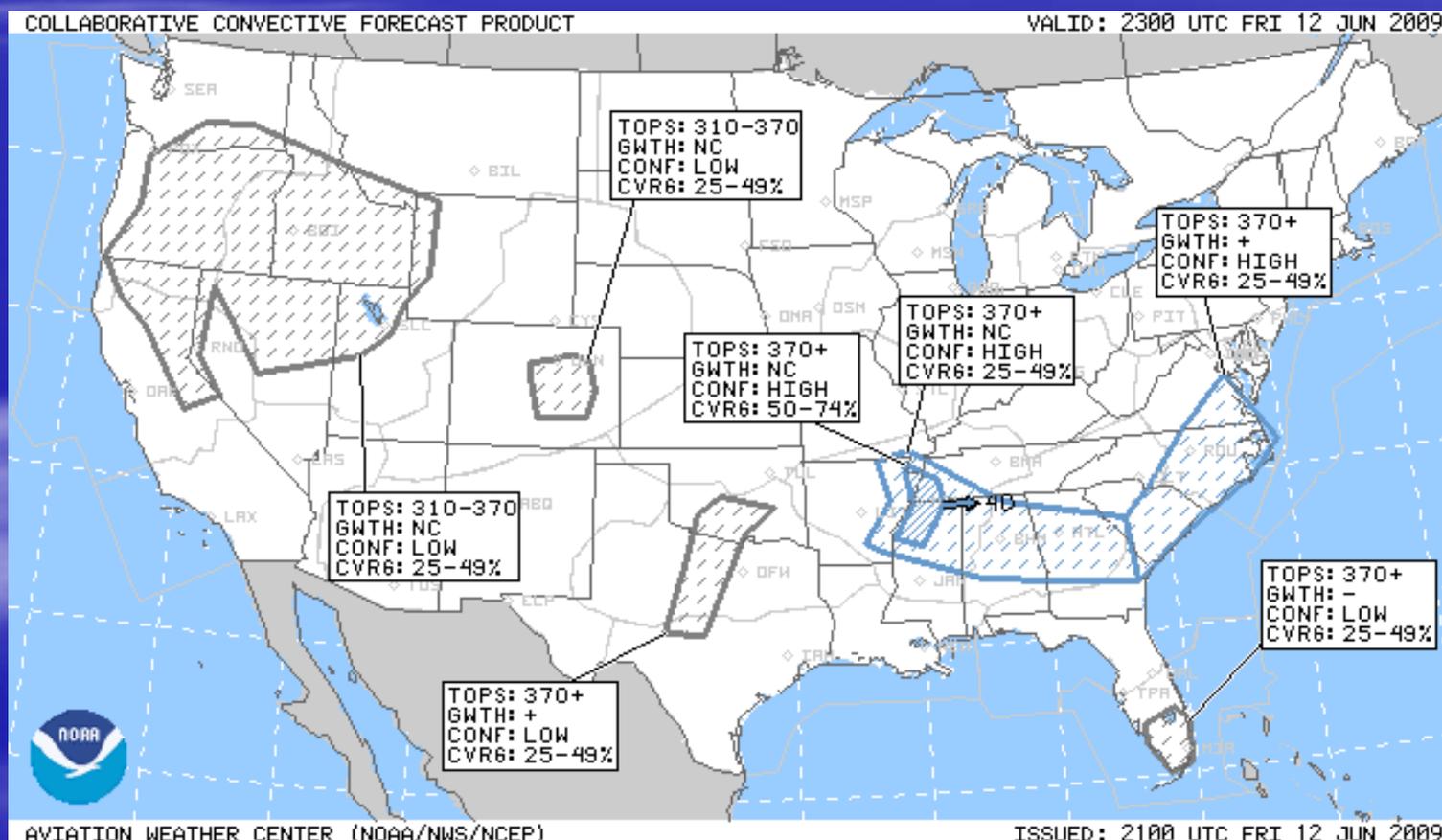
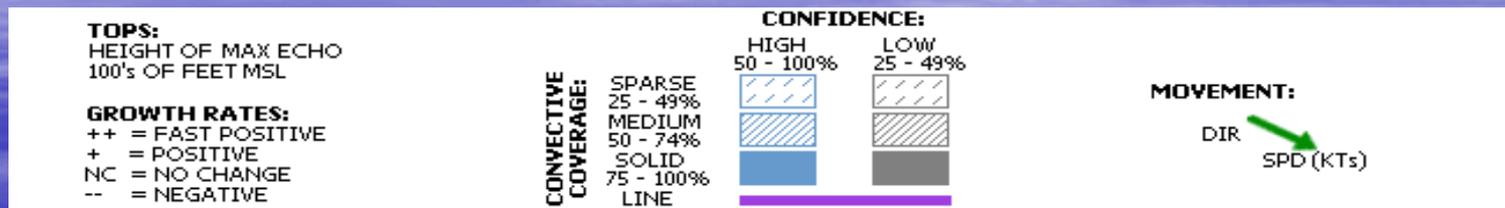
# Collaborative Convective Forecast Product: CCFP

- CCFP runs from **March 1<sup>st</sup> - October 31<sup>st</sup>**
- Several groups participate in developing CCFP product
  - **AWC**
  - **CWSU Forecasters**
  - **Meteorological Service of Canada**
  - **Private Weather Companies**
  - **Meteorological Divisions of Airlines**

# Collaborative Convective Forecast Product: CCFP

- CCFP is an online discussion lead by the AWC forecaster
- Forecasts are issued for 2, 4, 6 hours into future
- Forecasts are valid every other hour on the odd hours.
  - **Ex: Forecast issued at 21Z is valid for 23Z, 01Z, 03Z.**
  - **Exception is overnight. Last forecast is issued at 01Z with valid times of 03Z, 05Z, and 07Z. Next forecast is issued at 07Z.**
- CWSU forecasters add valuable input by enhancing the detail of CCFP within and around their airspace.
- CWSU forecasters share information about the CCFP discussion and forecasts with ARTCC, such as TMU.
  - **Forecasts of location, coverage, movement, change in intensity, and tops of thunderstorms are critical pieces of information covered when briefing ARTCC staff.**
- Reference: <http://aviationweather.gov/products/ccfp/info/>

# Collaborative Convective Forecast Product: CCFP





NAV CANADA



Environnement Canada Environment Canada

## CCFP QUICK REFERENCE

Collaborative Convective Forecast Product

Forecasts: [Fred.Johnson@noaa.gov](mailto:Fred.Johnson@noaa.gov)  
Training: [Scott.Fox@faa.gov](mailto:Scott.Fox@faa.gov)

**CCFP** is a *strategic* forecast of convection to guide traffic managers in their system-wide approach to managing traffic. The CCFP consists of 3 elements: collaboration, forecasts and applications. The CCFP forecast suite is a set of 3 forecast maps with lead times of 2, 4 and 6 hours, updated every 2 hours. Release times, based on Eastern Local Time (ELT), are from 0300 ELT to 2300 ELT, whether on Standard Time or DST.

**TRAINING:** Two briefings, “*Industry Users*” and “*Government Users*” are available from the ATCSCC’s Training Branch or from the AWC’s web site at: <http://aviationweather.gov/products/ccfp/info/> that contain a technical description of the CCFP and its interpretation.

**COLLABORATION, FORECASTS & APPLICATION**  
**Collaboration:** each CCFP is produced by the Aviation Weather Center after collaboration with Meteorological Service of Canada, Center Weather Service Units and meteorological offices of airlines and service providers.

**Forecast:** once the final product is produced, each CCFP is posted on the TSD, CCSD and AWC’s web site at: <http://aviationweather.gov/products/ccfp/>

**Application:** Planning TELCONs use the CCFP as the primary convective forecast product for strategic planning. This application by the users results in an operations plan.

**VERIFICATION:** The accuracy, precision and consistency of every forecast are verified by the NOAA Forecast Systems Laboratory, Forecast Verification Branch. Daily, monthly and seasonal verification statistics and a description of the methodology used can be found at the Forecast System Labs (FSL) web site at: <http://www-ad.fsl.noaa.gov/fvb/rtvs/conv/>

### FORECAST CRITERIA

**Forecast Region:** the Continental U.S. from March 1st through late October and portions of southern Ontario and southern Quebec, Canada from April through Sept.

### Minimum Threshold for CCFP (*convection*):

- At least 3000 square miles, and
- A coverage of at least 25% with echoes of at least 40 dbz composite reflectivity, and
- A coverage of at least 25% with echo tops of at least 25,000 feet MSL, and

All three threshold criteria are required for an area of convection to be included in a CCFP forecast polygon.

### CONVECTION DESCRIPTORS

**Coverage:** identified within each area of convection, in one of four classes:

- Sparse 25 – 49% (sparse fill)
- Medium 50 – 74% (medium fill)
- Solid 75 – 100% (solid fill)
- *Lines* of coverage shall be displayed as solid purple lines, either alone or within a polygon. The length of a line shall be at least 100 nm, the width at least 20nm on either side and the coverage at least 75%.



**Tops:** within each area of convection, the maximum 25% of *Echo Tops* with at least 18.5 dbz, identified in one of three classes:

- 25,000-31,000 ft MSL
- 31,000-37,000 ft MSL
- Above 37,000 ft MSL

**Growth Rate:** given for each area or line of convection in one of four classes:

- (-) Negative Growth
- (NC) No Change
- (+) Moderate Positive Growth
- (++) Fast Positive Growth

**Movement:** label indicates:

- Speed of movement (in kts) of the entire area
- Direction of movement of the entire area

**Confidence:** the forecaster’s subjective estimate that conditions defined by the minimum CCFP criteria will occur in the forecast polygon at the specified time and place. It will be identified in one of two classes:

- **LOW** 25 – 49% (border & fill gray)
- **HIGH** 50 – 100% (border & fill slate blue)

This Quick Reference card can be downloaded from the following websites:

[http://cdm.metronavigation.com/Workgroups/CDM\\_Training/tool\\_training.html](http://cdm.metronavigation.com/Workgroups/CDM_Training/tool_training.html)

<http://aviationweather.gov/products/ccfp/info/>

[http://www.ATCSCC.gov/Training/Training\\_Material/trainin\\_g\\_material.html](http://www.ATCSCC.gov/Training/Training_Material/trainin_g_material.html) (note: this site is FAA intranet only)

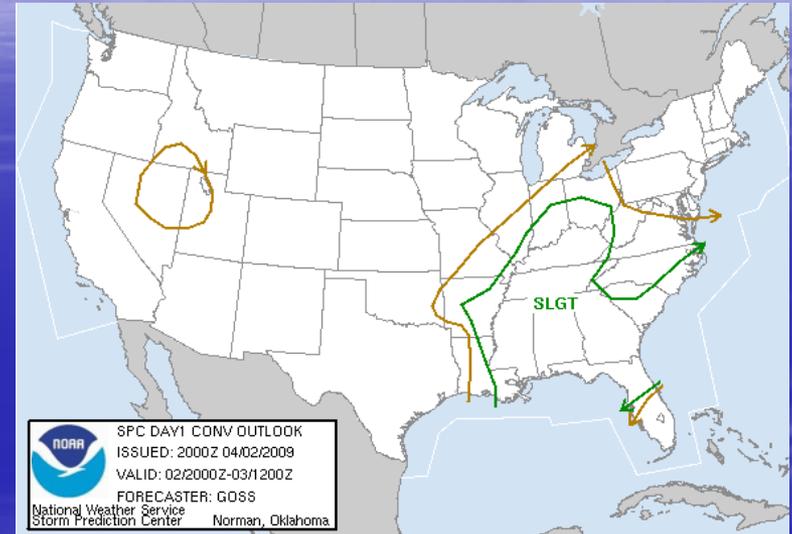
# CWSU & WFO Coordination

- **Example of coordination**

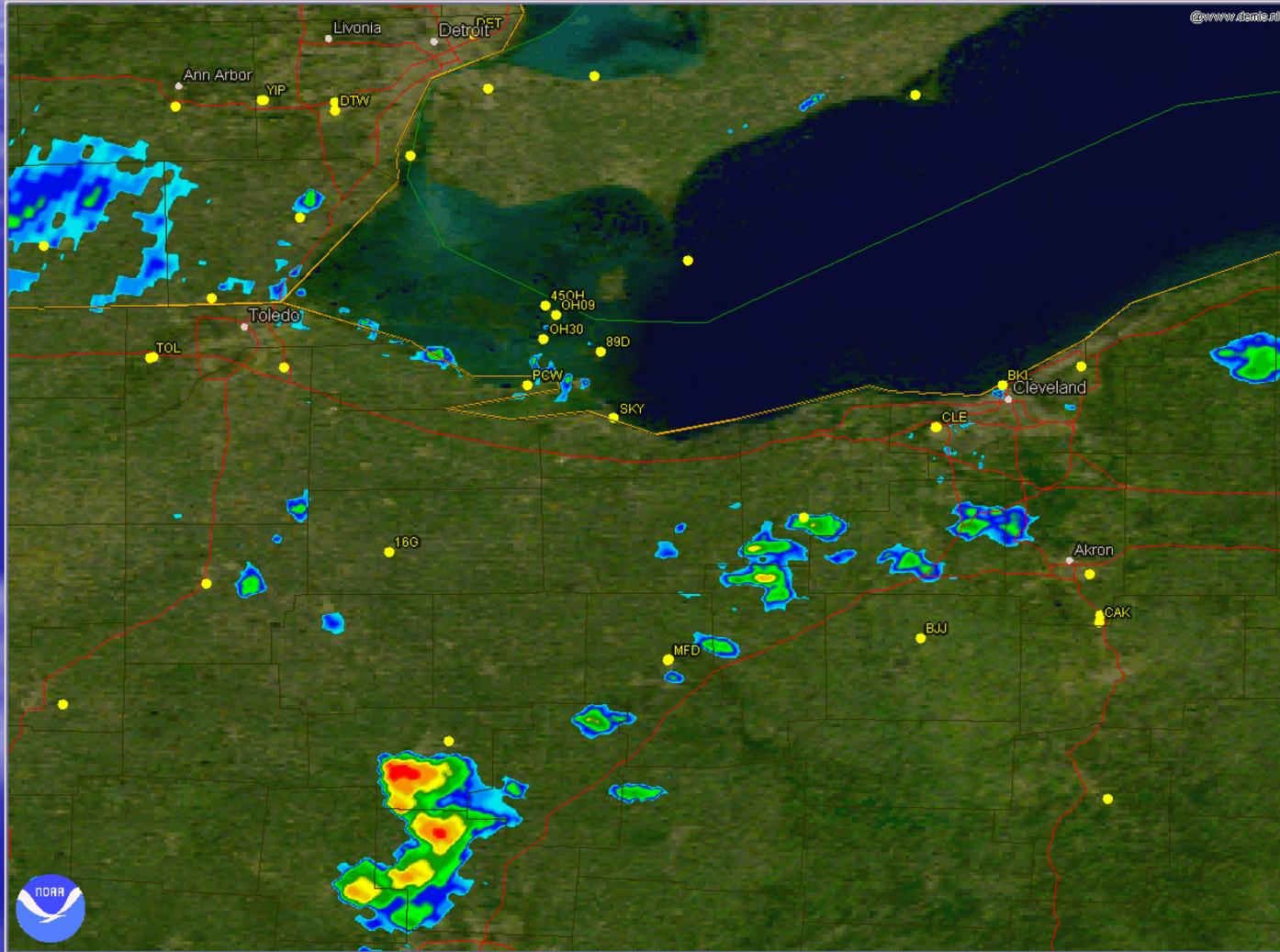
- Date: Thu 2 Apr 2009

- WFO CLE monitoring thunderstorms moving north into CWA.

- At 2018 EDT WFO CLE issues SVR for Marion and Wyandot Counties



# CWSU & WFO Coordination



# CWSU & WFO Coordination

- Shortly after warning was issued, WFO CLE placed a call to ZOB CWSU regarding issuance of SVR. Also relayed current spotter reports from storm.
- My experience at CWSU ZOB helped me realize that during the time this warning was issued the CWSU forecaster may have been dividing attention between current conditions, preparing the overnight forecast, CCFP discussion, and monitoring current PIREP's.
- Below is the UCWA in response to the thunderstorm activity:

```
FAUS21 KZOB 030035  
ZOB1 UCWA 030035  
ZOB UCWA 102 VALID UNTIL 030115  
FROM 40NE ROD TO 45SW CLE TO 30N APE TO 30E ROD TO 40NE ROD  
AREA OF SCT TS..WITH EXTREME RAINFALL AND HALF INCH HAIL REPORTED BY  
GROUND OBSERVER MOVING FM 17030KT. TOPS FL320.  
=
```

# CWSU & WFO Coordination

- Exchange of information between CWSU's and WFO's
  - Phone coordination for thunderstorms in previous example a minor event in WFO operation, but still significant at a CWSU.
  - For enhancement of service, monitored real-time LSR's to add valuable information to CWA's.
  - Utilize 12 Planet Chat to exchange information.

# Conclusion

- Awareness of operations at a CWSU could lead to improved aviation operations at a WFO.
- Knowledge of CWSU operations allows for enhanced collaboration between WFO's and CWSU's.
- Aviation users benefit when forecasts are collaborated, concise, and as accurate as scientifically possible.
- Air traffic safety is primarily dependent on weather. An understanding of the operations at each office, and timely exchanges of weather information increases weather awareness and improves safety in aviation.

# The End



Questions??

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