

## Inflight Advisories - Timely and accurate aviation weather warnings from the NWS

“Attention all aircraft...” begins the ATC announcement that describes a weather hazard that may well impact flight operations and flight safety. The controller reads the Navaids and airports that outline the area for a Convective SIGMET. Any conversation among the crew or passengers stops, and eyes become fixed in a gaze of concentration. The duty now is to form a mental picture of the area described. Then quickly, the task becomes that of assessing the short term impact of these thunderstorms.

SIGMETs, Convective SIGMETs, and AIRMETs are Inflight Advisories that are skillfully and meticulously maintained for aviation safety by forecasters at the Aviation Weather Center. Convective SIGMETs are short term aviation warnings for thunderstorms that pose a danger to all aircraft. Here are the basics:

A. Meteorological criteria

1. Severe thunderstorms due to:
  - a. surface wind gusts greater than or equal to 50 knots.

- b. hail at the surface equal to or greater than 3/4” in diameter.
    - c. tornadoes.
  2. Embedded thunderstorms.
  3. Lines of thunderstorms.
  4. Thunderstorms greater than or equal to Level 4 affecting 40 % or more of an area that is 3,000 square miles in size.
- B. Issuance and valid times
  1. issued hourly at H+55.
  2. valid for 2 hours, but replaced hourly.
  3. outlook portion valid 2 to 6 hours discusses technical aspects that are producing the thunderstorms.
  4. numbered sequentially beginning at 0000 UTC
  5. uses Navaids to locate the threat.
  6. uses 3 sections of the country - West, Central, and East to reduce the size of each hourly bulletin - W, C, or E are appended to the number to denote the section of the country for which they apply.



Figure 1. If you could “see” Inflight Advisories in effect on any day, you may wonder just how free you are to choose your altitude and route without encountering weather problems.

*In this issue:*

*Anatomy of Convective SIGMETs*

*Center Weather Advisories - The Inflight Advisory that augments Convective SIGMETs*

*NCWF - National Convective Weather Forecast - a graphical Nowcast tool*

*Sectorized plotting charts - new compact tools for the cockpit for locating Inflight Advisory areas*

### Mission Statement

*To enhance aviation safety by increasing the pilots’ knowledge of weather systems and processes and National Weather Service products and services.*

All pilots need to keep current on weather. That's just common sense, and that includes keeping abreast of Inflight Advisories, since there is no more urgent product issued for pilots. Yet, a review of the FAA test questions for Private Pilot/ Flight Instructor, Instrument, and Commercial ratings shows that there are no questions that test a pilot's ability to actually interpret any Inflight Advisory.

The very few questions about Convective SIGMETs that do exist focus mainly on the issuance criteria. That's like asking a pilot, "when is an altimeter used" and not providing simulated altimeter depictions to test the pilot's ability to interpret this crucial instrument.

The Aeronautical Information Manual (AIM), section 7-1-5 does a pretty good job of describing SIGMETs and Convective SIGMETs. Perhaps a graphic explaining the content of Convective SIGMETs would be more helpful. That's the focus of the following pages.

When Inflight Advisories were first introduced, the only source was Flight Service, and that was verbal. Gradually, DUATS matured giving pilots their first direct access to NWS products. Then private vendors created airport weather terminals for use at FBOs. Today the Internet delivers a plethora of weather text products, maps, and graphics to pilots. Does just having them available mean that pilots can remain current with these products? Perhaps, but let's study a couple of Inflight Advisories, namely Convective SIGMETs and Center Weather Advisories and get reacquainted.

The AWC home page,

<http://aviationweather.noaa.gov/>

has menu options on the left-hand side that take you directly to the Convective SIGMET page shown in Figure 2. The current WSTs are plotted in red, and outlooks are plotted in green. Options at the bottom of that page offer two other map displays as well as the ability to display the text message only.

The text versions can be plotted on the AWC's advisory plotting chart shown in Figure 3. That chart is available at:

<http://aviationweather.noaa.gov/awc/advstry/advstrypltn.html>

The anatomy of a Convective SIGMET is shown in Figure 4 on the next page. The individual advisories shown there are the ones plotted in Figure 3.

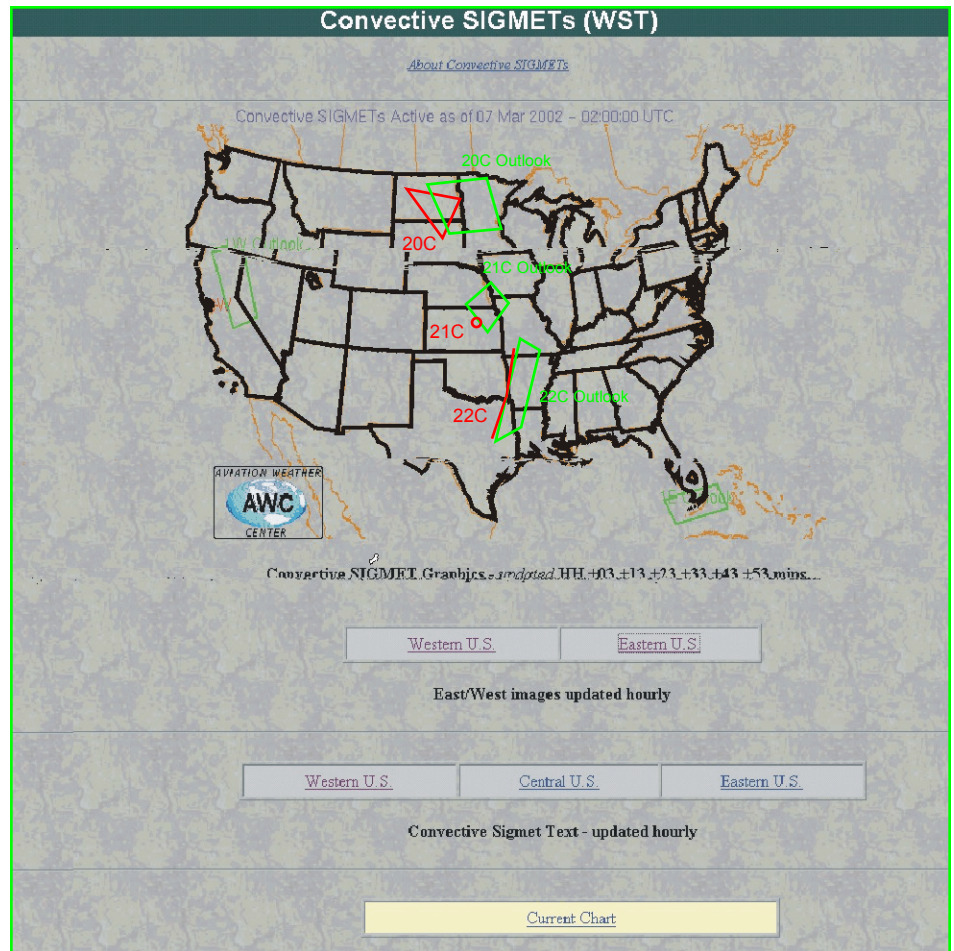


Figure 2. The Convective SIGMET page displays plots of WSTs in red and outlook areas in green. The map can be divided into east and west portions using the clickable tabs below the map. Text versions of the Convective SIGMETs are also available using the three tabs near the bottom of the page. Access it from the AWC home page, or go direct to this page with: <http://aviationweather.noaa.gov/awc/awc-wsts.html>

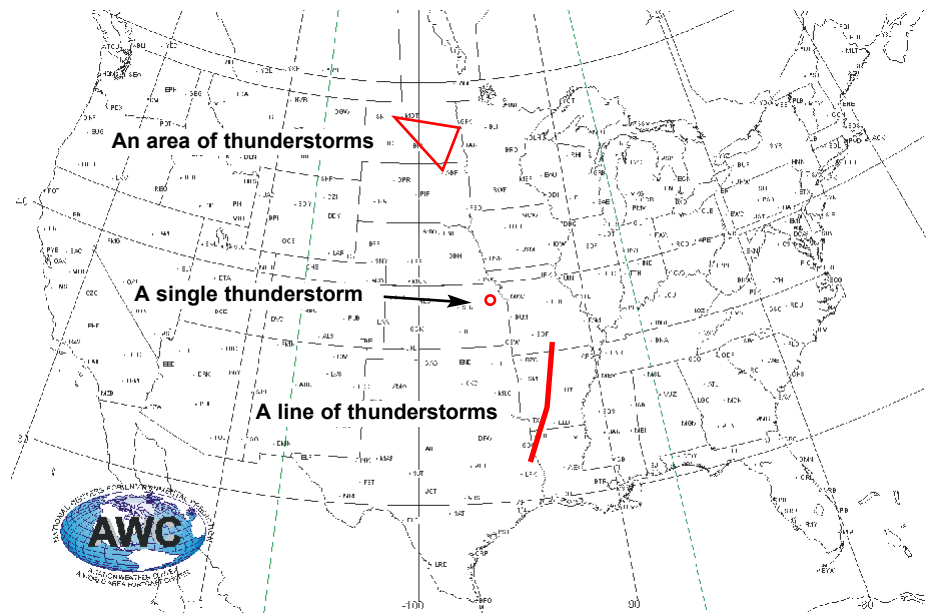


Figure 3. The Inflight Advisory plotting chart is used by Aviation Weather Center to graphically depict the location of SIGMETs, Convective SIGMETs, and AIRMETS. The Convective SIGMETs shown in Figure 4 on the next page are plotted here.



**"WST"** indicates this is a Convective SIGMET

**MKCC** indicates this Convective SIGMET is from the AWC. The end "C" means it is for the central portion of the continental U.S. E or W would be for East or West sections respectively.

**Issuance time:** 22nd day, 1855 UTC

**SIGMET number.** Numbering begins daily at 0000 UTC. The "C" means it's for the "Central" portion of the country.

Expiration time is 2 hours after issuance, but Convective SIGMETs are issued hourly and replace the previous hour's product.

**States affected**

**Area of thunderstorms.** Points are relative to Nav aids that outline the threat area. The starting and ending point are identical.

**Single Cell** thunderstorm 35 nm west of Kansas City

**Line** of severe thunderstorms 25 nm wide

Each Convective SIGMET has an outlook that is valid for 2 to 6 hours, but 4 hours is normally chosen. The outlook begins at the expiration time of the SIGMET. The outlook uses Nav aids to describe the area. Outlook Area 1 refers to the first SIGMET, in this case, 20C. Outlook Area 2 refers to the second SIGMET in this message, 21C. Outlook Area 3, references 22C.

**Convective SIGMET 20C**  
 VALID UNTIL 2055Z  
 ND SD  
 FROM 90W MOT-GFK-ABR-90W MOT  
 INTSFYG AREA SVR TSTMS MOVG FROM 2445. TOPS ABV FL450.  
 WIND GUSTS TO 60KT RPRTD. TORNADOES...HAIL TO 2 IN...WIND GUSTS TO 65KT PSBL ND PTN.

**Convective SIGMET 21C**  
 VALID UNTIL 2055Z  
 KS MO  
 35W MKC  
 ISOLD SVR TSTM D30 MOVG FROM 2520 TOPS ABV FL450.  
 HAIL TO 2 IN. WIND GUSTS TO 65 KT PSBL.

**Convective SIGMET 22C**  
 VALID UNTIL 2055Z  
 AR MO OK TX  
 FROM 90SE SGF-70NE TXK-50NE LFK  
 LN SVR TSTMS 25 MI WIDE MOVG FROM 2745. TOPS ABV FL450.  
 HAIL TO 2 IN. WIND GUSTS TO 65 KT PSBL.

**OUTLOOK VALID 222055-230055**  
 AREA 1 FROM INL-MSP-ABR-MOT-INL  
 SVR TSTMS CONT TO DVLP IN AREA OVR ND. AREA IS XPCD TO RMN SVR AND SPRD INTO MN AS STG PVA MOVS OVR VERY UNSTBL AMS CHARACTERIZED BY -12 LIFTED INDEX.

AREA 2 FROM DSM-IRK-BUM-PWE-DSM  
 ISOLD STG TSTMS WILL CON OVR ERN KS AND NWRN MO THRU FCST PD AS DVRGC ASSOCD WITH UPR LVL TROF MOVS NEWD OVR VERY UNSTBL AMS. LIFTED INDEX RMNS IN THE -9 TO -10 RANGE.

AREA 3 FROM COU-FAM-MCB-LFK-COU  
 LN SVR TSTMS WILL CONT OVR SRN MO AR NRN LA AND ERN TX ALG RPDLY MOVG CD FNT. TSTMS MOVG INTO AREA OF SFC DWPTS OF 70 TO 75 AND CAPE OF 3000 TO 4000 J/KG.

*"Intensifying area of severe thunderstorms moving from 240 degrees at 45 knots. Storm tops above flight level 4-5-Zero. Wind gusts to 60 knots reported. Tornadoes, hail to 2 inches in diameter, wind gusts to 65 knots possible in the North Dakota portion."*

*"Isolated severe thunderstorm, 30 nautical miles in diameter moving from 250 degrees at 20 knots. Tops above flight level 4-5-Zero. Hail to 2 inches in diameter. Wind gusts to 65 knots possible."*

*"Line of severe thunderstorms 25 miles wide moving from 270 degrees at 45 knots. Tops above flight level 4-5-Zero. Hail to 2 inches Wind gusts to 65 knots possible."*

*"Severe thunderstorms continue to develop in the area over North Dakota. Area is expected to remain severe and spread into Minnesota as strong positive vorticity advection moves over very unstable airmass characterized by a minus 12 lifted index."*

*"Isolated strong thunderstorms will continue ovr eastern Kansas and northwestern Missouri through the forecast period as divergence associated with upper level trough moves northeastward over very unstable airmass. Lifted index remains in the minus 9 to minus 10 range.."*

*"Line of severe thunderstorms will continue over southern Missouri, Arkansas, northern Louisiana and eastern Texas along a rapidly moving cold front. Thunderstorms are moving into an area of surface dew points of 70 to 75 and CAPE of 3000 to 4000 joules per kilogram."*

Figure 4. Convective SIGMETs consist of a warning section on top, each of which is sequentially numbered, and an outlook section below. The numbered areas refer to the warning areas in the same order.

Several Convective SIGMETs can be listed in each hourly bulletin if convection stretches over a wide area and if the clusters of thunderstorms are distinct from each other.

These bulletins consist of a warning section on top, in which each Convective SIGMET is sequentially numbered. Below that is an outlook section which is a concise short term forecast (up to 6 hours) for each respective area of thunderstorms. It's carefully crafted by AWC forecasters using satellite cloud motion and motion vectors from NWS NEXRAD data, as well as model output from the RUC (Rapid Update Cycle), ETA, MesoETA, and AVN atmospheric models. The numbered outlook areas are listed in the same sequence as the warnings above. In other words, Area 1 in the outlook refers to Convective SIGMET 20C.

Technical terms are used in this outlook section, and discuss the most important meteorological features that are contributing to the thunderous disruptions of air traffic.

Normally, Convective SIGMETs serve the country quite well. Sometimes though, a thunderstorm develops rapidly in an area of high traffic volume, or a portion of a storm cluster will affect a large terminal and disrupt the tight flow of traffic. One of these particular storms may

not meet Convective SIGMET criteria, but it may pose a problem for Air Traffic Control.

Center Weather Advisories (CWA) are another type of Inflight Advisory and were created for this very purpose. CWAs are equal in urgency to Convective SIGMETs but are issued by Center Weather Service Units (CWSU) in the Air Route Traffic Control Centers (ARTCC). The function of the CWA is to provide real time help when adverse weather erupts or covertly evolves.

Figure 5 is a diagrammed example of a CWA. CWAs may augment existing Convective SIGMETs, in which case that fact will be stated in the CWA as shown in Figure 5. CWSU forecasters are direct resources for ATC controllers but are not a pilot's alternative to Flight Watch.

CWAs are available on the AWC web site in the section called the CWSU Corner. Start again at the AWC home page:

<http://aviationweather.noaa.gov/>

Figure 6 shows that home page and where to click to access the CWSU Corner and other AWC products and services.

Figure 7 is the CWSU Corner page. Clicking on the dot under the ARTCC IDs will display any CWAs in effect for that Center at the top left corner of the page.

A new automated tool arrived on the

aviation scene in October, 2001. The National Convective Weather Forecast (NCWF) in Figure 9 depicts six level radar data on a map with ARTCC boundaries and hub airports. To zoom in on one of the hubs, click on the appropriate button at the bottom of the map. The NCWF looks for max reflectivity areas and then projects a one hour future location with a polygon similar to the way that AWC forecasters create the outlook portion of the Convective SIGMET. While the NCWF could be a parallel to the Convective SIGMET program, work is ongoing to assess its performance.

Most pilots have heard Convective SIGMETs read either directly by the controller or by changing to the HIWAS frequency. Controllers will normally summarize the area concerned. But if the controller chooses to read the points that outline the area of thunderstorms, it may be hard to quickly visualize where the area is. This task is nearly impossible if the current flight plan has you in an unfamiliar part of the country.

Does that WST straddle the course between two waypoints that you have entered into your GPS?

One way to find out is take out an en route chart, unfold it and search for the VORs just mentioned. Maybe you need to flip the chart over, or get another one out

ARTCC ID, ZKC is Kansas City Center. The "2" is a phenomenon number for a meteorologically unique event. There are normally only 6 numbers used, and they begin numbering each day at 00 UTC. Urgent Center Weather Advisory Issued 22nd day of the month at 1913 UTC

2nd line of header  
The "2" in "203" is the phenomenon number, a distinct area of thunderstorms.  
The "3" is the number of the CWA pertaining to this phenomenon.  
In other words, this is the 3rd CWA issued for this storm (phenomenon 2). This would be done only if the storm persisted, did not meet Convective SIGMET criteria, but was significant enough to impact the normal flow of air traffic.  
Expiration time, 22nd day of the month at 2113 UTC.

**/D ZKC2 UCWA 221913**  
**ZKC CWA 203 VALID UNTIL 222113**  
**32W MKC**  
**ISOLD LVL 6 TSTM (EXTREME) DIAM 30 NM MOVG FROM 25020KT. TOP TO FL550. TSTM WILL MOV OVR MKC BTWN 2030 UTC AND 2100 UTC. WND GUSTS TO 51 KTS RPTD. SEE CONVECTIVE SIGMET 21C.**

*"32 nm west of Kansas City VOR (MKC)  
Isolated level 6 thunderstorm (extreme) 30 nm in diameter moving from 250 degrees at 20 knots. Tops to Flight Level 5-5-Zero. Thunderstorm will move over MKC between 2030 UTC and 2100 UTC. Wind gusts to 51 knots reported. See Convective SIGMET 21C."*

PAZA - Anchorage	ZLA - Los Angeles
ZAB - Albuquerque	ZLC - Salt Lake
ZAU - Chicago	ZMA - Miami
ZBW - Boston	ZME - Memphis
ZDC - Washington	ZMP - Minneapolis
ZDV - Denver	ZNY - New York
ZFW - Fort Worth	ZOA - Oakland
ZHU - Houston	ZOB - Cleveland
ZID - Indianapolis	ZSE - Seattle
ZJX - Jacksonville	ZTL - Atlanta
ZKC - Kansas City	

Figure 5. Anatomy of a Center Weather Advisory (CWA). CWAs are issued by Center Weather Service Units (CWSUs) for weather threats that are either not covered by SIGMETs or Convective SIGMETs or to add important details for safe and efficient movement of air traffic by ATC.

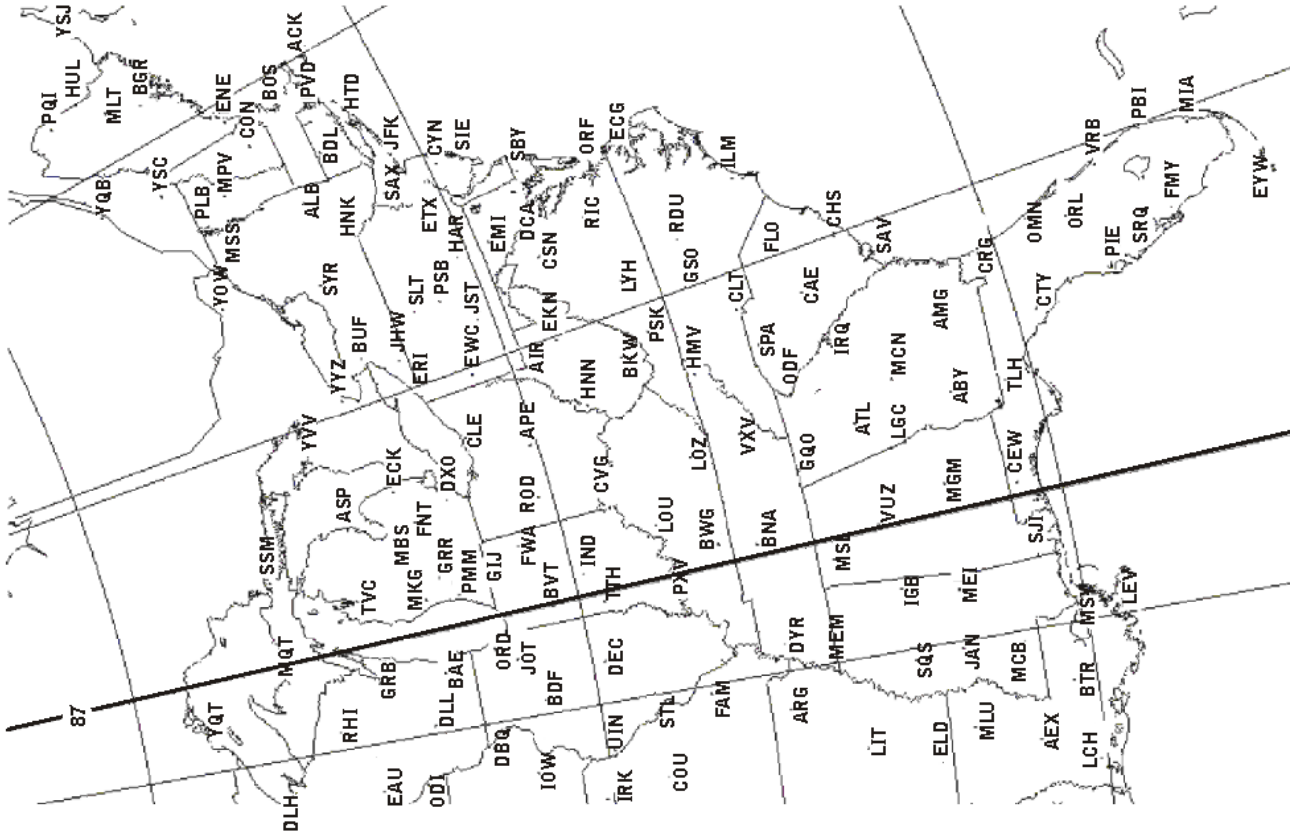
Air traffic control center IDs used in the headers of Center Weather Advisories.



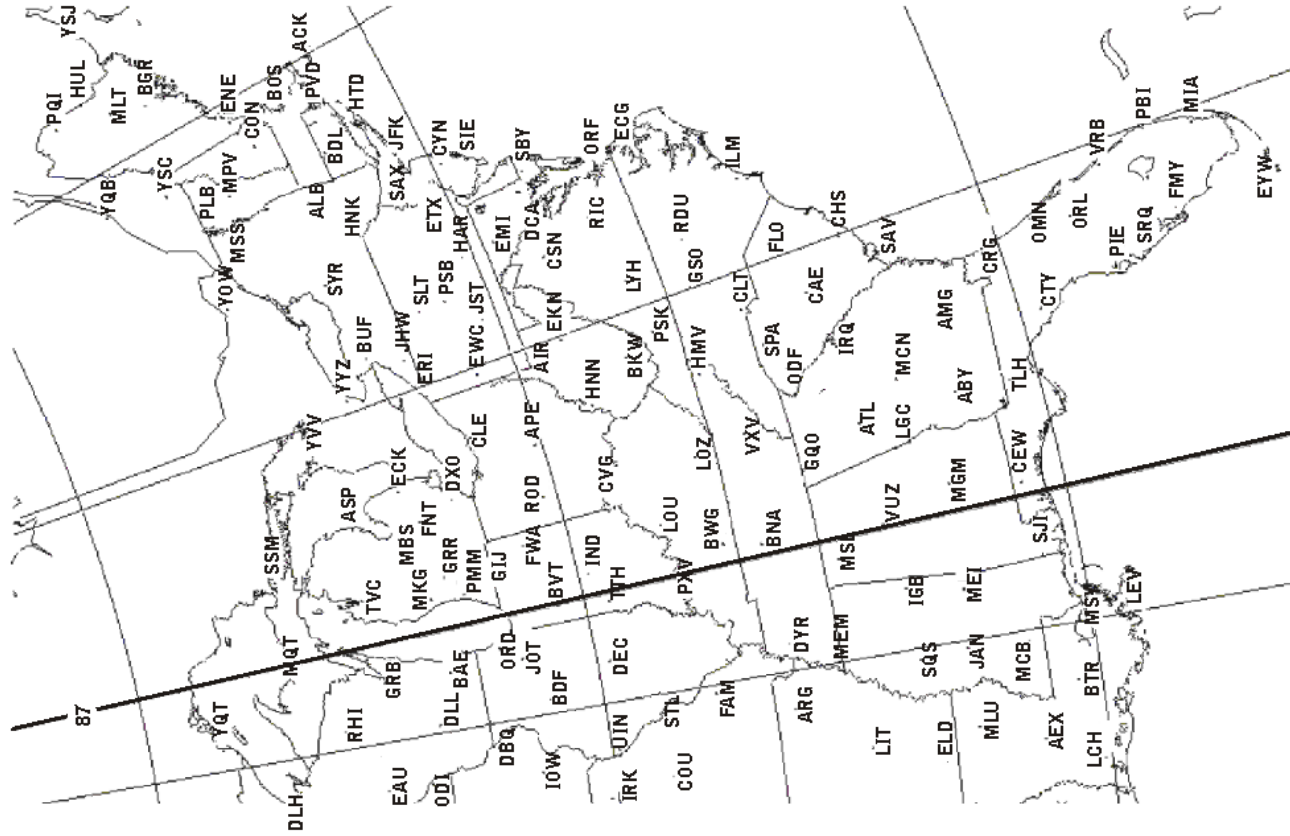








**Convective SIGMET  
East**



**Convective SIGMET  
East**



ID	NAME	STATE	ID	NAME	STATE	ID	NAME	STATE	ID	NAME	STATE
A	ABY	GA	M	MSL	NC	M	MSL	NC	M	MSL	NC
A	ACK	MA	M	MSS	NY	M	MSS	NY	M	MSS	NY
A	AEX	LA	M	MSY	LA	M	MSY	LA	M	MSY	LA
A	AIR	OH	O	ODF	GA	O	ODF	GA	O	ODF	GA
A	ALB	NY	O	ODI	MN	O	ODI	MN	O	ODI	MN
A	AMG	GA	O	OMN	FL	O	OMN	FL	O	OMN	FL
A	APE	OH	O	ORF	VA	O	ORF	VA	O	ORF	VA
A	ARG	AR	P	ORL	MI	P	ORL	MI	P	ORL	MI
A	ASP	MI	P	ORL	MI	P	ORL	MI	P	ORL	MI
A	ATL	GA	Y	OWW	ON	Y	OWW	ON	Y	OWW	ON
B	BAE	WI	Y	QAB	ON	Y	QAB	ON	Y	QAB	ON
B	BDF	IL	Y	QAT	ON	Y	QAT	ON	Y	QAT	ON
B	BDL	CT	Y	YSC	ON	Y	YSC	ON	Y	YSC	ON
B	BGR	MI	Y	YSJ	ON	Y	YSJ	ON	Y	YSJ	ON
B	BKW	MI	Y	YVW	ON	Y	YVW	ON	Y	YVW	ON
B	BNA	MI	Y	YZZ	ON	Y	YZZ	ON	Y	YZZ	ON
B	BOS	MA	Y			Y			Y		
B	BTR	MA	Y			Y			Y		
B	BUF	NY	Y			Y			Y		
B	BVT	NY	Y			Y			Y		
C	BWG	VA	L			L			L		
C	CAE	VA	L			L			L		
C	CEW	FL	L			L			L		
C	CHS	FL	L			L			L		
C	CLE	OH	L			L			L		
C	CLT	NC	L			L			L		
C	CON	NC	L			L			L		
C	COU	MO	L			L			L		
C	CRG	MO	L			L			L		
C	CSN	VA	L			L			L		
C	CTY	VA	L			L			L		
C	CVG	OH	L			L			L		
C	CYN	NJ	L			L			L		
D	DBQ	IA	L			L			L		
D	DCA	DC	L			L			L		
D	DEC	IL	L			L			L		
D	DLH	IL	L			L			L		
D	DLL	WI	L			L			L		
D	DXO	MI	L			L			L		
D	DYR	MI	L			L			L		
E	EAU	WI	L			L			L		
E	ECG	NC	L			L			L		
E	ECK	MI	L			L			L		
E	EKN	MI	L			L			L		
E	ELD	AR	L			L			L		
E	EMI	MD	L			L			L		
E	ENE	ME	L			L			L		
E	ERI	PA	L			L			L		
E	ETX	TX	L			L			L		
E	EWC	TX	L			L			L		
E	EYW	TX	L			L			L		
F	FAM	TX	L			L			L		
F	FLO	TX	L			L			L		
F	FMY	TX	L			L			L		
F	FNT	TX	L			L			L		
F	FWA	TX	L			L			L		
F	FWT	TX	L			L			L		
G	GLJ	TX	L			L			L		
G	GQO	TX	L			L			L		
G	GRB	TX	L			L			L		
G	GRR	TX	L			L			L		
G	GSO	TX	L			L			L		
H	HAR	TX	L			L			L		
H	HMV	TX	L			L			L		
H	HNK	TX	L			L			L		
H	HNC	TX	L			L			L		
H	HNN	TX	L			L			L		
H	HNT	TX	L			L			L		
H	HOU	TX	L			L			L		
H	HUL	TX	L			L			L		
H	HVG	TX	L			L			L		
H	HWH	TX	L			L			L		
H	HWT	TX	L			L			L		
H	HXL	TX	L			L			L		
H	HYP	TX	L			L			L		
H	HZE	TX	L			L			L		
H	HZZ	TX	L			L			L		
I	IAB	TX	L			L			L		
I	IAC	TX	L			L			L		
I	IAD	TX	L			L			L		
I	IAG	TX	L			L			L		
I	IAH	TX	L			L			L		
I	IAM	TX	L			L			L		
I	IAN	TX	L			L			L		
I	IAP	TX	L			L			L		
I	IAT	TX	L			L			L		
I	IAX	TX	L			L			L		
I	IAY	TX	L			L			L		
I	IBB	TX	L			L			L		
I	IBC	TX	L			L			L		
I	IBD	TX	L			L			L		
I	IBE	TX	L			L			L		
I	IBF	TX	L			L			L		
I	IBG	TX	L			L			L		
I	IBH	TX	L			L			L		
I	IBI	TX	L			L			L		
I	IBJ	TX	L			L			L		
I	IBK	TX	L			L			L		
I	IBL	TX	L			L			L		
I	IBM	TX	L			L			L		
I	IBN	TX	L			L			L		
I	IBO	TX	L			L			L		
I	IBP	TX	L			L			L		
I	IBQ	TX	L			L			L		
I	IBR	TX	L			L			L		
I	IBS	TX	L			L			L		
I	IBT	TX	L			L			L		
I	IBU	TX	L			L			L		
I	IBV	TX	L			L			L		
I	IBW	TX	L			L			L		
I	IBX	TX	L			L			L		
I	IBY	TX	L			L			L		
I	IBZ	TX	L			L			L		
J	JAA	TX	L			L			L		
J	JAB	TX	L			L			L		
J	JAC	TX	L			L			L		
J	JAD	TX	L			L			L		
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J	JAJ	TX	L			L			L		
J	JAK	TX	L			L			L		
J	JAL	TX	L			L			L		
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J	JAN	TX	L			L			L		
J	JAQ	TX	L			L			L		
J	JAR	TX	L			L			L		
J	JAS	TX	L			L			L		
J	JAT	TX	L			L			L		
J	JAU	TX	L			L			L		
J	JAV	TX	L			L			L		
J	JAW	TX	L			L			L		
J	JAX	TX	L			L			L		
J	JAY	TX	L			L			L		
J	JAZ	TX	L			L			L		
J	JBA	TX	L			L			L		
J	JBB	TX	L			L			L		
J	JBC	TX	L			L			L		
J	JBD	TX	L			L			L		
J	JBE	TX	L			L			L		
J	JBF	TX	L			L			L		
J	JBG	TX	L			L			L		
J	JBH	TX	L			L			L		
J	JBI	TX	L			L			L		
J	JBJ	TX	L			L			L		
J	JBK	TX	L			L			L		
J	JBL	TX	L			L			L		
J	JBM	TX	L			L			L		
J	JBN	TX	L			L			L		
J	JBO	TX	L			L			L		
J	JBP	TX	L			L			L		
J	JBQ	TX	L			L			L		
J	JBR	TX	L			L			L		
J	JBS	TX	L			L			L		
J	JBT	TX	L			L			L		
J	JBU	TX	L			L			L		
J	JBV	TX	L			L			L		
J											



