6 PRODUCTS FOR AVIATION HAZARDS

6.1 Significant Meteorological Information (SIGMET)

A SIGMET is a concise description of the occurrence or expected occurrence of specified en route weather phenomena which may affect the safety of aircraft operations. SIGMETs are intended for dissemination to all pilots in flight to enhance safety. SIGMETs are issued by the responsible MWO as soon as practical to give notice to operators and aircrews of potentially hazardous en-route conditions.

- SIGMETs are available on the Aviation Digital Data Service (ADDS) web site at: http://adds.aviationweather.noaa.gov/airmet/
    - Alaska SIGMETs are also available on the Alaska Aviation Weather Unit (AAWU) web site at: http://aawu.arh.noaa.gov/
    - Hawaii SIGMETs are also available on the NWS WFO Honolulu web site at: http://www.prh.noaa.gov/hnl/pages/aviation.php

6.1.1 SIGMET Issuance

SIGMETs are issued from Meteorological Watch Offices (MWO). The U.S. has three MWOs: the Aviation Weather Center (AWC), the Alaska Aviation Weather Unit (AAWU), and the Weather Forecast Office (WFO) in Honolulu. Their areas of responsibility are as follows:

- The AWC:
    - Twenty (20) domestic Air Route Traffic Control Center (ARTCC) Flight Information Regions (FIRs) covering the conterminous U.S. (CONUS) and adjacent coastal waters (CONUS) (Figure 6-1).
    - The New York, Houston, Miami, and San Juan Oceanic FIRs (Figure 6-2).
    - The Oakland Oceanic FIR north of 30 north latitude, and the portion east of 140 west longitude which is between the equator and 30 north latitude (Figure 6-3).
- The AAWU is responsible for the Anchorage Continental FIR and Anchorage Oceanic FIR (Figure 6-3).
- WFO Honolulu is responsible for the Oakland Oceanic FIR south of 30 north latitude and between 140 west and 130 east longitude (Figure 6-3).

Figure 6-1. AWC SIGMET Areas of Responsibility - Conterminous U.S.

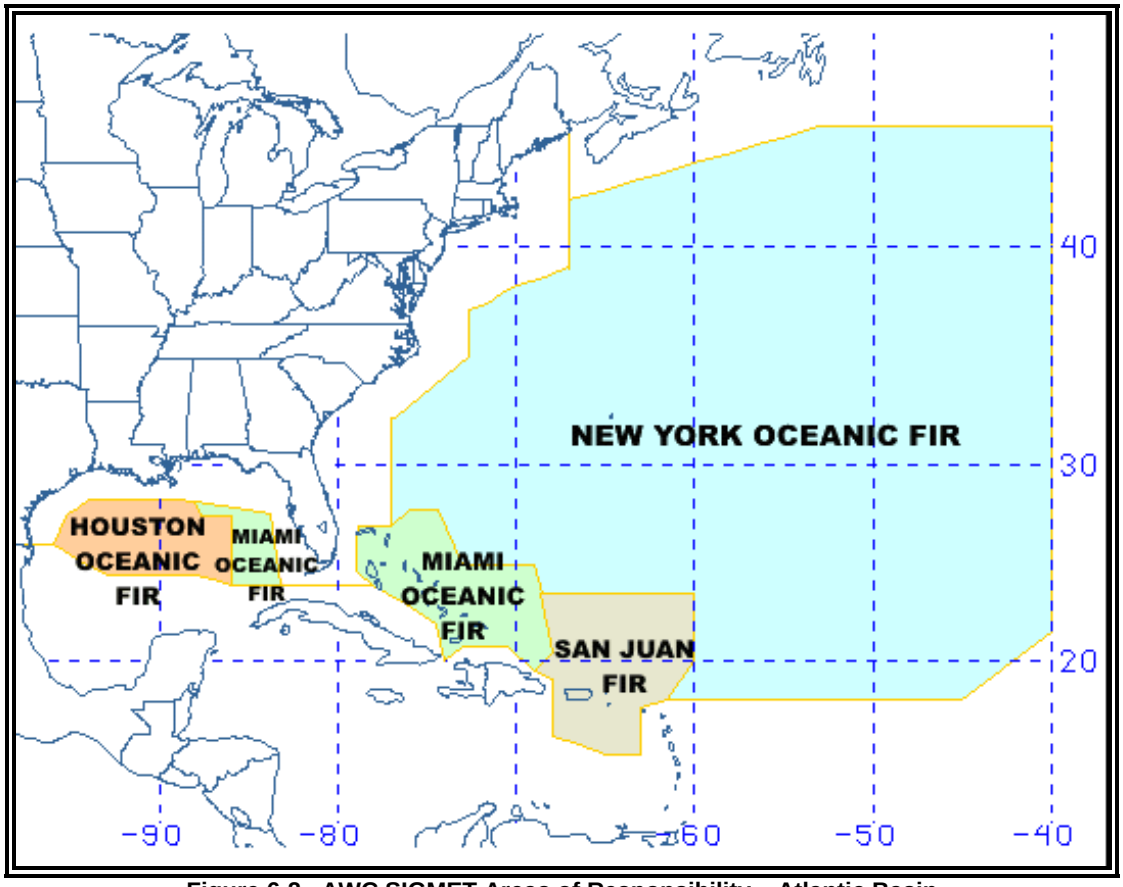

Figure 6-2. AWC SIGMET Areas of Responsibility – Atlantic Basin

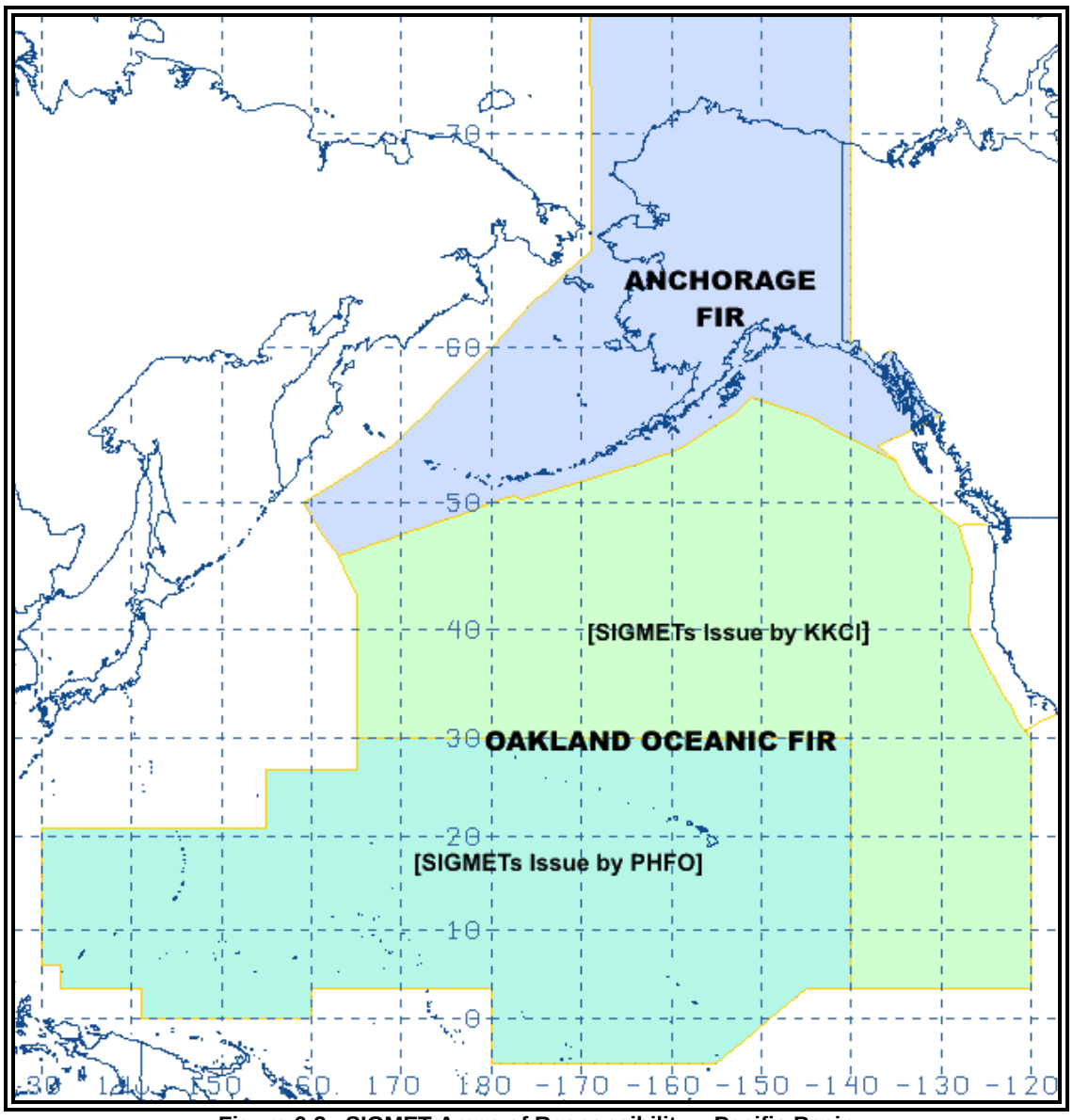

Figure 6-3. SIGMET Areas of Responsibility – Pacific Basin

6.1.1.1 SIGMET Identification

When a SIGMET is issued, it is assigned a unique series identifier:

- AWC for CONUS
  - **NOVEMBER** through **YANKEE**, excluding **SIERRA** and **TANGO**
- AWC for Oakland Oceanic FIR
  - **ALFA** through **HOTEL**
- Honolulu MWO for Oakland Oceanic FIR
  - **NOVEMBER** through **ZULU**
- AAWU for Anchorage FIR
  - **INDIA** through **MIKE**

A number is assigned sequentially with each issuance until the phenomenon ends. At 0000 UTC each day, all continuing SIGMETs are renumbered to one (1) regardless of a continuation of the phenomena. (e.g., YANKEE 1, YANKEE 2, YANKEE 3, etc.)

6.1.2 SIGMET Standardization

SIGMETs follow these standards:

- All heights or altitudes are referenced to above mean sea level (AMSL), unless otherwise noted, and annotated using the height in hundreds of feet, consisting of three digits (e.g., 040). For heights at or above 18,000 feet, the level is preceded by FL to represent flight levels (e.g., FL180).

- References to latitude and longitude are in whole degrees and minutes following the model: Nnn[nn] or Snn[nn], Wnnn[nn] or Ennn[nn] with a space between latitude and longitude and a hyphen between successive points. Example: N3106 W07118 – N3011 W7209

- Messages are prepared in abbreviated plain language using contractions from the Federal Aviation Administration (FAA) Order 7340.1Z for domestic products and International Civil Aviation Organization (ICAO) document 8400 for international products issued for Oceanic FIRs. A limited number of non-abbreviated words, geographical names and numerical values of a self-explanatory nature may also be used.

- Weather and obstructions to visibility are described using the weather abbreviations for surface weather observations (METAR/SPECI). See the Federal Meteorological Handbook (FMH) No. 1 – Surface Observations or Section 3.1 of this document.

- Heights are identified as follows:

    - For heights below 3,000 feet, increments are in 100's of feet
    - For heights from 3,000 to 5,000 feet, increments are in 500's of feet
    - For heights greater than 5,000 feet, increments are in 1,000's of feet

6.1.3 SIGMET (Non-Convective) – Conterminous U.S.

6.1.3.1 SIGMET (Non-Convective) Issuance Criteria – Contiguous U.S.

A SIGMET may be issued in the Contiguous U.S. when any of the following conditions are affecting or, in the judgment of the forecaster, are expected to affect an area of at least 3,000 square miles or an area judged to have a significant impact on the safety of aircraft operations.

- Severe or greater Turbulence (SEV TURB)

- Severe Icing (SEV ICE)

- Widespread Duststorm (WDSPR DS)

- Widespread Sandstorm (WDSPR SS)

- Volcanic Ash (VA)

6.1.3.2 SIGMET (Non-Convective) Issuance Time and Valid Period – Conterminous U.S.

A SIGMET is an unscheduled product issued any time conditions reaching SIGMET criteria are occurring or expected to occur within a 4-hour period. A SIGMET can have a valid period up to, but not exceeding, four (4) hours. SIGMETs for continuing phenomena will be reissued at least every 4 hours as long as SIGMET conditions continue to occur in the area for responsibility.

6.1.3.3 SIGMET (Non-Convective) Format – Conterminous U.S.

The content and order of elements in the SIGMET are as follows:

- series name and number
- valid beginning and ending time (UTC)
- list of states affected by the phenomena
- location of phenomena delineated by high-altitude VOR coordinates covering the affected area during the SIGMET valid time
- phenomena description (e.g., SEV ICE)
- vertical extent (base and top), if appropriate
- movement, if appropriate
- intensity change (INTSF – intensifying, WKN – weakening, NC – no change)
- Indication that the whether the condition will continue during the 4 hours beyond the valid time of the SIGMET

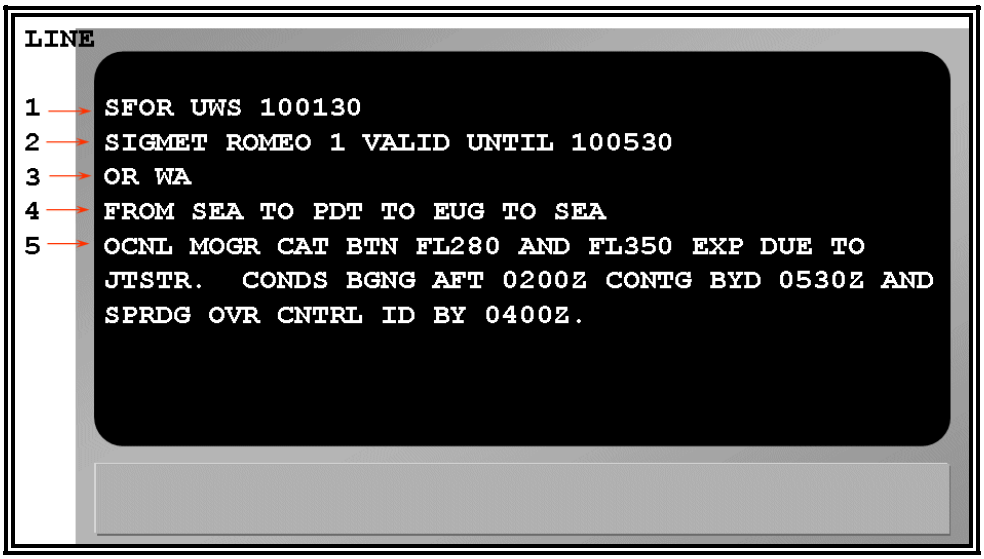

Figure 6-4. SIGMET for the Conterminous U.S. Decoding Example

Table 6-1. Decoding a SIGMET (Non-Convective) for the Conterminous U.S.

Line	Content	Description
1	SFO	SIGMET area identifier
	R	SIGMET series
	WS	Product identifier
	100130	Issuance date/time UTC
2	SIGMET	Product type
	ROMEO	SIGMET series name
	1	Series issuance number
	VALID UNTIL 100530	Ending valid date/time UTC
3	OR WA	Phenomenon location (states)
4	FROM SEA TO PDT TO EUG TO SEA	Phenomenon location (high-altitude VOR coordinates)
5	OCNL MOGR CAT BTN FL280 AND FL350 EXP DUE TO JTSTR. CONDS BGNG AFT 0200Z CONTG BYD 0530Z AND SPRDG OVR CNTRL ID BY 0400Z.	Phenomenon description

The SIGMET in Figure 6-4 is decoded as the following:

(Line 1) *SIGMET ROMEO series issued for the San Francisco Area at 0130 UTC on the 10th day of the month.*

(Line 2) *This is the first issuance of the SIGMET ROMEO series and is valid until the 10th day of the month at 0530 UTC.*

(Line 3) *The affected states within the SFO area are Oregon and Washington.*

(Line 4) *From Seattle, WA; to Pendleton, OR; to Eugene, OR; to Seattle, WA;*

(Line 5) *Occasional moderate or greater clear air turbulence between Flight Level 280 and Flight Level 350, expected due to jet stream. Conditions beginning after 0200Z continuing beyond 0530Z and spreading over central Idaho by 0400Z.*

6.1.3.4 SIGMET (Non-Convective) Cancellations – Conterminous U.S.

A CONUS non-convective SIGMET is canceled when the phenomena is no longer occurring or no longer expected to occur or has moved out of the area of responsibility.

6.1.3.5 SIGMET (Non-Convective) Amendments – Conterminous U.S.

Amendments to CONUS non-convective SIGMETs are NOT issued. Instead, a new SIGMET is issued using the next series number.

6.1.3.6 SIGMET (Non-Convective) Corrections – Conterminous U.S.

Corrections to CONUS non-convective SIGMETs are issued as necessary. The corrected SIGMET is identified by a "COR" located at the end of the first line after the issuance UTC date/time.

6.1.3.7 SIGMET (Non-Convective) Example – Conterminous U.S.

```
WSUS01 KKCI 050600
WS1R
BOSR WS 050600
SIGMET ROMEO 2 VALID UNTIL 051000
ME NH VT
FROM CAR TO YSJ TO CON TO MPV TO CAR
SEV TURB OBS AND FCST BLW 080. CONDS CONTG BYD 1000Z.
```

SIGMET (WSUS01) issued by the Meteorological Watch Office (WMO) (Aviation Weather Center) in Kansas City, Missouri (KKCI) on the 5th day of the month at 0600 UTC. The National Weather Service AWIPS communication header for this product is WSR1. SIGMET issued for the Boston Area Forecast region on the 5th day of the month at 0600 UTC. This is the second (2nd) issuance of SIGMET series Romeo and is valid until the 5th day of the month at 1000 UTC. The affected states are Maine (ME), New Hampshire (NH) and Vermont (VT). Within an area bounded from Caribou, Maine (CAR) to St. Johns, New Brunswick (YSJ); to Concord, New Hampshire (CON); to Montpelier, Vermont (MPV); to Caribou, Maine (CAR). Severe turbulence observed and forecast below 8,000 feet. Conditions continuing beyond 1000 UTC.

6.1.4 Convective SIGMET

Convective SIGMETs are issued for the conterminous U.S. (CONUS) instead of SIGMETs for thunderstorms. Any Convective SIGMET implies severe or greater turbulence, severe icing, and low level wind shear.

6.1.4.1 Convective SIGMET - Routine Issuance Criteria

A Convective SIGMET will be issued when any of the following conditions are occurring or, in the judgment of the forecaster, are expected to occur:

- A line of thunderstorms at least 60 miles long with thunderstorms affecting at least 40 percent of its length.

- An area of active thunderstorms affecting at least 3,000 square miles covering at least 40 percent of the area concerned and exhibiting a very strong radar reflectivity intensity or a significant satellite or lightning signature.

- Embedded or severe thunderstorm(s) expected to occur for more than 30 minutes during the valid period regardless of the size of the area.

6.1.4.2 Convective SIGMET - Special Issuance Criteria

A special Convective SIGMET may be issued when any of the following criteria are occurring or, in the judgment of the forecaster, are expected to occur for more than 30 minutes of the valid period.

- Tornado, hail greater than or equal to ¾ inch (at the surface), or wind gusts greater than or equal to 50 knots (at the surface) are reported.

- Indications of rapidly changing conditions, if in the forecaster's judgment, they are not sufficiently described in existing Convective SIGMETs.

- Special issuance is not required for a valid Convective SIGMET.

6.1.4.3 Convective SIGMET Issuance Time and Valid Period

Convective SIGMET bulletins for the eastern, central and western regions of the conterminous U.S. (Figure 6-5) are issued on a scheduled basis, hourly at 55 minutes past the hour. Each bulletin contains all valid Convective SIGMETs within the region. Convective SIGMETs are valid for two (2) hours or until superseded by the next hourly issuance. A Convective SIGMET bulletin must be transmitted each hour for each region. When conditions do not meet or are not expected to meet Convective SIGMET criteria within a region at the scheduled time of issuance a "CONVECTIVE SIGMET...NONE" message is transmitted.

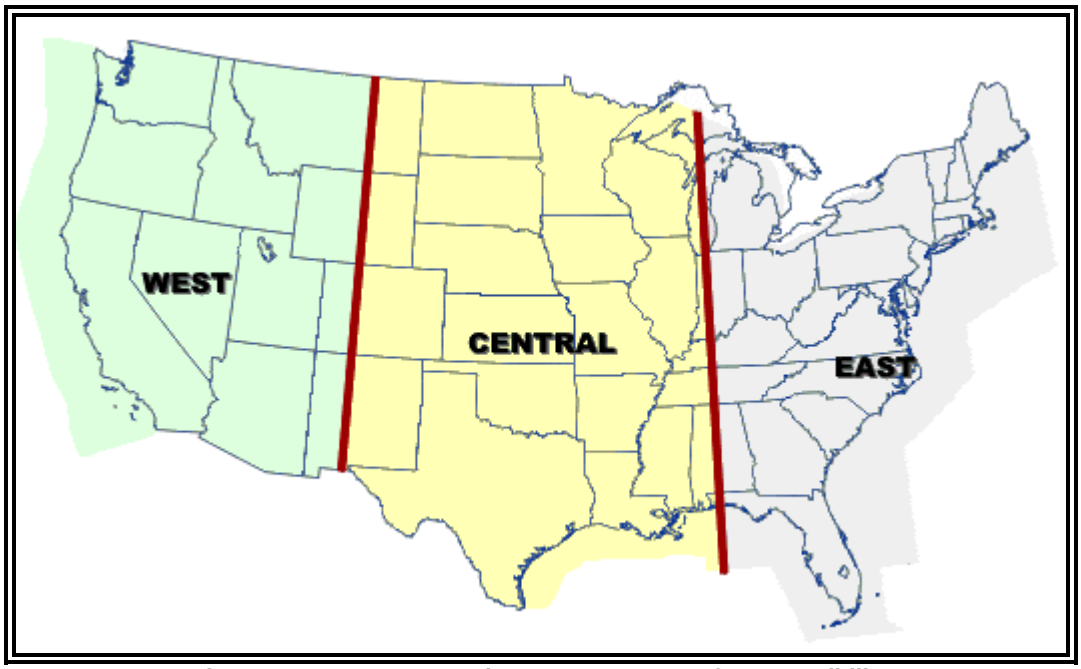

Figure 6-5. AWC Convective SIGMET Areas of Responsibility

6.1.4.4 Convective SIGMET Format

Each Convective SIGMET bulletin includes one or more individually numbered Convective SIGMETs for the region. The content and order of each bulletin is as follows:

- CONVECTIVE SIGMET series number and region letter (E, W or C)
- Valid ending time (UTC)
- list of states affected by the phenomena
- location of phenomena delineated by high-altitude VOR coordinates covering the affected area during the SIGMET valid time
- phenomena description (e.g., AREA SEV EMBD TS)
- movement (e.g., MOV FROM 26030KT)
- cloud top (e.g., TOPS ABV FL450)
- remarks (e.g., TORNADOES...HAIL TO 2.5 IN...WIND GUSTS TO 70KT POSS)

NOTE: Tropical Cyclone information will be added to remarks section of the CONUS Convective SIGMETs when appropriate.

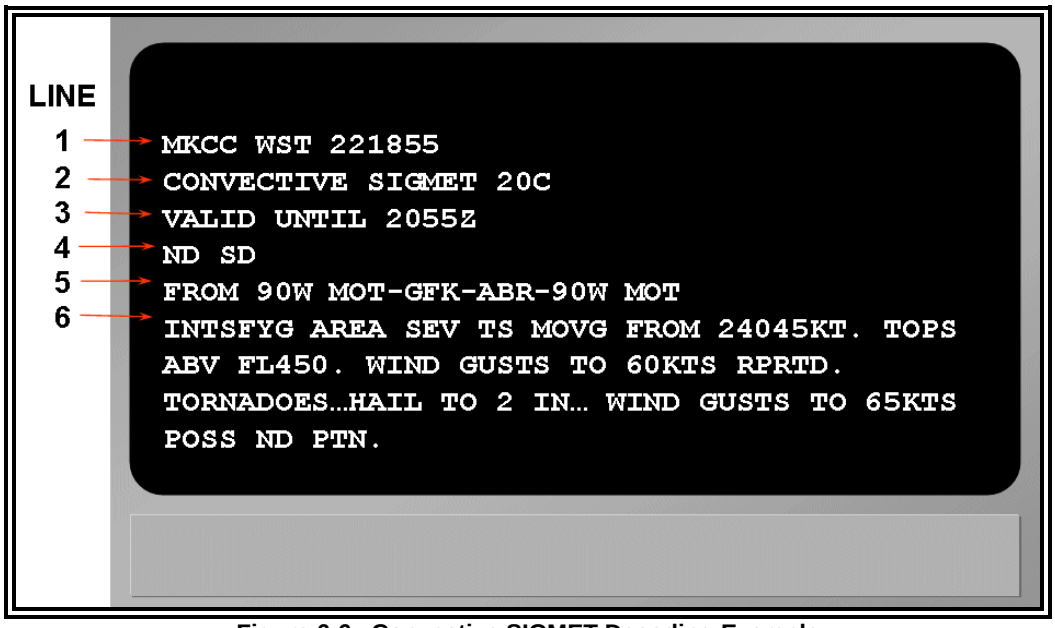

Figure 6-6. Convective SIGMET Decoding Example

Table 6-2. Decoding a Convective SIGMET

Line	Content	Description
1	MKC	Issuing Office (AWC)
	C	Region (East, Central or West)
	WST	Product Identifier
	221855	Issuance date/time (DDHHMM)
2	CONVECTIVE SIGMET	Product type
	20	Issuance number
	C	Region (East, Central or West)
3	VALID UNTIL 2055Z	Valid ending time (UTC)
4	ND SD	States/areas affected
5	FROM 90W MOT-GFK-ABR-90W MOT	Phenomenon location (high altitude VOR coordinates)
6	INTSFYG AREA SEV TS MOVG FROM 24045KT. TOPS ABV FL450. WIND GUSTS TO 60KTS RPRTD. TORNADOES…HAIL TO 2 IN… WIND GUSTS TO 65KTS POSS ND PTN	Phenomenon description, movement, cloud top, remarks

The Convective SIGMET in Figure 6-6 is decoded as the following:

(Line 1) *Convective SIGMET issued for the central portion of the United States on the 22nd at 1855Z*.

(Line 2) *This is the 20th Convective SIGMET issued on the 22nd for the central United States as indicated by "20C."*

(Line 3) *Valid until 2055Z*

(Line 4) *The affected states are North and South Dakota.*

(Line 5) *From 90 nautical miles west of Minot, ND; to Grand Forks, ND; to Aberdeen, SD; to 90 nautical miles west of Minot, ND.*

(Line 6) *An intensifying area of severe thunderstorms moving from 240 degrees at 45 knots (to the northeast). Thunderstorm tops above Flight Level 450. Wind gusts to 60 knots reported. Tornadoes, hail to 2 inches in diameter, and wind gusts to 65 knots possible in the North Dakota portion.*

6.1.4.5 Convective SIGMET Outlook

Each Convective SIGMET bulletin includes a 2- to 6-hour outlook at the end of the bulletin. The content and order of each bulletin is as follows:

- Beginning and ending valid times
- Location of expected Convective SIGMET issuances delineated by high-altitude VOR coordinates for the outlook valid time.
- Discussion of forecast

6.1.4.6 Convective SIGMET Cancellations

Convective SIGMETs are not cancelled but are superseded by the next Convective SIGMET in the series.

6.1.4.7 Convective SIGMET Amendments

Amended Convective SIGMETs are NOT issued. Instead, a new Convective SIGMET is issued for that region.

6.1.4.8 Convective SIGMET Corrections

Corrections to Convective SIGMETs are issued as necessary. The corrected Convective SIGMET is identified by a “COR” located at the end of the first line after the issuance UTC date/time.

6.1.4.9 Convective SIGMET Bulletin Examples

```
WSUS33 KKCI 091855
SIGW
CONVECTIVE SIGMET...NONE
.
OUTLOOK VALID 092055-100055
TS ARE NOT EXPD.
```

Convective SIGMET bulletin for the western region of the conterminous U.S.(WSUS33) issued by the Meteorological Watch Office (WMO) (Aviation Weather Center) in Kansas City, Missouri (KKCI) on the 9th day of the month at 1855 UTC. The National Weather Service AWIPS communication header for this product is SIGW.

No Convective SIGMETs are in effect.

The outlook portion of the Convective SIGMET bulletin is valid from the 9th day of the month at 2055 UTC to the 10th day of the month at 0055 UTC. Thunderstorms are not expected.

```
WSUS32 KKCI 091855
SIGC
MKCC WST 091855
CONVECTIVE SIGMET 21C
VALID UNTIL 2055Z
AR OK
FROM 20S RZC-40SSW FSM
DMSHG LINE TS 25 NM WIDE MOV FROM 27025KT. TOPS TO FL320.
.
OUTLOOK VALID 092055-100055
FROM 40NE BUM-60SE SGF-50WSW LIT-40W GGG-60ENE ABI-ADM-50WNW
BUM-40NE BUM
WST ISSUANCES EXPD. REFER TO MOST RECENT ACUS01 KWNS FROM STORM
PREDICTION CENTER FOR SYNOPSIS AND METEOROLOGICAL DETAILS.
```

Convective SIGMET bulletin for the central region of the conterminous U.S.(WSUS32) issued by the Meteorological Watch Office (Aviation Weather Center) in Kansas City, Missouri (KCCI) on the 9th day of the month at 1855 UTC. The National Weather Service AWIPS communication header for this product is SIGC.

Convective SIGMET (WST) for the central region of the conterminous U.S. issued by the Aviation Weather Center in Kansas City, Missouri (MKCC) on the 9th day of the month at 1855 UTC. Convective SIGMET 21C is the 21st Convective SIGMET issued for the central region of the conterminous US on the 9th day of the month. Valid until 2055 UTC. States affected are Arkansas (AR) and Oklahoma (OK). Bounded within an area from 20 nautical miles south of Razorback, Arkansas (RZC), to 40 nautical miles south-southwest of Fort Smith, Arkansas (FSM). A diminishing line of thunderstorms 25 nautical miles wide moving from 270 degrees (to the east) at 25 knots. Thunderstorms tops to FL320 (approximately 32,000 ft MSL).

The outlook portion of the Convective SIGMET bulletin is valid from the 9th day of the month at 2055 UTC to the 10th day of the month at 0055 UTC. Within an area bounded from 40 nautical miles northeast of Butler, Missouri (BUM), to 60 nautical miles southeast of Springfield, MO (SGF), to 50 nautical miles west-southwest of Little Rock, Arkansas (LIT), to 40 nautical miles west of Longview, Texas (GGG), to 60 nautical miles east-northeast of Abilene, Texas (ABI), to Ardmore, Oklahoma (ADM), to 50 nautical miles west-northwest of Butler, Missouri (BUM), to 40 nautical miles northeast of (BUM). Convective SIGMET issuances are expected. Refer to the most recent Day 1 Convective Outlook (ACUS01 KWNS) from the Storm Prediction Center (SPC) for a synopsis and meteorological details.

6.1.4.9.1 Convective SIGMET Bulletin – Tropical Cyclone Example

```
WSUS31 KKCI 211355
SIGE
MKCE WST 211355
CONVECTIVE SIGMET 1E
VALID UNTIL 1555Z
NC SC FL GA AND CSTL WTRS
```

```
FROM 30SSE CLT-160SE ILM-140ENE OMN-60E TLH-ABY-30SSE CLT
AREA SEV EMBD TS MOV FROM 21015KT. TOPS ABV FL450.
TORNADOES...WIND GUSTS TO 60KT POSS.
TS ASSOCD WITH TROPICAL STORM ALBERTO.
.
OUTLOOK VALID 211555-211955
FROM 30E RDU-180SE ECG-140SSE ILM-180E PBI-40SE PBI-40S
EYW-90SW EYW-70W SRQ-50N CTY-40N MCN-30NW SPA-30E RDU
REF WW 475.
WST ISSUANCES EXPD. REFER TO MOST RECENT ACUS01 KWNS FROM STORM
PREDICTION CENTER FOR SYNOPSIS AND METEOROLOGICAL DETAILS. REFER TO
MOST RECENT WTNT21 KNHC FROM TROPICAL PREDICTION CENTER FOR
DETAILS ON TROPICAL STORM ALBERTO.
```

Convective SIGMET bulletin for the eastern region of the conterminous U.S.(WSUS31) issued by the Meteorological Watch Office (Aviation Weather Center) in Kansas City, Missouri (KCCI) on the 21st day of the month at 1355 UTC. The National Weather Service AWIPS communication header for this product is SIGE.

Convective SIGMET (WST) for the eastern region of the conterminous U.S. issued by the Aviation Weather Center in Kansas City, Missouri (MKCE) on the 21st day of the month at 1355 UTC. Convective SIGMET 1E is the 1st Convective SIGMET issued for the eastern region of the conterminous US on the 21st day of the month. Valid until 1555 UTC. States affected are North Carolina (NC), South Carolina (SC), Florida (FL), Georgia (GA) and adjacent coastal waters. Within an area bounded from 30 nautical miles south-southeast of Charlotte, North Carolina (CLT) to 160 nautical miles southeast of Wilmington, North Carolina (ILM) to 140 nautical miles east-northeast of Ormond Beach, Florida (OMN) to 60 nautical miles east of Tallahassee, Florida (TLH) to Albany, Georgia (ABY) to 30 nautical miles south-southeast of Charlotte, North Carolina (CLT). An area of severe embedded thunderstorms moving from 210 degrees at 15 knots. Cumulonimbus tops above flight level 450 (approximately 45,000 feet MSL) Tornadoes and surface wind gust to 60 knots are possible. The thunderstorms are associated with Tropical Storm Alberto.

The outlook portion of the Convective SIGMET bulletin is valid from the 21st day of the month at 1555 UTC to the 21st day of the month at 1955 UTC. Within an area bounded from 30 nautical miles east of Raleigh-Durham, North Carolina (RDU) to 180 nautical miles southeast of Elizabeth City, North Carolina (ECG) to 140 south-southeast of Wilmington, North Carolina (ILM) to 180 nautical miles east of (PBI) to 40 nautical miles southeast of West Palm Beach, Florida (PBI) to 40 nautical miles south of Key West, Florida (EYW) to 90 nautical miles southwest of Key West, Florida (EYW) to 70 nautical miles west of Sarasota, Florida (SRQ) to 50 nautical miles north of Cross City, Florida (CTY) to 40 nautical miles north of Macon, Georgia (MCN) to 30 nautical miles northwest of Sparta, Georgia (SPA) to 30 nautical miles east of Raleigh-Durham, North Carolina (RDU). Refer to Weather Watch Notification Message 475. Convective SIGMET issuances are expected. Refer to the most recent Day 1 Convective Outlook (ACUS01 KWNS) from the Storm Prediction Center (SPC) for a synopsis and meteorological details. Refer to the most recent Tropical Cyclone Forecast/Advisory (WTNT21 KNHC) from the Tropical Prediction Center (TPC) for details on Tropical Storm Alberto.

6.1.5 SIGMET – Outside the Conterminous U.S. (O-CONUS)

6.1.5.1 SIGMET Issuance Criteria – Outside the Conterminous U.S. (O-CONUS)

SIGMETs outside the Conterminous U.S. (O-CONUS SIGMETs) are issued when any of the following is occurring or expected to occur affecting an area greater than 3,000 square miles or, in the judgment of the forecaster, an area having the potential to have a significant effect on the safety of aircraft operations.

- Thunderstorm - of type below*****
    - Obscured (OBSC TS)
    - Embedded (EMBD TS)
    - Widespread (WDSPR TS)
    - Squall line (SQL TS)
    - Isolated severe (ISOL SEV TS)
- Severe Turbulence (SEV TURB)
- Severe Icing (SEV ICE)
    - With Freezing rain (SEV ICE (FZRA)
- Widespread Duststorm (WDSPR DS)
- Widespread Sandstorm (WDSPR SS)
- Volcanic Ash (VA)
- Tropical Cyclone (TC)

NOTE: Obscured, embedded, or squall line thunderstorms do not have to reach 3,000 square miles criteria.

*****Tornado (TDO), Funnel Cloud (FC), Waterspout (WTSPT), and Heavy Hail (HVY GR) may be used as a further description of the thunderstorm as necessary.

6.1.5.2 SIGMET Issuance Time and Valid Period – Outside the Conterminous U.S. (O-CONUS)

A SIGMET is an unscheduled product issued any time conditions reaching SIGMET criteria are occurring or expected to occur within a 4-hour period. A SIGMET outside the conterminous U.S. (O-CONUS) can have a valid period up to, but not exceeding, four (4) hours, except for volcanic ash (VA) and tropical cyclone (TC) which can be valid up to six (6) hours. SIGMETs for continuing phenomena will be reissued at least every 4 (or 6) hours as long as SIGMET conditions continue to occur in the area for responsibility.

6.1.5.3 SIGMET Format – Outside the Conterminous U.S. (O-CONUS)

O-CONUS SIGMETs contain the following information, related to the specific phenomena and in the order indicated:

- Phenomenon and its description (e.g., SEV TURB).

- An indication whether the information is observed, using OBS and/or FCST. The time of observation will be given in UTC.

- Location of the phenomenon referring, where possible to latitude and longitude, and flight levels (altitude) covering the affected area during the SIGMET valid time. SIGMETs for volcanic ash cloud and tropical cyclones contain the positions of the ash cloud, tropical cyclone center and radius of convection at the start of the validity time of the SIGMET.

- Movement towards or expected movement using sixteen points of the compass, with speed in knots, or stationary, if appropriate.

- Thunderstorm maximum height as FL.

- Changes in intensity; using as appropriate, the abbreviations Intensifying (INTSF), Weakening (WKN), or No Change (NC).

- Forecast position of volcanic ash cloud or the center of the tropical cyclone at the end of the validity period of the SIGMET message.

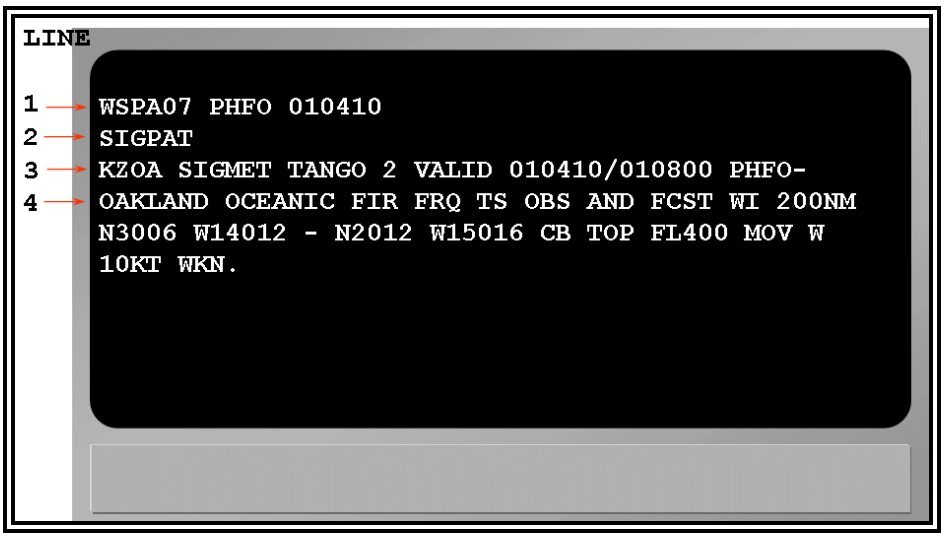

Figure 6-7. SIGMET Outside the Conterminous U.S. Decoding Example

Table 6-3. Decoding a SIGMET Outside of the Conterminous U.S. (O-CONUS)

Line	Content	Description
1	WSPA07	ICAO communication header
	PHFO	Issuance MWO
	010410	Issuance UTC date/time
2	SIGPAT	NWS AWIPS communication header
3	KZOA	Area Control Center
	SIGMET	Product type
	TANGO	SIGMET series
	2	Issuance number
	VALID 010410/010800	Valid period UTC date/time
	PHFO	Issuance office
4	OAKLAND OCEANIC FIR	Flight Information Region (FIR)
	FRQ TS OBS AND FCST WI 200NM N3006 W14012 - N2012 W15016 CB TOP FL400 MOV W 10KT WKN.	Phenomenon description

The SIGMET in Figure 6-7 is decoded as the following:

(*Line 1) The WMO product header is WSPA07. Issued by the PHFO on the 1st day of the month at 0410 UTC.*

(Line 2) The NWS AWIPS communication header is SIGPAT.

(Line 3) For the Oakland (KZOA) Area Control Center. This is the 2nd issuance of SIGMET Tango series, valid from the 1st day of the month at 0410 UTC until the 1st day of the month at 0800 UTC, issued by the Honolulu Meteorological Watch Office.

(Line 4) Concerning the Oakland Oceanic Flight Information Region (FIR), frequent thunderstorms observed and forecast within 200 nautical miles of 30 degrees and 6 minutes north; 140 degrees and 12 minutes west; to 20 degrees and 12 minutes north, 150 degrees and 16 minutes west, cumulonimbus tops to flight level 400 moving west at 10 knots, weakening.

6.1.5.4 SIGMETs for Volcanic Ash

A SIGMET for volcanic ash cloud is issued for volcanic eruptions. A volcanic eruption is any volcanic activity including the emission of volcanic ash, regardless of the eruption's magnitude. Initial Volcanic Ash SIGMETs may be issued based on credible pilot reports in the absence of a Volcanic Ash Advisory (VAA), but are updated once a VAA is issued. Volcanic ash SIGMETs will continue to be issued until the ash cloud is no longer occurring or expected to occur over the area of responsibility.

SIGMETs for volcanic ash cloud are valid up to six (6) hours and provide an observed or forecast location of the ash cloud at the beginning of the SIGMET. A six-hour forecast position for the ash cloud, valid at the end of the validity period of the SIGMET message, is also included. SIGMETs are reissued at least every six (6) hours while the volcanic ash cloud hazard exists or is expected to exist.

6.1.5.5 SIGMETs for Tropical Cyclone

A SIGMET for a tropical cyclone may be issued for non-frontal synoptic-scale cyclones meeting the following criteria.

- Originates over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation.

- Wind speeds reach 35 knots independent of the wind averaging time used by the Tropical Cyclone Advisory Center (TCAC).

SIGMETs for tropical cyclones will be valid up to six (6) hours. SIGMETs for tropical cyclones will include two positions. The first position included will be the TCAC advisory position. The second position will be the forecast position valid at the end of the SIGMET period.

In addition to the two storm positions, SIGMETs will include associated convection when applicable. SIGMETs will be reissued at least every six (6) hours while the tropical cyclone wind remains or are expected to remain above 34 knots.

6.1.5.6 SIGMET Cancellation– Outside the Conterminous U.S. (O-CONUS)

SIGMETs are cancelled when the phenomena is no longer occurring or expected to occur in the area of responsibility.

6.1.5.7 SIGMET Amendments– Outside the Conterminous U.S. (O-CONUS)

SIGMET amendments will NOT be issued. Instead, the next SIGMET in the series is issued to accomplish the update. The valid time of the new SIGMET is reset to reflect the new 4-hour valid period (6-hour for VA and TC SIGMETs).

6.1.5.8 SIGMET Corrections– Outside the Conterminous U.S. (O-CONUS)

Corrections to SIGMETs are issued as necessary. This is done by issuing a new SIGMET in the series which advances the SIGMET number and cancels the previous SIGMET.

6.1.5.9 SIGMET Example– Outside the Conterminous U.S. (O-CONUS)

```
WSPA07 PHFO 010358
SIGPAT
KZOA SIGMET TANGO 1 VALID 010400/010800 PHFO-
OAKLAND OCEANIC FIR. EMBD TS OBS BY SATELLITE WITHIN AREA BOUNDED BY
N2055 W15000 - N1950 W14945 - N1922 W15130 - N2027 W15048 – N2055
W15000. CB TO TOP FL400. MOV W 10KT. WKN.
```

SIGMET (SWPA07) issued by the Meteorological Watch Office (Weather Forecast Office) in Honolulu, Hawaii (PHFO) on the 1st day of the month at 0358 UTC. The National Weather Service AWIPS communication header for this product is SIGPAT. This SIGMET concerns the Oakland Oceanic FIR. This is the first (1) issuance of SIGMET series Tango valid from the 1st day of the month at 0400 UTC until the 1st day of the month at 0800 UTC. Within the WFO Honolulu portion of the Oakland Oceanic FIR, embedded thunderstorms observed by satellite within an area bounded by 20 degrees/55 minutes north, 150 degrees/00 minutes west to 19 degrees/50 minutes north, 14 degrees/45 minutes west to 19 degrees/22 minutes north, 151 degrees/30 minutes west to 20 degrees/27 minutes north, 150 degrees/48 minutes west to 20 degrees/55 minutes north, 150 degrees/00 minutes west. Cumulonimbus tops to flight level 400 (approximately 40,000 feet MSL). The thunderstorms are moving west at 10 knots and weakening.

6.1.5.9.1 SIGMET for Volcanic Ash Example

```
WVNT06 KKCI 082030
TJZS SIGMET FOXTROT 2 VALID 082030/090230 KKCI-
SAN JUAN FIR VA FROM SOUFRIERE HILLS LOC 1642N06210W
VA CLD OBS AT 2030Z SFC/060 WI N1730 W06400 - N1700 W06300 - N1650
W06300 - N1710 W06400 - N1730 W06400. MOV W 15KT. FCST 0230Z VA CLD
APRX N1730 W06500 - N1700 W06300 - N1650 W06300 - N1710 W06500 - N1730
W06500.
```

The ICAO communication header for this product is WVNT06. It is a SIGMET issued by the Aviation Weather Center (KCCI) in Kansas City, Missouri on the 8th day of the month at 2030 UTC. This is the second (2) issuance of SIGMET series Foxtrot valid from the 8th day of the month at 2030 UTC until the 9th day of the month at 0230 UTC. Within the San Juan Oceanic FIR, volcanic ash from Soufriere Hills volcano located at 16 degrees/42 minutes north, 62 degrees/10 minutes west. Volcanic ash cloud observed at 2030 UTC from the surface to 6,000 feet MSL within an area bounded by 17 degrees/30 minutes north, 64 degrees/00 minutes west to 17 degrees/00 minutes north, 63 degrees/00 minutes west to 16 degrees/50 minutes north, 63 degrees/00 minutes west to 17 degrees/10 minutes north, 64 degrees/00 minutes west to 17 degrees/30 minutes north, 64 degrees/00 minutes west. Moving to the west at 15 knots. Forecast at 0230 UTC, volcanic ash cloud located approximately at 17 degrees/30 minutes north, 65 degrees/00 minutes west to 17 degrees/00 minutes north, 63 degrees/00 minutes west to 16 degrees/50 minutes north, 63 degrees/00 minutes west to 17 degrees/10 minutes north, 65 degrees/00 minutes west to 17 degrees/30 minutes north, 65 degrees/00 minutes west.

6.1.5.9.2 SIGMET for Tropical Cyclone Example

```
WSNT03 KKCI 081451
SIGA0C
```

```
KZNY SIGMET CHARLIE 11 VALID 081500/082100 KKCI-
NEW YORK OCEANIC FIR TC KYLE OBS N3106 W07118 AT 1500Z CB TOP FL500 WI
120NM OF CENTER MOV WSW 5 KT NC FCST 2100Z TC CENTER N3142 W07012
```

The ICAO communication header for this product is WSNT03. It is a SIGMET issued by the Aviation Weather Center (KCCI) in Kansas City, Missouri on the 8th day of the month at 1451 UTC. The National Weather Service AWIPS communication header for this product is SIGPAT. This is the eleventh (11) issuance of SIGMET series Charlie valid from the 8th day of the month at 1500 UTC until the 8th day of the month at 2100 UTC. Within the New York Oceanic FIR, Tropical Cyclone Kyle observed at 31 degrees/6 minutes north, 71 degrees/18 minutes west at 1500 UTC, cumulonimbus tops to flight level 500 (approximately 50,000 feet MSL), within 120 nautical miles of the center, moving from west-southwest at 5 knots, no change in intensity is forecast, at 2100 UTC the tropical cyclone center will be at 31 degrees/42 minutes north, 70 degrees/12 minutes west.

6.2 Airmen's Meteorological Information (AIRMET)

An AIRMET is a concise description of the occurrence or expected occurrence of specified en route weather phenomena which may affect the safety of aircraft operations, but at intensities lower than those which require the issuance of a SIGMET. AIRMETs are intended for dissemination to all pilots in flight to enhance safety and are of particular concern to operators and pilots of aircraft sensitive to the phenomena described and to pilots without instrument ratings. AIRMETs are issued by the responsible Meteorological Watch Office (MWO) to give notice to operators and aircrews of potentially hazardous en route conditions.

- AIRMETs are available for the conterminous U.S. (CONUS) on the Aviation Digital Data Service (ADDS) web site at: http://adds.aviationweather.noaa.gov/airmets/

- AIRMETs are available for Alaska on the Alaska Aviation Weather Unit (AAWU) web site at: http://aawu.arh.noaa.gov/

- AIRMETs are available for Hawaii on the NWS WFO Honolulu web site at: http://www.prh.noaa.gov/hnl/pages/aviation.php

6.2.1 AIRMET Issuance

AIRMETs are issued from the three Meteorological Watch Offices (MWO) located at the Aviation Weather Center (AWC), the Alaska Aviation Weather Unit (AAWU), and the Weather Forecast Office (WFO) in Honolulu. Their areas of responsibility are:

- AWC: The conterminous U.S. and adjacent coastal waters (CONUS) (Figure 6-8)

- AAWU: Alaska and adjacent coastal waters (Figure 6-9)

- WFO Honolulu: Hawaii and adjacent waters (Figure 6-10)

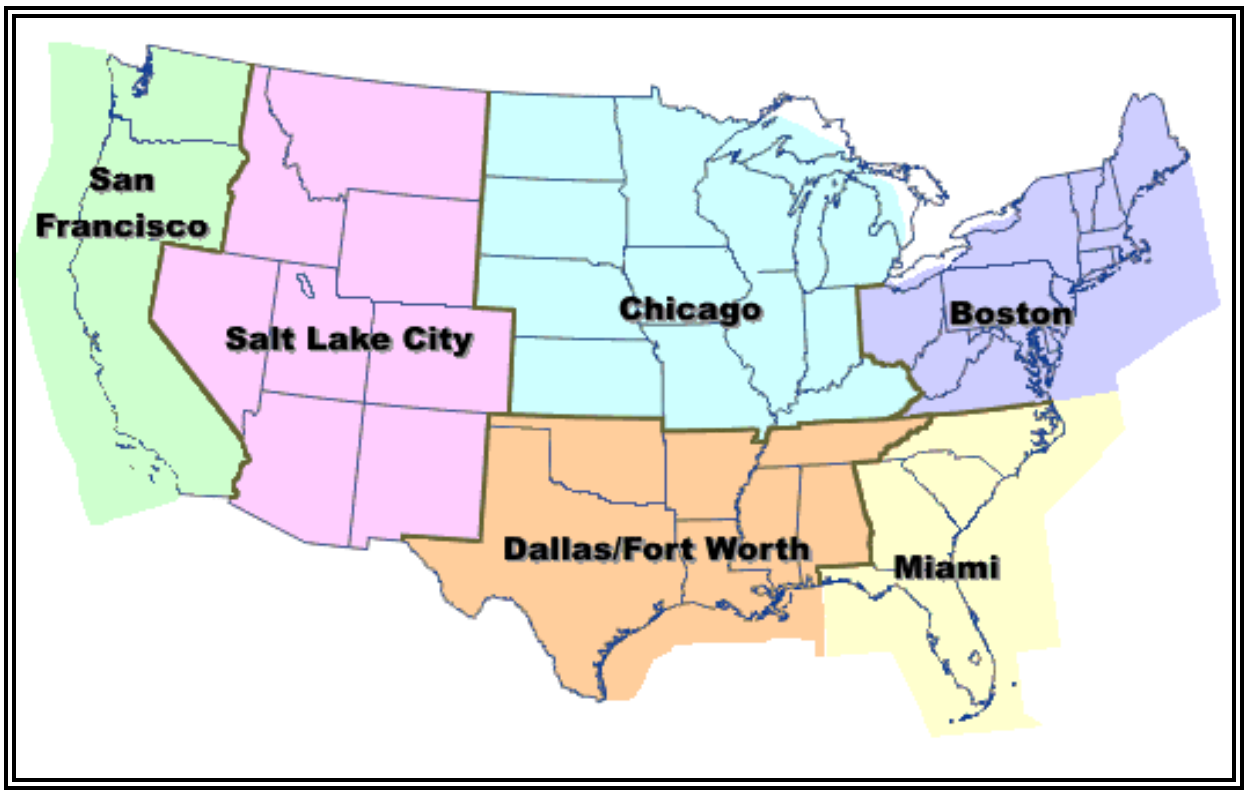

Figure 6-8 AWC AIRMET Areas of Responsibility – Conterminous U.S.

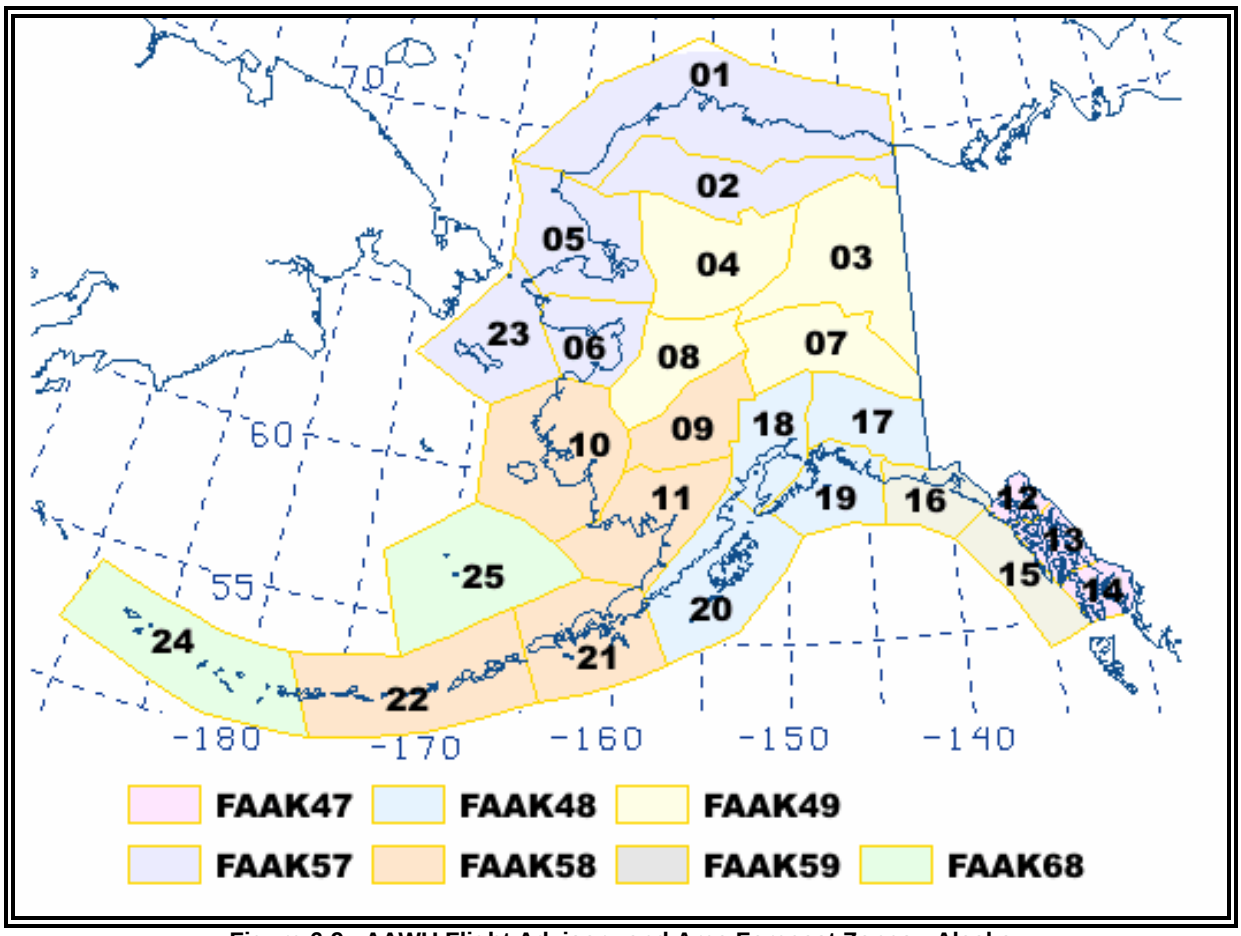

Figure 6-9. AAWU Flight Advisory and Area Forecast Zones - Alaska

Table 6-4. AAWU Flight Advisory and Area Forecast Zones – Alaska

1	Arctic Coast Coastal	**14**	Southern Southeast Alaska
2	North Slopes of the Brooks Range	**15**	Coastal Southeast Alaska
3	Upper Yukon Valley	**16**	Eastern Gulf Coast
4	Koyukuk and Upper Kobuk Valley	**17**	Copper River Basin
5	Northern Seward Peninsula-Lower Kobuk Valley	**18**	Cook Inlet-Susitna Valley
6	Southern Seward Peninsula-Eastern Norton Sound	**19**	Central Gulf Coast
7	Tanana Valley	**20**	Kodiak Island
8	Lower Yukon Valley	**21**	Alaska Peninsula-Port Heiden to Unimak Pass
9	Kuskowim Valley	**22**	Unimak Pass to Adak
10	Yukon-Kuskowim Delta	**23**	St. Lawrence Island-Bering Sea Coast
11	Bristol Bay	**24**	Adak to Attu
12	Lynn Canal and Glacier Bay	**25**	Pribilof Islands and Southeast Bering Sea
13	Central Southeast Alaska		

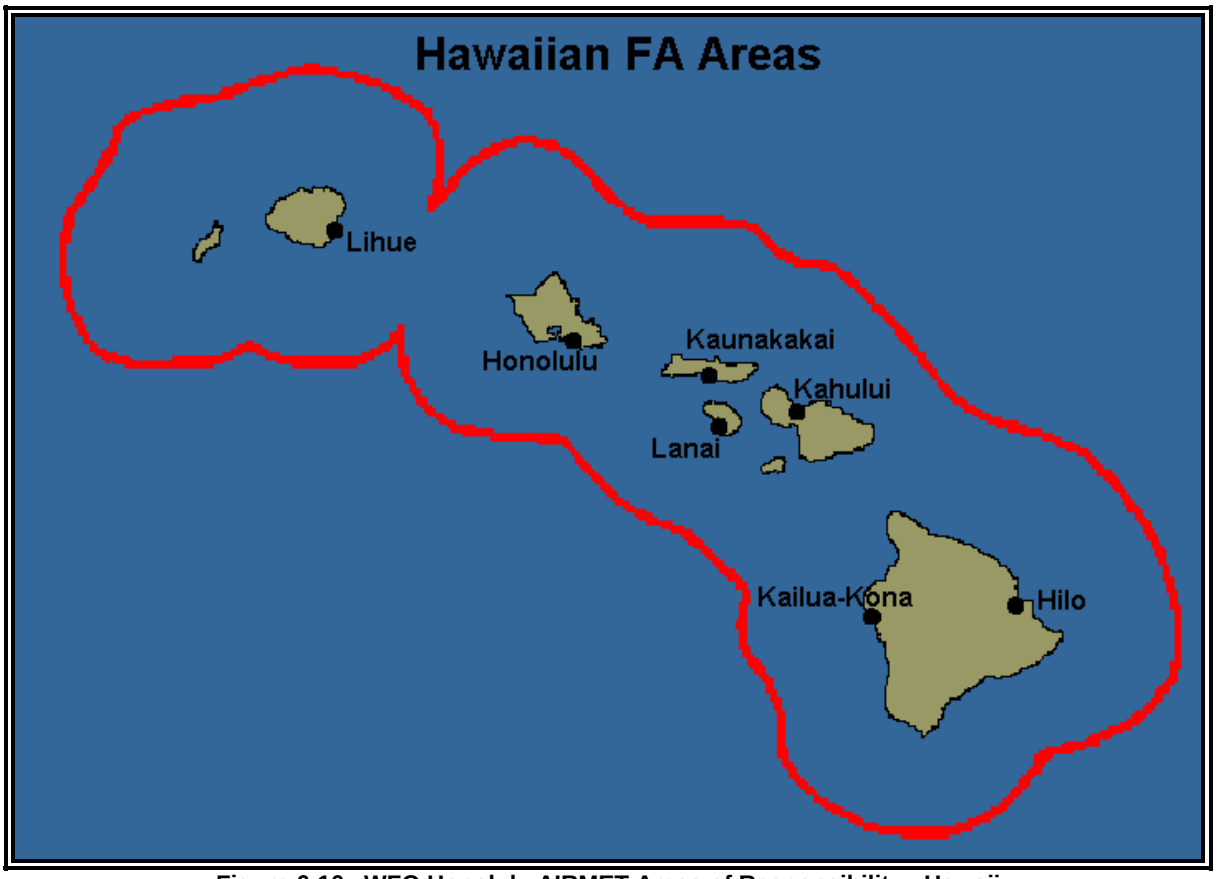

Figure 6-10. WFO Honolulu AIRMET Areas of Responsibility - Hawaii

6.2.2 AIRMET Issuance Criteria

An AIRMET may be issued when any of the following weather phenomena are occurring or expected to occur over an area of at least 3,000 square miles:

- Ceiling less than 1,000 feet and/or visibility less than 3 statute miles (IFR)
    - Weather phenomena restricting the visibility including, but not limited to, precipitation (PCPN), smoke (FU), haze (HZ), mist (BR), fog (FG), and blowing snow (BS).
- Widespread mountain obscuration (MTN OBSCN)
    - Weather phenomena causing the obscurement are included, but limited to clouds (CLDS), precipitation (PCPN), smoke (FU), haze (HZ), mist (BR), and fog (FG).
- Moderate turbulence (MOD TURB)
    - Top and bottom of MOD TURB layer are included.
- Sustained surface wind greater than 30 knots (STG SFC WND)
- Moderate icing (MOD ICE)

- Top and bottom of MOD ICE are included.
- The range of freezing level altitudes is given when the bottom altitude of MOD ICE is the freezing level (FRZLVL).
- Areas with multiple freezing levels are included.
- Range of freezing levels over the area is included.
- Lowest freezing levels above ground level (AGL) at intervals of 4,000 feet AMSL (or SFC as appropriate) are included.

- Non-convective low-level windshear potential below 2,000 feet AGL (LLWS POTENTIAL).

6.2.3 AIRMET Standardization

All AIRMETs follow these standards:

- All heights or altitudes are referenced to above mean sea level (AMSL), unless otherwise noted, and annotated using the height in hundreds of feet, consisting of three digits (e.g., 040). For heights at or above 18,000 feet, the level is preceded by FL to represent flight levels (e.g., FL180).

- Messages are prepared in abbreviated plain language using contractions from the Federal Aviation Administration (FAA) Order 7340.1Z. A limited number of non-abbreviated words, geographical names and numerical values of a self-explanatory nature may also be used.

- Weather and obstructions to visibility are described using the weather abbreviations for surface weather observations (METAR/SPECI). See the Federal Meteorological Handbook (FMH) No. 1 – Surface Observations or Section 3.1 of this document.

- Heights are identified as follows:

  - For heights below 3,000 feet, increments are in 100's of feet

  - For heights from 3,000 to 5,000 feet, increments are in 500's of feet

  - For heights greater than 5,000 feet, increments are in 1,000's of feet.

6.2.4 AIRMET Bulletins, Issuance Times, and Valid Period

AIRMETs are issued as bulletins containing one or more AIRMET messages following the schedule listed below. Unscheduled AIRMETs are issued when conditions are occurring or expected to occur, but were not forecast.

Table 6-5. AIRMET Issuance Schedule

	1st Scheduled Issuance (UTC)	2nd Scheduled Issuance (UTC)	3rd Scheduled Issuance (UTC)	4th Scheduled Issuance (UTC)
CONUS	0245	0845	1445	2045
Alaska	0145 (DT)/ 0245 (ST)	0745 (DT)/ 0845 (ST)	1345 (DT)/ 1445 (ST)	1945 (DT)/ 2045 (ST)
Hawaii	0400	1000	1600	2200
Note: DT - Daylight Time, ST - Standard Time				

AIRMETs are valid for no more than 6 hours. The valid period of an AIRMET message cannot exceed the valid time of the AIRMET bulletin. However, note that each AIRMET contains remarks concerning the continuance of the phenomenon during the six (6) hours following the AIRMET ending time. Also, AIRMET bulletins can contain a separate outlook when conditions meeting AIRMET criteria are expected to occur during the 6-hour period after the valid time of the AIRMET bulletin.

6.2.5 AIRMET Format

An AIRMET message includes the following information as appropriate and in the order indicated:

- Reference to appropriate active SIGMETs affecting the area at the time of AIRMET issuance (e.g., SEE SIGMET BRAVO SERIES).
- Beginning time of the AIRMET phenomenon if different from the AIRMET beginning valid time.
- AIRMET name (SIERRA, TANGO or ZULU), update number, weather phenomenon, and ending valid time (Note: the AIRMET number is reset to one (1) after 0000 UTC each day).
    - AIRMET Sierra describes IFR conditions and/or extensive mountain obscurations
    - AIRMET Tango describes moderate turbulence, sustained surface winds of 30 knots or greater and non-convective low-level wind shear.
    - AIRMET Zulu describes moderate icing and provides freezing level heights
- List of affected states (CONUS only).
- Location of phenomenon using VORs or other well known geographic features.
- Description of phenomenon for the AIRMET issuance.
- Vertical extent (bases and tops), as appropriate.
- Ending time of phenomenon if different from the AIRMET ending time.
- Remarks concerning the continuance of the phenomenon during the six (6) hours following the AIRMET ending time.
- CONUS and Hawaii AIRMETs: A separate AIRMET outlook is included in the AIRMET bulletin when conditions meeting AIRMET criteria are expected to occur during the 6-hour period after the valid time of the AIRMET bulletin.
- Alaska AIRMETs: Outlook information is included in the appropriate Area Forecast zone when conditions are expected to occur during the 6-hour period after the valid time of the AIRMET bulletin.

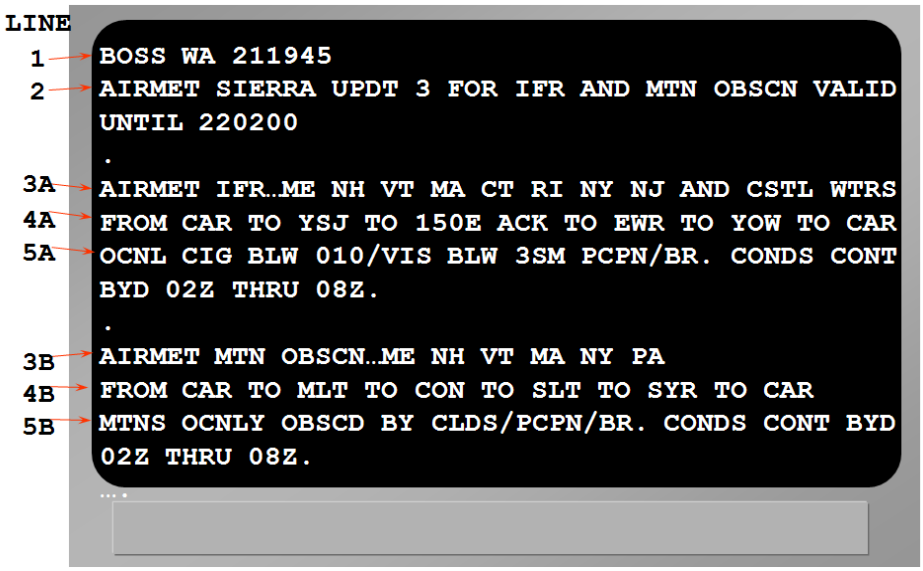

Figure 6-11. AIRMET Bulletin Decoding Example

Table 6-6. Decoding an AIRMET Bulletin

Line	Content	Description
1	BOS	AIRMET area identifier
	S	AIRMET series
	WA	Product type
	211945	Issuance UTC date/time
2	AIRMET	Product type
	SIERRA	AIRMET series
	UPDT 3	Update number
	FOR IFR AND MTN OBSCN	Product description
	VALID UNTIL 220200	Ending UTC date/time
3A	AIRMET IFR..ME NH VT MA CT RI NY NJ AND CSTL WTRS	Product type/series… Phenomenon location (states)
3B	AIRMET MTN OBSCN..ME NH VT MA NY PA	
4A	FROM CAR TO YSJ TO 150E ACK TO EWR TO YOW TO CAR	Phenomenon location (VOR locations)
4B	FROM CAR TO MLT TO CON TO SLT TO SYR TO CAR	
5A	CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONT BYD 02Z THRU 08Z.	Phenomenon description
5B	MTNS OBSCD BY CLDS/PCPN/BR. CONDS CONT BYD 02Z THRU 08Z.	

The AIRMET bulletin in Figure 6-11 is decoded as follows:

(Line 1) AIRMET SIERRA issued for the Boston area at 1945Z on the 21st day of the month. "SIERRA" contains information on Instrument Flight Rules (IFR) and/or mountain obscurations.

(Line 2) This is the third updated issuance of this Boston AIRMET series as indicated by "SIERRA UPDT 3" and is valid until 0200Z on the 22nd.

(Line 3A) The affected states within the BOS area are: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and coastal waters.

(Line 3B) The affected states within the BOS area are: Maine, New Hampshire, Vermont, Massachusetts, New York, and Pennsylvania.

(Line 4A) Within an area bounded by: Caribou, ME; to Saint Johns, New Brunswick; to 150 nautical miles east of Nantucket, MA; to Newark, NJ; to Ottawa, Ontario; to Caribou, ME

(Line 4B) Within an area bounded by: Caribou, ME to Millinocket, ME to Concord, NH to Slate Run, PA to Syracuse, NY to Caribou, ME

(Line 5A) Ceiling below 1,000 feet/visibility below 3 statute miles, precipitation/mist. Conditions continuing beyond 0200Z through 0800Z.

(Line 5B) Mountains Obscured by clouds, precipitation and mist. Conditions continuing beyond 0200Z through 0800Z.

6.2.5.1 AIRMET Updates and Amendments

If an AIRMET is amended, **AMD** is added after the date/time group on the FAA product line. The update number will be incremented, **UPDT** is added to end of the line containing the list of affected states (CONUS only). The issuance time of the AIRMET bulletin is updated to reflect the time of the amendment. The ending valid time remains unchanged.

6.2.5.2 AIRMET Corrections

AIRMETs containing errors are corrected by adding COR after the date/time group on the FAA product line. The issuance time of the AIRMET bulletin is updated to reflect the time of the correction. The ending valid time remains unchanged.

6.2.6 AIRMET Examples

6.2.6.1 CONUS AIRMET Example

```
WAUS43 KKCI 091445
CHIZ WA 091445
AIRMET ZULU UPDT 4 FOR ICE AND FRZLVL VALID UNTIL 092100
AIRMET ICE...KS IA MO IL
FROM 30WSW FOD TO DBQ TO 50NW DEC TO 50SW FAM TO OSW TO MKC TO
30WSW FOD
MOD ICE BTN FRZLVL AND FL200. FRZLVL 060-100. CONDS ENDG BY 21Z.
.
OTLK VALID 2100-0300Z...ICE IA MO WI IL IN KY
BOUNDED BY BAE-BVT-PXV-50SW FAM-50NW DEC-DBQ-BAE
MOD ICE BTN FRZLVL AND FL200. FRZLVL 080-100. CONDS CONTG THRU
03Z.
.
FRZLVL...RANGING FROM SFC-120 ACRS AREA
MULT FRZLVL 015-085 BOUNDED BY 40W INL-YQT-SSM-70NNE
```

```
ASP-YVV-DXO-40NE FWA-40SSE BJI-40W INL
SFC ALG 50NNW ISN-70W FAR-GFK-40NE ODI-40SW DXO
040 ALG ISN-70S BIS-30W ABR-30E ABR-60S FAR-30SW BRD-30NE FWA
080 ALG GLD-SLN-30W BDF-50S JOT-40SE IND-30SW CVG-40SW LOZ
```

AIRMET (WAUS43) issued by the Meteorological Watch Office (Aviation Weather Center) in Kansas City, Missouri on the 9th day of the month at 1445 UTC. This AIRMET (WA) is the Zulu series bulletin for the Chicago Area Forecast region (CHIZ) issued on the 9th day of the month at 1445 UTC. This is the 4th update to the Zulu series bulletin for icing and freezing levels and is valid until the 9th day of the month at 2100 UTC.

The first (and only) AIRMET noted within the bulletin is for icing affecting Kansas, Iowa, Missouri and Illinois. Within an area bounded from 30 nautical miles west-southwest of Fort Dodge, Iowa (FOD) to Dubuque, Iowa (DBQ) to 50 nautical miles northwest of Decatur, Illinois (DEC) to 50 nautical miles southwest of Farmington, Missouri (FAM) to Oswego, Kansas (OSW) to Kansas City, Missouri (MKC) to 30 nautical miles west-southwest of Fort Dodge, Iowa (FOD). Moderate icing between the freezing level and flight level 200 (approximately 20,000 feet MSL). The freezing level is between 6,000 feet MSL and 10,000 feet MSL. Conditions ending by 2100 UTC.

An outlook for icing between 2100 UTC to 0300 UTC exists over: Iowa, Missouri, Wisconsin, Illinois, Indiana and Kentucky. Within an area bounded by Milwaukee, Wisconsin (BAE) to Lafayette, Indiana (BVT) to Pocket City, Indiana (PXV) to 50 nautical miles southwest of Farmington, Missouri (FAM) to 50 nautical miles northwest of Decatur, Illinois (DEC) to Dubuque, Iowa (DBQ) to Milwaukee, Wisconsin (BAE). Moderate icing between the freezing level and flight level 200 (approximately 20,000 feet MSL). The freezing level is between 8,000 feet MSL and 10,000 feet MSL. Conditions continuing through 0300 UTC.

The freezing level ranges from the surface to 12,000 feet MSL across the Chicago Area Forecast region. Multiple freezing levels exist between 1,500 feet MSL and 8,500 feet MSL within an area bounded by 40 nautical miles west of International Falls, Minnesota (INL) to Thunder Bay, Ontario, Canada to Sault Saint Marie, Michigan (SSM) to 70 nautical miles north-northeast of Oscoda, Michigan (ASP) to Wiarton, Ontario, Canada to Detroit, Michigan (DXO) to 40 nautical miles northeast of Fort Wayne, Indiana (FWA) to 40 nautical miles south-southeast of Bemidji, Minnesota (BJI) to 40 nautical miles west of International Falls, Minnesota (INL). The freezing level is at the surface along a line from 50 nautical miles north-northwest of Williston, North Dakota (ISN) to 70 nautical miles west of Fargo, North Dakota (FAR) to Grand Forks, North Dakota (GFK) to 40 nautical miles northeast of Nodine, Minnesota (ODI) to 40 nautical miles southwest of Detroit, Michigan (DXO). The freezing level is at 4,000 feet MSL along a line from Williston, North Dakota (ISN) to 70 nautical miles south of Bismarck, North Dakota (BIS) to 30 nautical miles west of Aberdeen, South Dakota (ABR) to 30 nautical miles east of Aberdeen, South Dakota (ABR) to 60 nautical miles south of Fargo, North Dakota (FAR) to 30 nautical miles southwest of Brainerd, Minnesota (BRD) to 30 nautical miles northeast of Fort Wayne, Indiana. The freezing level is 8,000 feet MSL along a line from Goodland, Kansas (GLD) to Salina, Kansas (SLN) to 30 nautical miles west of Bradford, Illinois (BDF) to 50 nautical miles south of Joliet, Illinois to 40 nautical miles southeast of Indianapolis, Indiana (IND) to 30 nautical miles southwest of Covington, Kentucky (CVG) to 40 nautical miles southwest of London, Kentucky (LOZ).

6.2.6.2 Hawaii AIRMET Example

```
WAHW31 PHFO 090945
WA0HI
HNLT WA 091000
AIRMET TANGO UPDATE 1 FOR TURB VALID UNTIL 091600
AIRMET TURB...KAUAI OAHU MOLOKAI LANAI MAUI
OVR AND IMDT N THRU E OF MTS.
MOD TURB BLW 100. CONDS CONTG BYD 1600Z.
```

AIRMET (WAHW31) issued by the Meteorological Watch Office (Weather Forecast Office) in Honolulu, Hawaii on the 9th day of the month at 0945 UTC. The National Weather Service AWIPS communication code for this product is WA0HI. This AIRMET (WA) is the Tango series bulletin for the Hawaii Area Forecast region (HNLT) issued on the 9th day of the month at 1000 UTC. This is the 1st update to the Tango series bulletin for turbulence and is valid until the 9th day of the month at 1600 UTC.

The first (and only) AIRMET noted within the bulletin is for turbulence affecting the islands of Kauai, Oahu, Molokai, Lanai and Maui, over and immediately north through east of the mountains. Moderate turbulence below 10,000 feet MSL. Conditions continuing beyond 1600 UTC.

6.2.6.3 Alaska AIRMET Example

```
WAAK47 PAWU 011740
WA7O
JNUS WA 011740
AIRMET SIERRA FOR IFR AND MT OBSC VALID UNTIL 012100
.
LYNN CANAL AND GLACIER BAY JB
W OF LYNN CANAL..MTS OCNL OBSC IN CLDS/PCPN.
SPRDG E. INTSF.
.
CNTRL SE AK JC
PAOH-PAFE LN W..MTS OCNL OBSC IN CLDS/PCPN. SPRDG
E. INTSF.
.
ERN GLF CST JE
MTS OCNL OBSC IN CLDS/PCPN. IMPRG.
.
SE AK CSTL WTRS JF
OCNL CIG BLW 010 VIS BLW 3SM SN BLSN. NC.
```

AIRMET (WAAK47) issued by the Meteorological Watch Office (Alaska Aviation Weather Unit) in Anchorage, Alaska on the 1st day of the month at 1740 UTC. The National Weather Service AWIPS communication code for this product is WA7O. This AIRMET (WA) is the Sierra series bulletin for the Juneau forecast area issued on the 1st day of the month at 1740 UTC. This is the AIRMET Sierra series for IFR and mountain obscuration valid until the 1st day of the month at 2100 UTC.

For the Lynn Canal and Glacier Bay forecast regions, Juneau region B...west of Lynn Canal…mountains occasionally obscured in clouds and precipitation. Conditions spreading east and intensifying during the forecast period.

For the Central Southeast Alaska forecast region, Juneau region C…from a Hoonan, Alaska (PAOH) to Kake, Alaska (PAFE) line westward, mountains occasionally obscured in clouds and precipitation. Conditions spreading east and intensifying during the forecast period.

For the Eastern Gulf Coast forecast region, Juneau region E…Mountains occasionally obscured in clouds and precipitation. Conditions improving during the forecast period.

For the Southeast Alaska Coastal Waters, Juneau region F…Occasional ceiling below 1,000 feet AGL, visibility below 3 statute miles in snow and blowing snow. No change in conditions is expected during the forecast period.

6.3 Center Weather Advisory (CWA)

A Center Weather Advisory (CWA) is an aviation weather warning for conditions meeting or approaching national in-flight advisory (AIRMET, SIGMET or SIGMET for convection) criteria. The CWA is primarily used by aircrews to anticipate and avoid adverse weather conditions in the en route and terminal environments. CWAs are available on the Aviation Weather Center (AWC) web site at: http://aviationweather.gov/products/cwsu/.

6.3.1 CWA Issuance

CWAs are issued by the NWS Center Weather Service Units (CWSUs). CWSU areas of responsibility in the contiguous U.S. are depicted on Figure 6-12. CWSU Anchorage area of responsibility for Alaska is depicted on Figure 6-13.

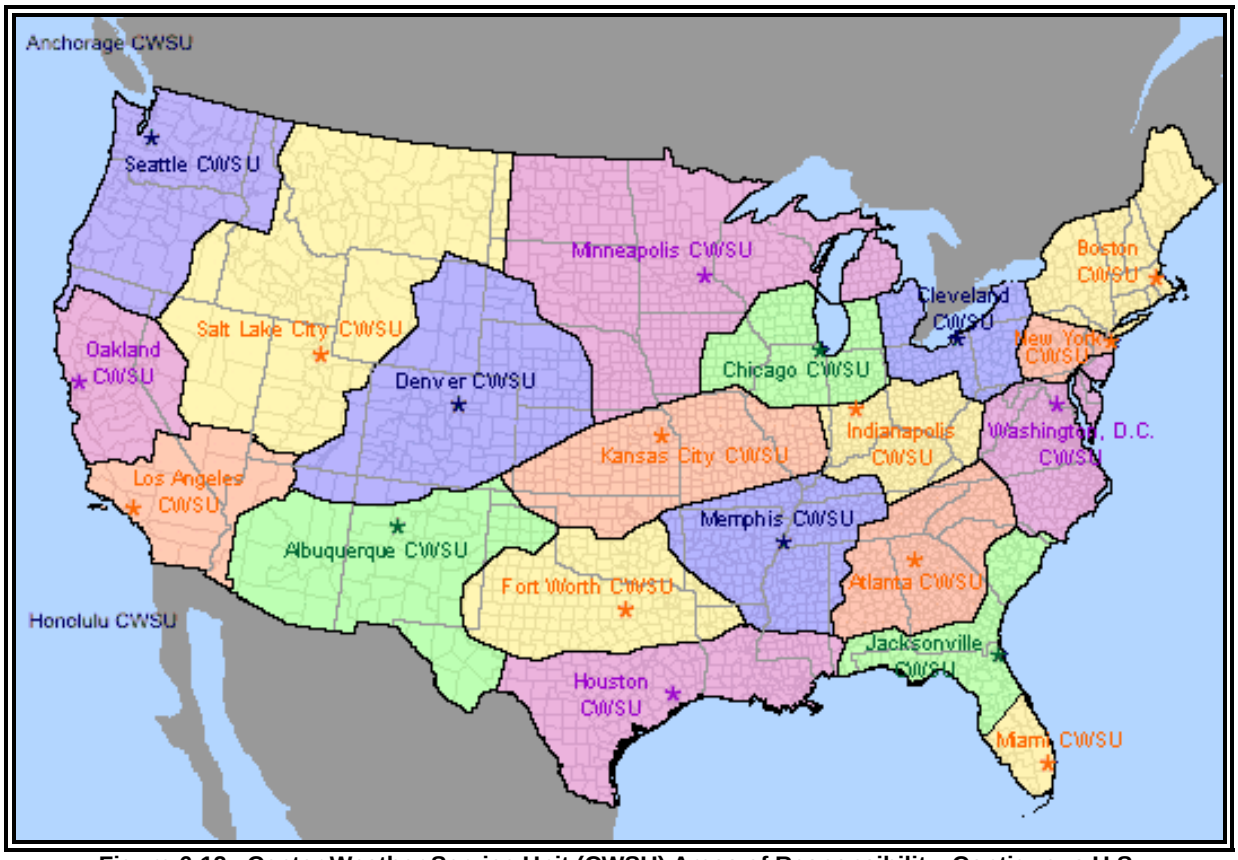

Figure 6-12. Center Weather Service Unit (CWSU) Areas of Responsibility, Contiguous U.S.

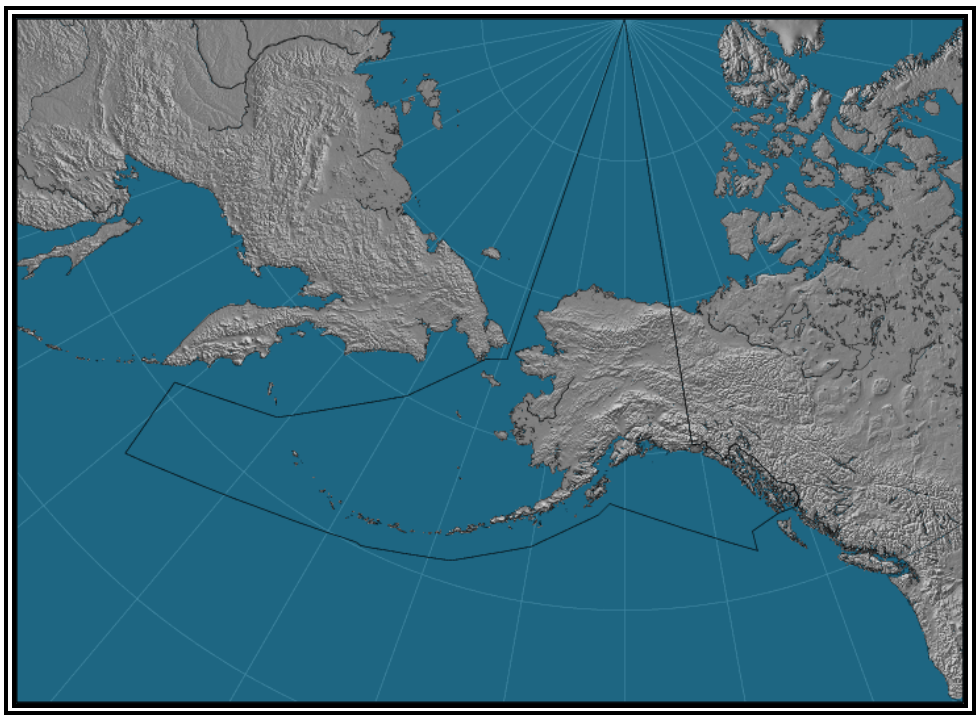

Figure 6-13. CWSU Anchorage, AK (PAZA) Area of Responsibility

CWAs are valid for up to two (2) hours and may include forecasts of conditions expected to begin within two (2) hours of issuance. If conditions are expected to persist after the advisory's valid period, a statement to that effect is included in the last line of the text. Additional CWAs will subsequently be issued as appropriate. Notice of significant changes in the phenomenon described in a CWA is provided by a new CWA issuance for that phenomenon. If the forecaster deems it necessary, CWAs may be issued hourly for convective activity.

6.3.2 CWA Communications Headers (UCWA / CWA)

The Urgent CWA (**UCWA**) communications header is intended for those situations where weather conditions have an immediate effect on the safe flow of air traffic within the ARTCC area of responsibility. It is only used when the CWSU meteorologist believes any delay in dissemination to FAA facilities would impact aviation safety. The routine CWA header is used for subsequent issuances of the same phenomenon.

6.3.3 CWA Criteria

CWAs are used in the four (4) following situations:

- **Precede an Advisory**
  - When the AWC has not yet issued an advisory, but conditions meet or will soon meet advisory criteria.
  - In the case of an impending advisory, the CWA can be issued as an Urgent CWA (UCWA) to allow the fastest possible dissemination.

- **Refine an existing Advisory**
  - To supplement an existing AWC advisory for the purpose of refining or updating the location, movement, extent, or intensity of the weather event relevant to the ARTCC's area of responsibility.

- **Highlight significant conditions not meeting Advisory criteria**
  - When conditions do not meet advisory criteria, but conditions, in the judgment of the CWSU meteorologist, will adversely impact air traffic within the ARTCC area of responsibility.

- **To cancel a CWA when the phenomenon described in the CWA is no longer expected.**

6.3.4 CWA Format

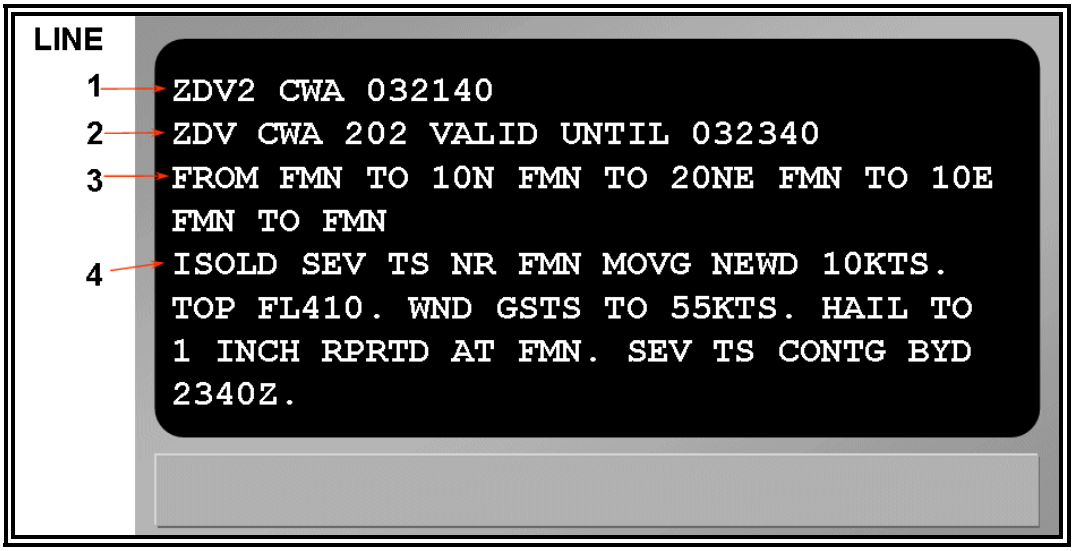

Figure 6-14. Center Weather Advisory (CWA) Decoding Example

Table 6-7. Decoding a Center Weather Advisory (CWA)

Line	Content	Description
1	ZDV	ARTCC Identification
	2	Phenomenon Number (single digit, 1-6)
	CWA	Product Type (UCWA/CWA)
	032140	Beginning and/or issuance UTC date/time
2	ZDV	ARTCC Identification
	CWA	Product Type
	2	Phenomenon Number (single digit, 1-6)
	02	Issuance Number (issued sequentially for each Phenomenon Number)
	VALID TIL 032340Z	Ending valid UTC date/time
3	FROM FMN TO 10N FMN TO 20NE FMN TO 10E FMN TO FMN	Phenomenon Location
4	ISOLD SEV TS NR FMN MOVG NEWD 10KTS. TOP FL410. WND GSTS TO 55KTS. HAIL TO 1 INCH RPRTD AT FMN. SEV TS CONTG BYD 2340Z	Phenomenon Description

Time permitting, any CWA overlapping into another center's airspace is coordinated and a statement is included in the text, e.g., **SEE ZOB CWA 201 FOR TS CONDS IN ZOB CTA** (CTA is control area). If issuance prior to coordination is necessary, a statement regarding the area(s) affected is included in the text, e.g., **LINE TS EXTDS NW INTO ZOB CTA**.

AIRMETs/SIGMETs being augmented by the CWA will be referenced in a text remark, e.g. **SEE CONVECTIVE SIGMET 8W**.

The CWA in Figure 6-14 is decoded as follows:

(Line 1) Center Weather Advisory issued for the Denver ARTCC (ZDV) CWSU. The "2" after ZDV in the first line denotes this is the second meteorological event of the local calendar day. This CWA was issued/begins on the 3rd day of the month at 2140 UTC.

(Line 2) The Denver ARTCC (ZDV) is identified again. The "202" in the second line denotes the phenomena number again (2) and the issuance number (02) for this phenomenon. This CWA is the valid until the 3rd day of the at 2340 UTC.

(Line 3) From Farmington, New Mexico to 10 nautical miles north of Farmington, New Mexico to 20 nautical miles northeast of Farmington, NM to 10 nautical mile east of Farmington, New Mexico to Farmington, New Mexico.

(Line 4) Isolated severe thunderstorms near Farmington moving northeastward at 10 knots. Tops to Flight Level 410. Wind gusts to 55 knots. Hail to one inch reported at Farmington. Severe thunderstorms continuing beyond 2340 UTC.

6.3.5 Examples

```
ZME1 CWA 081300

ZME CWA 101 VALID TIL 081500
FROM MEM TO JAN TO LIT TO MEM
OCNL TS MOV FM 26025KT. TOPS TO FL450.
```

Center Weather Advisory issued for the Memphis, Tennessee ARTCC on the 8th day of the month at 1300 UTC. The 1 after the ZME in the first line denotes this CWA has been issued for the first weather phenomenon to occur for the local calendar day. The 101 in the second line denotes the phenomenon number again (1) and the issuance number (01) for this phenomenon. The CWA is valid until the 8th of the month at 1500 UTC. From Memphis, Tennessee to Jackson, Mississippi to Little Rock, Arkansas to Memphis, Tennessee. Occasional thunderstorms moving from 260 degrees at 25 knots. Tops to flight level 450.

```
ZLC3 CWA 271645

ZLC CWA 303 VALID TIL 271745
CNL CWA 302.
SEE CONVECTIVE SIGMET 8W.
```

Center Weather Advisory issued for the Salt Lake City, Utah ARTCC on the 27th day of the month at 1645 UTC. The 3 after the ZLC in the first line denotes this CWA has been issued for the third weather phenomenon to occur for the local calendar day. The 303 in the second line

denotes the phenomenon number again (3) and the issuance number (03) for this phenomenon. The CWA is valid until the 27th day of the month at 1745 UTC. CWA number 302 has been cancelled. See Convective SIGMET 8W.

```
ZME1 CWA 040100

ZME CWA 101 VALID TIL 040300
VCY MEM
SEV CLR ICE BLW 020 DUE TO FZRA. NUMEROUS ACFT REP RAPID
ACCUMULATION OF ICE DRG DES TO MEM. NO ICE REPS ABV 020. CONDS CONTG
AFT 03Z. NO UPDATES AFT 040200Z.
```

Center Weather Advisory issued for the Memphis, Tennessee ARTCC on the 4th day of the month at 0100 UTC. The 1 after the ZLC in the first line denotes this CWA has been issued for the first weather phenomenon to occur for the local calendar day. The 101 in the second line denotes the phenomenon number again (1) and the issuance number (01) for this phenomenon. The CWA is valid until the 4th day of the month at 0300 UTC. For the Memphis, Tennessee vicinity. Severe clear icing below 2,000 feet MSL due to freezing rain. Numerous aircraft report rapid accumulation of icing during descent to Memphis. No icing reports above 2,000 feet MSL. Conditions continuing after 0300 UTC. No updates after 4th day of the month at 0200 UTC.

```
ZNY5 UCWA 021400

ZNY CWA 502 VALID TIL 021600
FROM BGM TO 18WNW JFK TO HAR TO SLT TO BGM
NUMEROUS ACFT REP SEV TURB AND WS BLW 020.
CONDS EXTD NE INTO ZBW CTA. CONDS EXP TO CONT AFT 16Z.
```

Center Weather Advisory issued for the New York ARTCC on the 2nd day of the month at 1400 UTC. The 5 after the ZNY in the first line denotes this CWA has been issued for the fifth weather phenomenon to occur for the local calendar day. The 502 in the second line denotes the phenomenon number again (5) and the issuance number (02) for this phenomenon. The CWA is valid until the 2nd day of the month at 1600 UTC. From Binghamton, New York; to 18 nautical miles west-northwest of New York (JFK Airport), New York; to Harrisburg, Pennsylvania; to Slate Run, Pennsylvania; to Binghamton, New York. Numerous aircraft report severe turbulence and wind shear below 2,000 feet MSL. Conditions extending northeast into Nashua, New Hampshire control area. Conditions expected to continue after 1600 UTC.

```
ZNY4 UCWA 041500

ZNY CWA 401 VALID TIL 041700
40N SLT TO 18WNW JFK
DEVELOPING LINE TS 25 NM WIDE MOV 24020KT. TOPS ABV FL350.
LINE TS EXTDS NW INTO ZOB CTA.
```

Urgent Center Weather Advisory issued for the New York ARTCC on the 4th day of the month at 1500 UTC. The 4 after the ZNY in the first line denotes this CWA has been issued for the fourth weather phenomenon to occur for the local calendar day. The 401 in the second line denotes the phenomenon number again (4) and the issuance number (01) for this phenomenon. The

CWA is valid until the 4th day of the month at 1700 UTC. From 40 nautical miles north of Slate Run, Pennsylvania; to 18 nautical miles west-northwest of New York (JFK Airport), New York. Developing line of thunderstorms 25 nautical miles wide moving from 240 degrees at 20 knots. Tops above flight level 350. The line of thunderstorms extends northwest into the Oberlin, Ohio control area.

6.4 Additional Products for Convection

The National Weather Service (NWS) in addition to the SIGMETs, Convective SIGMETs, and CWAs already discussed, offers a few more products informing the aviation community about the potential for convective weather.

6.4.1 Convective Outlooks (AC)

The NWS Storm Prediction Center (SPC) issues narrative and graphical convective outlooks to provide the contiguous U.S. NWS Weather Forecast Offices (WFOs), the public, media and emergency managers with the potential for severe (tornado, wind gusts 50 knots or greater, or hail 3/4 inch diameter size or greater) and non-severe (general) convection and specific severe weather threats during the following three days. The Convective Outlook defines areas of slight risk (**SLGT**), moderate risk (**MDT**) or high risk (**HIGH**) of severe thunderstorms for a 24-hour period beginning at 1200 UTC. The Day 1 and Day 2 Convective Outlooks also depict areas of general thunderstorms (**GEN TSTMS**), while the Day 1, Day 2, and Day 3 Convective Outlooks may use **SEE TEXT** for areas where convection may approach or slightly exceed severe criteria. The outlooks are available on the SPC web site at: http://www.spc.noaa.gov/products/outlook/.

6.4.1.1 Issuance

Convective Outlooks are scheduled products issued at the following times:

Table 6-8. Convective Outlook Issuance Schedule

Convective Outlook	Issuance Time (UTC)	Valid Period (UTC)
Day 1	0600	1200 – 1200
	1300	1300 – 1200
	1630	1630 – 1200
	2000	2000 – 1200
	0100	0100 – 1200
Day 2	0730 (Daylight Savings Time) 0830 (Standard Time)	Day 2/1200 – 1200
	1730	Day 2/1200 – 1200
Day 3	1100	Day 3/1200 – 1200

SPC corrects outlooks for format and grammatical errors and amends outlooks when the current forecast does not or will not reflect the ongoing or future convective development.

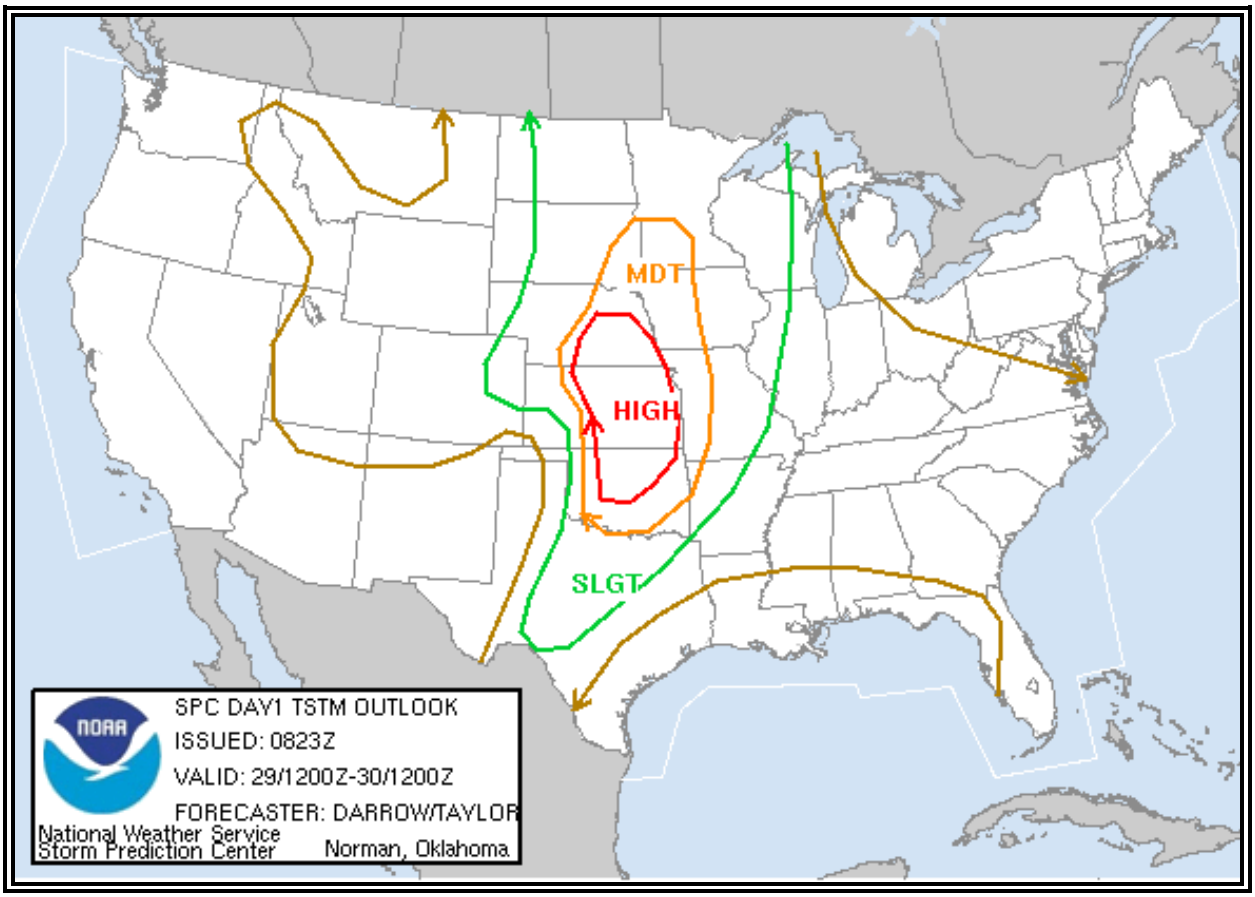

Figure 6-15. Day 1 Categorical Convective Outlook Graphic Example

6.4.1.2 Format of the Categorical Convective Outlook Narrative

`SPC AC ddhhmm` [SPC - issuing office, AC – product type, ddhhmm – date and time the product was issued

```
DAY (ONE, TWO OR THREE) CONVECTIVE OUTLOOK
NWS STORM PREDICTION CENTER NORMAN OK
time am/pm time zone day mon dd yyyy

VALID DDHHMM - DDHHMMZ

THERE IS A (SLIGHT, MODERATE, HIGH) RISK OF SEVERE THUNDERSTORMS TO
THE RIGHT OF LINE (LIST OF ANCHOR POINTS AND DIRECTION AND DISTANCE IN
STATUTE MILES FROM THE LINE). THE LINE WILL ENCLOSE THE AREA OF RISK.
THERE MAY BE ONE OR MORE AREAS OF RISK AT THE APPROPRIATE LEVEL OF
RISK. WHEN A MODERATE OR HIGH RISK IS FORECAST, THE INDIVIDUAL STATES
ARE ALSO LISTED WITH THE TWO LETTER POSTAL STATE IDENTIFIERS.

GEN TSTMS ARE FCST TO THE RIGHT OF A LINE FROM (LIST OF ANCHOR POINTS
AND DIRECTION AND DISTANCE IN STATUTE MILES FROM THE LINE). THERE MAY
BE ONE OR MORE AREAS OF GEN TSTMS LISTED.

…AREA OF CONCERN #1…
```

```
AREAS OF HIGHEST RISK ARE DISCUSSED FIRST (HIGH SEVERE RISK,
MODERATE SEVERE RISK, SLIGHT SEVERE RISK, APPROACHING SEVERE
LIMITS). THE FORECAST PROVIDES A NARRATIVE TECHNICAL DISCUSSION.

…AREA OF CONCERN #2…
NARRATIVE TECHNICAL DISCUSSION

$$

…FORECASTER NAME… MM/DD/YY
```

6.4.2 Watch Notification Messages

The NWS Storm Prediction Center (SPC) issues Watch Notification Messages to alert the aviation community, NWS offices (WFOs), the public, media and emergency managers to organized thunderstorms forecast to produce tornadic and/or severe weather in the conterminous U.S.

SPC issues three types of Watch Notification Messages: Aviation Watch Notification Message, Public Severe Thunderstorm Watch Notification Message and Public Tornado Watch Notification Message. They are available on the SPC web site at: http://www.spc.noaa.gov/products/watch/.

6.4.2.1 Aviation Watch Notification Message

SPC issues Aviation Watch Notification Messages to alert the aviation community to organized thunderstorms forecast to produce tornadic and/or severe weather as indicated in Public Watch Notification Messages.

6.4.2.1.1 Format of an Aviation Watch Notification Message

```
SPC AWW ddhhmm
WWnnnn SEVERE TSTM ST LO DDHHMMZ - DDHHMMZ
AXIS...XX STATUTE MILES EITHER SIDE OF A LINE
XXDIR CCC/LOCATION ST/ - XXDIR CCC/LOCATION ST
..AVIATION COORD.. XX NM EITHER SIDE /XXDIR CCC - XXDIR CCC
HAIL SURFACE AND ALOFT..X X/X INCHES. WIND GUSTS..XX KNOTS.
MAX TOPS TO XXX. MEAN STORM MOTION VECTOR DIR/SPEED
```

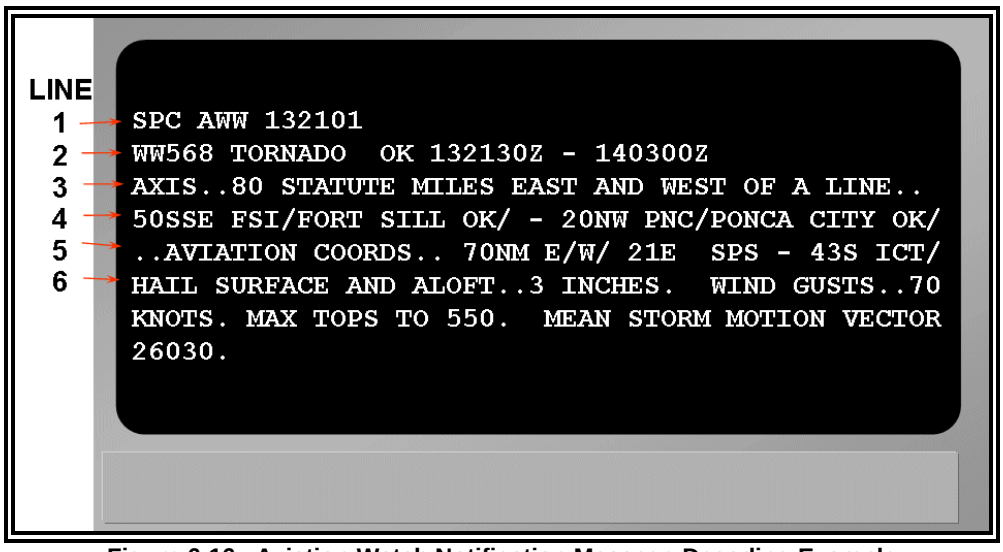

Figure 6-16. Aviation Watch Notification Message Decoding Example

Table 6-9. Decoding a Severe Weather Watch Bulletin

Line	Content	Description
1	SPC AWW 132101	Issuing office Product Type Issuance date/time
2	WW568 TORNADO OK 132130Z – 140300Z	Watch number Watch Type States affected Valid date/time period
3	AXIS..80 STATUTE MILES EAST AND WEST OF A LINE...	Watch axis
4	50SSE FSI/FORT SILL OK/ - 20NW PNC/PONCA CITY OK/	Anchor points
5	…AVIATION COORDS.. 70NM E/W/ 21E SPS – 43S ICT/	Aviation coordinates
6	HAIL SURFACE AND ALOFT…3 INCHES. WIND GUSTS..70 KNOTS. MAX TOPS TO 550. MEAN STORM MOTION VECTOR 26030.	Type, intensity, max tops, and mean storm motion using standard contractions.

The Severe Weather Watch Bulletin in Figure 6-16 is decoded as follows:

(Line 1) *Alert Severe Weather Watch Bulletin (AWW), issued by the Storm Prediction Center on the 13th at 2101Z,*

(Line 2) *for Tornado Watch number 568 (WW568) for Oklahoma, valid from the 13th at 2130Z until the 14th at 0300Z.*

(Line 3) *The Tornado Watch area is along and 80 statute miles east and west of a line from*

(Line 4) *50 statute miles south southeast of Fort Sill (Lawton), OK to 20 statute miles northwest of Ponca City, OK.*

(Line 5) *Aviation coordinates for this Tornado Watch are 70 nautical miles east and west of a line from 21 nautical miles east of Sheppard AFB (Wichita Falls), TX to 43 nautical miles south of Wichita, KS.*

(Line 6) *Hail surface and aloft to 3 inches in diameter, wind gusts to 70 knots, max tops to Flight Level 550, mean storm motion from 260 degrees at 30 knots*

6.4.2.1.2 Issuance

Watch Notification Messages are non-scheduled, event driven products valid from the time of issuance to expiration or cancellation time. Valid times are in UTC. SPC will correct watches for format and grammatical errors.

When tornadoes or severe thunderstorms have developed, the local NWS Weather Forecast Offices (WFOs) will issue the warnings for the storms.

SPC forecasters may define the watch area as a rectangle (some number of miles either side of line from point A to point B) or as a parallelogram (some number of miles north and south or east and west of line from point A to point B). The axis coordinates are measured in statute miles. The aviation coordinates are measured in nautical miles and referenced to VHF Omni-Directional Range (VOR) navigational aid locations. The watch half-width is in statute miles. The Aviation Watch Notification Message contains hail size in inches or half inches at the surface and aloft, surface convective wind gusts in knots, maximum tops, and the Mean Storm Motion Vector. Forecasters have discretion in including hail size for tornado watches associated with hurricanes.

6.4.3 Public Severe Thunderstorm Watch Notification Message

SPC issues a Public Severe Thunderstorm Watch Notification Message when forecasting six or more hail events of 3/4 inch (penny) diameter or greater or damaging winds of 50 knots (58 mph) or greater. The forecast event minimum threshold is at least 2 hours over an area at least 8,000 square miles. Below these thresholds, SPC, in collaboration with affected NWS offices may issue convective watches along coastlines, near the Canadian and Mexican borders, and for any ongoing organized severe convection.

A Public Severe Thunderstorm Watch Notification Message contains the area description and axis, watch expiration time, a description of hail size and thunderstorm wind gusts expected, the definition of the watch, a call to action statement, a list of other valid watches, a brief discussion of meteorological reasoning, and technical information for the aviation community.

SPC includes the term “adjacent coastal waters” when the watch affects coastal waters adjacent to the Pacific/Atlantic coast, Gulf of Mexico, or Great Lakes. Adjacent coastal waters refers to a WFO’s near-shore responsibility (out to 20 miles for oceans), except for convective watches which include portions of the Great Lakes.

SPC issues a watch cancellation message when **no** counties, parishes, independent cities and/or marine zones remaining are in the watch area prior to the expiration time. The text of the message will specify the number and area of the cancelled watch.

6.4.3.1 Format of Public Severe Thunderstorm Watch Notification Message

`WWUS20 KWNS ddhhmm` (*ICAO communication header*)

```
URGENT - IMMEDIATE BROADCAST REQUESTED
SEVERE THUNDERSTORM WATCH NUMBER nnnn
NWS STORM PREDICTION CENTER NORMAN OK
time am/pm time zone day mon dd yyyy

THE STORM PREDICTION CENTER HAS ISSUED A
SEVERE THUNDERSTORM WATCH FOR PORTIONS OF

                PORTION OF STATE
                PORTION OF STATE
                AND ADJACENT COASTAL WATERS (IF REQUIRED)

EFFECTIVE (TIME PERIOD) UNTIL hhmm am/pm time zone.

...THIS IS A PARTICULARLY DANGEROUS SITUATION (IF FORECAST)...

HAIL TO X INCHES IN DIAMETER...THUNDERSTORM WIND GUSTS TO XX MPH...AND
DANGEROUS LIGHTNING ARE POSSIBLE IN THESE AREAS.

NARRATIVE DESCRIPTION OF WATCH AREA USING A LINE AND ANCHOR
POINTS. DISTANCES TO EITHER SIDE OF THE LINE WILL BE IN STATUTE MILES.

CALL TO ACTION STATEMENTS

OTHER WATCH INFORMATION...OTHER WATCHES IN EFFECT AND IF THIS
WATCH REPLACES A PREVIOUS WATCH.

NARRATIVE DISCUSSION OF REASON FOR THE WATCH.

AVIATION...BRIEF DESCRIPTION OF SEVERE WEATHER THREAT TO AVIATORS.
HAIL SIZE WILL BE GIVEN IN INCHES AND WIND GUSTS IN KNOTS. MAXIMUM
STORM TOPS AND A MEAN STORM VECTOR WILL ALSO BE GIVEN.

$$

..FORECASTER NAME.. MM/DD/YY
```

6.4.3.2 Example of a Public Severe Thunderstorm Watch Notification Message

```
WWUS20 KWNS 161711 (ICAO communication header)
SPC WW 161710

URGENT - IMMEDIATE BROADCAST REQUESTED
SEVERE THUNDERSTORM WATCH NUMBER 647
NWS STORM PREDICTION CENTER NORMAN OK
1210 PM CDT FRI JUL 16 2004

THE NWS STORM PREDICTION CENTER HAS ISSUED A
SEVERE THUNDERSTORM WATCH FOR PORTIONS OF

       EASTERN IOWA
       NORTHERN ILLINOIS
```

```
       NORTHWEST INDIANA
       LAKE MICHIGAN

EFFECTIVE THIS FRIDAY AFTERNOON FROM 1210 PM UNTIL 500 PM CDT.

HAIL TO 2 INCHES IN DIAMETER...THUNDERSTORM WIND GUSTS TO 70
MPH...AND DANGEROUS LIGHTNING ARE POSSIBLE IN THESE AREAS.

THE SEVERE THUNDERSTORM WATCH AREA IS ALONG AND 75 STATUTE MILES
EITHER SIDE OF A LINE FROM 40 MILES SOUTHEAST OF SOUTH BEND
INDIANA TO 35 MILES SOUTHWEST OF CEDAR RAPIDS IOWA.

REMEMBER...A SEVERE THUNDERSTORM WATCH MEANS CONDITIONS ARE
FAVORABLE FOR SEVERE THUNDERSTORMS IN AND CLOSE TO THE WATCH AREA.
PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR THREATENING
WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS AND POSSIBLE
WARNINGS. SEVERE THUNDERSTORMS CAN AND OCCASIONALLY DO PRODUCE
TORNADOES.

OTHER WATCH INFORMATION...CONTINUE...WW 646...

DISCUSSION...THUNDERSTORMS WILL CONTINUE TO INCREASE ACROSS WATCH
AREA WHERE AIR MASS HAS BECOME STRONGLY UNSTABLE AND UNCAPPED.
VEERING SHEAR PROFILE SUPPORT STORMS EVOLVING INTO SHORT LINE
SEGMENTS ENHANCING WIND DAMAGE POTENTIAL

AVIATION...A FEW SEVERE THUNDERSTORMS WITH HAIL SURFACE AND ALOFT
TO 2 INCHES. EXTREME TURBULENCE AND SURFACE WIND GUSTS TO 60
KNOTS. A FEW CUMULONIMBI WITH MAXIMUM TOPS TO 500. MEAN STORM
MOTION VECTOR 33025.

...HALES
```

6.4.4 Public Tornado Watch Notification Message

SPC issues a Public Tornado Watch Notification Message when forecasting three or more tornadoes or any tornado which could produce F2 or greater damage. The forecast event minimum thresholds are at least 2 hours over an area at least 8,000 square miles. Below these thresholds, SPC, in collaboration with affected NWS offices, may issue convective watches along coastlines, near the Canadian and Mexican borders and for any ongoing organized severe convection.

A Public Tornado Watch Notification Message contains the area description and axis, watch expiration time, the term “damaging tornadoes”, a description of the largest hail size and strongest thunderstorm wind gusts expected, the definition of the watch, a call to action statement, a list of other valid watches, a brief discussion of meteorological reasoning, and technical information for the aviation community.

SPC includes the term “adjacent coastal waters” when the watch affects coastal waters adjacent to the Pacific/Atlantic coast, Gulf of Mexico, or Great Lakes. Adjacent coastal waters refers to a WFO’s near shore responsibility (out to 20 nautical miles for oceans), except for convective watches which include portions of the Great Lakes.

SPC issues a watch cancellation message whenever it cancels a watch prior to the expiration time. The text of the message will specify the number and area of the cancelled watch.

6.4.4.1 Format of a Public Tornado Watch Notification Message

WWUS20 KWNS ddhhmm (*ICAO communication header*)

```
URGENT - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER nnnn
NWS STORM PREDICTION CENTER NORMAN OK
time am/pm time zone day mon dd yyyy

THE STORM PREDICTION CENTER HAS ISSUED A
TORNADO WATCH FOR PORTIONS OF

           PORTION OF STATE
           PORTION OF STATE
           AND ADJACENT COASTAL WATERS (IF REQUIRED)

EFFECTIVE (TIME PERIOD) UNTIL hhmm am/pm time zone.

...THIS IS A PARTICULARLY DANGEROUS SITUATION (IF FORECAST)...

DESTRUCTIVE TORNADOES...HAIL TO X INCHES IN DIAMETER...THUNDERSTORM
WIND GUSTS TO XX MPH...AND DANGEROUS LIGHTNING ARE POSSIBLE IN THESE
AREAS.

NARRATIVE DESCRIPTION OF WATCH AREA USING A LINE AND ANCHOR POINTS.
DISTANCES TO EITHER SIDE OF THE LINE WILL BE IN STATUTE MILES.

CALL TO ACTION STATEMENTS

OTHER WATCH INFORMATION...OTHER WATCHES IN EFFECT AND IF THIS WATCH
REPLACES A PREVIOUS WATCH.

NARRATIVE DISCUSSION OF REASON FOR THE WATCH.

AVIATION...BRIEF DESCRIPTION OF SEVERE WEATHER THREAT TO AVIATORS.
HAIL SIZE WILL BE GIVEN IN INCHES AND WIND GUSTS IN KNOTS. MAXIMUM
STORM TOPS AND A MEAN STORM VECTOR WILL ALSO BE GIVEN.

$$

..FORECASTER NAME.. MM/DD/YY
```

6.4.4.2 Example of a Public Tornado Watch Notification Message

WWUS20 KWNS 050550 (*ICAO communication header*)

```
URGENT - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 243
NWS STORM PREDICTION CENTER NORMAN OK
```

1250 AM CDT MON MAY 5 2003

THE NWS STORM PREDICTION CENTER HAS ISSUED A
TORNADO WATCH FOR PORTIONS OF

WESTERN AND CENTRAL ARKANSAS
SOUTHERN MISSOURI
FAR EASTERN OKLAHOMA

EFFECTIVE THIS MONDAY MORNING FROM 1250 AM UNTIL 600 AM CDT.

...THIS IS A PARTICULARLY DANGEROUS SITUATION...

DESTRUCTIVE TORNADOES...LARGE HAIL TO 2 INCHES IN DIAMETER...
THUNDERSTORM WIND GUSTS TO 70 MPH...AND DANGEROUS LIGHTNING ARE
POSSIBLE IN THESE AREAS.

THE TORNADO WATCH AREA IS ALONG AND 100 STATUTE MILES EAST AND
WEST OF A LINE FROM 15 MILES WEST NORTHWEST OF FORT LEONARD WOOD
MISSOURI TO 45 MILES SOUTHWEST OF HOT SPRINGS ARKANSAS.

REMEMBER...A TORNADO WATCH MEANS CONDITIONS ARE FAVORABLE FOR
TORNADOES AND SEVERE THUNDERSTORMS IN AND CLOSE TO THE WATCH AREA.
PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR THREATENING
WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS AND POSSIBLE
WARNINGS.

OTHER WATCH INFORMATION...THIS TORNADO WATCH REPLACES TORNADO
WATCH NUMBER 237. WATCH NUMBER 237 WILL NOT BE IN EFFECT AFTER
1250 AM CDT. CONTINUE...WW 239...WW 240...WW 241...WW 242...

DISCUSSION...SRN MO SQUALL LINE EXPECTED TO CONTINUE EWD...WHERE
LONG/HOOKED HODOGRAPHS SUGGEST THREAT FOR EMBEDDED
SUPERCELLS/POSSIBLE TORNADOES. FARTHER S...MORE WIDELY SCATTERED
SUPERCELLS WITH A THREAT FOR TORNADOES WILL PERSIST IN VERY STRONGLY
DEEP SHEARED/LCL ENVIRONMENT IN AR.

AVIATION...TORNADOES AND A FEW SEVERE THUNDERSTORMS WITH HAIL
SURFACE AND ALOFT TO 2 INCHES. EXTREME TURBULENCE AND SURFACE WIND
GUSTS TO 60 KNOTS. A FEW CUMULONIMBI WITH MAXIMUM TOPS TO 500. MEAN
STORM MOTION VECTOR 26045.
.
..CORFIDI

6.5 Products for Tropical Cyclones

The NWS issues SIGMETs, Convective SIGMETs and CWAs to inform the aviation community about the potential or existence of tropical cyclones and the adverse conditions associated with them. These above listed products are the primary source of information. The NWS also issues other products pertaining to Tropical Cyclones. These additional products are defined in this section.

6.5.1 Aviation Tropical Cyclone Advisory (TCA)

The Aviation Tropical Cyclone Advisory (TCA) is intended to provide short-term tropical cyclone forecast guidance for international aviation safety and routing purposes. It is prepared by the National Hurricane Center (NHC) and the Central Pacific Hurricane Center (CPHC) in Honolulu, Hawaii, for all on-going tropical cyclone activity in their respective areas of responsibility. This requirement is stated in the World Meteorological Organization Region IV hurricane plan. Any valid TCA in the Atlantic or eastern Pacific is available on the NHC web site at: http://www.nhc.noaa.gov. Any valid TCA for the central Pacific is available on the CPHC web site at: http://www.prh.noaa.gov/hnl/cphc/

6.5.1.1 Issuance

TCAs are issued at 0300, 0900, 1500, and 2100 UTC and are valid from the time of issuance until the next scheduled issuance or update.

6.5.1.2 Content

TCAs list the current tropical cyclone position, motion and intensity, and 12-, 18- and 24-hour forecast positions and intensities. It is an alphanumeric text product produced by hurricane forecasters and consists of information extracted from the official forecasts. This forecast is produced from subjective evaluation of current meteorological and oceanographic data as well as output from numerical weather prediction models, and is coordinated with affected NWS offices, the NWS National Centers, and the Department of Defense.

6.5.1.3 Format

The format of the Aviation Tropical Cyclone Advisory is as follows:

```
FKaa2i cccc ddhhmm (ICAO communication header)

(TROPICAL CYCLONE TYPE) (NAME)ICAO ADVISORY NUMBER ##
(ISSUING OFFICE CITY STATE) BBCCYYYY
time UTC day of week mon dd yyyy

TEXT
$$
```

NOTE: As part of the header, a coded string is appended at the end of the “ISSUING OFFICE CITY STATE” line. (Example: NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL BBCCYYY)

Where: (BB) is the basin AL – North Atlantic, EP – East Pacific, or CP – Central Pacific
Where: (CC) is the cyclone number (01, 02, 03,…49)
Where: (YYYY) is the 4 digit year.

6.5.1.4 Aviation Tropical Cyclone Advisory (TCA) Example

```
FKNT25 KNHC 210900
TCANT5

TROPICAL STORM ICAO ADVISORY NUMBER 27
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL AL092007
0900 UTC SUN OCT 21 2007

TC ADVISORY
DTG:                    20071021/0900Z
TCAC:                   KNHC
TC:                     ERNESTO
NR:                     027
PSN:                    N3000 W08012
MOV:                    N 13KT
C:                      0998HPA
MAX WIND:               045KT
FCST PSN + 06 HR:       211200 N3106 W07951
FCST MAX WIND + 06 HR: 045KT
FCST PSN + 12 HR:       211800 N3206 W07930
FCST MAX WIND + 12 HR: 050KT
FCST PSN + 18 HR:       220000 N3321 W07903
FCST MAX WIND + 18 HR: 045KT
FCST PSN + 24 HR:       220600 N3436 W07836
FCST MAX WIND + 24 HR: 040KT
NXT MSG:                20071021/1500Z

$$
```

6.5.2 Tropical Cyclone Public Advisory (TCP)

A Tropical Cyclone Public Advisory (TCP) is the primary tropical cyclone information product issued to the public. The TCP provides critical tropical cyclone watch, warning, and forecast information for the protection of life and property.

6.5.2.1 TCP Responsibility

The National Hurricane Center (NHC), as a part of the Tropical Prediction Center (TPC); the Central Pacific Hurricane Center (CPHC); and Weather Forecast Office (WFO) Tiyan, Guam, issue TCPs. In the Atlantic and central Pacific, NHC and CPHC issue TCPs for all tropical cyclones respectively. In the eastern Pacific, NHC will issue public advisories when watches or warnings are required, or the tropical cyclone is otherwise expected to impact nearby land areas. In the western Pacific, WFO Guam will issue public advisories generally based on the tropical cyclone bulletins of the Joint Typhoon Warning Center (JTWC) for all tropical cyclones expected to affect land within 48 hours.

Valid TCP in the Atlantic or eastern Pacific is available on the NHC web site at: http://www.nhc.noaa.gov.

Valid TCP for the central Pacific is available on the CPHC web site at: http://www.prh.noaa.gov/hnl/cphc/.

TCPs issued by WFO Guam for the western Pacific are available at: http://www.prh.noaa.gov/pr/guam/cyclone.php.

6.5.2.2 TCP Issuance

The initial advisory may be issued when data confirm a tropical cyclone has developed. The title of the advisory will depend upon the intensity of the tropical cyclone as listed below.

- A tropical depression advisory refers to a tropical cyclone with 1-minute sustained winds up to 33 knots (38 mph).
- A tropical storm advisory will refer to tropical cyclones with 1-minute sustained surface winds 34 to 63 knots (39 to 73 mph).
- A hurricane/typhoon advisory will refer to tropical cyclones with winds 64 knots (74 mph) or greater.

Public advisories are discontinued when the tropical cyclone:

- Ceases to be a tropical cyclone; that is, it becomes extratropical, a remnant low, or dissipates, or
- Is centered over land, is below tropical storm strength, and is not forecast to move back over water as a tropical cyclone, and no coastal tropical cyclone watches or warnings are in effect.
- For Guam when the tropical cyclone moves out of the WFO area of responsibility.

Tropical Cyclone Public Advisories are issued according to the schedule below and are valid from the time of issuance until the next scheduled issuance or update. Valid position times correspond to the advisory time.

Table 6-10. Tropical Cyclone Public Advisory Issuance Schedule

TPC/CPHC ISSUANCE TIME (UTC)	WFO GUAM ISSUANCE TIME (UTC)
0300	0400
0900	1000
1500	1600
2100	2200

Times in advisories are local time of the affected area; however, local time and UTC are used when noting the storm's location. All advisories use statute miles and statute miles per hour. The Tropical Cyclone Center (TPC and CPHC) and WFO Guam, at their discretion, may use nautical miles/knots in parentheses immediately following statute miles/mph. Advisories include the metric units of kilometers and kilometers per hour following the equivalent English units except when the United States is the only country threatened.

NHC, CPHC and WFO Guam issue tropical storm/hurricane/typhoon watches if tropical storm/hurricane/typhoon conditions are possible over land areas within 36 hours, except 48

hours in the western north Pacific. Tropical storm watches are not issued if the tropical cyclone is forecast to reach hurricane/typhoon intensity within the watch period.

Tropical storm/hurricane/typhoon warnings are issued when tropical storm/hurricane/typhoon conditions along the coast are expected within 24 hours. Tropical storm warnings are issued at the discretion of the hurricane specialist when gale warnings, not related to the pending tropical storm, are already in place. Tropical storm warnings may be issued on either side of a hurricane/typhoon warning area.

6.5.2.2.1 TCP Intermediate Issuances

Intermediate Public Advisories are issued on a 2- to 3-hourly interval between scheduled advisories (see times of issuance below). 3-hourly intermediate advisories are issued whenever a tropical storm or hurricane watch/warning is in effect. 2-hourly intermediates are issued whenever tropical storm or hurricane warnings are in effect and coastal radars are able to provide responsible Tropical Cyclone Centers with a reliable hourly center position. For clarity, when intermediate public advisories are issued, a statement is included at the end of the scheduled public advisory informing users when an intermediate advisory may be issued, i.e., "AN INTERMEDIATE ADVISORY WILL BE ISSUED BY THE CENTRAL PACIFIC HURRICANE CENTER AT 2 PM HST FOLLOWED BY THE NEXT COMPLETE ADVISORY ISSUANCE AT 5 PM HST."

Table 6-11. Intermediate Tropical Cyclone Public Advisory Issuance Schedule

	TPC/CPHC ISSUANCE TIME (UTC)	WFO GUAM ISSUANCE TIME (UTC)
3-Hourly Issuances	0000	0100
	0600	0700
	1200	1300
	1800	1900
2-Hourly Issuances	2300	0000
	0100	0200
	0500	0600
	0700	0800
	1100	1200
	1300	1400
	1700	1800
	1900	2000

Intermediate advisories are not used to issue tropical cyclone watches or warnings. They can be used to clear all, or parts of, a watch or warning area. Content is similar to the scheduled advisory.

6.5.2.3 TCP Content

Advisories list all tropical cyclone watches and warnings in effect. The first advisory in which watches or warnings are mentioned will give the effective time of the watch or warning, except when it is being issued by other countries and the time is not known. Except for tropical storms and hurricanes/typhoons forming close to land, a watch will precede a warning. Once a watch is in effect, it will either be replaced by a warning or remain in effect until the threat of the tropical

cyclone conditions has passed. A hurricane/typhoon watch and a tropical storm warning can be in effect for the same section of coast at the same time.

All advisories include the location of the center of the tropical cyclone by its latitude and longitude, and distance and direction from a well known point, preferably downstream from the tropical cyclone. If the forecaster is unsure of the exact location of a depression, the position may be given as within 50, 75, etc., miles of a map coordinate. When the center of the tropical cyclone is over land, its position is given referencing the state or country in which it is located and in respect to some well known city, if appropriate.

Movement forecasts apply to the tropical cyclone's center. The present movement is given to 16 points of the compass when possible. A 24-hour forecast of movement in terms of a continuance or departure from the present movement and speed is also included. This can be reduced to a 12-hour forecast. Uncertainties in either the tropical cyclone's location or movement will be explained in the advisory. An outlook beyond 24 hours (out to 72 hours when appropriate) may be included in the text of the advisory.

Maximum observed 1-minute sustained surface wind speed rounded to the nearest 5 mph is given. During landfall threats, specific gust values and phrases like “briefly higher in squalls” may be used. The area (or radius) of both tropical and hurricane/typhoon force winds is given. The storm may also be compared to some memorable hurricane or referred to by relative intensity. Where appropriate, the Saffir/Simpson Hurricane Scale (SSHS) is used in public releases.

Central pressure values in millibars and inches are provided as determined by available data.

The inland impacts of tropical cyclones will be highlighted in advisories. This includes the threat of strong winds, heavy rainfall, flooding, and tornadoes. The extent and magnitude of the inland winds is included as well as anticipated rainfall amounts and the potential for flooding and tornadoes. Tornado and flood watches will be mentioned as appropriate.

6.5.2.4 TCP Format

The format of the Tropical Cyclone Public Advisory is as follows:

```
WTaaii cccc ddhhmm
TCPxxx

BULLETIN
(TROPICAL CYCLONE TYPE) (NAME) ADVISORY NUMBER XX.
(ISSUING OFFICE CITY STATE) BBCCYYYY
time am/pm time zone day month dd YYYY

...HEADLINE...

TEXT
$$

FORECASTER NAME
```

NOTE: As part of the header, a coded string is appended at the end of the “ISSUING OFFICE CITY STATE” line (Example: NWS TPC/NATIONAL HURRICANE CENTER

MIAMI FL BBCCYYYY)

Format:
where: (BB) is the basin AL - North Atlantic, EP - East Pacific, CP - Central Pacific
WP – western Pacific
where: (CC) is the cyclone number (01, 02, 03,...49)
where: (YYYY) is the 4 digit year.

6.5.2.5 Tropical Storm Public Advisory (TCP) Example

```
WTNT34 KNHC 260359
MIATCPAT4
BULLETIN
TROPICAL STORM DEBBY ADVISORY NUMBER 18
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL AL042006
1100 PM AST FRI AUG 25 2006

...DEBBY BARELY HANGING ON AS A TROPICAL STORM...

AT 1100 PM AST...0300Z...THE CENTER OF TROPICAL STORM DEBBY WAS
LOCATED NEAR LATITUDE 25.2 NORTH...LONGITUDE 45.6 WEST OR ABOUT 1400
MILES...2255 KM...SOUTHWEST OF THE AZORES.

DEBBY IS MOVING TOWARD THE WEST-NORTHWEST NEAR 14 MPH...22 KM/HR...
AND A TURN TO THE NORTHWEST AND THEN NORTH-NORTHWEST IS EXPECTED
OVER THE NEXT 24 HOURS.

MAXIMUM SUSTAINED WINDS ARE NEAR 40 MPH...65 KM/HR...WITH HIGHER
GUSTS. LITTLE CHANGE IN STRENGTH IS FORECAST DURING THE NEXT 24
HOURS.

TROPICAL STORM FORCE WINDS EXTEND OUTWARD UP TO 105 MILES...165 KM
FROM THE CENTER.

ESTIMATED MINIMUM CENTRAL PRESSURE IS 1008 MB...29.77 INCHES.

REPEATING THE 1100 PM AST POSITION...25.2 N...45.6 W. MOVEMENT
TOWARD...WEST-NORTHWEST NEAR 14 MPH. MAXIMUM SUSTAINED WINDS...40
MPH. MINIMUM CENTRAL PRESSURE...1008 MB.

THE NEXT ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE CENTER
AT
500 AM AST.
$$
FORECASTER KNABB
```

6.5.2.6 Hurricane/Typhoon Public Advisory Example

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WTNT32 KNHC 282058
TCPAT2
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BULLETIN
HURRICANE KATRINA ADVISORY NUMBER 24
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
4 PM CDT SUN AUG 28 2005

...POTENTIALLY CATASTROPHIC HURRICANE KATRINA HEADED FOR THE NORTHERN GULF COAST...

A HURRICANE WARNING IS IN EFFECT FOR THE NORTH CENTRAL GULF COAST FROM MORGAN CITY LOUISIANA EASTWARD TO THE ALABAMA/FLORIDA BORDER...INCLUDING THE CITY OF NEW ORLEANS AND LAKE PONTCHARTRAIN. PREPARATIONS TO PROTECT LIFE AND PROPERTY SHOULD BE COMPLETED THIS EVENING.

A TROPICAL STORM WARNING AND A HURRICANE WATCH ARE IN EFFECT FROM EAST OF THE ALABAMA/FLORIDA BORDER TO DESTIN FLORIDA...AND FROM WEST OF MORGAN CITY TO INTRACOASTAL CITY LOUISIANA.

A TROPICAL STORM WARNING IS ALSO IN EFFECT FROM DESTIN FLORIDA EASTWARD TO INDIAN PASS FLORIDA...AND FROM INTRACOASTAL CITY LOUISIANA WESTWARD TO CAMERON LOUISIANA.

FOR STORM INFORMATION SPECIFIC TO YOUR AREA...INCLUDING POSSIBLE INLAND WATCHES AND WARNINGS...PLEASE MONITOR PRODUCTS ISSUED BY YOUR LOCAL WEATHER OFFICE.

AT 4 PM CDT...2100Z...THE CENTER OF HURRICANE KATRINA WAS LOCATED NEAR LATITUDE 26.9 NORTH...LONGITUDE 89.0 WEST OR ABOUT 150 MILES SOUTH OF THE MOUTH OF THE MISSISSIPPI RIVER.

KATRINA IS MOVING TOWARD THE NORTHWEST NEAR 13 MPH...AND A GRADUAL TURN TO THE NORTH IS EXPECTED OVER THE NEXT 24 HOURS. ON THIS TRACK THE CENTER OF THE HURRICANE WILL BE NEAR THE NORTHERN GULF COAST EARLY MONDAY. HOWEVER...CONDITIONS ARE ALREADY BEGINNING TO DETERIORATE ALONG PORTIONS OF THE CENTRAL AND NORTHEASTERN GULF COAST...AND WILL CONTINUE TO WORSEN THROUGH THE NIGHT.

MAXIMUM SUSTAINED WINDS ARE NEAR 165 MPH...WITH HIGHER GUSTS. KATRINA IS A POTENTIALLY CATASTROPHIC CATEGORY FIVE HURRICANE ON THE SAFFIR-SIMPSON SCALE. SOME FLUCTUATIONS IN STRENGTH ARE LIKELY UNTIL LANDFALL. KATRINA IS EXPECTED TO MAKE LANDFALL AT CATEGORY FOUR OR FIVE INTENSITY. WINDS AFFECTING THE UPPER FLOORS OF HIGH-RISE BUILDINGS WILL BE SIGNIFICANTLY STRONGER THAN THOSE NEAR GROUND LEVEL.

KATRINA IS A LARGE HURRICANE. HURRICANE FORCE WINDS EXTEND OUTWARD UP TO 105 MILES FROM THE CENTER...AND TROPICAL STORM FORCE WINDS EXTEND OUTWARD UP TO 230 MILES. SUSTAINED TROPICAL STORM FORCE WINDS ARE OCCURRING OVER THE SOUTHEAST LOUISIANA COAST. SOUTHWEST PASS...NEAR THE MOUTH OF THE MISSISSIPPI RIVER...RECENTLY REPORTED SUSTAINED WINDS OF 48 MPH WITH GUSTS TO 53 MPH.

A NOAA HURRICANE HUNTER PLANE REPORTED A MINIMUM CENTRAL
PRESSURE OF 902 MB...26.64 INCHES.

COASTAL STORM SURGE FLOODING OF 18 TO 22 FEET ABOVE NORMAL TIDE
LEVELS...LOCALLY AS HIGH AS 28 FEET...ALONG WITH LARGE AND DANGEROUS
BATTERING WAVES...CAN BE EXPECTED NEAR AND TO THE EAST OF WHERE THE
CENTER MAKES LANDFALL. SOME LEVEES IN THE GREATER NEW ORLEANS
AREA COULD BE OVERTOPPED. SIGNIFICANT STORM SURGE FLOODING WILL OCCUR
ELSEWHERE ALONG THE CENTRAL AND NORTHEASTERN GULF OF MEXICO
COAST.

RAINFALL TOTALS OF 5 TO 10 INCHES...WITH ISOLATED MAXIMUM AMOUNTS OF
15 INCHES...ARE POSSIBLE ALONG THE PATH OF KATRINA ACROSS THE GULF
COAST AND THE TENNESSEE VALLEY. RAINFALL TOTALS OF 4 TO 8 INCHES
ARE POSSIBLE ACROSS THE OHIO VALLEY INTO THE EASTERN GREAT LAKES
REGION TUESDAY AND WEDNESDAY.

ISOLATED TORNADOES WILL BE POSSIBLE BEGINNING THIS EVENING OVER
SOUTHERN PORTIONS OF LOUISIANA...MISSISSIPPI...AND ALABAMA...AND
OVER THE FLORIDA PANHANDLE.

REPEATING THE 4 PM CDT POSITION...26.9 N... 89.0 W. MOVEMENT
TOWARD...NORTHWEST NEAR 13 MPH. MAXIMUM SUSTAINED WINDS...165 MPH.
MINIMUM CENTRAL PRESSURE... 902 MB.

AN INTERMEDIATE ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE
CENTER AT 7 PM CDT FOLLOWED BY THE NEXT COMPLETE ADVISORY AT
10 PM CDT.

FORECASTER PASCH

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6.5.2.7 Intermediate Public Advisory Example

WTNT33 KNHC 221858
TCPAT3

BULLETIN
HURRICANE RITA INTERMEDIATE ADVISORY NUMBER 20A
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
1 PM CDT THU SEP 22 2005

...RITA WEAKENS A LITTLE FURTHER...REMAINS AN EXTREMELY DANGEROUS
HURRICANE...

A HURRICANE WARNING IS IN EFFECT FROM PORT O'CONNOR TEXAS TO
MORGAN CITY LOUISIANA. A HURRICANE WARNING MEANS THAT HURRICANE
CONDITIONS ARE EXPECTED WITHIN THE WARNING AREA WITHIN THE NEXT 24
HOURS. PREPARATIONS TO PROTECT LIFE AND PROPERTY SHOULD BE RUSHED TO
COMPLETION.

A TROPICAL STORM WARNING REMAINS IN EFFECT FROM SOUTH OF PORT O'CONNOR TO PORT MANSFIELD TEXAS AND FOR THE SOUTHEASTERN COAST OF LOUISIANA EAST OF MORGAN CITY TO THE MOUTH OF THE MISSISSIPPI RIVER. A TROPICAL STORM WARNING MEANS THAT TROPICAL STORM CONDITIONS ARE EXPECTED WITHIN THE WARNING AREA WITHIN THE NEXT 24 HOURS.

A TROPICAL STORM WATCH IS IN EFFECT FROM NORTH OF THE MOUTH OF THE MISSISSIPPI RIVER TO THE MOUTH OF THE PEARL RIVER INCLUDING METROPOLITAN NEW ORLEANS AND LAKE PONTCHARTRAIN...FROM SOUTH OF PORT MANSFIELD TO BROWNSVILLE TEXAS...AND FOR THE NORTHEASTERN COAST OF MEXICO FROM RIO SAN FERNANDO NORTHWARD TO THE RIO GRANDE. A TROPICAL STORM WATCH MEANS THAT TROPICAL STORM CONDITIONS ARE POSSIBLE WITHIN THE WATCH AREA...GENERALLY WITHIN 36 HOURS.

FOR STORM INFORMATION SPECIFIC TO YOUR AREA...INCLUDING POSSIBLE INLAND WATCHES AND WARNINGS...PLEASE MONITOR PRODUCTS ISSUED BY YOUR LOCAL WEATHER OFFICE.

AT 1 PM CDT...1800Z...THE CENTER OF HURRICANE RITA WAS LOCATED NEAR LATITUDE 25.5 NORTH...LONGITUDE 89.2 WEST OR ABOUT 435 MILES...700 KM...SOUTHEAST OF GALVESTON TEXAS AND ABOUT 430 MILES...695 KM... SOUTHEAST OF PORT ARTHUR TEXAS.

RITA IS MOVING TOWARD THE WEST-NORTHWEST NEAR 9 MPH...15 KM/HR. A GRADUAL TURN TO THE NORTHWEST IS EXPECTED DURING THE NEXT 24 TO 36 HOURS.

DATA FROM A NOAA RECONNAISSANCE AIRCRAFT INDICATE THAT MAXIMUM SUSTAINED WINDS HAVE DECREASED TO NEAR 150 MPH...240 KM/HR... WITH HIGHER GUSTS. RITA IS NOW A STRONG CATEGORY FOUR HURRICANE ON THE SAFFIR-SIMPSON SCALE. SOME SLIGHT WEAKENING IS FORECAST DURING THE NEXT 24 HOURS BUT RITA IS EXPECTED TO REMAIN AN EXTREMELY DANGEROUS HURRICANE.

HURRICANE FORCE WINDS EXTEND OUTWARD UP TO 85 MILES...140 KM... FROM THE CENTER...AND TROPICAL STORM FORCE WINDS EXTEND OUTWARD UP TO 185 MILES...295 KM.

LATEST MINIMUM CENTRAL PRESSURE REPORTED BY A NOAA HURRICANE HUNTER PLANE WAS 915 MB...27.01 INCHES.

COASTAL STORM SURGE FLOODING OF 15 TO 20 FEET ABOVE NORMAL TIDE LEVELS...ALONG WITH LARGE AND DANGEROUS BATTERING WAVES...CAN BE EXPECTED NEAR AND TO THE EAST OF WHERE THE CENTER MAKES LANDFALL. TIDES ARE CURRENTLY RUNNING ABOUT 2 FOOT ABOVE NORMAL ALONG THE MISSISSIPPI AND LOUISIANA COASTS IN THE AREAS AFFECTED BY KATRINA. TIDES IN THOSE AREAS WILL INCREASE UP TO 3 TO 4 FEET AND BE ACCOMPANIED BY LARGE WAVES...AND RESIDENTS THERE COULD EXPERIENCE SOME COASTAL FLOODING.

```
RAINFALL ACCUMULATIONS OF 8 TO 12 INCHES WITH ISOLATED MAXIMUM 15
INCH TOTAL ARE POSSIBLE ALONG THE PATH OF RITA PARTICULARLY OVER
SOUTHEAST TEXAS AND WESTERN LOUISIANA. IN ADDITION...RAINFALL
AMOUNTS OF 3 TO 5 INCHES ARE POSSIBLE OVER SOUTHEASTERN LOUISIANA
INCLUDING NEW ORLEANS. BASED ON THE FORECAST TRACK...RAINFALL
TOTALS IN EXCESS OF 25 INCHES ARE POSSIBLE AFTER RITA MOVES INLAND.

REPEATING THE 1 PM CDT POSITION...25.5 N... 89.2 W. MOVEMENT
TOWARD...WEST-NORTHWEST NEAR 9 MPH. MAXIMUM SUSTAINED WINDS...150
MPH. MINIMUM CENTRAL PRESSURE...915 MB.

THE NEXT ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE CENTER
AT 4 PM CDT.

FORECASTER AVILA

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6.5.2.8 Special Public Advisory Example

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WTNT33 KNHC 241309
TCPAT3

BULLETIN
HURRICANE ANDREW SPECIAL ADVISORY NUMBER 25
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL AL011992
900 AM EDT MON AUG 24 1992

...HURRICANE ANDREW MOVING INTO THE GULF OF MEXICO...

HURRICANE WARNINGS REMAIN POSTED FOR THE FLORIDA WEST COAST SOUTH
OF VENICE TO FLAMINGO AND FOR LAKE OKEECHOBEE. AT 9 AM EDT A
HURRICANE WATCH WILL GO INTO EFFECT FOR THE NORTHERN GULF COAST
FROM MOBILE ALABAMA TO SABINE PASS TEXAS. ALL OTHER POSTED
WATCHES AND WARNINGS ARE DISCONTINUED.

WIND GUSTS TO HURRICANE FORCE CONTINUE TO OCCUR ALONG THE
SOUTHEAST FLORIDA COAST BUT WILL GRADUALLY DIMINISH DURING THE
DAY. SMALL CRAFT ADVISORIES REMAIN IN EFFECT. RESIDENTS IN THESE
AREAS SHOULD MONITOR LOCAL NWS OFFICES FOR THE LATEST FORECASTS
AND CONDITIONS IN THEIR AREA.

AT 9 AM EDT THE CENTER OF HURRICANE ANDREW WAS LOCATED NEAR
LATITUDE 25.6 NORTH AND LONGITUDE 81.8 WEST OR APPROXIMATELY 45 MILES
SOUTH OF NAPLES FLORIDA.

HURRICANE ANDREW IS MOVING TOWARD THE WEST AT 18 MPH. THIS MOTION
IS EXPECTED TO CONTINUE THIS MORNING WITH A GRADUAL TURN TO THE
WEST NORTHWEST LATER TODAY.

MAXIMUM SUSTAINED WINDS ARE NEAR 140 MPH. LITTLE CHANGE IN
```

STRENGTH IS LIKELY DURING THE NEXT 24 HOURS.

HURRICANE FORCE WINDS EXTEND OUTWARD TO 30 MILES...50 KM FROM THE CENTER WITH TROPICAL STORM FORCE WINDS EXTENDING OUTWARD TO 140 MILES. ESTIMATED MINIMUM CENTRAL PRESSURE IS 945 MB...27.91 INCHES.

STORM SURGES OF 5 TO 8 FEET ARE POSSIBLE ON THE FLORIDA WEST COAST NEAR AND TO THE SOUTH OF THE CENTER FOLLOWING PASSAGE OF THE HURRICANE. ALONG THE SOUTHEAST COAST OF FLORIDA STORM SURGE TIDES ARE DECREASING. PRELIMINARY REPORTS FROM THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT INDICATE A STORM SURGE OF 8 FEET ABOVE NORMAL WAS RECORDED IN BISCAYNE BAY NEAR HOMESTEAD FLORIDA.

RAINFALL AMOUNTS OF 5 TO 8 INCHES AND ISOLATED TORNADOES ARE POSSIBLE ACROSS SOUTHERN AND CENTRAL FLORIDA TODAY.

FOR STORM INFORMATION SPECIFIC TO YOUR AREA...PLEASE MONITOR PRODUCTS ISSUED BY YOUR LOCAL WEATHER OFFICE.

REPEATING THE 9 AM EDT POSITION...LATITUDE 25.6 NORTH AND LONGITUDE 81.8 WEST AND MOVING TOWARD THE WEST AT 18 MPH. MAXIMUM SUSTAINED WINDS NEAR 140 MPH. MINIMUM CENTRAL PRESSURE OF 945 MB...27.91 INCHES.

THE NEXT SCHEDULED ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE CENTER AT 11 AM EDT MON.

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6.5.2.9 Public Advisory Correction Example

HURRICANE ANDREW ADVISORY NUMBER 25...**CORRECTED**
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
500 AM EDT MON AUG 24 1992

CORRECTED FOR CENTRAL PRESSURE...

BODY OF TEXT

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6.6 Volcanic Ash Advisory Products

In addition to SIGMETs, the NWS issues products to notify the aviation community of volcanic ash.

6.6.1 Volcanic Ash Advisory Center (VAAC)

A Volcanic Ash Advisory Center (VAAC) is a meteorological office designated by ICAO regional air navigation agreement to provide advisory volcanic ash information to Meteorological Watch Offices (MWOs), World Area Forecast Centers (WAFCs), area control centers, flight information centers and international operational meteorological (OPMET) data banks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following a volcanic eruption. There are nine VAACs worldwide (Figure 6-17). The duties of a VAAC include:

- Monitoring relevant geostationary and polar-orbiting satellite data to detect the existence and extent of volcanic ash in the atmosphere in the area concerned
- Activating the volcanic ash numerical trajectory/dispersion model in order to forecast the movement of any ash cloud which has been detected or reported
- Issuing advisory information regarding the extent and forecast movement of the volcanic ash cloud.

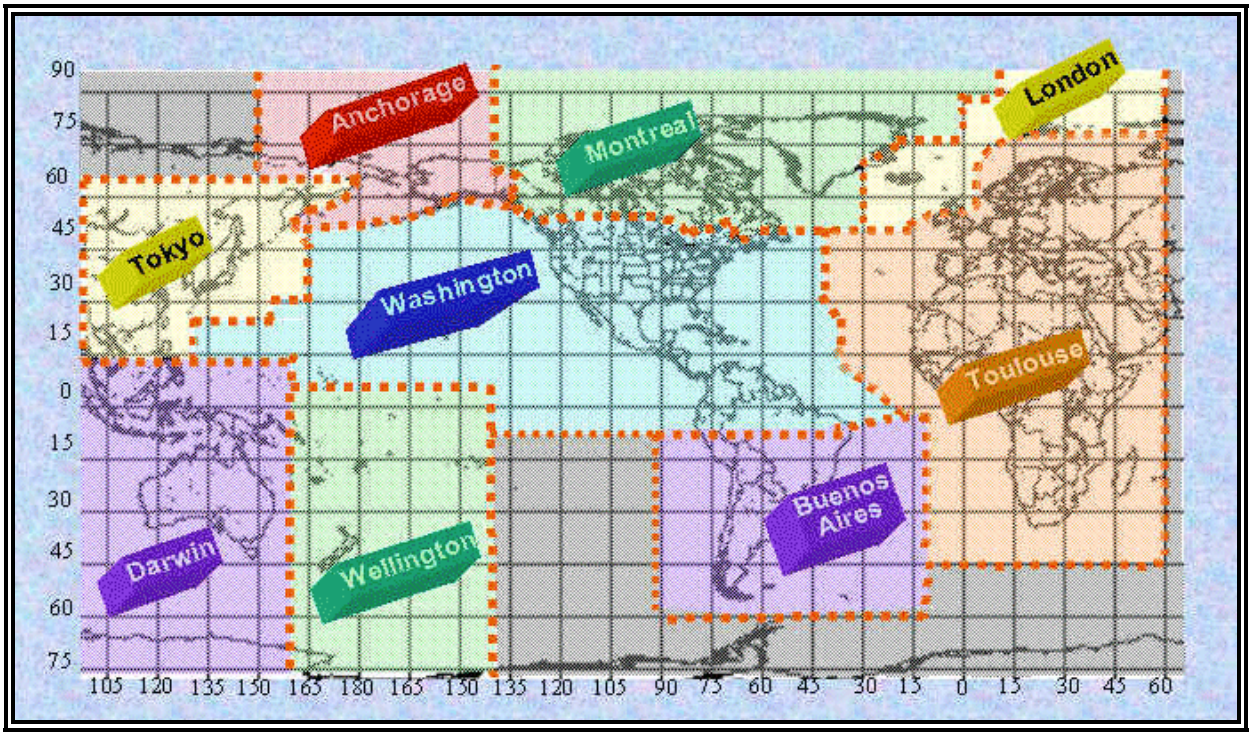

Figure 6-17. Volcanic Ash Advisory Centers (VAACs) Area of Responsibility

The U.S. has two VAACs with responsibilities defined in ICAO Annex 3. The Washington VAAC is jointly managed by the National Environmental Satellite Data and Information Service (NESDIS) Satellite Analysis Branch (SAB) and the NWS National Centers for Environmental

Prediction (NCEP) Central Operations (NCO). The Anchorage VAAC is managed by the AAWU. The areas of responsibility for each VAAC are:

- Washington VAAC
    - FIRs in CONUS and adjacent coastal waters (Figures 6-1 and 6-18)
    - The Oakland Oceanic FIR over the Pacific Ocean (Figures 6-3 and 6-18)
    - The New York FIR over the western Atlantic Ocean (Figures 6-2 and 6-18)
    - FIRs over and adjacent to the Caribbean, and Central and South America north of 10 degrees south latitude (Figure 6-2 and 6-18)

- Anchorage VAAC
    - The Anchorage FIR (Figures 6-3 and 6-18).
    - Russian FIRs north of 60 degrees north latitude and east of 150 degrees east longitude (Figure 6-18).

6.6.2 Volcanic Ash Advisory Statement (VAAS)

A Volcanic Ash Advisory Statement (VAAS) provides information on hazards to aircraft flight operations caused by a volcanic eruption.

6.6.2.1 Issuance

Volcanic Ash Advisory Centers (VAACs) are responsible for providing ash movement and dispersion guidance to Meteorological Watch Offices (MWOs) and neighboring VAACs. There are nine VAACs worldwide, two of which are located in the US (Figure 6-18). Each VAAC issues Volcanic Ash Advisory Statements and provide guidance to Meteorological Watch Offices (MWOs) for SIGMETs involving volcanic ash.

A VAAS may be issued within 6 hours of an eruption and every 6 hours thereafter. However, it can be issued more frequently if new information about the eruption is received.

6.6.2.2 Format

A VAAS summarizes the known information about an eruption. It may include the location of the volcano, height of the volcano summit, height of the ash plume, a latitude/longitude box of the ash dispersion cloud, and a forecast of ash dispersion. The height of the ash cloud is estimated by meteorologists analyzing satellite imagery and satellite cloud drift winds combined with any pilot reports, volcano observatory reports, and upper-air wind reports.

6.6.2.3 VAAS Issued by the Washington VAAC Example

```
VOLCANIC ASH ADVISORY
ISSUED: 2003JUL10/1300Z      VAAC: WASHINGTON

VOLCANO: ANATAHAN 0804-20
LOCATION: N1621E14540    AREA: MARIANA ISLANDS

SUMMIT ELEVATION: 2585 FT (788 M)

ADVISORY NUMBER: 2003/251

INFORMATION SOURCE: GOES 9 IMAGERY. GFS MODEL WINDS FORECAST
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ERUPTION DETAILS: ASH AND GAS EMISSIONS SINCE MAY 10.

OBS ASH DATE/TIME: 09/1202Z.

OBS ASH CLOUD: ASH NOT IDENTIFIABLE FROM SATELLITE DATA.

WINDS SFC/FL080 MOVING SW 10-15 KNOTS.

FCST ASH CLOUD +6H: SEE SIGMETS.

REMARKS: THE ASH PLUME OBSERVED IN VISIBLE IMAGERY IS TOO THIN AND
DIFFUSE TO BE SEEN IN INFRARED AND MULTISPECTRAL IMAGAERY. ANY ASH UP
TO FL080 SHOULD MOVE TOWARDS THE SW AT 10-15 KNOTS.

NEXT ADVISORY: WILL BE ISSUED BY 2003JUL10/1900Z.
```

6.6.3 Volcanic Ash Advisory (VAA)

The Volcanic Ash Advisory (VAA) is advisory information on volcanic ash cloud issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self explanatory nature.

6.6.3.1 VAA Issuance

Volcanic Ash Advisory Centers (VAACs) are responsible for providing ash movement and dispersion guidance to Meteorological Watch Offices (MWOs) and neighboring VAACs. There are nine VAACs worldwide, two of which are located in the US (Figure 6-18). Each VAAC issues Volcanic Ash Advisory Statements and provide guidance to Meteorological Watch Offices (MWOs) for SIGMETs involving volcanic ash.

VAAs are issued as necessary, but at least every six hours until such time as the volcanic ash cloud is no longer identifiable from satellite data, no further reports of volcanic ash are received from the area, and no further eruptions of the volcano are reported.

6.6.3.2 VAA Format

The VAA format conforms to the “Template for advisory message for volcanic ash” included in ICAO Annex 3.

6.6.3.3 Volcanic Ash Advisory (VAA) Example

```
FVAK21 PAWU 190615
VOLCANIC ASH ADVISORY
ISSUED:                 20030419/0615Z
VAAC:                   ANCHORAGE
VOLCANO:                CHIKURACHKI, 900-36
LOCATION:               N5019 E15527
AREA:                   KAMCHATKA NORTHERN KURIL ISLANDS
SUMMIT ELEVATION:       7674 FT (2339 M)
ADVISORY NUMBER:        2003-02
INFORMATION SOURCE:     SATELLITE
AVIATION COLOR CODE:    NOT GIVEN
ERUPTION DETAILS:       NEW ERUPTION OCCURRED APPROX 190500 UTC.
                        HEIGHT IS ESTIMATED AT FL300. ESTIMATE IS BASED
```

	ON OBSERVEDAND MODEL WINDS. MOVEMENT APPEARS TO BE E AT 75 KTS.
OBS ASH DATA/TIME:	19/0500Z
OBS ASH CLOUD:	VA EXTENDS FM NEAR VOLCANO EWD TO N50 E160.
FCST ASH CLOUD +6HR:	30NM EITHER SIDE OF LN FM NIPPI N49 E159 - N50 E175.
FCST ASH CLOUD +12HR:	30NM EITHER SIDE OF LN FM N50 E168 - N50 E180.
FCST ASH CLOUD +18HR:	30NM EITHER SIDE OF LN FM N51 E175 - N50 E185.
NEXT ADVISORY:	20030419/1500Z
REMARKS:	UPDATES AS SOON AS INFO BECOMES AVAILABLE.