6.4 Additional Products for Convection

The National Weather Service (NWS) in addition to the SIGMETs (Section 6.1), Convective SIGMETs (Section 6.1.8), and CWAs (Section 6.3) 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 (Figure 6-16). 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.

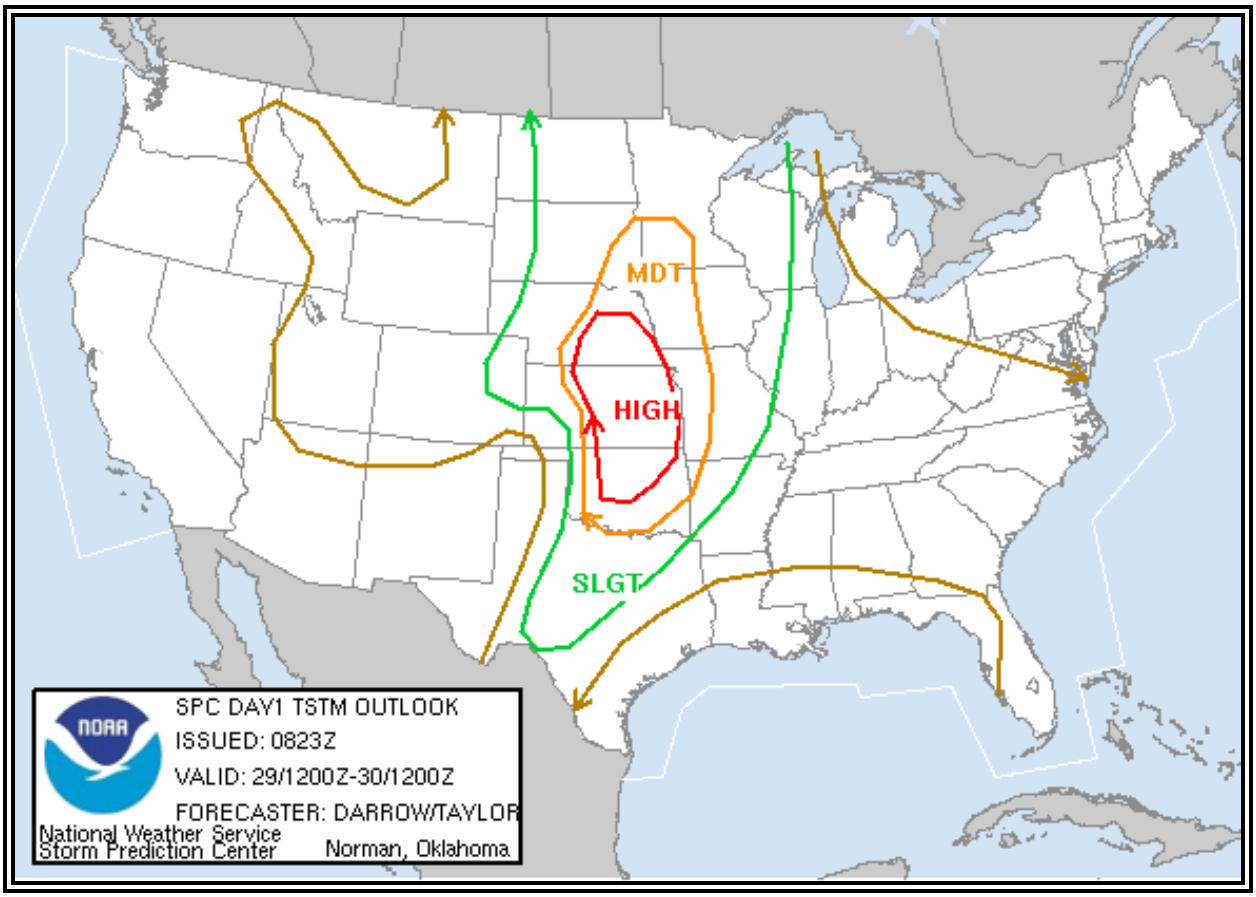


Figure 6-16. Day 1 Categorical Convective Outlook Graphic Example

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 (Figure 6-17) 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
```

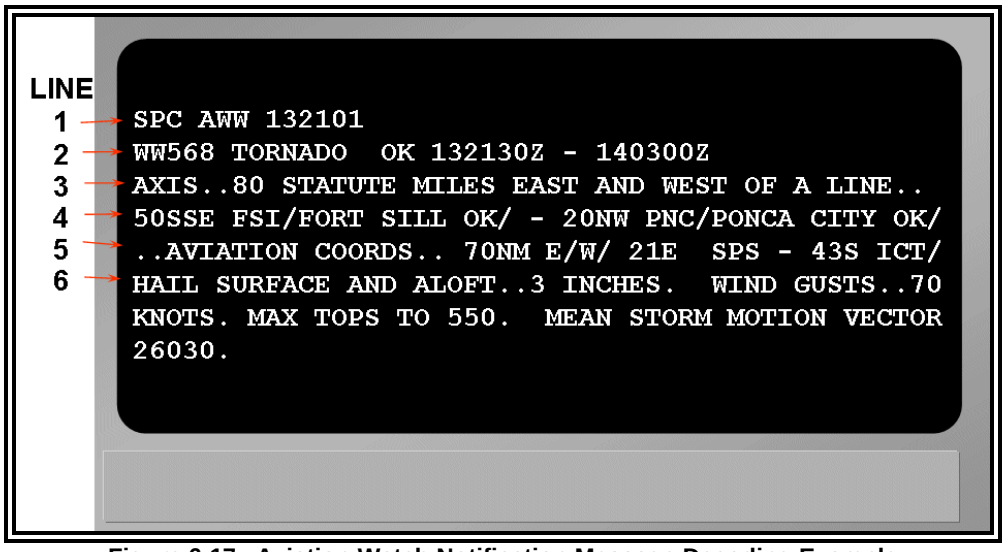


Figure 6-17. Aviation Watch Notification Message Decoding Example

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 6-17 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 (Section 6.1), Convective SIGMETs (Section 6.1.8) and CWAs (Section 6.3) 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 convection. 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) ICAO ADVISORY NUMBER ##
ISSUING OFFICE CITY STATE
time am/pm time.zone day mon DD YYYY

TEXT

$$
```

6.5.1.4 Example of an Aviation Tropical Cyclone Advisory:

FKPZ21 KNHC 260215 (*ICAO communication header*)

```
TROPICAL DEPRESSION PATRICIA ICAO ADVISORY NUMBER 23
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
0300Z SUN OCT 26 2003

TC ADVISORY
DTG:                      20031026/0300Z
TCAC:                     KNHC
TC:                       PATRICIA
NR:                       023
PSN:                      N1612 W11454
MOV:                      NW 05KT
C:                        1008HPA
MAX WIND:                 025KT
FCST PSN + 12 HR:         261200 N1636 W11500
FCST MAX WIND +           12 HR: 020KT
FCST PSN + 18 HR:         261800 N1654 W11506
FCST MAX WIND + 18 HR:    020KT
FCST PSN + 24 HR:         270000 N1712 W11512
FCST MAX WIND + 24 HR:    020KT
NXT MSG:                  NO MSG EXP
```

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 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 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 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:

- Becomes extra-tropical which is indicated by the center of the storm becoming colder than the surrounding air, fronts appear, and the strongest winds move to the upper atmosphere;

- Drops below tropical depression advisory criteria by dissipating or becoming a remnant low); or

- Moves inland and watches and warnings are no longer required.

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 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 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 Format

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

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

...HEADLINE...

TEXT

$$

FORECASTER NAME
```

6.5.2.5 Example of a Tropical Storm Public Advisory

```
BULLETIN
TROPICAL STORM FLOYD ADVISORY NUMBER 4
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
11 AM AST WED SEP 08 1999

...FLOYD MOVING WEST-NORTHWESTWARD IN THE TROPICAL ATLANTIC...

AT 11 AM AST...1500Z...THE CENTER OF TROPICAL STORM FLOYD WAS
LOCATED NEAR LATITUDE 15.8 NORTH...LONGITUDE 50.0 WEST OR ABOUT
755 MILES...1210 KM...EAST OF THE LEEWARD ISLANDS.
```

FLOYD IS MOVING TOWARD THE WEST NORTHWEST NEAR 15 MPH ...24
KM/HR...AND THIS MOTION IS EXPECTED TO CONTINUE THROUGH TONIGHT.

MAXIMUM SUSTAINED WINDS ARE NEAR 45 MPH... 75 KM/HR...WITH HIGHER
GUSTS...AND SOME SLOW STRENGTHENING IS EXPECTED DURING THE NEXT
24 HOURS.

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

ESTIMATED MINIMUM CENTRAL PRESSURE IS 1003 MB...29.62 INCHES.

REPEATING THE 11 AM AST POSITION...15.8 N... 50.0 W. MOVEMENT
TOWARD...WEST NORTHWEST NEAR 15 MPH. MAXIMUM SUSTAINED
WINDS... 45 MPH. MINIMUM CENTRAL PRESSURE...1003 MB.

THE NEXT ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE
CENTER AT 5 PM AST.

FORECASTER FRANKLIN

6.5.2.6 Example of a Hurricane/Typhoon Public Advisory

BULLETIN
HURRICANE FLOYD ADVISORY NUMBER 32
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
11 AM EDT WED SEP 15 1999

...FRINGES OF HURRICANE CONTINUE TO IMPACT COAST OF NORTH FLORIDA
AND GEORGIA...BUT FLOYD IS HEADING FOR THE CAROLINAS...

AT 11 AM EDT...A TROPICAL STORM WATCH IS EXTENDED NORTHWARD AND
IS NOW IN EFFECT FROM NORTH OF CHINCOTEAGUE VIRGINIA TO
SANDYHOOK NEW JERSEY...INCLUDING DELAWARE BAY.

A HURRICANE WARNING REMAINS IN EFFECT FROM TITUSVILLE FLORIDA
TO THE NORTH CAROLINA/VIRGINIA BORDER...INCLUDING PAMLICO AND
ALBEMARLE SOUNDS. AT 11 AM EDT...HURRICANE WARNINGS ARE
DISCONTINUED SOUTH OF TITUSVILLE.

A HURRICANE WATCH CONTINUES IN EFFECT FROM THE NORTH
CAROLINA/VIRGINIA BORDER TO CHINCOTEAGUE VIRGINIA...INCLUDING
CHESAPEAKE BAY SOUTH OF SMITH POINT.

INTERESTS ALONG THE FLORIDA EAST COAST SOUTH OF TITUSVILLE
SHOULD EXERCISE CAUTION UNTIL WINDS AND SEAS SUBSIDE.

AT 11 AM EDT...1500Z...THE CENTER OF HURRICANE FLOYD WAS LOCATED
NEAR LATITUDE 29.9 NORTH...LONGITUDE 79.0 WEST OR ABOUT 165 MILES
EAST-SOUTHEAST OF JACKSONVILLE FLORIDA. THIS POSITION IS ALSO

ABOUT 260 MILES SOUTH OF MYRTLE BEACH SOUTH CAROLINA.

FLOYD IS MOVING TOWARD THE NORTH NORTHWEST NEAR 14 MPH AND A GRADUAL TURN TOWARD THE NORTH IS EXPECTED TODAY.

MAXIMUM SUSTAINED WINDS ARE NEAR 125 MPH...205 KM/HR...WITH HIGHER GUSTS. LITTLE CHANGE IN STRENGTH IS FORECAST BEFORE LANDFALL...WHICH IS EXPECTED TONIGHT NEAR THE BORDER OF SOUTH AND NORTH CAROLINA. ALL PREPARATIONS SHOULD BE RUSHED TO COMPLETION.

HURRICANE FORCE WINDS EXTEND OUTWARD UP TO 140 MILES...220 KM...FROM THE CENTER...AND TROPICAL STORM FORCE WINDS EXTEND OUTWARD UP TO 230 MILES...370 KM.

THE LATEST MINIMUM CENTRAL PRESSURE REPORTED BY U.S. AIR FORCE HURRICANE HUNTER AIRCRAFT IS 943 MB...27.85 INCHES.

STORM SURGE FLOODING OF 10 TO 13 FEET ABOVE NORMAL TIDE LEVELS...ALONG WITH LARGE AND DANGEROUS BATTERING WAVES...ARE EXPECTED NEAR AND TO THE EAST OF WHERE THE CENTER CROSSES THE COAST. HEAVY SURF ADVISORIES ARE IN EFFECT FOR THE U.S. EAST COAST NORTHWARD TO CHATHAM MASSACHUSETTS. REFER TO STATEMENTS ISSUED BY LOCAL NATIONAL WEATHER SERVICE OFFICES FOR ADDITIONAL INFORMATION.

RAINFALL TOTALS OF 5 TO 10 INCHES ARE EXPECTED ALONG THE PATH OF THE HURRICANE.

ISOLATED TORNADOES ARE POSSIBLE OVER THE COASTAL COUNTIES OF SOUTH AND NORTH CAROLINA.

REPEATING THE 11 AM EDT POSITION...29.9 N... 79.0 W. MOVEMENT TOWARD...NORTH NORTHWEST NEAR 14 MPH. MAXIMUM SUSTAINED WINDS...125MPH. MINIMUM CENTRAL PRESSURE... 943 MB.

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

INTERMEDIATE ADVISORIES WILL BE ISSUED BY THE NATIONAL HURRICANE CENTER AT 1 PM EDT AND 3 PM EDT FOLLOWED BY THE NEXT COMPLETE ADVISORY AT 5 PM EDT.

FORECASTER LAWRENCE

6.5.2.7 Example of an Intermediate Public Advisory

BULLETIN
HURRICANE FLOYD INTERMEDIATE ADVISORY NUMBER 32B
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
3 PM EDT WED SEP 15 1999

...FRINGES OF HURRICANE CONTINUE TO IMPACT COAST OF NORTH FLORIDA AND GEORGIA...BUT FLOYD IS HEADING FOR THE CAROLINAS...

A HURRICANE WARNING REMAINS IN EFFECT FROM NORTH OF FERNANDINA BEACH FLORIDA TO THE NORTH CAROLINA/VIRGINIA BORDER...INCLUDING PAMLICO AND ALBEMARLE SOUNDS. AT 3 PM EDT...WARNINGS ARE DISCONTINUED FROM FERNANDINA BEACH SOUTHWARD. WARNINGS WILL LIKELY BE DISCONTINUED FOR PORTIONS OF GEORGIA LATER TODAY.

A HURRICANE WATCH REMAINS IN EFFECT FROM THE NORTH CAROLINA/VIRGINIA BORDER TO CHINCOTEAGUE VIRGINIA...INCLUDING CHESAPEAKE BAY SOUTH OF SMITH POINT.

A TROPICAL STORM WATCH REMAINS IN EFFECT FROM NORTH OF CHINCOTEAGUE VIRGINIA TO MONTAUK POINT LONG ISLAND...INCLUDING DELAWARE BAY AND LONG ISLAND SOUND.

INTERESTS ALONG THE FLORIDA EAST COAST SHOULD EXERCISE CAUTION UNTIL WINDS AND SEAS SUBSIDE.

AT 3 PM EDT...1900Z...THE CENTER OF HURRICANE FLOYD WAS LOCATED NEAR LATITUDE 30.8 NORTH...LONGITUDE 79.1 WEST OR ABOUT 200 MILES SOUTH OF MYRTLE BEACH SOUTH CAROLINA.

FLOYD IS MOVING ALMOST DUE NORTHWARD AT 15 MPH AND THIS MOTION IS EXPECTED TO CONTINUE TODAY WITH A GRADUAL TURN TOWARD THE NORTH-NORTHEAST ON THURSDAY.

MAXIMUM SUSTAINED WINDS HAVE DECREASED TO NEAR 120 MPH...WITH HIGHER GUSTS. ALTHOUGH THE HURRICANE HAS BEEN SLOWLY WEAKENING...IT IS OVER THE WARM WATERS OF THE GULF STREAM COULD MAINTAIN ITS PRESENT STRENGTH UNTIL LANDFALL TONIGHT. ALL PREPARATIONS IN THE WARNING AREA SHOULD BE RUSHED TO COMPLETION.

HURRICANE FORCE WINDS EXTEND OUTWARD UP TO 140 MILES...220 KM... FROM THE CENTER...AND TROPICAL STORM FORCE WINDS EXTEND OUTWARD UP TO 230 MILES...370 KM.

THE LATEST MINIMUM CENTRAL PRESSURE REPORTED BY U.S. AIR FORCE HURRICANE HUNTER AIRCRAFT IS 947 MB...27.96 INCHES.

STORM SURGE FLOODING OF 10 TO 13 FEET ABOVE NORMAL TIDE LEVELS...ALONG WITH LARGE AND DANGEROUS BATTERING WAVES...ARE EXPECTED NEAR AND TO THE EAST OF WHERE THE CENTER CROSSES THE COAST.

HEAVY SURF ADVISORIES ARE IN EFFECT FOR THE U.S. EAST COAST NORTHWARD TO CHATHAM MASSACHUSETTS. REFER TO STATEMENTS ISSUED BY LOCAL NATIONAL WEATHER SERVICE OFFICES FOR ADDITIONAL INFORMATION.

RAINFALL TOTALS OF 5 TO 10 INCHES ARE EXPECTED ALONG THE PATH OF THE HURRICANE.

ISOLATED TORNADOES ARE POSSIBLE OVER THE COASTAL COUNTIES OF SOUTH AND NORTH CAROLINA.

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

REPEATING THE 3 PM EDT POSITION...30.8 N... 79.1 W. MOVEMENT TOWARD...NORTH NEAR 15 MPH. MAXIMUM SUSTAINED WINDS...120 MPH. MINIMUM CENTRAL PRESSURE... 947 MB.

THE NEXT ADVISORY WILL BE ISSUED BY THE NATIONAL HURRICANE CENTER AT 5 PM EDT.

FORECASTER LAWRENCE

6.5.2.8 Example of a Special Public Advisory

BULLETIN
HURRICANE ANDREW SPECIAL ADVISORY NUMBER 25
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
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.

6.5.2.9 Example of a Public Advisory Correction

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

6.6 Volcanic Ash Advisory Products

In addition to SIGMETs (Section 6.1), the NWS issues the following products to notify the aviation community of volcanic ash.

6.6.1 Volcanic Ash Advisory Statement (VAAS)

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

6.6.1.1 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.

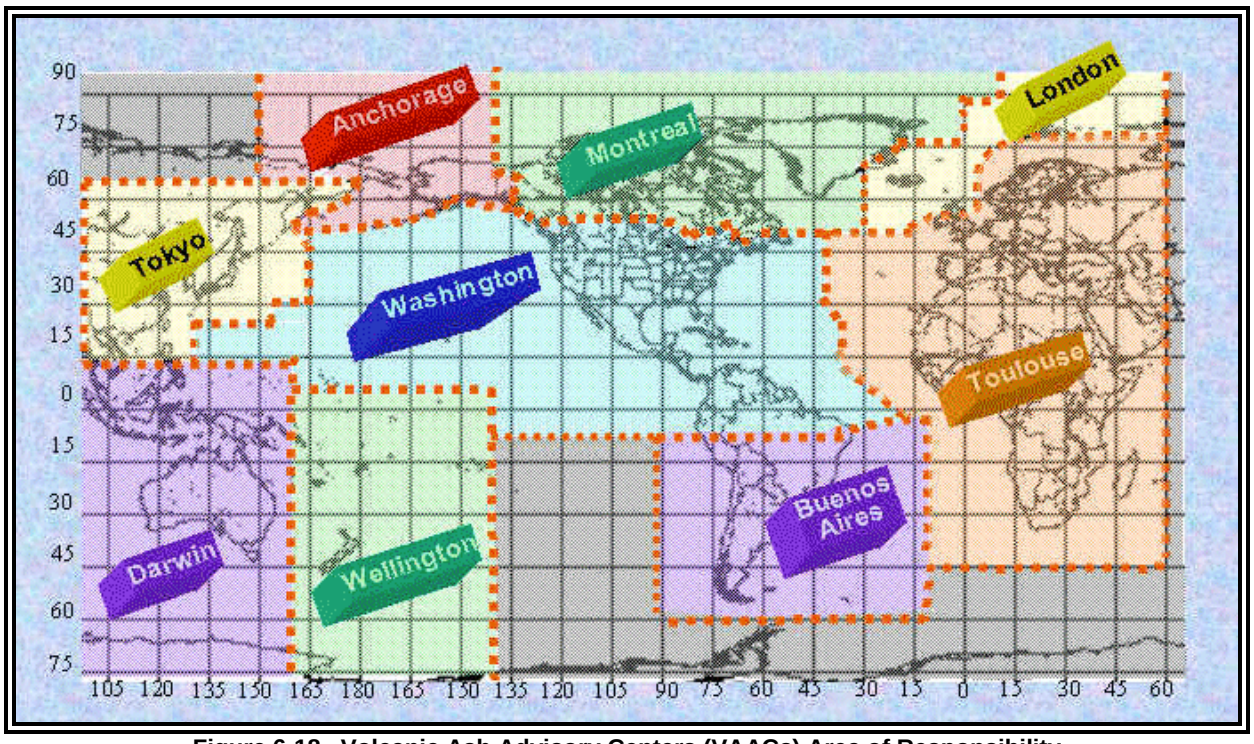


Figure 6-18. Volcanic Ash Advisory Centers (VAACs) Area of Responsibility

6.6.1.2 Format

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.

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.

6.6.1.3 Example of a VAAS Issued by the Washington VAAC

```
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

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.
```

6.6.2 Volcanic Ash Advisory (VAA)

Volcanic Ash Advisory Centers (VAACs) issue Volcanic Ash Advisories (VAAs) when airborne volcanic ash is observed or reported which may affect the atmosphere in the VAAC's area of responsibility. The VAA is intended as guidance to support MWOs in meeting their responsibility to issue the volcanic ash SIGMET. The VAA also may be issued as a watch for an imminent eruption expected to produce airborne ash.

6.6.2.1 VAA 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 6-3 and 6-18)
    - The Oakland Oceanic FIR over the Pacific Ocean (Figures 6-5 and 6-18)
    - The New York FIR over the western Atlantic Ocean (Figures 6-4 and 6-18)

  - FIRs over and adjacent to the Caribbean, and Central and South America north of 10 degrees south latitude (Figure 6-4 and 6-18)

- Anchorage VAAC
  - The Anchorage FIR (Figures 6-5 and 6-18).
  - Russian FIRs north of 60 degrees north latitude and east of 150 degrees east longitude (Figure 6-18).

6.6.2.2 VAA Issuance and Update Times

The VAA may be issued as soon as possible after credible information is received on the presence of airborne volcanic ash in the VAAC's area of responsibility or when responsibility for an existing VAA is transferred between VAACs. The VAA contains information on an ash cloud up to 18 hours. It may be issued any time to account for changing or new information. Any necessary updates are issued at a minimum of every 6 hours.

6.6.2.3 VAA Content

The VAA follows international recommendations contained in ICAO Annex 3, chapter 3.6.2 and contains the name of the erupting volcano and number, if known; its location (latitude and longitude) and summit height (in meters or feet); the information source; the volcano aviation color code if applicable; eruption details; the date and time of the observed ash; information about the observed ash cloud; the forecast area and height of the ash cloud at 6, 12, and 18 hours after the issuance of the VAA; any pertinent remarks on the eruption/ash event; and the next VAA issuance time.

A VAA watch is not an official WMO/ICAO product. However, if it is issued, it contains all information **except** for the eruption details, and observed and forecast ash clouds. Information on the direction the ash likely will spread in the event of an eruption will be included in remarks. In Alaska, a VAA watch may be issued for a non-erupting seismically monitored volcano in color code orange or red. A one-time VAA Watch may be issued when a monitored Alaska volcano goes from color code green to yellow.

6.6.2.4 VAA Cancellation

The VAA will be canceled when it is determined airborne volcanic ash is no longer a threat to aircraft or has moved out of the VAAC's area of responsibility.

6.6.2.5 Interchange of VAAs among Volcanic Ash Advisory Centers (VAAC)

When an ash cloud is forecast to move from one VAAC's area of responsibility into another VAAC's area of responsibility, the two VAACs will coordinate by telephone or telephone fax on handoff procedures. The VAAC passing off responsibility will include in remarks of its last VAA the name of the VAAC assuming responsibility for issuing subsequent VAAs for the event, the new WMO header, and the date/time of next expected issuance. The accepting VAAC will include in remarks the name of the VAAC from which it is accepting responsibility and the WMO header of the current VAA it will be updating. Generally, only one (1) VAAC will issue VAAs for a particular ash event. If the ash area affects more than one VAAC area of responsibility, the VAAC issuing the VAA will include the entire ash area in the advisory. In the rare situation of large or persistent ash emissions, adjacent responsible VAACs, upon coordination, may agree to divide operational responsibilities.

6.6.2.6 VAA Dissemination

VAAs will be disseminated to Meteorological Watch Offices (MWOs), Area (Traffic) Control Centers, World Area Forecast Centers (WAFCs), relevant Regional Area Forecast Centers

(RAFCs), international operational meteorological data banks, and other government and commercial meteorological offices, in accordance with regional air navigation agreements.

6.6.2.7 Example of a Volcanic Ash Advisory (VAA)

```
VOLCANIC ASH ADVISORY - ALERT

ISSUED 2003 APR 19/0615Z

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: A NEW ERUPTION OCCURRED AT APPROXIMATELY 190500
UTC. HEIGHT IS ESTIMATED AT FL300. ESTIMATE IS BASED ON OBSERVED
AND 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.
```

7 FORECAST TEXT PRODUCTS

7.1 Area Forecasts (FA)

The NWS issues Area Forecasts (FA) to provide an overview of regional weather conditions that could impact aviation operations in the U.S. and adjacent coastal waters. Area forecasts are issued by the following offices for the following areas:

- The Aviation Weather Center (AWC)
  - o Conterminous U.S. and adjacent coastal waters (CONUS)
  - o Gulf of Mexico
  - o Caribbean Sea and north Atlantic Ocean

- The Alaskan Aviation Weather Unit (AAWU)
  - o Alaska and adjacent coastal waters

- WFO Honolulu, Hawaii
  - o Hawaii and adjacent coastal waters

They are all available on the Aviation Weather Center (AWC) web site at: http://aviationweather.gov/products/fa/.

7.1.1 CONUS (FAUS) and Hawaii (FAHW) Area Forecasts

A CONUS and Hawaii Area Forecast (FA) describe, in abbreviated language, specified en route weather phenomena below FL450. To understand the complete weather picture, the FA **must** be used in conjunction with the AIRMETs (Section 6.2) and SIGMETs (Section 6.1). Together, they are used to determine forecast en route weather and to interpolate conditions at airports for which no Terminal Aerodrome Forecasts (TAFs) are issued.

The CONUS and Hawaii FAs are available on the Aviation Weather Center (AWC) web site at: http://aviationweather.gov/products/fa/.

The Hawaii Area Forecast can also be found on the NWS WFO Honolulu web site at: http://www.prh.noaa.gov/hnl/pages/aviation.php.

The FA contains forecast information for VFR/MVFR clouds and weather for a 12-hour period with a 12- to 18-hour categorical outlook forecast for IFR, MVFR, and/or VFR. The following weather elements are included in the 12-hour forecast:

- Thunderstorms and precipitation;
- Sky condition (cloud height, amount, and tops) if bases are at or below (AOB) FL180 MSL. (Tops will only be forecast for broken (BKN) or overcast (OVC) clouds);
- Obstructions to visibility (fog, mist, haze, blowing dust, etc.) if surface visibilities are three (3) to six (6) miles; and
- Sustained surface wind speed of 20 knots or greater.

Hazardous weather (e.g., IFR, icing, turbulence, etc.) meeting AIRMET or SIGMET criteria is not forecast in the CONUS or Hawaii FA. Valid AIRMETs and SIGMETs must be used in conjunction with the FA to determine hazardous weather information for the flight.

The Aviation Weather Center (AWC) issues the following CONUS FAs for six (6) geographical areas (Figure 7-1). The Weather Forecast Office (WFO) Honolulu issues FAs for the main Hawaiian Islands and coastal waters extending out to 40 NM of the coastlines (Figure 7-2).

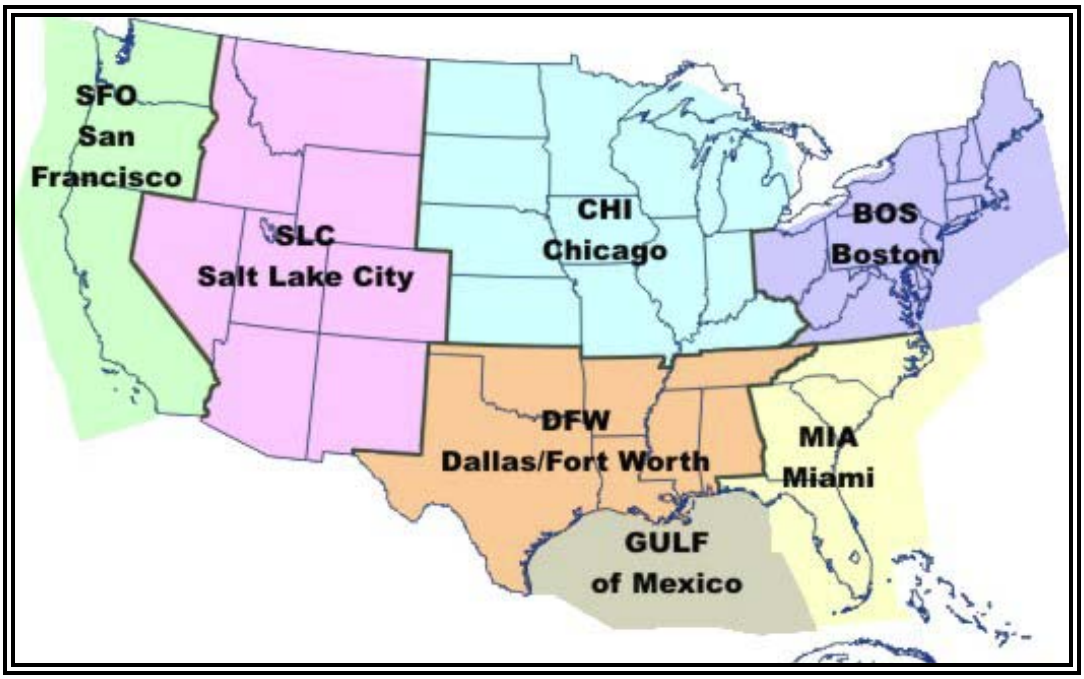


Figure 7-1. AWC Area Forecast Regions- Contiguous U.S.

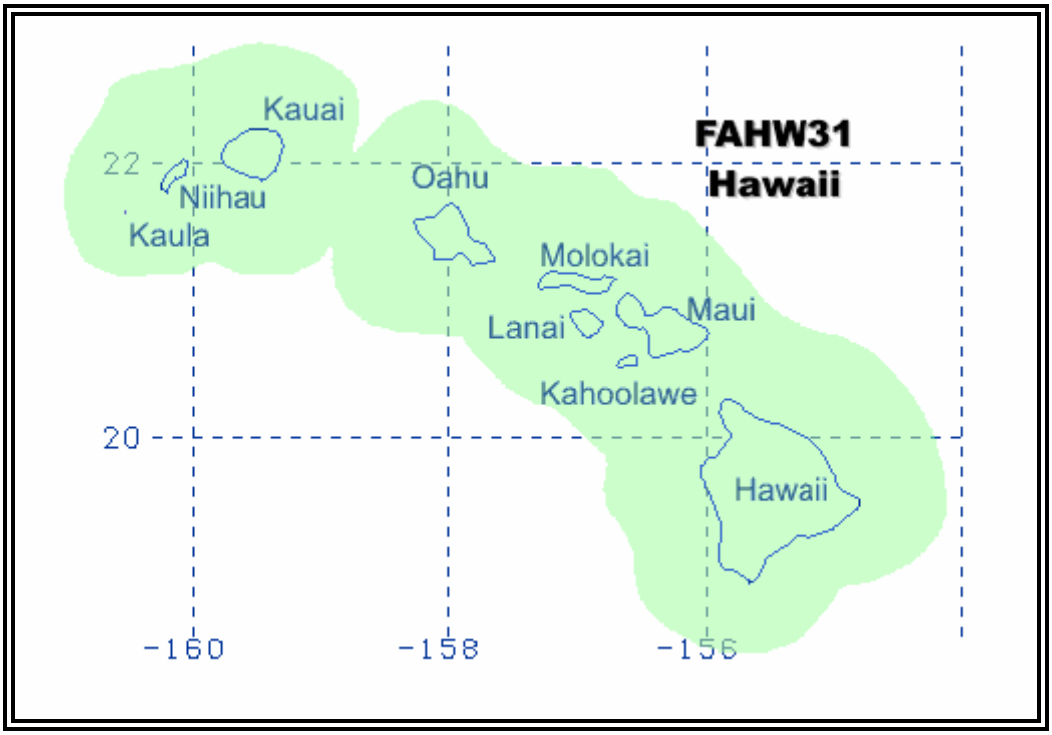


Figure 7-2. WFO Honolulu Area Forecast Region and WMO header - Hawaii

An Area Forecast (FA) provides an overview of regional weather conditions that could impact aviation operations in the U.S. and adjacent coastal waters. The Area Forecast **does not** include forecast for IFR conditions so the Area Forecast **must** be used in conjunction with SIGMETs and AIRMETs. Each FA contains a precautionary statement, prior to the synopsis, saying **SEE AIRMET SIERRA** followed by a reminder of what thunderstorm activity implies and a reference to how heights not reported in MSL are denoted. This is not a reference to a specific AIRMET but a reminder the FA does not include forecasted IFR conditions.

7.1.1.1 Standardization

The CONUS FA follows these standards:

- All referenced heights or altitudes are referenced above mean sea level (AMSL), unless otherwise noted, and annotated using the height in hundreds of feet, consisting of three (3) digits (e.g., 040). For heights at or above 18,000 feet, the level will be preceded by FL (e.g., FL180).

- Messages are prepared in abbreviated plain language using contractions from the Federal Aviation Administration (FAA) Order 7340.1Y 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, geographic names and numerical values of a self-explanatory nature may also be used.

- Weather and obstructions to visibility are described using the weather and abbreviations for surface airways observations (METAR or SPECI).

7.1.1.1.1 Height Reference

All heights are referenced to Mean Sea Level (MSL) except when prefaced by **AGL**, **CIG** or **CEILING**. Tops are always referenced to MSL.

Examples:

SCT030 BKN100

Scattered at 3,000 feet MSL, broken at 10,000 feet MSL

AGL SCT030 CIG BKN050

Scattered at 3,000 feet AGL, broken at 5,000 feet AGL

AGL SCT-BKN015-025. TOPS 070-090

Scattered to broken at 1,500 to 2,500 feet AGL. Tops 7,000 to 9,000 feet MSL.

7.1.1.2 CONUS and Hawaii Area Forecast Format

The FA is an 18 hour forecast composed of the following 4 sections: communication and product header, precautionary statements, synopsis and visual flight rules (VFR) clouds and weather forecast.

7.1.1.2.1 Communication and Product header

The Communication and Product header section (Figure 7-3) contains descriptive information about the product.

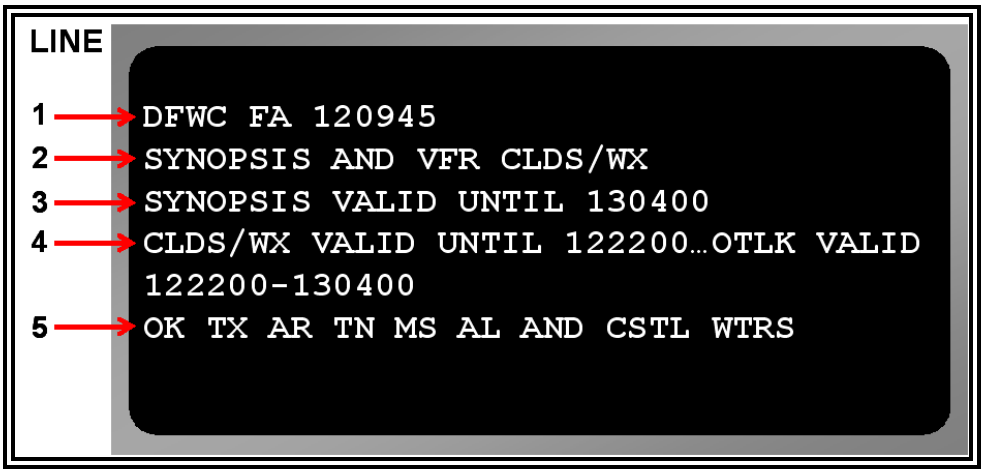


Figure 7-3. Area Forecast - Communication and Product Header Example

Table 7-1. Decoding the Communications and Product Header

Line	Content	Description
1	DFW C FA 120945	Area Forecast region identifier Indicates VFR clouds and weather forecast Product type Issuance and beginning of valid date/time (UTC)
2	SYNOPSIS AND VFR CLDS/WX	Statement of weather information contained in this forecast message
3	SYNOPSIS VALID UNTIL 130400	Synopsis valid date and time
4	CLDS/WX VALID UNTIL 122200…OTLK VALID 122200-130400	The main forecast for VFR clouds and weather valid time. The valid date and time of the outlook.
5	OK TX AR TN MS AL AND CSTL WTRS	Description of the area for which the FA is valid.

7.1.1.2.2 Precautionary Statements

The Precautionary Statements section (Figure 7-4) consists of three lines.

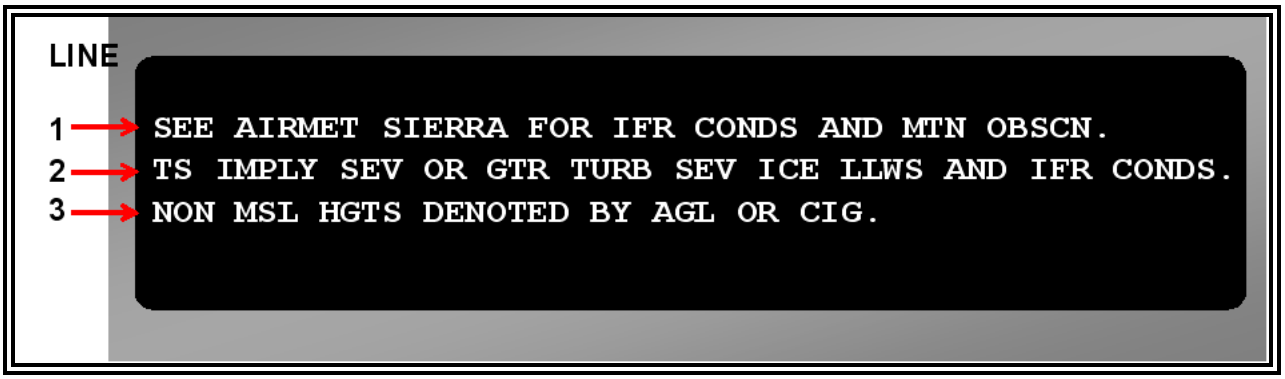


Figure 7-4. Area Forecast- Precautionary Statements Example

Line 1 is included to alert users that IFR conditions and/or mountain obscurations may be occurring or are forecast to occur and are not included in the product.

Line 2 is included as a reminder of all hazards associated with thunderstorms. These hazards are not spelled out in the body of the FA.

Line 3 indicates height references are Mean Sea Level (MSL) unless they are preceded by **AGL** or **CIG**.

7.1.1.2.3 Synopsis

The Synopsis section (Figure 7-5) contains a brief summary of the location and movement of fronts, pressure systems, and other circulation features for the entire 18 hour (FA) valid period.

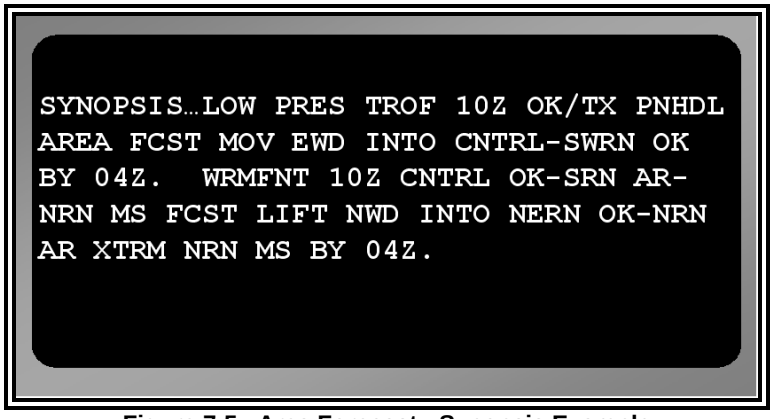


Figure 7-5. Area Forecast - Synopsis Example

The Synopsis is decoded as follows:

Synopsis...low pressure through at 1000 UTC over the Oklahoma and Texas Panhandle area forecast to move eastward into central/southwestern Oklahoma by 0400 UTC. A warm front at 1000 UTC from central Oklahoma to southern Arkansas to northern Mississippi is forecast to lift northward into northeastern Oklahoma to northern Arkansas to extreme northern Mississippi by 0400 UTC.

7.1.1.2.4 VFR clouds and Weather (CLDS/WX)

The VFR CLDS/WX section (Figure 7-6) describes conditions consisting of MVFR cloud ceilings (1,000 to 3,000 feet AGL), MVFR obstructions to visibility (3-5 statute miles), and any other significant VFR clouds (bases at or below FL180) or VFR precipitation. The CLDS/WX section also includes widespread sustained surface winds of 20 knots or greater. Occasionally, IFR conditions may be forecast in the Hawaii FA as IFR conditions may not reach AIRMET geographical coverage criteria.

This section contains a 12-hour forecast, followed by a 6-hour categorical outlook of IFR, MVFR and/or VFR, giving a total forecast period of 18 hours. In the CONUS, the CLDS/WX section is divided into regions with generally uniform weather conditions. These divisions may be by geographical regions (e.g., LM – Lake Michigan) or states using their 2-letter designators (e.g. ND – North Dakota). See Appendix H for geographical regions.

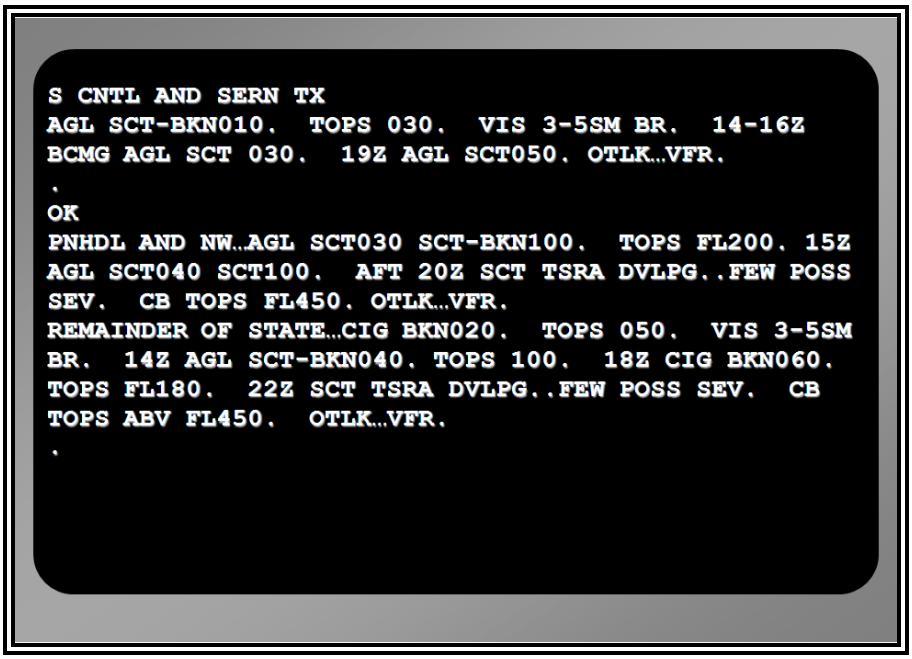


Figure 7-6. Area Forecast - VFR Clouds and Weather Example

The VFR CLDS/WX section is decoded as follows:

South central and southeast Texas.
Scattered to broken at 1,000 feet above ground level (AGL). Tops at 3,000 feet above mean sea level (MSL). Visibility 3 to 5 statute miles in mist. Between 1400 and 1600 UTC…clouds becoming scattered at 3,000 feet AGL. 1900 UTC…scattered at 5,000 feet AGL.
Outlook…VFR.

Oklahoma
Panhandle and northwest…scattered at 3,000 feet AGL, scattered to broken at 10,000 feet AGL. Tops at flight level 20,000 feet MSL. 1500 UTC…scattered at 4,000 feet AGL, scattered at 10,000 feet AGL. After 2000 UTC…scattered thunderstorms with rain showers developing..a few possible severe. Cumulonimbus tops to flight level 45,000 feet MSL. Outlook…VFR.
Remainder of the state…Ceilings broken at 2,000 feet AGL. Tops at 5,000 feet MSL. Visibilities 3 to 5 statute miles in mist. 1400 UTC…scattered to broken at 4,000 feet AGL. Tops at 10,000 feet MSL. 1800 UTC…ceilings broken 6,000 feet AGL. Tops to flight level 18,000 feet MSL. 2200 UTC…scattered thunderstorm with rain showers developing…a few possibly severe. Cumulonimbus tops above flight level 45,000 feet MSL. Outlook…VFR.

7.1.1.3 CONUS and Hawaii Area Forecast Issuance

The CONUS FAUSs are issued three times daily for each of six areas (see following table).

Table 7-2. Area Forecast (FAUS) Issuance Schedule - CONUS

Area Forecast (FAUS)	Boston and Miami (UTC)	Chicago and Fort Worth (UTC)	San Francisco and Salt Lake City (UTC)
1st Issuance	0845 DT 0945 ST	0945 DT 1045 ST	1045 DT 1145 ST
2nd Issuance	1745 DT 1845 ST	1845 DT 1945 ST	1945 DT 2045 ST
3rd Issuance	0045 DT 0145 ST	0145 DT 0245 ST	0245 DT 0345 ST

The Hawaii Area Forecast is issued four times daily at 0340, 0940, 1540, and 2140 UTC.

7.1.1.3.1 FA Amendments

An amended FA may be issued to notify pilots and briefers that a weather phenomena and/or condition that was not forecast is now expected or a forecast phenomena or condition has improved or did not develop as expected. The new condition is expected to exceed half of the time of a regular issuance and is expected to no longer affect low-level flights. An amended FA is denoted by an **AMD** after the date/time group on the FAA product line (line 1 in Table 7-1) and will contain an **UPDT** contraction following the affected geographical area in the CLDS/WX section.

Example

```
CHIC FA 231345 AMD
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 240400
CLDS/WX VALID UNTIL 232200...OTLK VALID 232200-240400
ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY
.
SD...UPDT
EXTRM SWRN/EXTRM S CNTRL...CIG BKN-OVC010 TOP 120. 18Z AGL SCT015
SCT-BKN035. OTLK...VFR.
RMNDR WRN/CNTRL...SCT CI. OTLK...VFR TSRA.
ERN...AGL SCT-BKN035 TOP 120. OTLK...VFR.
```

7.1.1.3.2 FA Corrections

FAs containing errors are corrected. This is identified by **COR** after the date/time group on the FAA product line. The first time indicated is the issuance time with the ending valid time unchanged. A corrected FA contains **UPDT** following the affected geographical area in the CLDS/WX section.

Example:

```
CHIC FA 231015 COR
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 240400
CLDS/WX VALID UNTIL 232200...OTLK VALID 232200-240400
ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY
.
```

SD...**UPDT**
EXTRM SWRN/EXTRM S CNTRL...CIG BKN-OVC010 TOP 120. 18Z AGL SCT015
SCT-BKN035. OTLK...VFR.
RMNDR WRN/CNTRL...SCT CI. OTLK...VFR TSRA.
ERN...AGL SCT-BKN035 TOP 120. OTLK...VFR.

7.1.1.4 Example of a CONUS Area Forecast

FAUS5 KDFW 030953 (*ICAO Communication Header)*
FA4W
DFWC FA 030945 *(**AMD** or **COR** if needed)*
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 040400
CLDS/WX VALID UNTIL 032200...OTLK VALID 032200-040400
OK TX AR TN LA MS AL
.
SEE AIRMET SIERRA FOR IFR COND AND MT OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGT DENOTED BY AGL OR CIG.
.
SYNOPSIS...HURCN LILI MOVG ONSHORE OVER CENTRAL LA COASTLINE. SEE
LATEST ADVISORY FM NHC. QUASI-STNR FRONTAL SYSTEM EXTENDS FM N OH
AND CENTRAL IN ACROSS S IL..SW MO..SW OK INTO SE CORNER OF NM. BY
04Z...COLD FRONT WILL EXTEND FM A LOW OVER SERN NE ACROSS CENTRAL KS
AND W OK INTO BIG BEND AREA OF SW TX.
.
OK
PANHANDLE/W OK...CIG OVC010. CLDS LYR TO FL240.
VIS 3-5SM BR. BECMG 1618 CIG OVC015-025. WIDELY SCT -SHRA/ISOL EMBD
-TSRA. CB TOP FL350. OTLK...MVFR CIG TSRA BR.
ERN OK...AGL SCT-BKN015-025. TOPS 030-050. VIS 3-5SM BR. BECMG
1417 AGL SCT030-050. OTLK...VFR.
.
NW TX
CIG010. CLDS LYR TO FL240. VIS 3-5SM BR. BECMG 1618 CIG OVC015-025.
WIDELY SCT -SHRA/ISOL EMBD -TSRA. CB TOP FL350. OTLK...MVFR CIG TSRA
BR.
.
SW TX
AGL SCT040-060. OTLK...VFR.
.
CENTRAL TX
CIG BKN015-025. TOP 030-050. VIS 3-5SM BR. BECMG 1417 AGL SCT030-050.
OTLK...VFR.
.
E TX
SKC. BECMG 1316 AGL SCT030-050. OTLK...VFR.
.
AR
AGL SCT030-050. SCT-BKN100. TOP FL200. BKN CI. OTLK...MVFR CIG TSRA
BR.
.

```
LA
N LA...AGL SCT-BKN030-050. BKN100. TOPS FL240. ISOL -SHRA. BECMG 1618
CIG BKN030-050. WIDELY SCT TSRA/SHRA DEVELOPING. CB TOP FL400.
OTLK...MVFR CIG TSRA WIND.
S LA...CIG OVC010-020. CLDS LYR TO FL280. OCNL RA/+RA...SCT
+TSRA...POSS SEV. CB TOPS FL450. SFC WND 14030G50KT.  E SECTIONS...WND
30025G40KT. WND DIMINISHING TO 20G30KT 19-22Z.
OTLK...MVFR CIG SHRA WND.
.
TN
BKN CI. OCNL VIS 3-5SM BR TIL 14Z. OTLK...VFR.
.
MS AL
N AND CENTRAL MS-AL/SE AL..SCT-BKN100. BKN150. TOPS FL280.  BECMG 1618
AGL SCT-BKN050 BKN100 OVC150. OTLK...MVFR CIG TSRA.
S MS/SW AL...AGL SCT-BKN050 BKN100 OVC150. TOPS FL280. BECMG 1316 CIG
OVC015-025. OCNL RA/SCT EMBD TSRA. CB TOP FL410. OTLK...MVFR CIG TSRA.
```

7.1.1.5 Example of a Hawaii Area Forecast

```
FAHW31 PHFO 080940
FA0HI
HNLC FA 080940 (AMD or COR, if necessary)
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 090400
CLDS/WX VALID UNTIL 082200...OTLK VALID 082200-090400
HI
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GRTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGT DENOTED BY AGL OR CIG.
.
SYNOPSIS...SFC HIGH FAR N PHNL NEARLY STNR.
.
BIG ISLAND ABV 060.
SKC. 20Z SCT090. OTLK...VFR.
.
BIG ISLAND LOWER SLOPES...CSTL AND ADJ WTRS FROM UPOLU POINT TO
CAPE KUMUKAHI TO APUA POINT.
SCT030 BKN050 TOPS 080 ISOL BKN030 VIS 3-5SM -SHRA BR TIL 20Z ISOL
BKN010 VIS BELOW 3SM SHRA BR. 21Z SCT030 SCT-BKN050 TOPS 080 ISOL
BKN030 5SM -SHRA. OTLK...VFR.
.
BIG ISLAND LOWER SLOPES FROM APUA POINT TO SOUTH CAPE TO UPOLU POINT.
SKC. 21Z SCT-BKN060 TOPS 080. 23Z SCT030 SCT-BKN060 TOPS 080 ISOL
BKN030 -SHRA. OTLK...VFR.
.
BIG ISLAND CSTL AND ADJ WTRS FROM SOUTH CAPE TO PHKO TO UPOLU
POINT.
SCT050 ISOL BKN050 TOPS 080. 18Z FEW050. 23Z SCT-BKN050 TOPS080.
OTLK...VFR.
.
```

```
N AND E FACING SLOPES...CSTL AND ADJ WTRS OF THE REMAINING
ISLANDS.
SCT020 BKN045 TOPS070 TEMPO BKN020 VIS 3-5SM -SHRA...FM OAHU EASTWARD
ISOL CIG BLW 010 AND VIS BELOW 3SM SHRA BR WITH TOPS 120. 22Z SCT025
SCTBKN050 TOPS 070 ISOL BKN025 3-5SM -SHRA. OTLK...VFR.
.
REST OF AREA.
SCT035 SCT-BKN050 TOPS 070 ISOL BKN030 -SHRA. 20Z SCT050 ISOL SCT030
BKN045 TOPS 070 -SHRA. OTLK...VFR.
```

7.1.2 Gulf of Mexico Area Forecast (FAGX)

The Gulf of Mexico FA is an overview of weather conditions that could impact aviation operations over the northern Gulf of Mexico (Figure 7-7). It serves as a flight-planning and weather briefing aid and describes weather of significance to general aviation (GA), military and helicopter operations. The FAGX is a 24 hour forecast product with the synopsis valid the entire 24 hour period, the forecast section valid the first 12 hours, and the outlook section is valid the last 12 hours.

Each FA contains a statement before the synopsis indicating heights not reported in MSL are denoted and a reminder of what thunderstorm activity implies.

The Aviation Weather Center (AWC) produces this forecast and it can be found at:
http://www.aviationweather.gov/products/fa/?area=gulf

Figure 7-7. AWC Area Forecast Region and WMO Header - Gulf of Mexico

7.1.2.1 Standardization

All forecasts follow these standards:

- All referenced heights or altitudes consist of three (3) digits depicting height in hundreds of feet Mean Sea Level (MSL).

- Messages are prepared using approved ICAO contractions, abbreviations and numerical values of self-explanatory nature.

- Weather and obstructions to visibility are the same as weather abbreviations used for surface airways observations (METAR or SPECI) (Section 2).

7.1.2.1.1 Height Reference

All heights are referenced to Mean Sea Level (MSL) except when prefaced by AGL or CIG. Tops are always referenced to MSL.

Examples:

SCT030 BKN100

Scattered at 3,000 feet MSL, broken at 10,000 feet MSL

AGL SCT030 BKN100

Scattered at 3,000 feet AGL, broken at 10,000 feet MSL

CIG BKN006 BKN070. TOP 100.

Broken at 600 feet AGL, broken at 7,000 feet MSL. Top 10,000 feet MSL.

7.1.2.2 Gulf of Mexico Area Forecast Content

The Gulf of Mexico FA (FAGX) is a single product combining information contained in FAs prepared for the conterminous U.S. and the in-flight advisories -- AIRMET/SIGMET. Each section describes the phenomena impacting the respective areas and will always have an entry even if it is negative.

The FAGX contains a synopsis and a weather forecast section. The weather section includes:

- Flight precautions at or below 12,000 feet MSL for thunderstorms which are at least scattered or meet Convective SIGMET criteria;
- Moderate or greater turbulence; moderate or greater icing;
- Wind speeds greater than or equal to 25 knots below 1,000 feet;
- Ceilings and/or visibilities less than 1,000 feet and/or three (3) miles;
- Significant Clouds and Weather;
- Icing and freezing level;
- and turbulence.

Table 7-3. Area Forecast Sections – Gulf of Mexico

SECTION	DESCRIPTION
SYNOPSIS…	A brief description of the location and movement of fronts, pressures systems, and other circulations as well as the weather associated with them.
FLIGHT PRECAUTIONS…	Flight precautions (at or below 12,000 feet MSL) include adverse weather. Examples may include thunderstorms, IFR, turbulence, strong winds, icing, etc…
SIGNIFICANT CLD/WX…	A 12-hour forecast of clouds and weather at or below 12,000 feet MSL. This forecast can include IFR conditions. It also includes a 12-hour categorical outlook (IFR/MVFR/VFR/WND) and the clouds or weather causing the categorical forecast.
ICE AND FZ LVL BLW 120	The location and altitudes of moderate or greater icing and the associated freezing levels at or below 12,000 feet MSL.

7.1.2.3 Example of a Gulf of Mexico Area Forecast

The following is an example of a Gulf of Mexico Area Forecast.

```
FAGX20 KKCI 091812
OFAGX
SYNOPSIS VALID TIL 101900Z
FCST...091900Z-100700Z
OTLK...100700Z-101900Z
.
 INTERNATIONAL OPERATIONS BRANCH
AVIATION WEATHER CENTER KANSAS CITY MISSOURI
.
CSTL WATERS FROM COASTLINE OUT TO HOUSTON OCEANIC FIR AND GLFMEX MIAMI
OCEANIC FIR AND W OF 85W. HOUSTON OCEANIC FIR AND GLFMEX MIAMI OCEANIC
FIR.
.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS. HGTS MSL.
.
01 SYNOPSIS...HIGH PRES OVR NRN GLFMEX.
.
02 SIGNIFICANT CLD/WX...
.
CSTL WATERS...
SCT020. OTLK...VFR.
.
HOUSTON OCEANIC FIR...SCT020. OTLK...VFR.
.
GLFMEX MIAMI OCEANIC FIR... SCT020. OTLK...VFR.
.
03 ICE AND FRZLVL...
CSTL WATERS...SEE AIRMETS ZULU WAUS44 KKCI AND WAUS42 KKCI.
HOUSTON OCEANIC FIR... NO SGFNT ICE EXP OUTSIDE CNVTV ACT.
```

```
GLFMEX MIAMI OCEANIC FIR...NO SGFNT ICE EXP OUTSIDE CNVTV ACT.
FRZLVL...140 THRUT.
.
04 TURB... CSTL WATERS...SEE AIRMETS TANGO WAUS44 KKCI AND WAUS42
KKCI.
HOUSTON OCEANIC FIR... NO SGFNT TURB EXP OUTSIDE CNVTV ACT.
GLFMEX MIAMI OCEANIC FIR...NO SGFNT TURB EXP OUTSIDE CNVTV ACT.
```

7.1.2.4 Gulf of Mexico Area Forecast Issuance

The FAGX, valid for 12 hours with a 12-hour extended outlook, is issued twice daily at 1030 and 1830 UTC.

7.1.2.4.1 Gulf of Mexico FA Amendments

Gulf of Mexico FAs are amended at the forecaster's discretion.

If any phenomena or conditions depicted in FA improve and are no longer expected to affect low-level flights (including VFR) and the new conditions will exceed half the period between regular issuances, a FA **AMD** message is sent indicating which section has been amended by adding **AMD**. The first time indicated is the issuance time with the ending valid time unchanged.

The product will not be amended between 0200 and 1100 UTC.

7.1.2.4.2 FA Corrections

FAs containing errors are corrected. A FA correction is sent indicating which section has changed by adding **COR**. The first time indicated is the issuance time with the ending valid time unchanged.

7.1.3 Caribbean Area Forecast (FACA)

The Caribbean FA is an overview of weather conditions that could impact aviation operations over the Caribbean Sea and adjacent landmasses and islands and the southwestern portions of the New York Oceanic FIR (Figure 7-8). Specifically, it covers the Atlantic south of 32N and W of 57W, the Caribbean from surface to FL240 (approximately 400 millibars).

The synopsis and forecast sections are valid for 12 hours each, with the outlook valid for 12 hours beyond the synopsis and forecast section valid period. In this form, it serves as a flight planning and weather briefing aid for general aviation pilots, and civil and military aviation operations.

The clouds/weather forecast section includes the following areas:

- Atlantic (Southwestern NY and MIA Oceanic FIRs)
- Caribbean Sea (San Juan FIR; Western Piarco FIR; Santo Domingo, Port au Prince and Habana FIRs; Northern Maiquetia, Curacao, and Northern Barranquilla FIRs; Kingston and Northern Central America FIRs; Northern Merida FIR; and Eastern Monterrey FIR)

The Caribbean Area Forecast is issued by the AWC and can be found at:
http://www.aviationweather.gov/products/fa/?area=carib

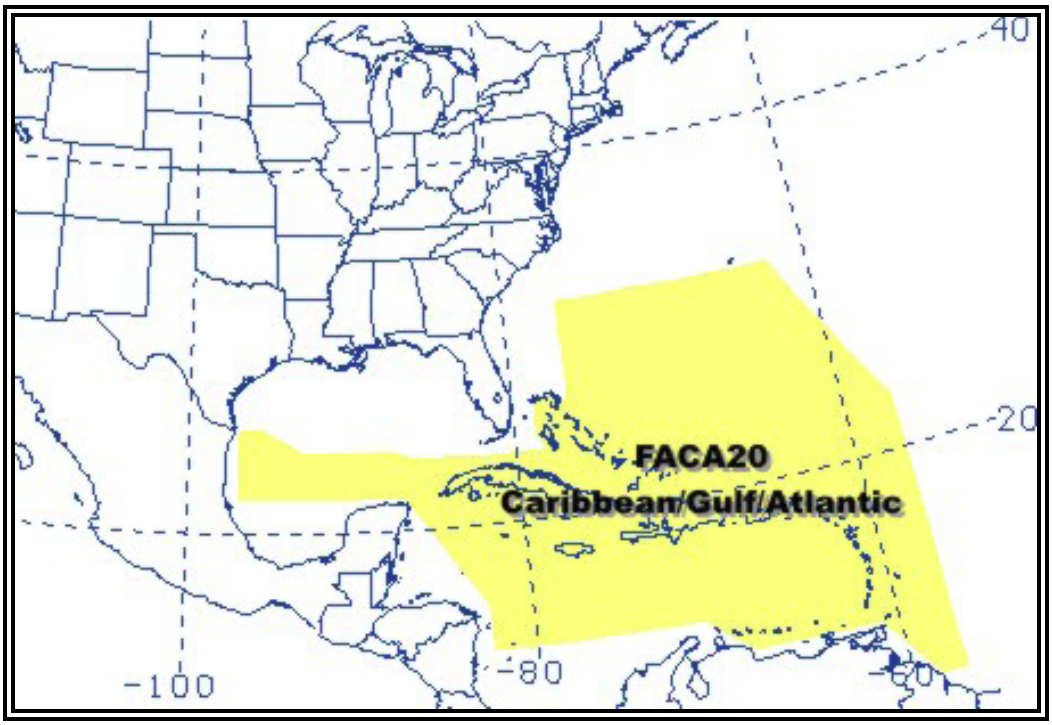


Figure 7-8. AWC Area Forecast Region and WMO Header - Caribbean

7.1.3.1 Standardization

All forecasts follow these standards:

- All Mean Sea Level (MSL) referenced heights or altitudes are annotated as FL for heights at or above 18,000 and consist of three (3) digits depicting height in hundreds of feet.

- Messages are prepared using approved ICAO contractions, abbreviations and numerical values of self-explanatory nature.

- Weather and obstructions to visibility are the same as weather abbreviations used for surface airways observations (METAR or SPECI) (Section 2).

7.1.3.1.1 Height Reference

All heights are referenced to Mean Sea Level (MSL) except when prefaced by AGL or CIG. Tops are always referenced to MSL.

Examples:

`SCT030 BKN100`
Scattered at 3,000 feet MSL, broken at 10,000 feet MSL

`AGL SCT030 BKN100`
Scattered at 3,000 feet AGL, broken at 10,000 feet MSL

`CIG BKN006 BKN070. TOP 100.`
Broken at 600 feet AGL, broken at 7,000 feet MSL. Top 10,000 feet MSL.

7.1.3.2 Caribbean Area Forecast Content

Table 7-4. Area Forecast Sections - Caribbean

Section	Description
SYNOPSIS...	A brief description of the location and movement of fronts, pressure systems, and other circulations, as well as the weather associated with them.
SIGNIFICANT CLD/WX...	A 12-hour forecast of clouds and weather (including IFR conditions) plus a 12-hour categorical outlook (IFR/MVFR/VFR/WND). The cause of IFR/MVFR conditions is specified. Wind is 25 knots or greater.
ICE AND FZ LVL...	The location and altitudes of moderate or greater icing and the associated freezing levels.
TURB...	The location and altitudes of moderate or greater turbulence.

7.1.3.3 Example of a Caribbean Area Forecast

FACA20 KKCI 121530
OFAMKC
INTERNATIONAL OPERATIONS BRANCH
AVIATION WEATHER CENTER KANSAS CITY MISSOURI
VALID 121600-130400
OUTLOOK...130400-131600
.
ATLANTIC S OF 32N W OF 57W...CARIBBEAN...GULF OF MEXICO BTN 22N AND 24N.
.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS. SFC TO 400 MB.
.
SYNOPSIS...WK CDFNT EXTDS FM NR 28N60W TO 23N63W TO THE MONA PASSAGE. CDFNT WL MOV EWD AND WKN TODAY. EXP NARROW BAND OF CLDS WITH ISOL SHRA INVOF CDFNT.
.
SIGNIFICANT CLD/WX...
ERN MONTERREY FIR...NRN MERIDA FIR
SCT025 SCT060. OTLK...VFR.
.
ATLC SWRN NEW YORK FIR...SAN JUAN FIR
NW OF CDFNT...SCT025 SCT060. LYR OCNL BKN. TOP 120. ISOL SHRA.
OTLK...VFR.
VCNTY CDFNT...SCT025 BKN060. OCNL BKN025. TOP 120. WDLY SCT SHRA. ISOL TSRA TIL 20Z. OTLK...VFR SHRA.
SE OF CDFNT...SCT025 SCT060. ISOL SHRA. OTLK...VFR.
.
ATLC MIAMI FIR
SCT025 SCT060. LYR OCNL BKN. TOP 120. ISOL SHRA. OTLK...VFR.
.
WRN PIARCO FIR...NRN MAIQUETIA FIR...CURACAO FIR
BTN 61W-63W...SCT025 BKN060. OCNL BKN025. TOP 120. WDLY SCT SHRA. OTLK...VFR SHRA.
RMNDR...SCT025 SCT060. ISOL SHRA. OTLK...VFR.

.
SANTO DOMINGO FIR...PORT-AU-PRINCE FIR
SCT025 SCT060. LYR OCNL BKN. TOP 120. ISOL SHRA. OTLK...VFR.
.
NRN BARRANQUILLA FIR...NRN PANAMA FIR
SCT025 SCT060. ISOL SHRA. SFC WND NE 20-25KT. OTLK...VFR.
.
KINGSTON FIR...NERN CNTRL AMERICAN FIR...HABANA FIR
SCT025 SCT060. ISOL SHRA. OTLK...VFR.
.
ICE AND FRZLVL...
NO SGFNT ICE EXP OUTSIDE CNVTV ACT.
FRZLVL... 145-170.
.
TURB...
NO SGFNT TURB EXP OUTSIDE CNVTV ACT.

7.1.3.4 Caribbean Area Forecast Issuance

The FACA is issued four times daily at 0330, 0930, 1530, and 2130 UTC.

7.1.3.4.1 FA Amendments

If any phenomena or condition included in the FA is no longer expected to affect flight operations (including VFR), and the new condition is expected to exceed half the period between regular issuances, a FA **AMD** message is sent indicating which section has been amended by adding **AMD**. The first time indicated is the issuance time with the ending valid time unchanged.

7.1.3.4.2 FA Corrections

FAs containing errors are corrected. A FA correction is sent indicating which section has changed by adding **COR**. The first time indicated is the issuance time with the ending valid time unchanged.

7.1.3.4.3 Routine Delayed (RTD) FAs

For FAs delayed in transmission, **RTD** is added after the date/time group on the FAA product line (section 7.1.3.3 line1). The first time indicated is the issuance time with the ending valid time unchanged.

7.1.4 Alaska Area Forecast

The Alaskan FAs contain an overview of weather conditions that could impact aviation operations over Alaska and it coastlines. The Alaskan FAs contain a short synopsis for the entire area and a forecast for each of a specified number of aviation zones (Figure 7-9). The valid period of the synopsis and flight precautions section is 12 hours. The outlook section is for eighteen (18) hours beyond the forecast valid period.

Each FA contains AIRMETs and references to SIGMETs. In addition, a statement about conditions implied by a forecast of thunderstorms and a reference to how heights not reported in MSL are denoted is included.

The Alaska Area Forecast is issued by the Alaska Aviation Weather Unit (AAWU) and can be found at:

http://aawu.arh.noaa.gov/areaforecasts.php and on the Aviation Weather Center (AWC) web site at http://aviationweather.gov/products/fa/?area=alaska

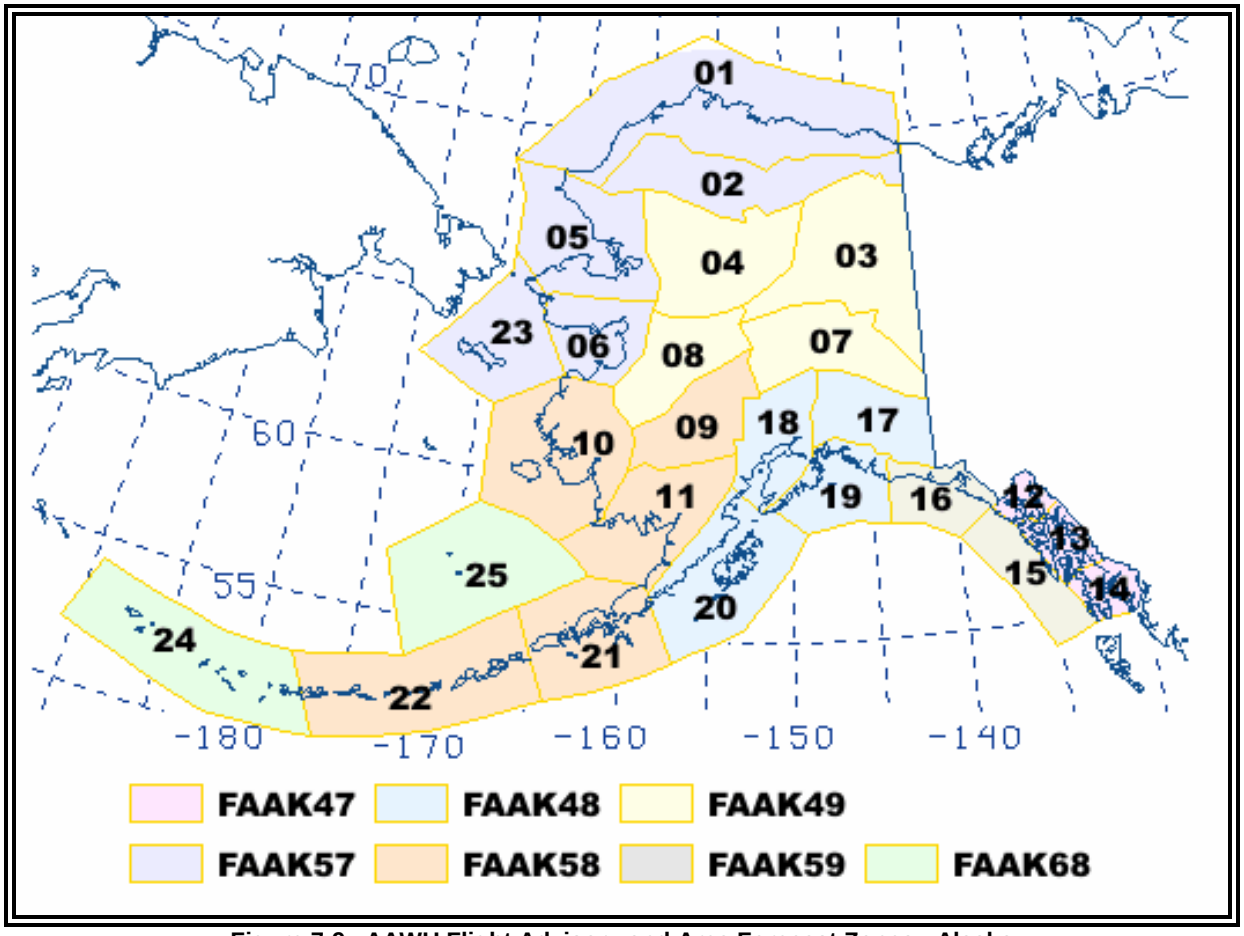


Figure 7-9. AAWU Flight Advisory and Area Forecast Zones - Alaska

Table 7-5. 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		

7.1.4.1 Standardization

All forecasts follow these standards:

- All referenced heights or altitudes are annotated as FL for heights at or above 18,000 and consist of three (3) digits depicting height in hundreds of feet Mean Sea Level (MSL).

- Messages are prepared using approved ICAO contractions, abbreviations and numerical values of self-explanatory nature.

- Weather and obstructions to visibility are the same as weather abbreviations used for surface airways observations (METAR or SPECI) (Section 2).

7.1.4.1.1 Height Reference

All heights are referenced to Mean Sea Level (MSL) except when prefaced by AGL or CIG. Tops are always referenced to MSL.

Examples:

SCT030 BKN100
Scattered at 3,000 feet MSL, broken at 10,000 feet MSL

AGL SCT030 BKN100
Scattered at 3,000 feet AGL, broken at 10,000 feet AGL

AGL SCT-BKN015-025. TOPS 030-050.
Scattered to broken at 1,500 to 2,500 feet AGL. Tops 3,000 to 5,000 feet MSL.

7.1.4.2 Alaska Area Forecast Content

The Alaskan Area Forecast zones contain sections on Clouds and Weather, Turbulence, and Icing and Freezing Levels.

The Clouds and Weather section includes:

- SIGMETs for Thunderstorms and Volcanic Ash;
- AIRMETs for IFR ceiling and visibility, mountain obscuration, and strong surface winds;
- Bases and tops of significant cloud layers;
- Visibilities of six (6) miles or less and restricting phenomena;
- Precipitation and thunderstorms;
- Surface winds of 20 KTS or greater;
- Outlook using categorical terms (i.e., VFR CIG, MVFR BR, IFR SN WND); and
- Mountain-pass conditions using categorical terms (for selected zones only).

The Turbulence section includes:

- SIGMETs for Turbulence;
- AIRMETs for Turbulence and/or Low Level Wind Shear (LLWS);
- Forecast of significant turbulence not meeting SIGMET or AIRMET criteria or that is forecast for the period 6 to 12 hours after issuance; and
- If no significant turbulence is forecast, NIL SIG will be entered.

Icing section includes:

- SIGMETs for Icing;
- AIRMETs for Icing and freezing precipitation;

- Forecast of significant icing not meeting SIGMET or AIRMET criteria or which is forecast for the period 6 to 12 hours after issuance;
- Freezing Level; and
- If no significant icing is forecast, NIL SIG will be entered followed by the freezing level.

7.1.4.3 Example of an Alaska Area Forecast

```
FAAK01 PANC 251345 (AMD, COR, RTD if necessary)
FA8H
ANCH FA 251345
AK SRN HLF EXC SE AK...
.
AIRMETS VALID UNTIL 252000
TS IMPLY POSSIBLE SEV OR GREATER TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HEIGHTS NOTED BY AGL OR CIG.
.
SYNOPSIS VALID UNTIL 260800
972 MB BRISTOL BAY LOW WL MOV N TO 50 S PAOM AT 987 MB BY END OF PD.
ASSOCIATED OCCLUDED FRONT FM PALJ..KENNEDY ENTRANCE..SE WL MOV NE
TO PAMH..PACV..SE
BY 08Z.
.
COOK INLET AND SUSITNA VALLEY AB...VALID UNTIL 260200
...CLOUDS/WX...
***AIRMET IFR/MT OBSC***AK RANGE/W SIDE COOK INLET..OCNL CIGS BLW 10
VIS BLW 3SM -RA BR. NC...
OTHERWISE..AK RANGE/W SIDE INLET..SCT005 OVC020 VIS 3-5SM -RA BR.
ELSEWHERE..SCT025 BKN045 OVC080 LYR ABV TO FL250. OCNL BKN025 OVC045
-RA.
COOK INLET..SFC WND NE 20G30 KTS. THRU TERRAIN GAPS..ERN MTS/AK
RANGE..SFC WND E 30G60 KTS.
OTLK VALID 260200-262000...MVFR CIG RA WND.
PASSES...LAKE CLARK..MERRILL..RAINY..IFR CIG RA WND. WINDY..MVFR CIG
RA.
PORTAGE..IFR CIG RA WND.
...TURB...
***SIGMET***KILO 1 VALID 251607/252000 PANC-
OCNL SEV TURB FCST BLW 080 WI AN AREA FM TKA-JOH-MDO-AKN-SQA-TKA.
THIS IS THE AREA S OF A PAHZ-PATK LN.
***AIRMET TURB/LLWS***OCNL MOD TURB BLW 120. LLWS. NC...
...ICE AND FZLVL...
***AIRMET ICE***OCNL MOD RIME/MX ICEIC 050-160. FZLVL 050. NC...
.
COPPER RIVER BASIN AC...VALID UNTIL 260200
...CLOUDS/WX...
FEW045 SCT090 BKN-OVC180 TOP FL250.
SFC WND SE G 25 KTS.
WRN MTS..ISOL BKN025 OVC045 4SM -SHRA.
OTLK VALID 260200-262000...VFR.
PASS...TAHNETA..MVFR CIG.
...TURB...
NIL SIG.
```

```
...ICE AND FZLVL...
NIL SIG. FZLVL 050.
.
CNTRL GLF CST AD...VALID UNTIL 260200
...CLOUDS/WX...
***AIRMET MT OBSC***MTS OBSCD IN CLDS/PRECIPITATION. NC...
SCT020 OVC040 LYRD ABV TO FL250 -RA.
OCNL SCT005 OVC020 VIS 3-5SM -RA BR.
SFC WND E 20G35 KTS. THRU TRRN GAPS WND E-NE 25G50 KTS.
ALONG KENAI PENINSULA..ISOL CIGS BLW 10 VIS BLW 3SM RA BR.
OTLK VALID 260200-260200..MVFR CIG RA WND.
...TURB...
***SIGMET***KILO 1 VALID 251607/252000 PANC-
OCNL SEV TURB FCST BLW 080 WI AN AREA FM TKA-JOH-MDO-AKN-SQA-TKA.
THIS IS THE AREA E OF A JOH-PAMD LN.
***AIRMET TURB/LLWS***OCNL MOD TURB BLW 120. LLWS NR TRRN. NC...
...ICE AND FZLVL...
***AIRMET ICE***OCNL MOD RIME ICEIC 050-160. FZLVL 050. NC...
.
KODIAK ISLAND AE...VALID UNTIL 260200
...CLOUDS/WX...
***AIRMET MT OBSC***MTS OBSCD IN CLDS/PRECIPITATION. NC...
SCT020 OVC040 LYRD ABV TO FL250 -RA.
OCNL SCT005 OVC020 VIS 3-5SM -RA BR.
E SIDE..ISOL CIGS BLW 10 VIS BLW 3SM RA BR.
SFC WND SE G 25 KT.
OTLK VALID 260200-262000...MVFR CIG SHRA WND. AFT 06Z..VFR.
...TURB...
NIL SIG.
...ICE AND FZ LVL...
ISOL MOD RIME ICEIC 030-120. FZLVL 030.
```

7.1.4.4 Alaska FA Issuance

The Alaskan FAs are produced four (4) times daily

Table 7-6. Area Forecast Issuance Schedule - Alaska

Alaska Area Forecast	Standard Time (UTC)	Daylight Time (UTC)
1st Issuance	0245	0145
2nd Issuance	0845	0745
3rd Issuance	1445	1345
4th Issuance	2045	1945

7.1.4.4.1 FA Amendments

FAs are under continuous review and amended at the discretion of the forecaster. An amended FA contains **AAA** after the date/time group on the WMO heading line for the first amendment, **AAB** for the second, and continuing for all subsequent amendments. **AMD** is also included after the date/time group on the FAA product line (section 7.1.4.3 line 1).

7.1.4.4.2 FA Corrections

FAs containing errors are corrected. This is identified by **COR** after the date/time group on the FAA product line (section 7.1.4.3 line 1). The first time indicated is the issuance time, with the ending valid time unchanged.

7.1.4.4.3 Routine Delayed (RTD) FAs

For FAs delayed in transmission, **RTD** is added after the date/time group on the FAA product line (section 7.1.4.3 line 1). The first time indicated is the issuance time, with the ending valid time unchanged.

7.2 Terminal Aerodrome Forecast (TAF)

A Terminal Aerodrome Forecast (TAF) is a concise statement of the expected meteorological conditions significant to aviation for a specified time period within five statute miles (SM) of the center of the airport's runway complex (terminal). The TAFs use the same weather codes found in METAR weather reports (Section 2) and can be viewed on the National Weather Service (NWS) Aviation Digital Data Service (ADDS) web site at: http://adds.aviationweather.noaa.gov/tafs/.

7.2.1 Responsibility

TAFs are issued by NWS Weather Forecast Offices (WFOs). A map of U.S. TAF locations is located on Figures 7-10, 7-11, and 7-12.

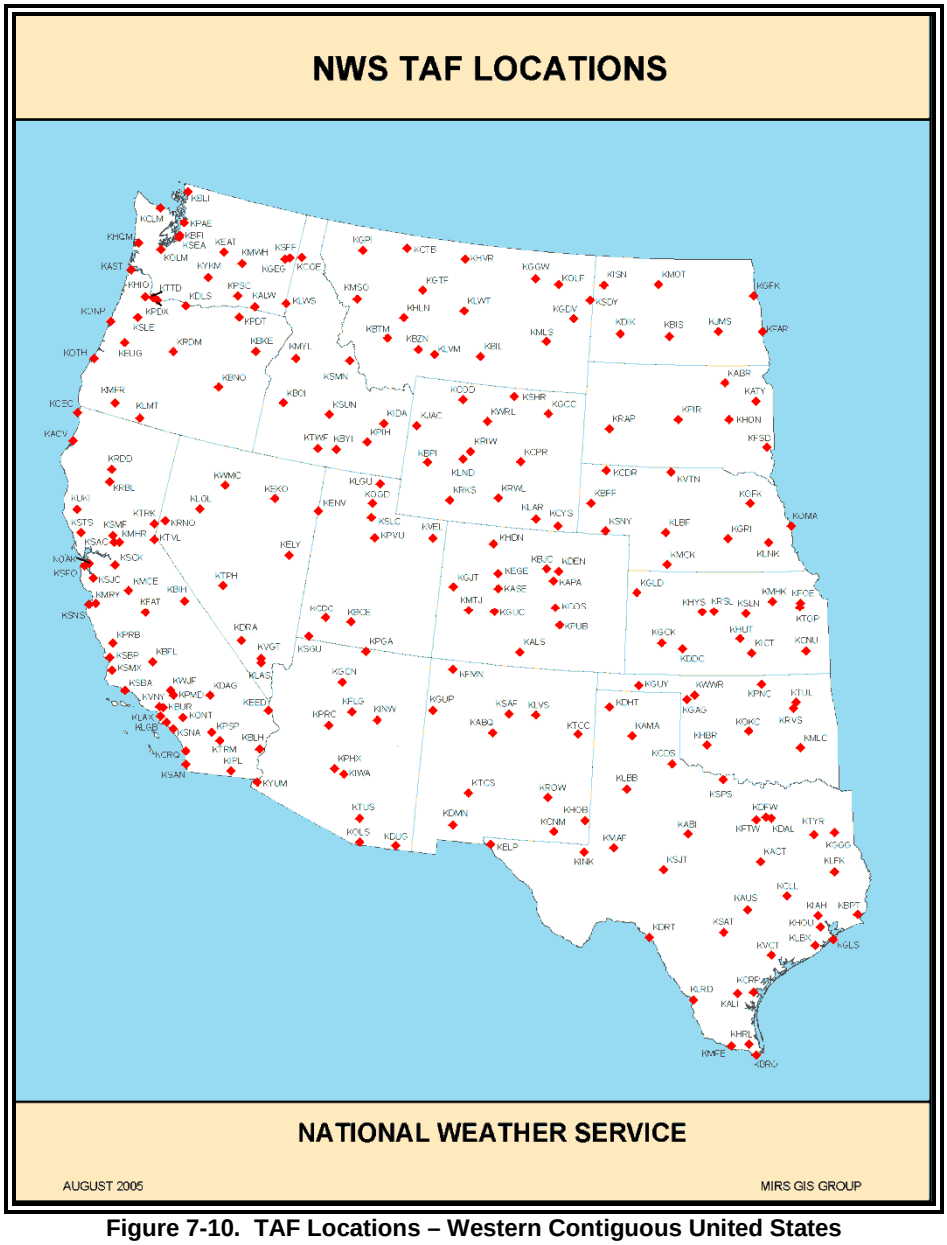


Figure 7-10. TAF Locations – Western Contiguous United States

Figure 7-11. TAF Locations – Eastern Contiguous U.S., Puerto Rico and Virgin Islands

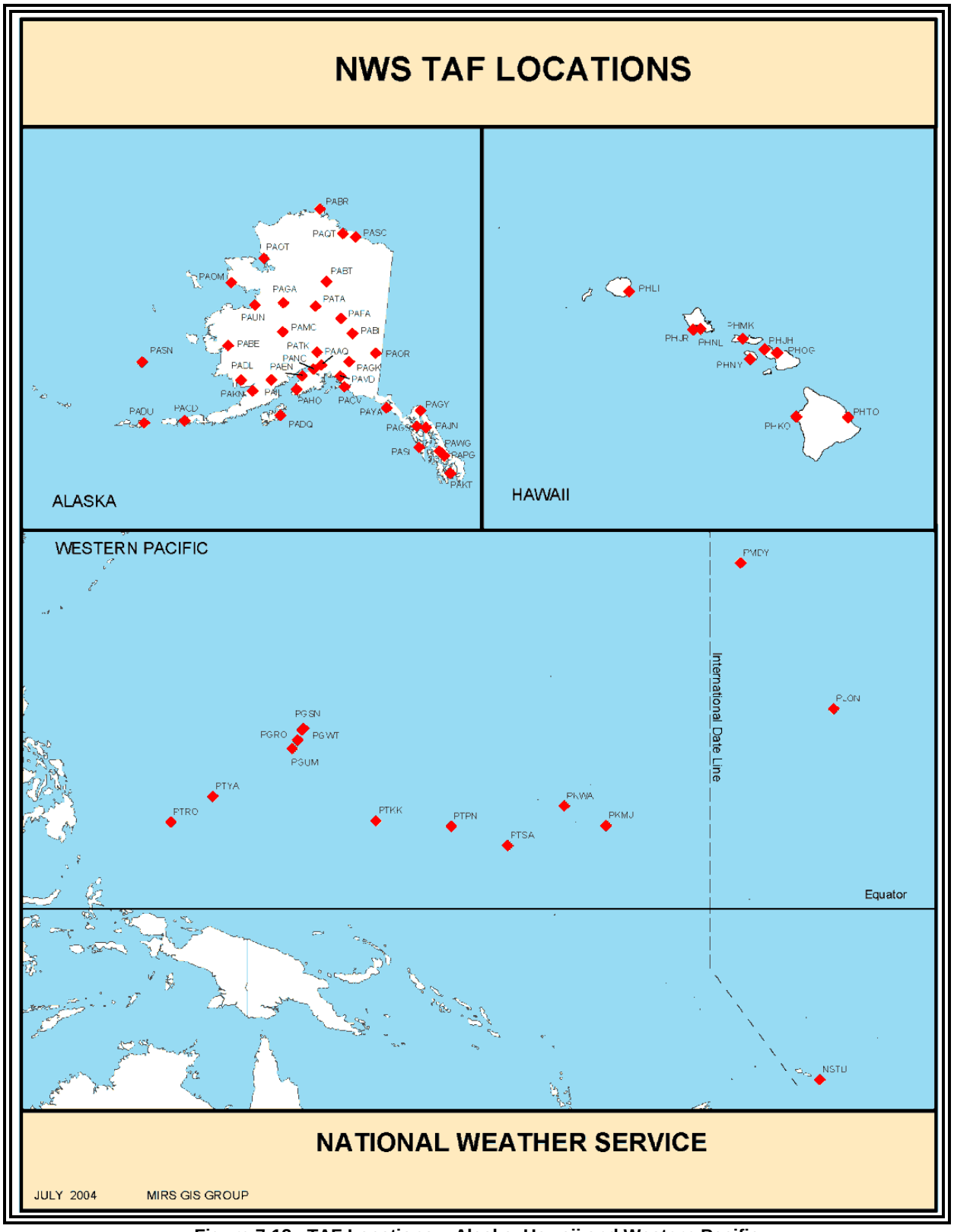


Figure 7-12. TAF Locations – Alaska, Hawaii and Western Pacific

7.2.2 Generic Format of the Forecast Text of a NWS-Prepared TAF

TAF or **TAF AMD**			
Type of report			
CCCC	**YYGGggZ**	**YlY1G1G1G2G2**	**DddffGfmfmKT**
Location identifier	Date/time of forecast origin group	Valid period	Wind group
VVVV	**w'w'** or **NSW**	**NsNsNshshshs** or **VVhshshs** or **SKC**	**WShwshwshws/dddftKT**
Visibility group	Significant weather group	Cloud and vertical obscuration groups	Non-convective low-level wind shear (LLWS) group
TTGGgg			
Forecast change indicator groups			
FMGG GGGeGe	**TEMPO GGGeGe**	**PROB40GGGeGe**	
"From" group	"Temporary" group	Probability Forecast	

7.2.2.1 Type of Report (TAF or TAF AMD)

The report-type header always appears as the first element in the TAF and is produced in two forms: a routine forecast, **TAF**, and an amended forecast, **TAF AMD**.

TAFs are amended whenever they become, in the forecaster's judgment, unrepresentative of existing or expected conditions, particularly regarding those elements and events significant to aircraft and airports. An amended forecast is identified by **TAF AMD** (in place of **TAF**) on the first line of the forecast text.

7.2.2.2 Location Identifier (CCCC)

After the line containing either **TAF** or **TAF AMD**, each TAF begins with its four-letter International Civil Aviation Organization (ICAO) location identifier. Figures 7-11, 7-12 and 7-13 contains the locations of NWS issued TAFs.

Examples:
KDFW – Dallas-Fort Worth
PANC – Anchorage, Alaska
PHNL – Honolulu, Hawaii

7.2.2.3 Date/Time of Forecast Origin Group (YYGGggZ)

The date/time of forecast origin group (**YYGGggZ**) follows the terminal's location identifier. It contains the day of the month in two (2) digits (**YY**) and time in four (4) digits (**GGgg** in hours

and minutes) the forecast is completed and ready for transmission, with a **Z** appended to denote UTC. This time is entered by the forecaster.

Examples
061737Z
The TAF was issued on the 6th day of the month at 1737 UTC.

121123Z
The TAF was issued on the 12th day of the month at 1123 UTC.

7.2.2.4 Valid Period (Y1Y1G1G1G2G2)

The TAF valid period (**Y1Y1G1G1G2G2**) is the next group. Scheduled 24-hour TAFs are issued four (4) times per day, at 0000, 0600, 1200, and 1800Z. The first two digits (**Y1Y1**) are the day of the month for the start of the TAF. The next two digits (**G1G1**) are the starting hour, and the last two digits (**G2G2**) are the ending hour of the valid period. A forecast period beginning at midnight UTC is annotated as **00**. If the end time of a valid period is at midnight UTC, it is annotated as **24**. For example, a 00Z TAF issued on the 9th of the month would have a valid period of **090024**.

Examples:
151212
The TAF is valid from 1200 UTC on the 15th of the month until 1200 UTC on the 16th.

230606
The TAF is valid from 0600 UTC on the 23rd of the month until 0600 UTC on the 24th of the month.

011818
The TAF is valid from 1800 UTC on the 1st of the month until 1800 UTC on the 2nd of the month.

060024
The TAF is valid from 0000 UTC on the 6th of the month until 0000 UTC on the 7th of the month.

7.2.2.5 Valid Period of Amended TAFs

An amended TAF (**TAF AMD**) covers all of the remaining valid period of the original scheduled forecast. Expired portions of the amended forecast or references to weather occurring before the issuance time are omitted from the amendment.

In an amended forecast, the date and time of the forecast origin group (**YYGGggZ**) reflects the time the amended forecast was prepared. In the forecast valid period group (**Y1Y1G1G1G2G2**), the first four digits (**Y1Y1G1G1**) reflect the UTC date and time of the beginning of the valid period of the amended TAF.

With an issuance time (**YYGGggZ**) in the first half hour of any given hour (:00 to :29), the current hour (based on UTC) is used to denote the beginning valid time. For example, an amended TAF issued at 1416Z would be valid from 1400 UTC until the standard ending time of the TAF. For the second half of any given hour (:30 to :59), the next hour (based on UTC) is used for the beginning valid time. For example, an amended TAF issued at 1639Z would be valid from 1700 UTC until the standard ending time of the TAF.

Example:

Original	Amended
TAF	**TAF AMD**
PAEN 030540Z 030606...	**PAEN 031012Z 031006...**

The scheduled forecast was sent, and 4 ½ hours later, the forecaster prepared an amendment to the forecast, at 1012Z on the 3rd day of the month.

7.2.2.6 Wind Group (dddffGfmfmKT)

The initial time period and any subsequent **FM** groups (Section 7.2.2.12.1) begin with a mean surface wind forecast (**dddffGfmfmKT**) for the period. Wind forecasts are expressed as the mean three-digit direction (**ddd** - relative to true north) rounded to the nearest ten degrees and the mean wind speed in knots (**ff**) for the time period. If wind gusts are forecast (gusts are defined as rapid fluctuations in wind speeds with a variation of 10 knots or more between peaks and lulls), they are indicated immediately after the mean wind speed by the letter **G**, followed by the peak gust speed expected. **KT** is appended to the end of the wind forecast group. Any wind speed of 100 knots or more will be encoded in three digits. Calm winds are encoded as **00000KT**.

The prevailing wind direction is forecast for any speed greater than or equal to seven (7) knots. When the prevailing surface wind direction is variable (variations in wind direction of 30 degrees or more), the forecast wind direction is encoded as **VRBffKT**. Two conditions where this can occur are very light winds and convective activity. Variable wind direction for very light winds must have a wind speed of one (1) through six (6) knots inclusive. For convective activity, the wind group may be encoded as **VRBffGfmfmKT**, where **Gfmfm** is the maximum expected wind gusts. **VRB** is not used in the non-convective LLWS group.

Squalls are forecast in the wind group as gusts (**G**), but must be identified in the significant weather group (Section 7.2.2.8) with the code **SQ**.

Examples:

23010KT
Wind from 230 degrees “true” (southwest) at 10 knots.

28020G35KT
Wind from 280 degrees “true” (west) at 20 knots gusting to 35 knots.

VRB05KT
Wind variable at 5 knots. This example depicts a forecast for light winds that are expected to variable in direction.

VRB15G30KT
Wind variable at 15 knots gusting to 30 knots. This example depicts winds that are forecast to be variable with convective activity.

00000KT
Wind calm

090105KT
Wind from 90 degrees at 105 knots

7.2.2.7 Visibility Group (VVVV)

The initial time period and any subsequent FM groups (Section 7.2.2.12.1) include a visibility forecast (**VVVV**) in statute miles appended by the contraction SM.

When the prevailing visibility is forecast to be less than or equal to six (6) SM, one or more significant weather groups (Section 7.2.2.8) are included in the TAF. However, drifting dust (**DRDU**), drifting sand (**DRSA**), drifting snow (**DRSN**), shallow fog (**MIFG**), partial fog (**PRFG**), and patchy fog (**BCFG**) may be forecast with prevailing visibility greater than or equal to seven (7) statute miles.

When a whole number and a fraction are used to forecast visibility, a space is included between them (e.g., **1 1/2SM**). Visibility greater than six (6) statute miles is encoded as **P6SM**.

If the visibility is not expected to be the same in different directions, prevailing visibility is used.

When volcanic ash (**VA**) is forecast in the significant weather group, visibility is included in the forecast, even if it is unrestricted (**P6SM**). For example, an expected reduction of visibility to 10 statute miles by volcanic ash is encoded in the forecast as **P6SM VA**.

Examples

P6SM
Visibility unrestricted

1 1/2SM
Visibility 1 and ½ statute miles.

4SM
Visibility 4 statute miles.

7.2.2.8 Significant Weather Group (w'w' or NSW)

The significant weather group (**w'w'** or **NSW**) consists of the appropriate qualifier(s) and weather phenomenon contraction(s) (Section 2) or **NSW** (No significant weather).

If the initial forecast period and subsequent **FM** groups (Section 7.2.2.12.1) are not forecast to have explicit significant weather, the significant weather group is omitted. **NSW** is **not** used in the initial forecast time period or **FM** groups.

Tornadic activity (tornadoes, waterspouts, and funnel clouds) are not forecast in terminal forecasts because the probability of occurrence at a specific site is extremely small.
One or more significant weather group(s) is (are) required when the visibility is forecast to be 6SM or less. The exceptions are: volcanic ash (**VA**), low drifting dust (**DRDU**), low drifting sand (**DRSA**), low drifting snow (**DRSN**), shallow fog (**MIFG**), partial fog (**PRFG**), and patchy fog (**BCFG**). Obstructions to vision are only forecast when the prevailing visibility is less than 7 statute miles or, in the opinion of the forecaster, is considered operationally significant.

Volcanic ash (**VA**) is always forecast when expected. When **VA** is included in the significant weather group, visibility is included in the forecast as well, even if the visibility is unrestricted (**P6SM**).

NSW is used in place of significant weather only in a **TEMPO** group (Section 7.2.2.12.2) to indicate when significant weather (including in the vicinity (**VC**), see below) included in a previous sub-divided group is expected to end.

Multiple precipitation elements are encoded in a single group (e.g., **-TSRASN**). If more than one type of precipitation is forecast, up to three appropriate precipitation contractions can be combined in a single group (with no spaces) with the predominant type of precipitation being first. In this single group, the intensity refers to the total precipitation and can be used with either one or no intensity qualifier, as appropriate. In TAFs, the intensity qualifiers (light, moderate, and heavy) (Section 2.1.3.8.1) refer to the intensity of the precipitation and not to the intensity of any thunderstorms associated with the precipitation.

Intensity is coded with precipitation types, except ice crystals and hail, including those associated with thunderstorms and those of a showery nature (**SH**). No intensity is ascribed to blowing dust (**BLDU**), blowing sand (**BLSA**), or blowing snow (**BLSN**). Only moderate or heavy intensity is ascribed to sandstorm (**SS**) and duststorm (**DS**).

7.2.2.8.1 Exception for Encoding Multiple Precipitation Types

When more than one type of precipitation is forecast in a time period, any precipitation type associated with a descriptor (e.g., **FZRA**) (Section 2.1.3.8.3) is encoded first in the precipitation group, regardless of the predominance or intensity of the other precipitation types. Descriptors are not encoded with the second or third precipitation type in the group. The intensity is associated with the first precipitation type of a multiple precipitation type group. For example, a forecast of moderate snow and light freezing rain is coded as **-FZRASN** although the intensity of the snow is greater than the freezing rain.

Examples:

Combinations of one precipitation and one non-precipitation weather phenomena:

-DZ FG
Light drizzle and fog (obstruction which reduces visibility to less than 5/8 SM – See Section 7.2.2.8.3)

RA BR
Moderate rain and mist (obstruction which reduces visibility to less than 7 SM but greater than or equal to 5/8 SM – See Section 7.2.2.8.3)

-SHRA FG
Light rain showers and fog (visibility less than 5/8 statute miles)

+SN FG
Heavy snow and fog

Combinations of more than one type of precipitation:

-RASN FG HZ
Light rain and snow (light rain predominant), fog and haze

TSSNRA
Thunderstorm with moderate snow and rain (moderate snow predominant)

FZRASNPL
Moderate freezing rain, snow, and ice pellets (freezing rain mentioned first due to the descriptor, followed by other precipitation types in order of predominance)

SHSNPL
Moderate snow showers and ice pellets

7.2.2.8.2 Thunderstorm Descriptor

The TS descriptor is treated differently than other descriptors in the following cases:

- When non-precipitating thunderstorms are forecast, TS may be encoded as the sole significant weather phenomenon; and

- When forecasting thunderstorms with freezing precipitation (**FZRA** or **FZDZ**), the **TS** descriptor is included first, followed by the intensity and weather phenomena.

Example:

TS -FZRA
When a thunderstorm is included in the significant weather group (even using vicinity - **VCTS**), the cloud group (**NsNsNshshshs**) includes a forecast cloud type of CB. See the following example for encoding **VCTS**.

Example

-FZRA VCTS BKN010CB

7.2.2.8.3 Fog Forecast

A visibility threshold must be met before a forecast for fog (FG) is included in the TAF. When forecasting a fog-restricted visibility from 5/8SM to 6SM, the phenomena is coded as **BR** (mist). When a fog-restricted visibility is forecast to result in a visibility of less than 5/8SM, the code **FG** is used. The forecaster never encodes weather obstruction as mist (**BR**) when the forecast visibility is greater than 6 statute miles (P6SM).

The following fog-related terms are used as described below:

Table 7-7. TAF Fog Terms

TERM	DESCRIPTION
Freezing Fog (**FZFG**)	Any fog (visibility less than 5/8 SM) consisting predominantly of water droplets at temperatures less than or equal to 32° F/0°C, whether or not rime ice is expected to be deposited. **FZBR** is not a valid significant weather combination and will not be used in TAFs.
Shallow Fog (**MIFG**)	The visibility at 6 feet above ground level is greater than or equal to 5/8 SM and the apparent visibility in the fog layer is less than 5/8 SM.
Patchy Fog (**BCFG**)	Fog patches covering part of the airport. The apparent visibility in the fog patch or bank is less than 5/8 SM, with the foggy patches extending to at least 6 feet above ground level.
Partial Fog (**PRFG**)	A substantial part of the airport is expected to be covered by fog while the remainder is expected to be clear of fog (e.g., a fog bank). NOTE: **MIFG**, **PRFG** and **BCFG** may be forecast with prevailing visibility of P6SM.

Examples:

`1/2SM FG`
Fog is reducing visibilities to less than 5/8SM, therefore FG is used to encode the fog.

`3SM BR`
Fog is reducing visibilities to between 5/8 and 6SM, therefore BR is used to encode the fog.

7.2.2.9 Vicinity (VC)

In the United States, vicinity (**VC**) is defined as a donut-shaped area between 5 and 10SM from the center of the airport's runway complex. The FAA requires TAFs to include certain meteorological phenomena which may directly affect flight operations to and from the airport. Therefore, NWS TAFs may include a prevailing condition forecast of fog, showers and thunderstorms in the airport's vicinity. A prevailing condition is defined as a greater than or equal to 50% probability of occurrence for more than ½ of the sub-divided forecast time period. **VC** is not included in **TEMPO** or **PROB** groups.

The significant weather phenomena in Table 7-8 are valid for use in prevailing portions of NWS TAFs in combination with **VC**:

Table 7-8: TAF Use of Vicinity (VC)

Phenomenon	Coded
Fog*	VCFG
Shower(s)**	VCSH
Thunderstorm	VCTS

* Always coded as **VCFG** regardless of visibility in the obstruction, and without qualification as to intensity or type (frozen or liquid)

** The **VC** group, if used, should be the last entry in any significant weather group (**w'w'**).

7.2.2.10 Cloud and Vertical Obscuration Groups

The initial time period and any subsequent **FM** groups include a cloud or obscuration group (**NsNsNshshshs**, **VVhshshs** or **SKC**), used as appropriate to indicate the cumulative amount (**NsNsNs**) of all cloud layers in ascending order and height (**hshshs**), to indicate vertical visibility (**VVhshshs**) into a surface-based obstructing medium, or to indicate a clear sky (**SKC**). All cloud layers and obscurations are considered opaque

7.2.2.10.1 Cloud Group

The cloud group (**NsNsNshshshs**) is used to forecast cloud amount in Table 7-8.

Table 7-9. TAF Sky Cover

SKY COVER CONTRACTION	SKY COVERAGE
SKC	0 oktas
FEW	0 to 2 oktas
SCT	3 to 4 oktas
BKN	5 to 7 oktas
OVC	8 oktas

When zero (0) oktas of sky coverage is forecast, the cloud group is replaced by **SKC**. The contraction **CLR**, which is used in the METAR code, is not used in TAFs. TAFs for sites with ASOS/AWOS contain the cloud amount and/or obscurations which the forecaster expects, not what is expected to be reported by an ASOS/AWOS.

Heights of clouds (**hshshs**) are forecast in hundreds of feet AGL.

The lowest level at which the cumulative cloud cover equals 5/8 or more of the celestial dome is understood to be the forecast ceiling (Section 2.1.3.9). For example, **VV008**, **BKN008** or **OVC008** all indicate an 800 ft ceiling.

7.2.2.10.2 Vertical Obscuration Group

The vertical obscuration group (**VVhshshs**) is used to forecast, in hundreds of feet AGL, the vertical visibility (**VV**) into a surface-based total obscuration (Section 2.1.3.9). **VVhshshs** is this ceiling at the height indicated in the forecast. TAFs do not include forecasts of partial obscurations (i.e., **FEW000**, **SCT000**, or **BKN000**).

Example:

`1SM BR VV008`
Ceiling is 800 feet due to vertical visibility into fog

7.2.2.10.3 Cloud Type

The only cloud type included in the TAF is **CB**. **CB** follows cloud or obscuration height (**hshshs**) without a space whenever thunderstorms are included in significant weather group (**w'w'**), even if thunderstorms are only forecast in the vicinity (**VCTS**). **CB** can be included in the cloud group (**NsNsNshshshs)** or the vertical obscuration group (**VVhshshs**) without mentioning thunderstorm in the significant weather group (**w'w'**). Therefore, situations may occur where nearly identical **NsNsNshshshs** or **VVhshshs** appear in consecutive time periods, with the only change being the addition or elimination of **CB** in the forecast cloud type.

Examples:

1/2SM TSRA OVC010CB
Thunderstorms are forecast at the airport

7.2.2.11 Non-Convective Low-Level Wind Shear (LLWS) Group

Wind Shear (**WS**) is defined as a rapid change in horizontal wind speed and/or direction, with distance and/or a change in vertical wind speed and/or direction with height. A sufficient difference in wind speed, wind direction, or both, can severely impact airplanes, especially within 2,000 feet AGL because of limited vertical airspace for recovery.

Forecasts of LLWS in the TAF refer only to non-convective LLWS from the surface up to and including 2,000 feet AGL. LLWS is always assumed to be present in convective activity. LLWS is included in TAFs on an "as-needed" basis to focus the aircrew's attention on LLWS problems which currently exist or are expected. Non-convective LLWS may be associated with the following: frontal passage, inversion, low-level jet, lee side mountain effect, sea breeze front, Santa Ana winds, etc.

When LLWS conditions are expected, the non-convective LLWS code **WS** is included in the TAF as the last group (after cloud forecast). Once in the TAF, the **WS** group remains the prevailing condition until the next **FM** change group or the end of the TAF valid period if there are no subsequent **FM** groups. Forecasts of non-convective LLWS are not included in **TEMPO** or **PROB** groups.

The format of the non-convective low-level wind shear group is:

WShwshwshws/dddffKT

WS - Indicator for non-convective LLWS
hwshwshws - Height of the top of the WS layer in hundreds of feet AGL
ddd - True direction in ten degree increments at the indicated height
-- **VRB** is not used for direction in the non-convective LLWS forecast group.
ff - Speed in knots of the forecast wind at the indicated height
KT - Unit indicator for wind

Example:

TAF…13012KT…WS020/27055KT
Wind shear from the surface to 2,000 feet. Surface winds from 130 (southeast) at 12 knots changes to 270 (west) at 55 knots at 2,000 feet.

In this example the indicator **WS** is followed by a three-digit number which is the top of the wind shear layer. LLWS is forecast to be present from the surface to this level. After the solidus ***/***, the five digit wind group is the wind direction and speed at the top of the wind shear layer. It is not a value for the amount of shear.

A non-convective LLWS forecast is included in the initial time period or a **FM** group in a TAF whenever:

- One or more PIREPs are received of non-convective LLWS within 2,000 feet of the surface, at or in the vicinity of the TAF airport, causing an indicated air speed loss or

gain of 20 knots or more, and the forecaster determines the report(s) reflect a valid non-convective LLWS event rather than mechanical turbulence, or

- When non-convective vertical **WS** of 10 knots or more per 100 feet in a layer more than 200 feet thick are expected or reliably reported within 2,000 feet of the surface at, or in the vicinity of, the airport.

7.2.2.12 Forecast Change Indicator Groups

Forecast change indicator groups are contractions which are used to sub-divide the forecast period (24-hours for scheduled TAFs; less for amended or delayed forecasts) according to significant changes in the weather.

The forecast change indicators, FM, TEMPO, and PROB, are used when a change in any or all of the elements forecast is expected:

7.2.2.12.1 From (FM) Group (FMGGgg)

The change group **FMGGgg** (voiced as "from") is used to indicate when prevailing conditions are expected to change significantly over a period of less than one hour. In these instances, the forecast is sub-divided into time periods using the contraction **FM**, followed, without a space, by four digits indicating the time (in hours and minutes Z) the change is expected to occur. While the use of a four-digit time in whole hours (e.g. 2100Z) is acceptable, if a forecaster can predict changes and/or events with higher resolution, then more precise timing of the change to the minute will be indicated. All forecast elements following **FMGGgg** relate to the period of time from the indicated time (**GGgg**) to the end of the valid period of the terminal forecast, or to the next **FM** if the terminal forecast valid period is divided into additional periods.

The **FM** group will be followed by a complete description of the weather (i.e., self-contained) and all forecast conditions given before the **FM** group are superseded by those following the group. All elements of the TAF (surface wind, visibility, significant weather, clouds, obscurations, and when expected, non-convective LLWS) will be included in each **FM** group, regardless if they are forecast to change or not. For example, if forecast cloud and visibility changes warrant a new **FM** group but the wind does not, the new **FM** group will include a wind forecast, even if it is the same as the most recently forecast wind.

The only exception to this involves the significant weather group. If no significant weather is expected in the **FM** time period group, then significant weather group is omitted. A TAF may include one or more **FM** groups, depending on the prevailing weather conditions expected. In the interest of clarity, each **FM** group starts on a new line of forecast text, indented five spaces.

Examples:

```
TAF
KDSM 022336Z 030024 20015KT P6SM BKN015
     FM0230 29020G35KT 1SM +SHRA OVC005
      TEMPO 0304 30030G45KT 3/4SM -SHSN
     FM0500 31010G20KT P6SM SCT025...
```

A change in the prevailing weather is expected at **0230** UTC and **0500** UTC.

```
TAF
KAPN 312330Z 010024 13008KT P6SM SCT030
```

```
      FM0320 31010KT 3SM -SHSN BKN015
      FM0500 31010KT 1/4SM +SHSN VV007...
```

Note the wind in the **FM0500** group is the same as the previous **FM** group, but is repeated since all elements are required to be included in a **FM** group.

7.2.2.12.2 TEMPO GGGeGe

The change-indicator group **TEMPO GGGeGe** is used to indicate temporary fluctuations to forecast meteorological conditions which are expected to:

- Have a high percentage (greater than 50%) probability of occurrence,
- Last for one hour or less in each instance and,
- In the aggregate, cover less than half of the period **GG** to **GeGe**

Temporary changes described by **TEMPO** groups occur during a period of time defined by a two-digit beginning and two-digit ending time, both in whole hours UTC.

Each **TEMPO** group is placed on a new line in the TAF. The **TEMPO** identifier is followed by a description of all the elements in which a temporary change is forecast. A previously forecast element which has not changed during the **TEMPO** period is understood to remain the same and will not be included in the **TEMPO** group. Only those weather elements forecast to temporarily change are required to be included in the **TEMPO** group.

TEMPO groups will not include forecasts of either significant weather in the vicinity (**VC**) or non-convective LLWS.

Examples:

```
TAF
KDDC 221130Z 221212 29010G25KT P6SM SCT025
      TEMPO 1517 30025G35KT 1 1/2SM SHRA BKN010...
```

In the example, all forecast elements in the TEMPO group are expected to be different than the prevailing conditions.

```
TAF
KSEA 091125Z 091212 19008KT P6SM SCT010 BKN020 OVC090
      TEMPO 1215 -RA SCT010 BKN015 OVC040...
```

In this example the visibility is **not** forecast in the TEMPO group. Therefore, the visibility is expected to remain the same (P6SM) as forecast in the prevailing conditions group. Also, note that in the TEMPO 1215 group, all three cloud layers are included, although the lowest layer is not forecast to change from the initial time period.

7.2.2.12.3 PROB30 GGGeGe

The probability group, **PROB30 GGGeGe,** is only used by NWS forecasters to forecast a low probability occurrence (30% chance) of a thunderstorm or precipitation event and its associated weather and obscuration elements (wind, visibility and/or sky condition) at an airport.

The **PROB30** group is the forecaster's assessment of probability of occurrence of the weather event which follows it. **PROB30** is followed by a space, then four digits (**GGGeGe**) stating the

beginning and ending time (in hours) of the expected condition. **PROB30** is the only **PROB** group used in NWS TAFs.

NOTE: U.S. military and international TAFs may use the PROB40 (40% chance) group as well.

The **PROB30** group is located within the same line of the prevailing condition group, continuing on the line below if necessary.

The **PROB30** group is not used in the first nine (9) hours of the TAF's valid period, including amendments. **PROB30** groups are six (6) hours or less in length. Only one **PROB30** group is used following any subsequent **FM** groups.

PROB30 groups do not include forecasts of significant weather in the vicinity (**VC**) or non-convective LLWS.

Example:
FM2100 18015KT P6SM SCT050 PROB30 2301 2SM TSRA OVC020CB

7.2.2.13 TAF Examples

```
TAF
KPIR 111140Z 111212 13012KT P6SM BKN100 WS020/35035KT
      TEMPO 1214 5SM BR
     FM1500 16015G25KT P6SM SCT040 BKN250
     FM0000 14012KT P6SM BKN080 OVC150 PROB30 0004 3SM TSRA BKN030CB
     FM0400 14008KT P6SM SCT040 OVC080 TEMPO 0408 3SM TSRA OVC030CB
```

TAF ▶ Terminal Aerodrome Forecast
KPIR ▶ Pierre, South Dakota
111140 ▶ prepared on the 11th at 1140 UTC
111212 ▶ valid from the 11th at 1200 UTC until the 12th at 1200 UTC
13012KT ▶ wind 130 at 12 knots
P6SM ▶ visibility greater than 6 statute miles
BKN100 ▶ ceiling 10,000 broken
WS020/35035KT ▶ wind shear at 2,000 feet, wind from 350 at 35 knots
TEMPO 1214 ▶ temporary conditions between 1200 UTC and 1400 UTC
5SM ▶ visibility 5 statute miles
BR ▶ mist
FM1500 ▶ from 1500 UTC
16015G25KT ▶ wind 160 at 15 knots gusting to 25 knots
P6SM ▶ visibility greater than 6 statute miles
SCT040 BKN250 ▶ 4,000 scattered, ceiling 25,000 broken
FM0000 ▶ from 0000Z
14012KT ▶ wind 140 at 12 knots
P6SM ▶ visibility greater than 6 statute miles
BKN080 OVC150 ▶ ceiling 8,000 broken, 15,000 overcast
PROB30 0004 ▶ 30% probability between 0000 UTC and 0400 UTC
3SM ▶ visibility 3 statute miles
TSRA ▶ thunderstorm with moderate rain showers
BKN030CB ▶ ceiling 3,000 broken with cumulonimbus
FM0400 ▶ from 0400 UTC
14008KT ▶ wind 140 at 8 knots
P6SM ▶ visibility greater than 6 statute miles
SCT040 OVC080 ▶ 4,000 scattered, ceiling 8,000 overcast
TEMPO 0408 ▶ temporary conditions between 0400 UTC and 0800 UTC
3SM ▶ visibility 3 statute miles
TSRA ▶ thunderstorms with moderate rain showers
OVC030CB ▶ ceiling 3,000 overcast with cumulonimbus

```
TAF AMD
KEYW 131555Z 131612 VRB03KT P6SM VCTS SCT025CB BKN250
      TEMPO 1618 2SM TSRA BKN020CB
     FM1800 VRB03KT P6SM SCT025 BKN250 TEMPO 2024 1SM TSRA OVC010CB
     FM0000 VRB03KT P6SM VCTS SCT020CB BKN120 TEMPO 0812 BKN020CB
```

TAF AMD ▶ Amended Terminal Aerodrome Forecast
KEYW ▶ Key West, Florida
131555Z ▶ prepared on the 13th at 1555 UTC
131612 ▶ valid from the 13th at 1600 UTC until the 14th at 1200 UTC
VRB03KT ▶ wind variable at 3 knots
P6SM ▶ visibility greater than 6 statute miles
VCTS ▶ thunderstorms in the vicinity
SCT025CB BKN250 ▶ 2,500 scattered with cumulonimbus, ceiling 25,000 broken
TEMPO 1618 ▶ temporary conditions between 1600 UTC and 1800 UTC
2SM ▶ visibility 2 statute miles
TSRA ▶ thunderstorms with moderate rain showers
BKN020CB ▶ ceiling 2,000 broken with cumulonimbus
FM1800 ▶ from 1800 UTC
VRB03KT ▶ wind variable at 3 knots
P6SM ▶ visibility greater than 6 statute miles
SCT025 BKN250 2,500 scattered, ceiling 25,000 broken
TEMPO 2024 ▶ temporary conditions between 2000 UTC and 0000 UTC
1SM ▶ visibility 1 statute mile
TSRA ▶ thunderstorms with moderate rain showers
OVC010CB ▶ ceiling 1,000 overcast with cumulonimbus
FM0000 ▶ from 0000 UTC
VRB03KT ▶ variable wind at 3 knots
P6SM ▶ visibility greater than 6 statute miles
VCTS ▶ thunderstorms in the vicinity
SCT020CB BKN120 ▶ 2,000 scattered with cumulonimbus, ceiling 12,000 broken
TEMPO 0812 ▶ temporary conditions between 0800 UTC and 1200 UTC
BKN020CB ▶ ceiling 2,000 broken with cumulonimbus

```
TAF
KCRP 111730Z 111818 19007KT P6SM SCT030
      TEMPO 1820 BKN040
     FM2000 16011KT P6SM VCTS FEW030CB SCT250
     FM0200 14006KT P6SM FEW025 SCT250
     FM0800 VRB03KT 5SM BR SCT012
     FM1500 17007KT P6SM SCT025
```

TAF ▸ Terminal Aerodrome Forecast
KCRP ▸ Corpus Christi, Texas
111730Z ▸ prepared on the 11th at 1730 UTC
111818 ▸ valid from the 11th at 1800 UTC until the 12th at 1800 UTC
19007KT ▸ wind 190 at 7 knots
P6SM ▸ visibility greater than 6 statute miles
SCT030 ▸ 3,000 scattered
TEMPO 1820 ▸ temporary conditions between 1800 UTC and 2000 UTC
BKN040 ▸ ceiling 4,000 broken
FM2000 ▸ from 2000 UTC
16011KT ▸ wind 160 at 11 knots
P6SM ▸ visibility greater than 6 statute miles
VCTS ▸ thunderstorms in the vicinity
FEW030CB SCT250 ▸ 3,000 few with cumulonimbus, 25,000 scattered
FM0200 ▸ from 0200 UTC
14006KT ▸ wind 140 at 6 knots
P6SM ▸ visibility greater than 6 statute miles
FEW025 SCT250 ▸ 2,500 few, 25,000 scattered
FM0800 ▸ from 0800 UTC
VRB03KT ▸ wind variable at 3 knots
5SM ▸ visibility 5 statute miles
BR ▸ mist
SCT012 ▸ 1,200 scattered
FM1500 ▸ from 1500 UTC
17007KT ▸ wind 170 at 7 knots
P6SM ▸ visibility greater than 6 statute miles
SCT025 ▸ 2,500 scattered

7.2.3 Issuance

Scheduled TAFs prepared by NWS offices are issued four times a day, every six (6) hours, according to the following schedule:

Table 7-10. TAF Issuance Schedule

SCHEDULED ISSUANCE	VALID PERIOD	ISSUANCE WINDOW
0000 UTC	0000 to 2400 UTC	2320 to 2340 UTC
0600 UTC	0600 to 0600 UTC	0520 to 0540 UTC
1200 UTC	1200 to 1200 UTC	1120 to 1140 UTC
1800 UTC	1800 to 1800 UTC	1720 to 1740 UTC

7.2.3.1 Minimum Observational Requirements for Routine TAF Issuance and a Continuation

The NWS WFO forecaster must have certain information for the preparation and scheduled issuance of each individual TAF. Observations or other complementary and/or supplementary data sources must include, at a minimum:

- Wind (speed and direction)
- Visibility
- Weather and obstructions to vision
- Sky condition
- Temperature
- Dewpoint
- Altimeter setting

All weather elements need not be provided completely and/or at all times in the hourly/special observation itself. Alternative methods of obtaining the required weather elements can be utilized, at the discretion of the forecaster, in order to continue providing TAFs. However, in the event the forecaster believes the absence of one or more observed elements will lead to a degradation of the quality of the TAF, the TAF is limited (e.g., **NIL AMD**, indicating no amendments will be provided) or suspended (**NIL**).

Once a particular TAF has been suspended (**NIL**), a delayed or scheduled TAF for that airport is not issued until two consecutive observations not less than 30 minutes nor more than about one (1) hour apart have been received to establish a trend. The forecaster may also use alternative observations, such as satellite, in addition to a single surface observation to issue a TAF.

7.2.3.2 Sites with Scheduled Part-Time Observations

For TAFs with less than 24-hour observational coverage, or for which part-time TAFs are provided, the TAF is valid to the end of the routine scheduled forecast period even if observations cease prior to that time. The time observations are scheduled to end and/or resume is indicated by expanding the **AMD NOT SKED** statement. Expanded statements will include the observation ending time (**AFT 02Z**), the scheduled observation resumption time (**TIL 12Z**) or the period of observation unavailability (**02Z-12 Z**).

7.2.3.2.1 Examples of Scheduled Part-Time Observations TAFs

TAF AMD
KACV 141410Z 141412 NIL=
The TAF is suspended until a complete data source is available

TAF AMD
KRWF 150202Z 150224 AMD NOT SKED 05Z-18Z=
No amendments will be available between 0500 UTC an 1800 UTC due to lack of a complete observational set between those times.

TAF AMD
KPSP 190230Z 190324
NIL AMD=
No amendments will be made to the TAF.

7.2.3.3 Automated Observing Sites Requiring Part-Time Augmentation

TAFs for AWOS-III sites which have part-time augmentation are prepared using the procedures for part-time manual observation sites detailed in the previous section, with one exception. This exception is the remark used when the automated system is unattended. Specifically, the time an augmented automated system is scheduled to go into unattended operation and/or the time augmentation resumes is included in a remark unique to automated observing sites: **AMD LTD TO CLD VIS AND WIND** (**AFT aaZ**, or **TIL bbZ**, or **aaZ-bbZ**), where **aaZ** is the time of the last augmented observation and **bbZ** is the time the second complete observation is expected to be received. This remark, which does not preclude amendments for other forecast elements, is appended to the last scheduled TAF issued prior to the last augmented observation. It will also be appended to all subsequent amendments until augmentation resumes.

The **AMD LTD TO** (elements specified) remark is a flag for users and differs from the **AMD NOT SKED AFT Z** remark for part-time manual observation sites. **AMD LTD TO** (elements specified) means users should expect amendments only for those elements and the times specified.

Example:

```
TAF AMD
KCOE 150202Z 150224 text
AMD LTD TO CLD VIS AND WIND 05Z-18Z=
```

The amended forecast indicates that between 0500 and 1800Z amendments will only be issued for wind, visibility and clouds.

An amendment includes forecasts for all appropriate TAF elements, even those not reported when the automated site is not augmented. If unreported elements are judged crucial to the TAF and cannot be adequately determined (e.g., fog versus moderate snow), the TAF will be suspended (i.e. an amended TAF stating **NIL** may be issued). AWOS-III systems with part-time augmentation, which the forecaster suspects are providing unreliable information when not augmented, is reported for maintenance and treated the same as part-time manual observation sites. In such cases, the **AMD NOT SKED AFT Z** remark will be used.

7.2.3.4 Non-Augmented Automated Observing Sites

The TAF issued for a non-augmented ASOS site may be suspended in the event the forecaster is notified of, or strongly suspects, an outage or unrepresentative data. The term **NIL AMD** is appended to the end of an amendment to the existing TAF when appropriate. If the outage occurs within one (1) hour of the next scheduled issuance or if the forecaster believes the existing TAF is unrepresentative of conditions, an amendment or scheduled issuance containing only the statement **NIL** may be issued.

7.3 International Aviation Route Forecasts (ROFOR)

International ROFORs are prepared and issued several hours in advance of regularly scheduled flights. The only NWS office which routinely issues ROFORs is the Weather Forecast Office (WFO) in Honolulu in its capacity as a Meteorological Watch Office (MWO) for ICAO, for routes within its area of responsibility that are underserved by conventional aviation forecasts and products.

7.3.1 ROFOR Criteria

WFO Honolulu honors all ROFOR requests for flights beginning, ending, or having most of the flight path within its area of responsibility within the Pacific Region which is generally the Oakland Oceanic FIR south of 30N and west of 140W.

7.3.2 Issuance

ROFORs are issued for prescribed times, several hours in advance, for regularly scheduled flights. ROFOR requests for unscheduled flights are prepared as soon as time permits.

7.3.2.1 ROFOR Amendments

ROFORs are not amended.

7.3.2.2 ROFOR Corrections

ROFOR corrections are issued as soon as possible when erroneous data has been identified as being transmitted.

7.3.3 ROFOR Content

ROFORs contain some or all of the following forecast parameters:

a. Winds and temperatures aloft
b. Significant en-route weather
c. Zone weather
d. Weather Synopsis.

At a minimum, ROFORs include a. and b. above. They may contain data for multiple altitudes and include TAFs for destination points and/or alternates.

The core of a ROFOR is formatted as follows: **0iQLL 4hhhTT ddFFF**

Where **i** = 1 for zone up to latitude **L**
i = 2 for zone up to longitude **LL**

Q = 1 east of the dateline in the northern hemisphere
Q = 2 west of the dateline in the northern hemisphere
Q = 6 east of the dateline in the southern hemisphere
Q = 7 west of the dateline in the southern hemisphere

hhh = height to which the temperature and wind refer
TT = air temperature in whole degrees Celsius at hhh
dd = true direction in tens of degrees from which the wind will blow at hhh
fff = wind speed in know at hhh

01104 4300M31 10010
Decoded as: The 30,000 foot wind (10010) and temperature (M31) are for that zone along the flight path from the equator to 05N east of the dateline.

7.3.4 ROFOR Example

Tarawa to Majuro Route
FROC33 PHFO 291510 *(ICAO Communication Header)*

```
FOR PKMJYMYX
ROFOR VALID 2008 FOR ROUTE NGTA TO PKMJ
01205 4100P08 06010 4140P00 06015 4180M03 07020
01201 4100P08 09015 4140P00 09020 4180M04 10025
SIGWX...ISOL TCU/VIS 5SM SHRA
PKMJ 221120Z 221212 NIL=
```

7.4 Wind and Temperature Aloft Forecast (FB)

Wind and Temperature Aloft Forecasts (FB) are computer prepared forecasts of wind direction, wind speed, and temperature at specified times, altitudes, and locations. Forecasts are based on the North American Mesoscale (NAM) forecast model run. FBs are available on the Aviation Weather Center (AWC) web site at: http://aviationweather.gov/products/nws/winds/

7.4.1 Forecast Altitudes

The following table contains the altitudes for which winds are forecast. Altitudes up to 15,000 feet are referenced to Mean Sea Level (MSL). Altitudes at or above 18,000 feet are references to flight levels (FL).

Table 7-11. Wind and Temperature Aloft Forecast Levels

Actual Altitudes (MSL)
1,000 feet*
1,500 feet*
2,000 feet*
3,000 feet
6,000 feet
9,000 feet
12,000 feet
15,000 feet*
Pressure Altitudes (Hectopascals)
18,000 feet (500 Hectopascals)
24,000 feet (400 Hectopascals)
30,000 feet (300 Hectopascals)
34,000 feet (250 Hectopascals)
39,000 feet (200 Hectopascals)
45,000 feet (150 Hectopascals)#
53,000 feet (100 Hectopascals)#
* Hawaii and Western Pacific only.
# Not available for selected locations in the Contiguous US.

Wind forecasts are not issued for altitudes within 1,500 feet of a location's elevation. Temperature forecasts are not issued for altitudes within 2,500 feet of a location's elevation. Forecasts for intermediate levels are determined by interpolation.

7.4.2 Format

The symbolic form of the forecasts is **DDff+TT** in which **DD** is the wind direction, **ff** the wind speed, and **TT** the temperature.

Wind direction is indicated in tens of degrees (two digits) with reference to true north and wind speed is given in knots (two digits). Light and variable wind or wind speeds of less than 5 knots are expressed by **9900**. Forecast wind speeds of 100 through 199 knots are indicated by subtracting 100 from the speed and adding 50 to the coded direction. For example, a forecast

of 250 degrees, 145 knots, is encoded as **7545**. Forecast wind speeds of 200 knots or greater are indicated as a forecast speed of 199 knots. For example, **7799** is decoded as 270 degrees at 199 knots or greater.

Temperature is indicated in degrees Celsius (two digits) and is preceded by the appropriate algebraic sign for the levels from 6,000 through 24,000 feet. Above 24,000 feet, the sign is omitted since temperatures are always negative at those altitudes.

The product header includes the date and time observations were collected, the forecast valid date and time, and the time period during which the forecast is to be used.

Examples

1312+05
The wind direction is from 130 degree (i.e. - southeast), the wind speed is 12 knots and the temperature is 5 degrees Celsius.

9900+10
Wind light and variable, temperature +10 degrees.

7735-07
The wind direction is from 270 degrees (i.e. west), the wind speed is 135 knots and the temperature is minus 7 degrees Celsius.

7.4.2.1 Coding Example

Sample winds aloft text message:

```
DATA BASED ON 010000Z
VALID 010600Z   FOR USE 0500-0900Z. TEMPS NEG ABV 24000
FT  3000    6000   9000    12000   18000   24000  30000  34000  39000
MKC 9900 1709+06 2018+00 2130-06 2242-18 2361-30 247242 258848 550252
```

Sample message decoded:

(Line 1) **DATA BASED ON 010000Z**

Forecast data is based on computer forecasts generated the first day of the month at 0000 UTC.

(Line 2) **VALID 010600Z   FOR USE 0500-0900Z. TEMPS NEG ABV 24000**

The valid time of the forecast is the 1st day of the month at 0600 UTC. The forecast winds and temperature are to be used between 0500 and 0900 UTC. Temperatures are negative above 24,000 feet.

(Line 3)
FT 3000   6000   9000   12000   18000   24000 30000 34000 39000

FT indicates the altitude of the forecast.
(Line4)
MKC 9900 1709+06 2018+00 2130-06 2242-18 2361-30 247242 258848 550252

MKC indicates the location of the forecast. The rest of the data is the winds and temperature aloft forecast for the respective altitudes.

The following table shows data for MKC (Kansas City, MO).

Table 7-12. Wind and Temperature Aloft Forecast Decoding Examples

FT 3000 6000 9000 12000 18000 24000 30000 34000 39000 MKC 9900 1709+06 2018+00 2130-06 2242-18 2361-30 247242 258848 550252			
Altitude (feet)	**Coded**	**Wind**	**Temperature (°C)**
3,000 FT	**9900**	Light and variable	Not forecast
6,000 FT	**1709+06**	170 degrees at 9 knots	+06 degrees Celsius
9,000 FT	**2018+00**	200 degrees at 18 knots	Zero degrees Celsius
12,000 FT	**2130-06**	210 degrees at 30 knots	-06 degrees Celsius
18,000 FT	**2242-18**	220 degrees at 42 knots	-18 degrees Celsius
24,000 FT	**2361-30**	230 degrees at 61 knots	-30 degrees Celsius
30,000 FT	**247242**	240 degrees at 72 knots	-42 degrees Celsius
34,000 FT	**258848**	250 degrees at 88 knots	-48 degrees Celsius
39,000 FT	**750252**	250 degrees at 102 knots	-52 degrees Celsius

7.4.2.2 Example for the Contiguous US and Alaska

```
DATA BASED ON 091200Z
VALID 091800Z   FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT  3000    6000    9000   12000   18000   24000  30000  34000  39000
ABI      1931+10 1929+10 2024+06 2331-10 2448-23 235239 246348 256056
ABQ              2213+03 2327-04 2253-17 2263-27 227242 236946 245749
ABR 2017 2312+14 2308+09 2615+02 2724-13 2527-26 273641 274051 274562
AGC (etc.)

FT   45000  53000
ABI 301049 281149
ABQ 235061 244859
ABR 224559 243756
AGC (etc.)
```

Note: 45,000- and 53,000-foot winds are not available for selected locations in the conterminous US.

7.4.2.3 Example for Hawaii and the Western Pacific

```
DATA BASED ON 091200Z
VALID 091800Z   FOR USE 1400-2100Z. TEMPS NEG ABV 24000

FT  1000 1500 2000 3000    6000    9000   12000   15000   18000   24000
LIH 9900 9900 1705 1806 1711+13 2216+10 2520+05 2523+01 2833-07 2937-19
HNL 9900 9900 9900 9900 1407+14 1908+11 2410+05 2612+01 2928-07 2930-18
LNY 9900 9900 9900 9900 1208+14 9900+11 9900+06 2909+01 3024-07 3027-18
OGG (etc.)

FT   30000  34000  39000  45000  53000
LIH 040734 990044 241055 281666 990072
HNL 051234 010543 250654 301066 990072
```

```
LNY 041433 010743 230754 260966 990072
OGG (etc)
```

Note: The altitudes forecast in the Hawaii and western Pacific bulletins are different than those forecast in the Contiguous US and Alaska

Note: The Hawaii and western Pacific bulletins are separated at the 24,000 foot level instead of 39,000 feet because of the additional, lower levels noted in Table 7-10.

7.4.3 Issuance

The NWS National Centers for Environmental Prediction (NCEP) produces scheduled Wind and Temperature Aloft Forecasts (**FB**) four (4) times daily for specified locations in the Continental United States (CONUS), the Hawaiian Islands, Alaska and coastal waters, and the western Pacific Ocean (Figures 7-13 through 7-16).

Amendments are not issued to the forecasts.

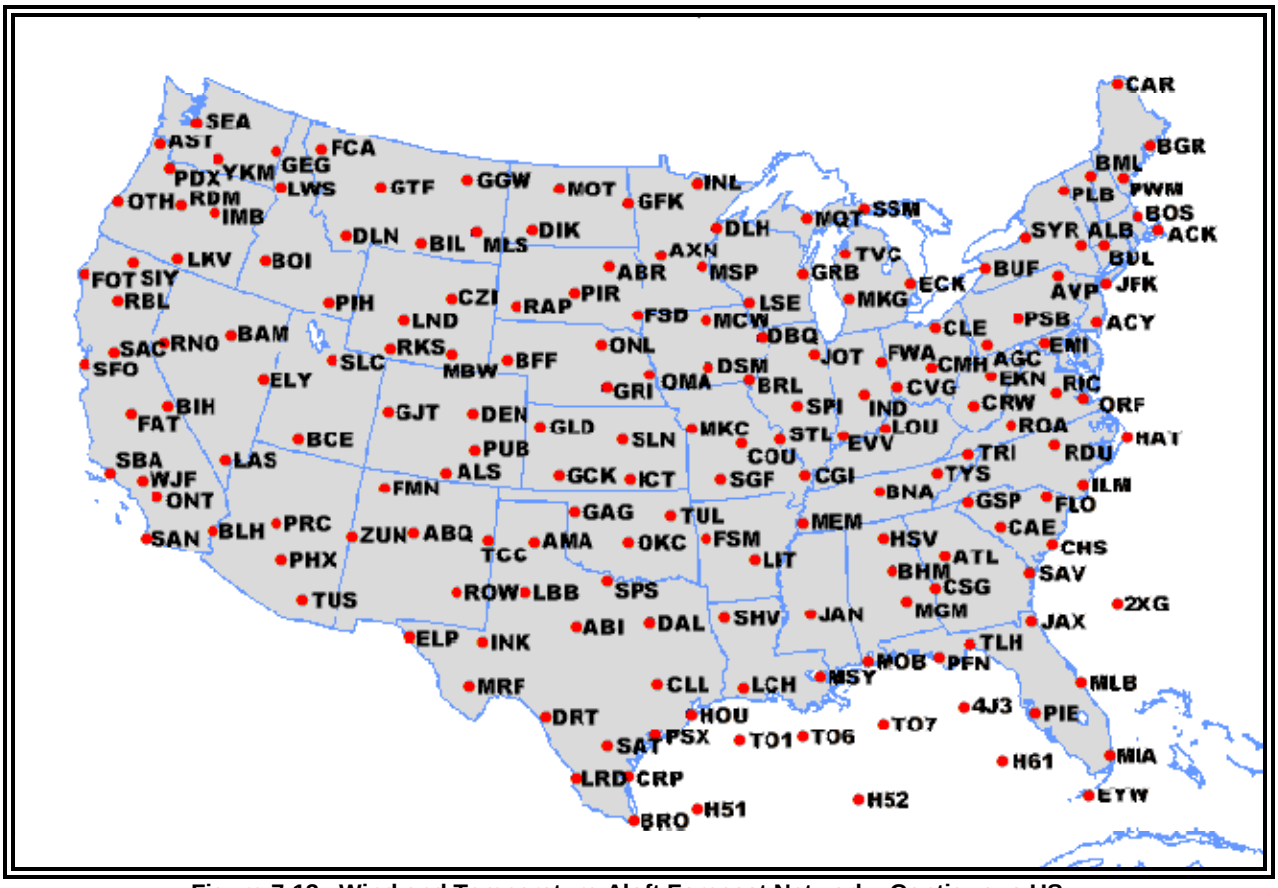


Figure 7-13. Wind and Temperature Aloft Forecast Network - Contiguous US

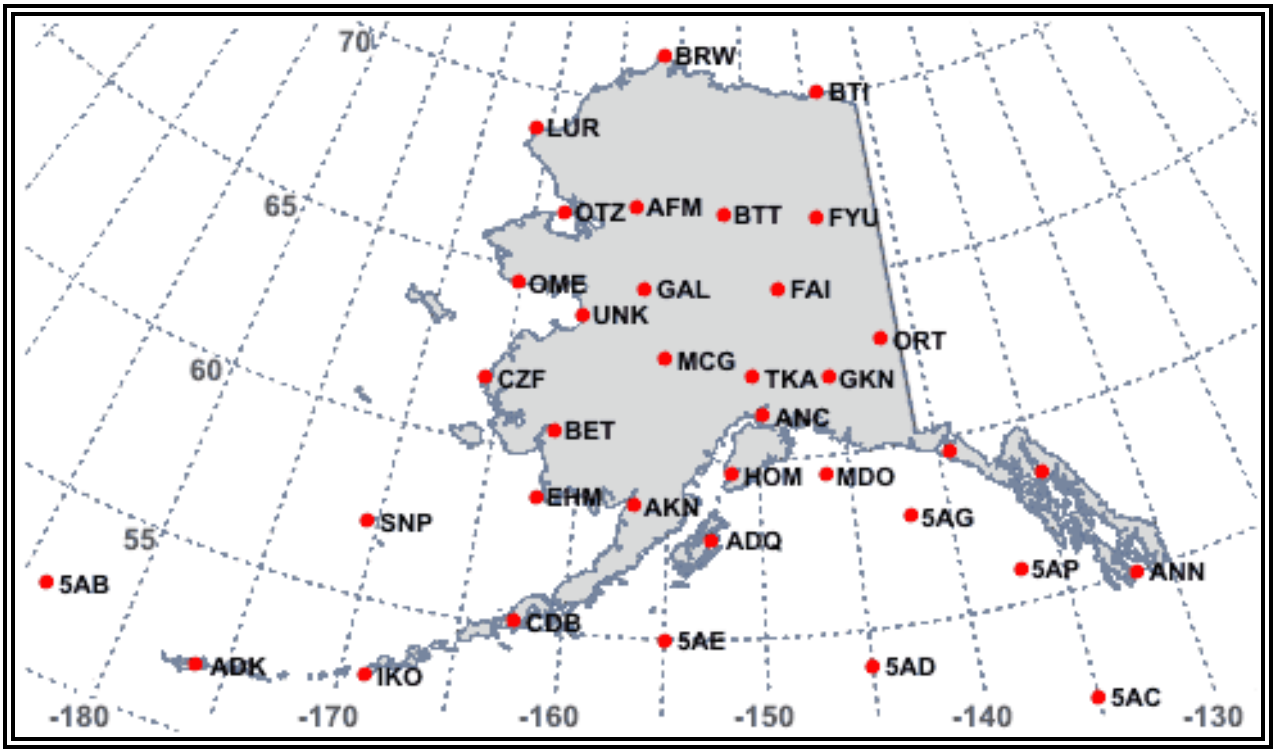


Figure 7-14. Wind and Temperature Aloft Forecast Network - Alaska

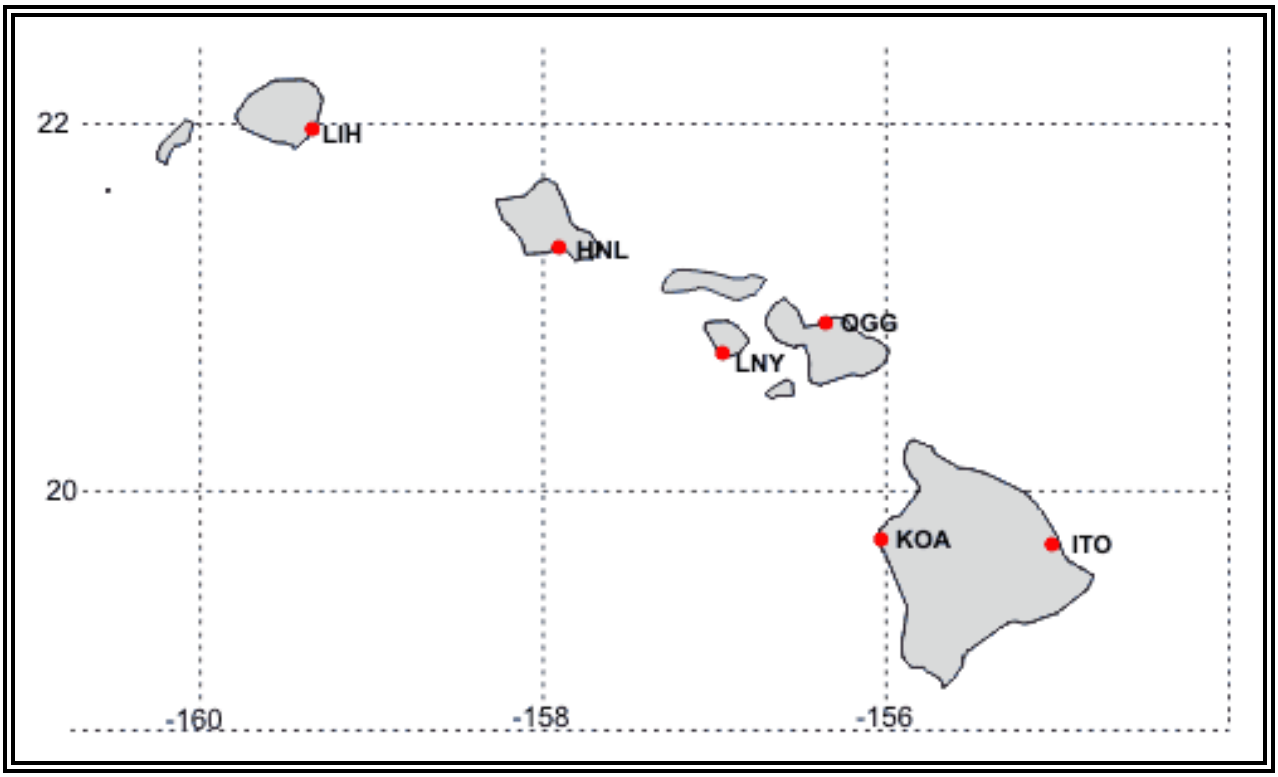


Figure 7-15. Wind and Temperature Aloft Forecast Network - Hawaii

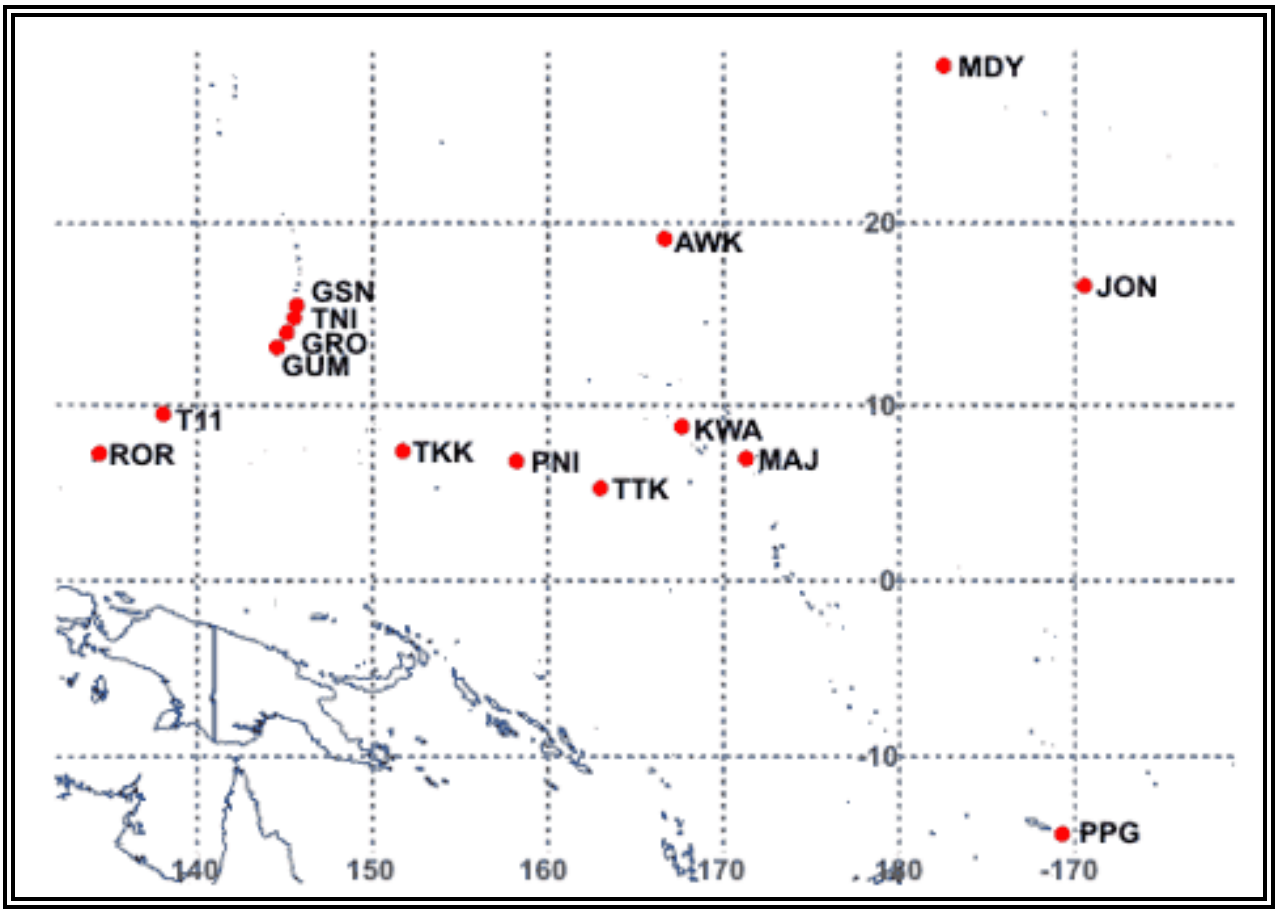


Figure 7-16. Wind and Temperature Aloft Forecast Network - Western Pacific

Table 7-13. Wind and Temperature Aloft Forecast (FB) Periods

Model Run	Product Available	6 hour Forecast		12 hour Forecast		24 hour Forecast	
		Valid	For Use	Valid	For Use	Valid	For Use
0000Z	~0200Z	0600Z	0200-0900Z	1200Z	0900-1800Z	0000Z	1800-0600Z
0600Z	~0800Z	1200Z	0800-1500Z	1800Z	1500-0000Z	0600Z	0000-1200Z
1200Z	~1400Z	1800Z	1400-2100Z	0000Z	2100-0600Z	1200Z	0600-1800Z
1800Z	~2000Z	0000Z	2000-0300Z	0600Z	0300-1200Z	1800Z	1200-0000Z

7.4.4 Delayed Forecasts

If the scheduled forecast transmission is delayed, the existing valid forecast based on the earlier 6-hourly data can be used until a new forecast is transmitted.

8 FORECAST CHARTS

8.1 Short-Range Surface Prognostic (Prog) Charts

Short-Range Surface Prognostic (Prog) Charts (Figure 8-1) provide a forecast of surface pressure systems, fronts and precipitation for a 2-day period. The forecast area covers the 48-contiguous states, the coastal waters and portions of adjacent countries. The forecasted conditions are divided into four forecast periods, 12-, 24-, 36-, and 48-hours. Each chart depicts a "snapshot" of weather elements expected at the specified valid time.

The Surface Prognostic (Prog) Charts are available at the Aviation Digital Data Services (ADDS) web site at: http://adds.aviationweather.noaa.gov/progs/.

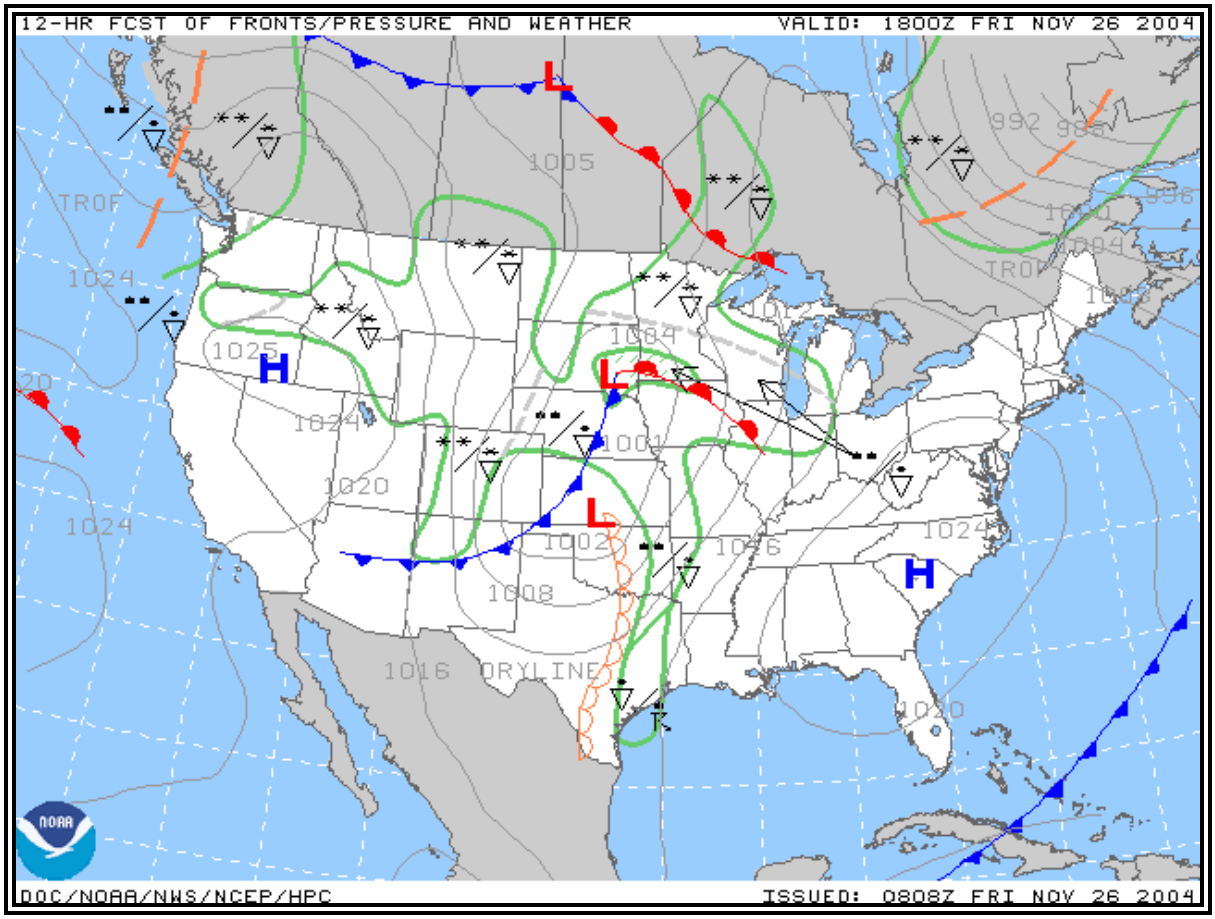


Figure 8-1. Surface Prog Chart Example

8.1.1 Content

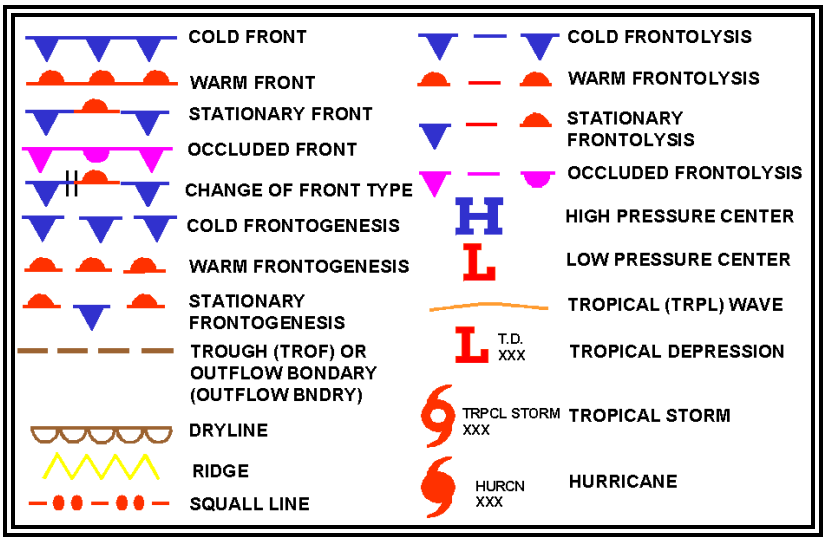


Figure 8-2. Surface Prog Chart Symbols

8.1.1.1 Pressure Systems

Pressure systems are depicted by pressure centers, troughs, isobars, drylines, tropical waves, tropical storms and hurricanes using standard symbols (Figure 8-2). Isobars are denoted by solid thin gray lines and labeled with the appropriate pressure in millibars. The central pressure is plotted near the respective pressure center.

8.1.1.2 Fronts

Fronts are depicted using the standard symbols in Figure 8-2.

8.1.1.3 Squall Lines

Squall lines are denoted using the standard symbol in Figure 8-2.

8.1.1.4 Precipitation

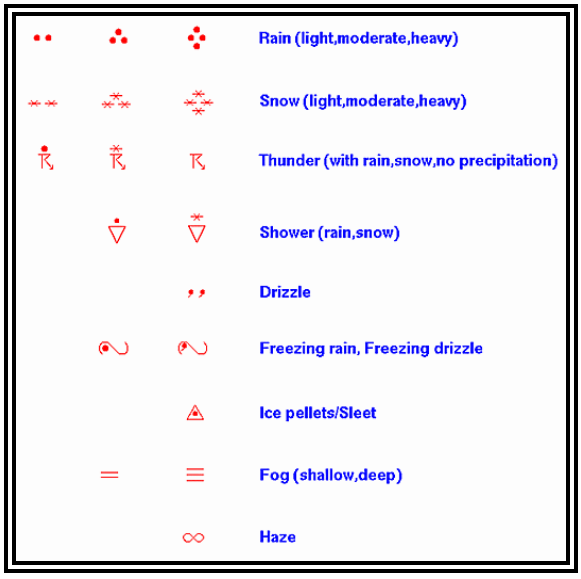


Figure 8-3. Surface Prog Chart Precipitation Symbols

Precipitation areas are enclosed by thick, solid, green lines (Figure 8-4). Standard precipitation symbols are used to identify precipitation types (Figure 8-3). These symbols are positioned within or adjacent to the associated area of precipitation. If adjacent to the area, an arrow will point to the area with which they are associated. A mix of precipitation is indicated by the use of two pertinent symbols separated by a slash (Figure 8-4). A bold, dashed, grey line is used to separate precipitation within an outlined area with contrasting characteristics (Figure 8-4). For instance, a dashed line would be used to separate an area of snow from an area of rain.

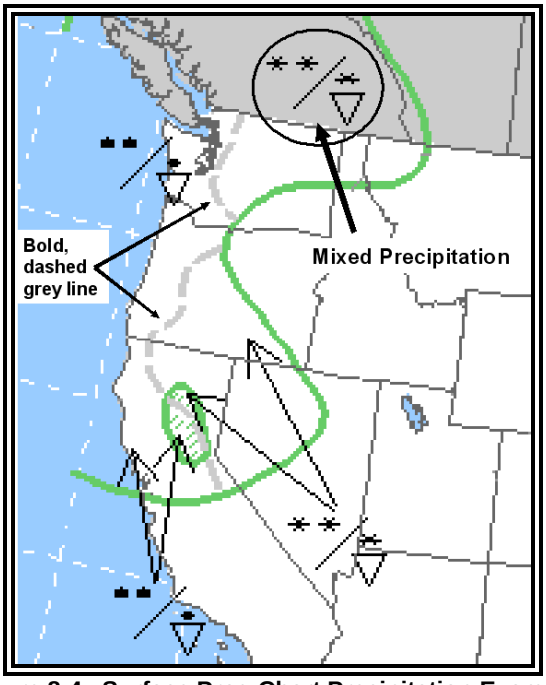


Figure 8-4. Surface Prog Chart Precipitation Example

Precipitation characteristic are further described by the use of shading (Figure 8-5). Shading or lack of shading indicates the expected coverage of the precipitation. Shaded areas indicate the precipitation is expected to have more than 50% (broken) coverage. Unshaded areas indicate 30-50% (scattered) coverage.

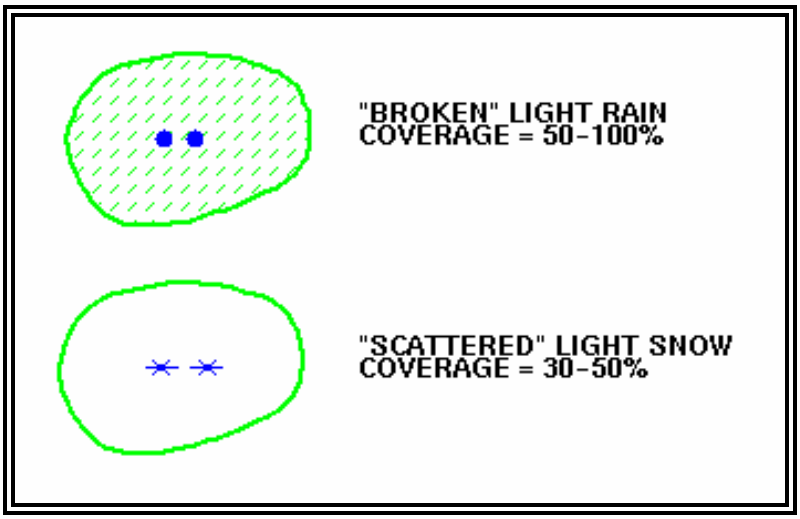


Figure 8-5. Surface Prog Chart Precipitation Coverage

8.1.2 Issuance

Short-Range Surface Prognostic (Prog) Charts are issued by the Hydrometeorological Prediction Center (HPC) in Camp Springs, MD. Table 8-1 provides the product schedule. The 12- and 24-Hour Surface Prognostic (Prog). Charts are issued four times a day and are termed "Day 1" progs. The 36- and 48- Hour Surface Prog Charts are issued twice daily and are termed "Day 2" progs. They are available on the HPC web site at: http://adds.aviationweather.noaa.gov/progs/.

Table 8-1. Short-Range Surface Prog Charts Schedule

	Issuance Time (UTC)			
	~1720	~2310	~0530	~0935
	Valid Time (UTC)			
12-Hour Surface Prog	0000	0600	1200	1800
24-Hour Surface Prog	1200	1800	0000	0600
36-Hour Surface Prog	0000	NA	1200	NA
48-Hour Surface Prog	1200	NA	0000	NA

8.1.3 Use

Short-Range Surface Prognostic (Prog) Charts can be used to obtain an overview of the progression of surface weather features during the next 48 hours. The progression of weather is the change in position, size, and intensity of weather with time. Progression analysis is accomplished by comparing charts of observed conditions to the 12-, 24-, 36-, and 48-hour progs. Short-Range Surface Prognostic (PROG) Charts make the comprehension of weather details easier and more meaningful. For example, in Figures 8-6 through 8-9, the cold front located from the eastern Great Lakes to Missouri is forecast to move southeastward and the High pressure center just north of the Minnesota/North Dakota boarder is also forecast to move southeast and weaken.

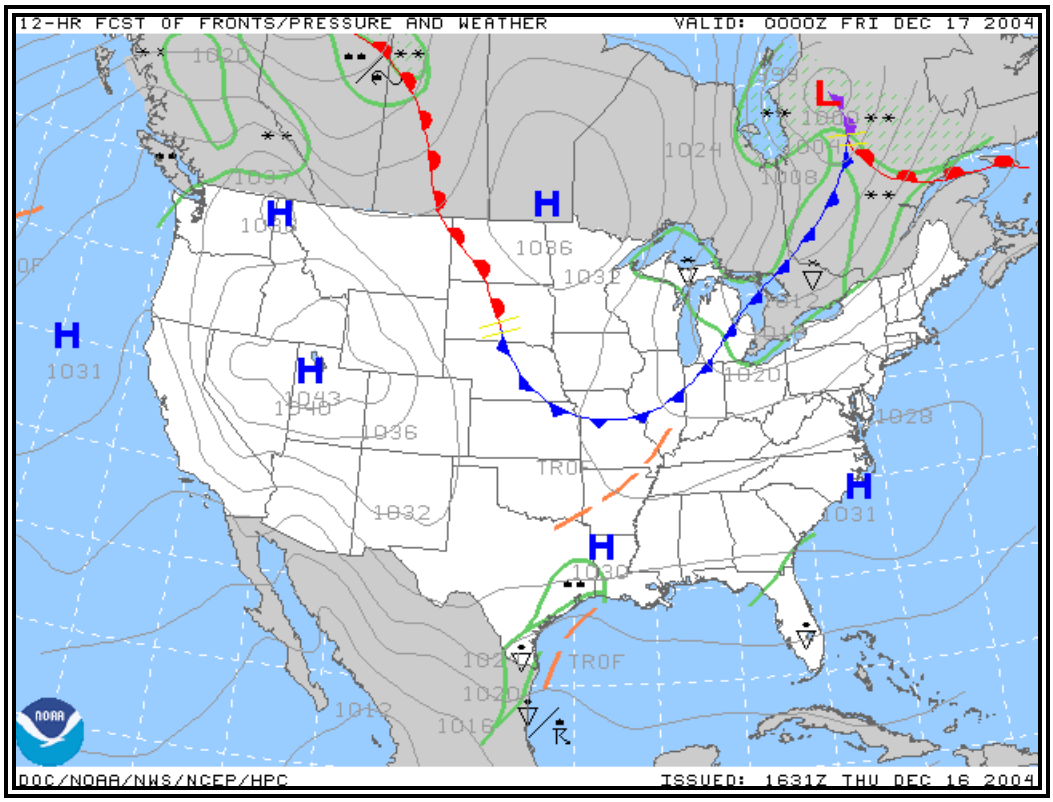


Figure 8-6. 12-hour Surface Prog Chart Example

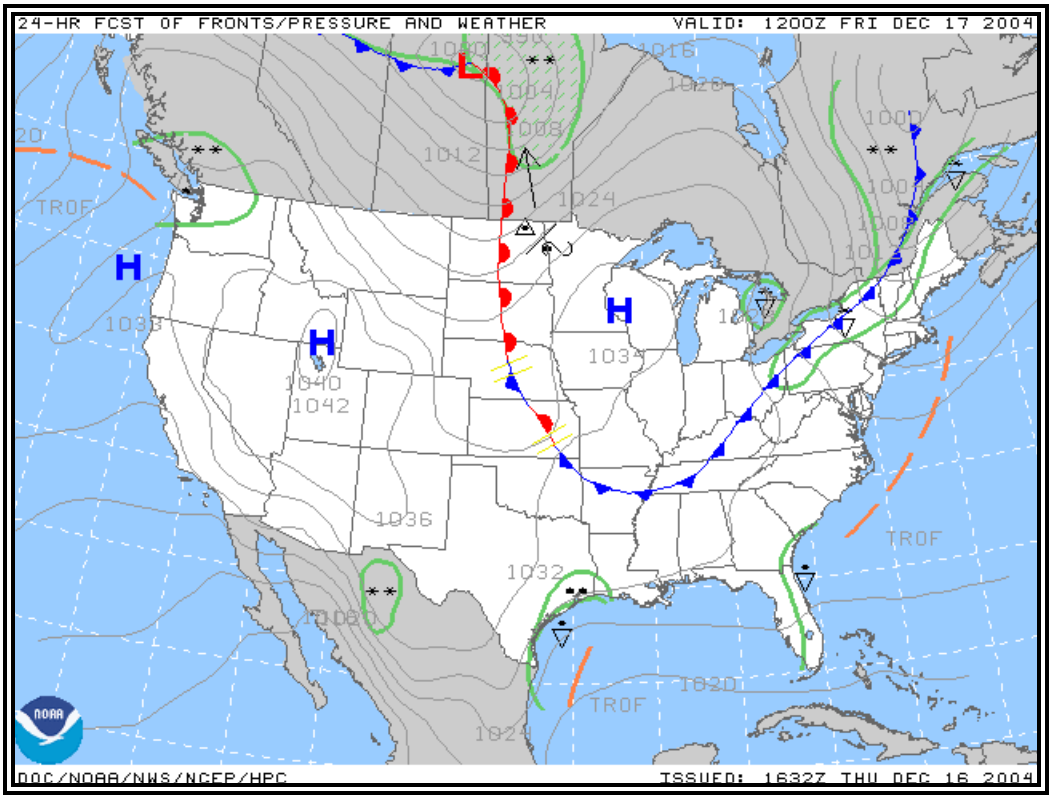


Figure 8-7. 24-hour Surface Prog Chart Example

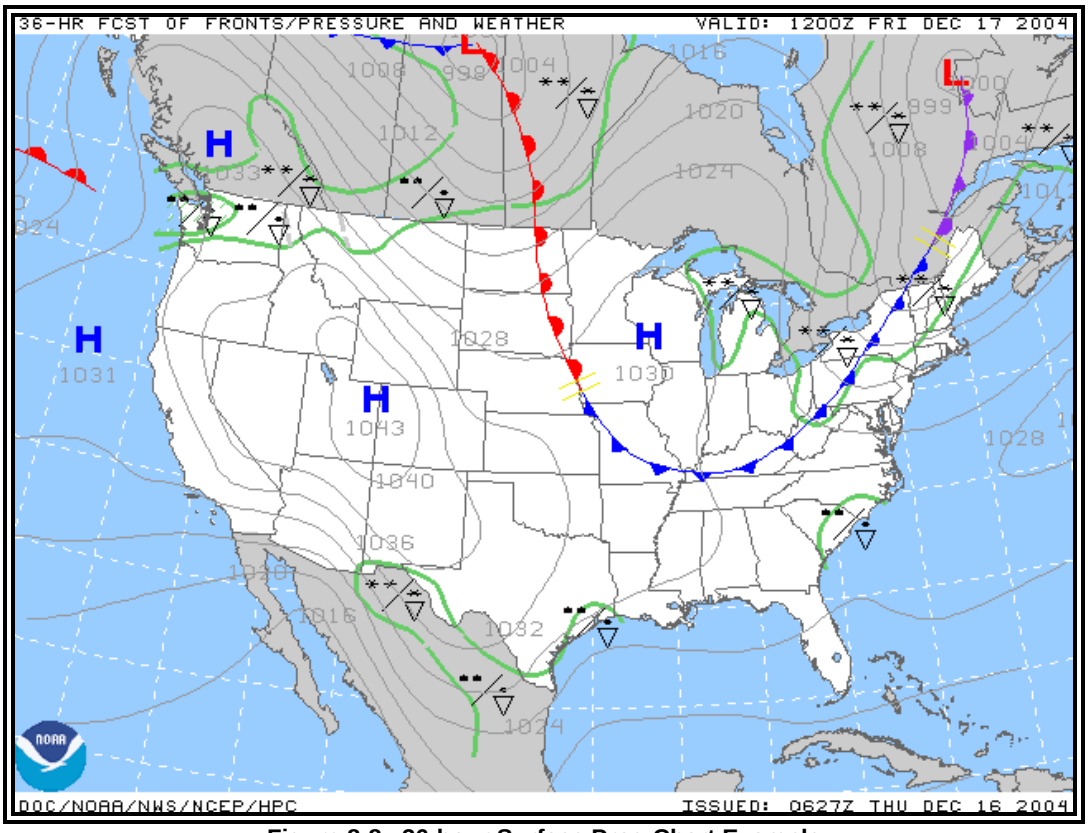


Figure 8-8. 36-hour Surface Prog Chart Example

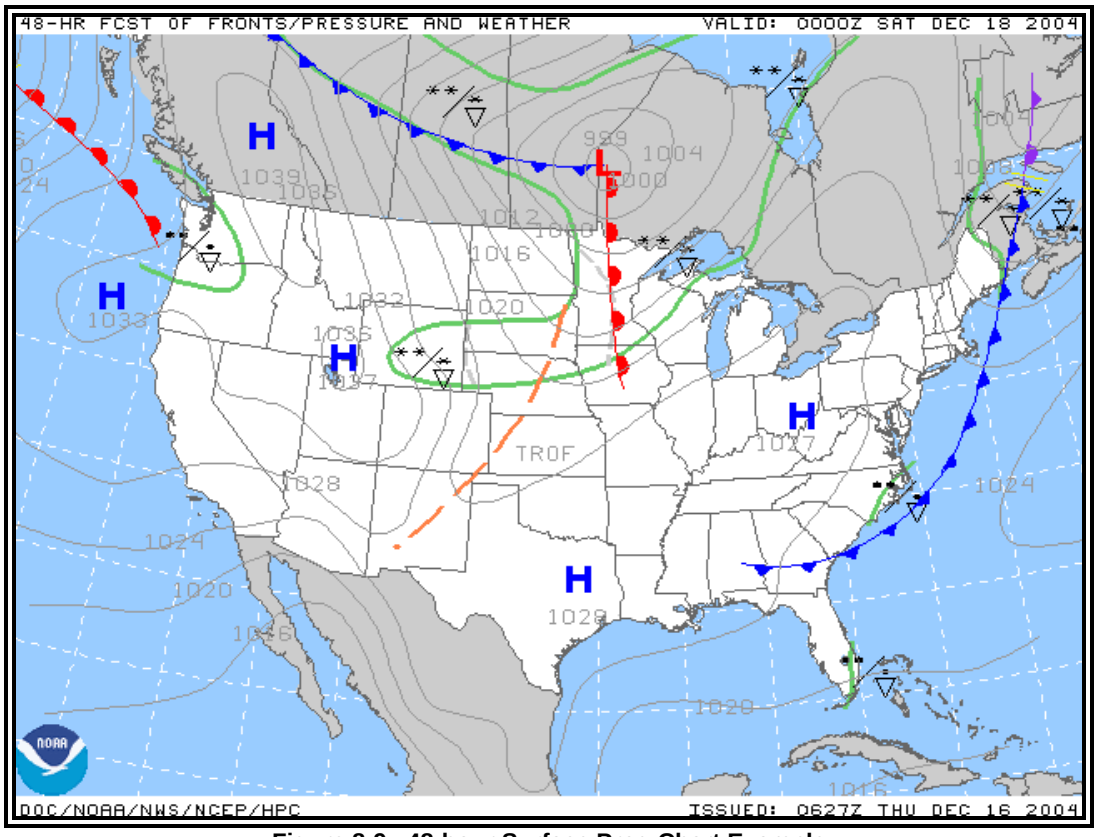


Figure 8-9. 48-hour Surface Prog Chart Example

8.2 Low-Level Significant Weather (SIGWX) Charts

The Low-Level Significant Weather (SIGWX) Charts (Figure 8-10) provide a forecast of aviation weather hazards primarily intended to be used as guidance products for pre-flight briefings. The forecast domain covers the 48 contiguous states and the coastal waters for altitudes 24,000 ft MSL (Flight Level 240 or 400 millibars) and below. Each chart depicts a "snapshot" of weather expected at the specified valid time.

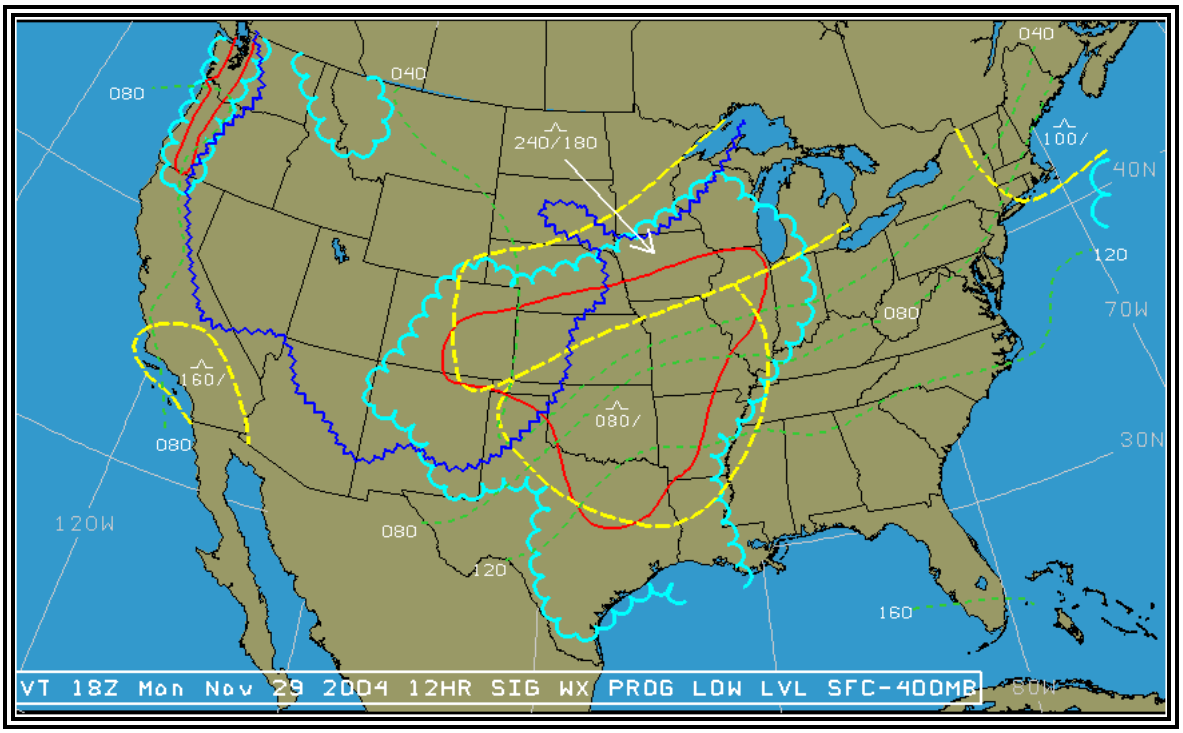


Figure 8-10. 12-Hour Low-Level SIGWX Chart Example

8.2.1 Content

Low-Level Significant Weather (SIGWX) Charts depict weather flying categories, turbulence, and freezing levels (Figure 8-11). Icing is not specifically forecast.

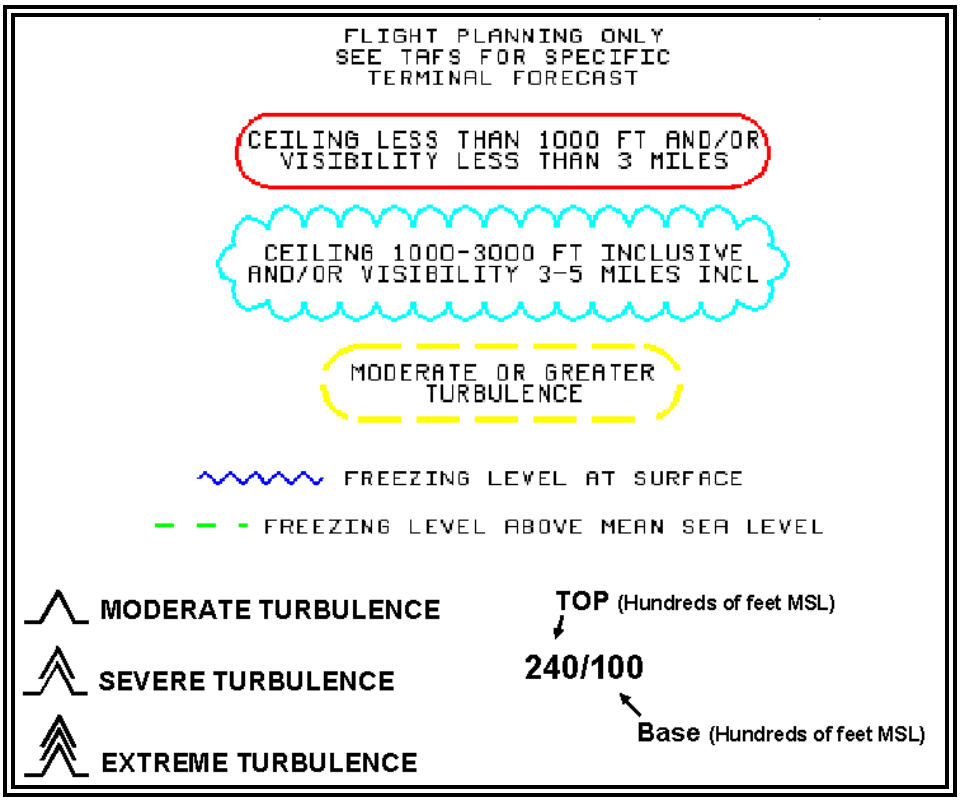


Figure 8-11. Low-Level SIGWX Chart Symbols

8.2.1.1 Flying Categories

Instrument Flight Rules (IFR) areas are outlined with a solid red line, Marginal Visual Flight Rules (MVFR) areas are outlined with a scalloped blue line, Visual Flight Rules (VFR) areas are not depicted (Figure 8-12).

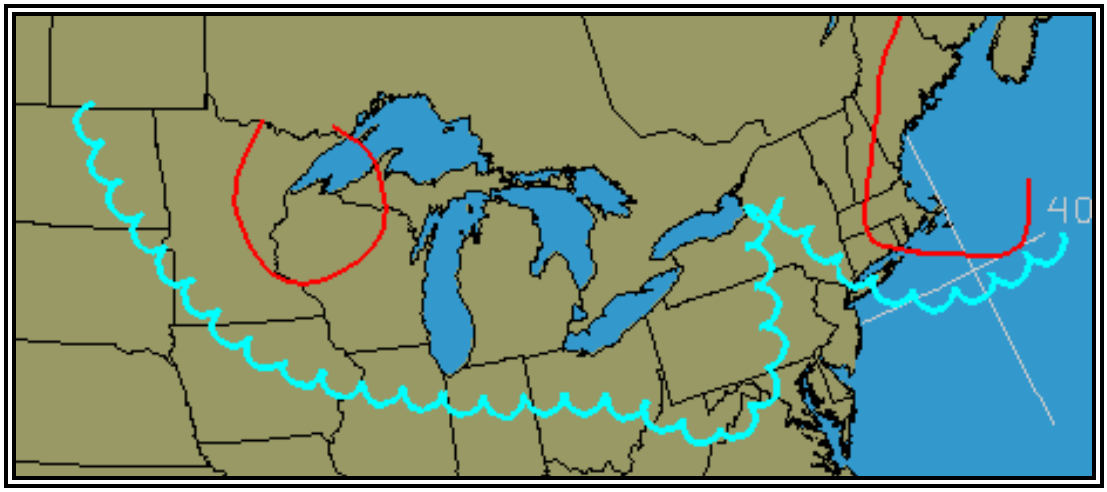


Figure 8-12. Low-Level SIGWX Chart Flying Categories Example

8.2.1.2 Turbulence

Areas of moderate or greater turbulence are enclosed by bold, dashed, yellow lines (Figure 8-13). Turbulence intensities are identified by standard symbols (Figure 8-11). The vertical extent of turbulence layers is specified by top and base heights separated by a slant. The intensity

symbols and height information may be located within or adjacent to the forecasted areas of turbulence. If located adjacent to an area, an arrow will point to the associated area. Turbulence height is depicted by two numbers separated by a solidus **/**. For example, an area on the chart with turbulence indicated as **240/100** indicates the turbulence can be expected from the top at FL240 to the base at 10,000 feet MSL. When the base height is omitted, the turbulence is forecast to reach the surface. For example, **080/** identifies a turbulence layer from the surface to 8,000 feet MSL. Turbulence associated with thunderstorms is not depicted on the chart.

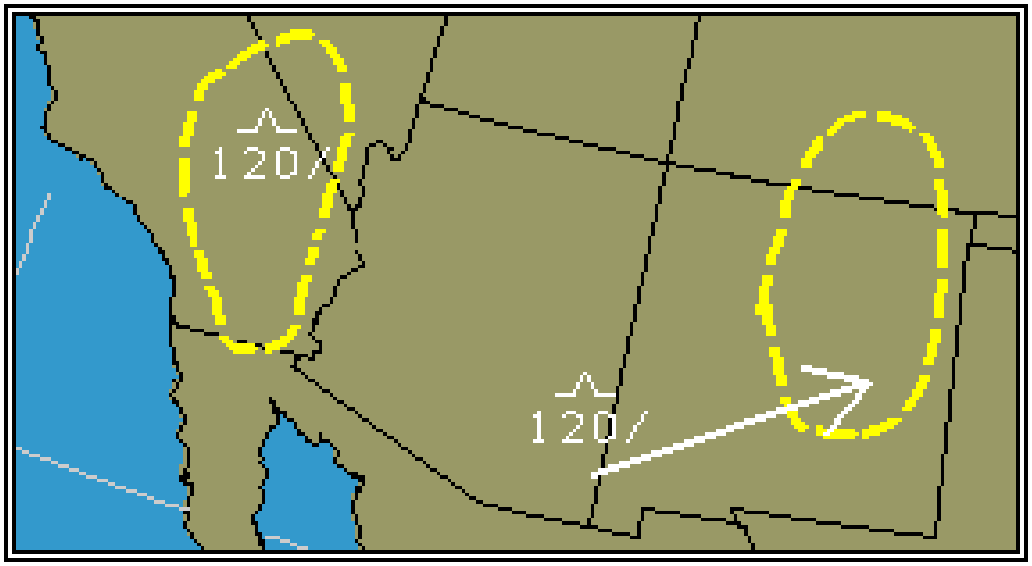


Figure 8-13. Low-Level SIGWX Chart Turbulence Forecast Example

8.2.1.3 Freezing Levels

The freezing level at the surface is depicted by a blue, saw-toothed symbol (Figure 8-11). The surface freezing level separates above-freezing from below-freezing temperatures at the Earth's surface.

Freezing levels above the surface are depicted by fine, green, dashed lines labeled in hundreds of feet MSL beginning at 4,000 feet using 4,000 foot intervals (Figure 8-11). If multiple freezing levels exist, these lines are drawn to the highest freezing level. For example, **80** identifies the 8,000-foot freezing level contour (Figure 8-14). The lines are discontinued where they intersect the surface.

The freezing level for locations between lines is determined by interpolation. For example, the freezing level midway between the 4,000 and 8,000 foot lines is 6,000 feet.

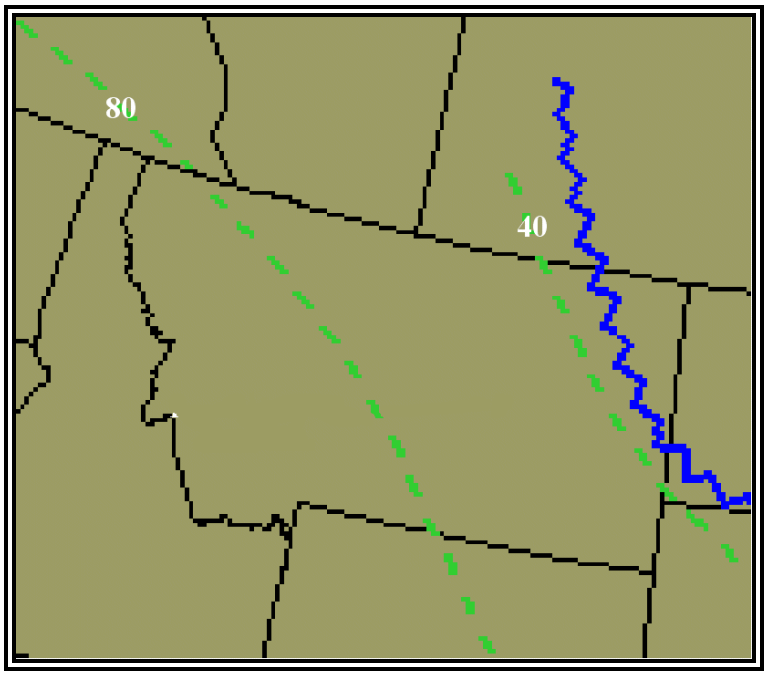


Figure 8-14. Low-Level SIGWX Chart Freezing Level Forecast Example

Multiple freezing levels occur when the temperature is zero degrees Celsius at more than one altitude aloft. Multiple freezing levels can be forecasted on the Low-Level Significant Weather Prog Charts in situations where the temperature is below-freezing (negative) at the surface with multiple freezing levels aloft.

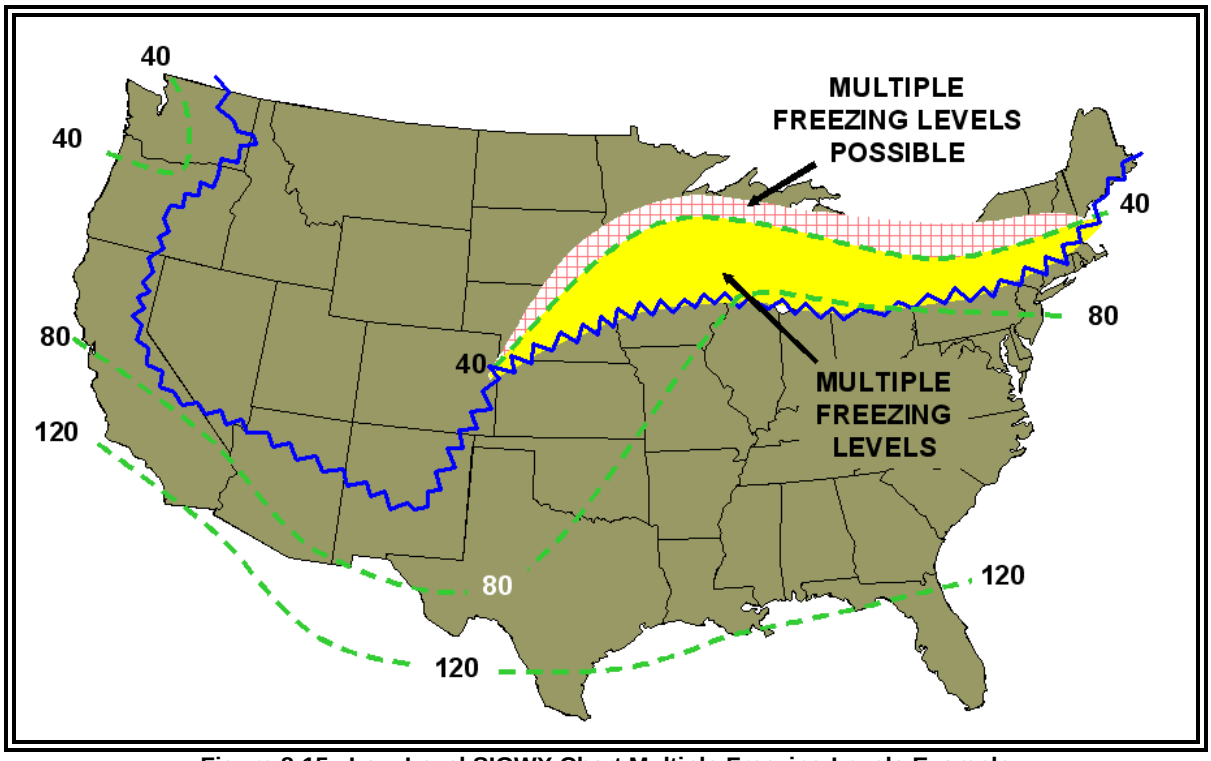


Figure 8-15. Low-Level SIGWX Chart Multiple Freezing Levels Example

On the chart, areas with multiple freezing levels are located on the below-freezing side of the surface freezing level contour and bounded by the 4,000 foot freezing level. Multiple freezing levels are **possible** beyond the 4,000 feet freezing level (i.e., below 4,000 feet MSL), but the exact cutoff cannot be determined (Figure 8-15).

8.2.2 Issuance

Low-Level Significant Weather (SIGWX) Charts are issued four times per day by the Aviation Weather Center (AWC) in Kansas City, Missouri (Table 8-2). Two charts are issued; a 12-hour and a 24-hour prog. Both are available on the AWC web site: http://aviationweather.gov/products/swl/.

Table 8-2. Low-Level SIGWX Chart Issuance Schedule

	Issuance Time			
	~1720Z	~2310Z	~0530Z	~0935Z
Chart	**Valid Time**			
12-Hour Prog	00Z	06Z	12Z	18Z
24-Hour Prog	12Z	18Z	00Z	06Z

8.2.3 Use

The Low-Level Significant Weather (SIGWX) Charts provide an overview of selected aviation weather hazards up to 24,000 feet MSL (FL240 or 400 millibars) at 12- and 24-hours into the future.

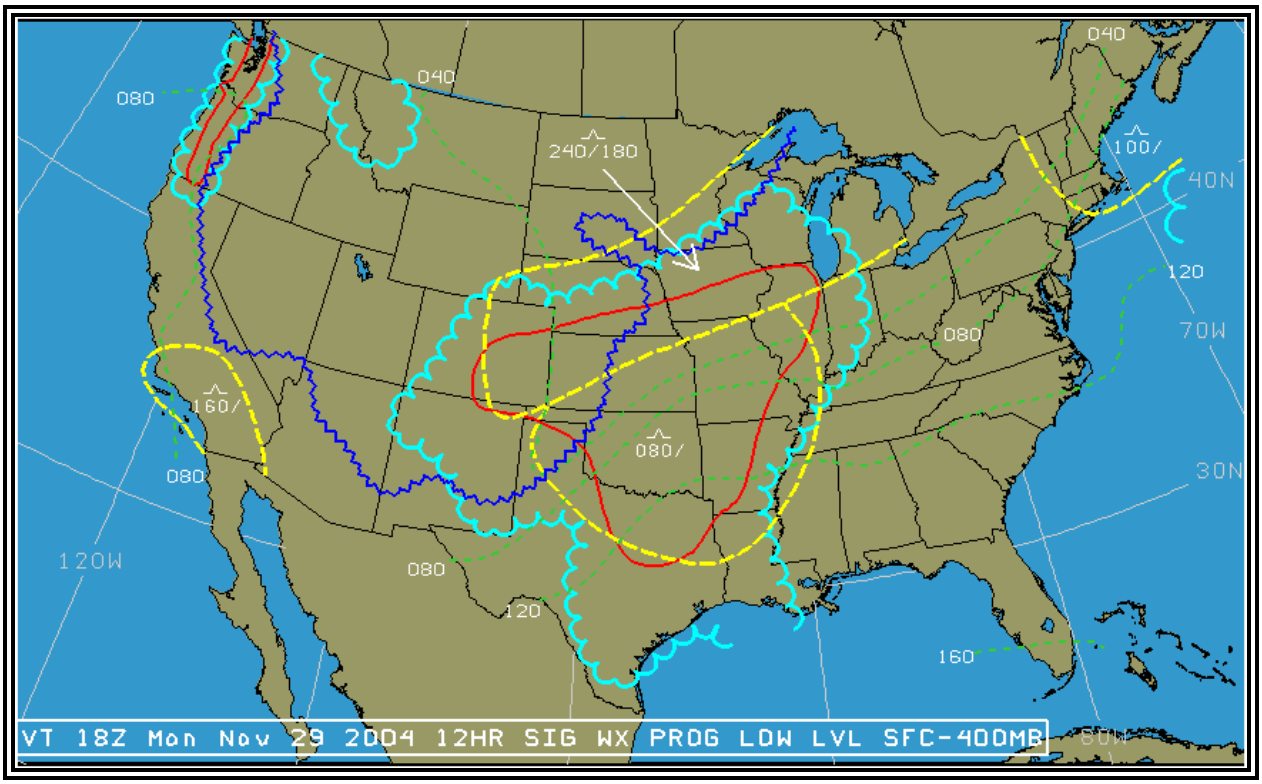


Figure 8-16. 12-Hour Low-Level SIGWX Chart Example

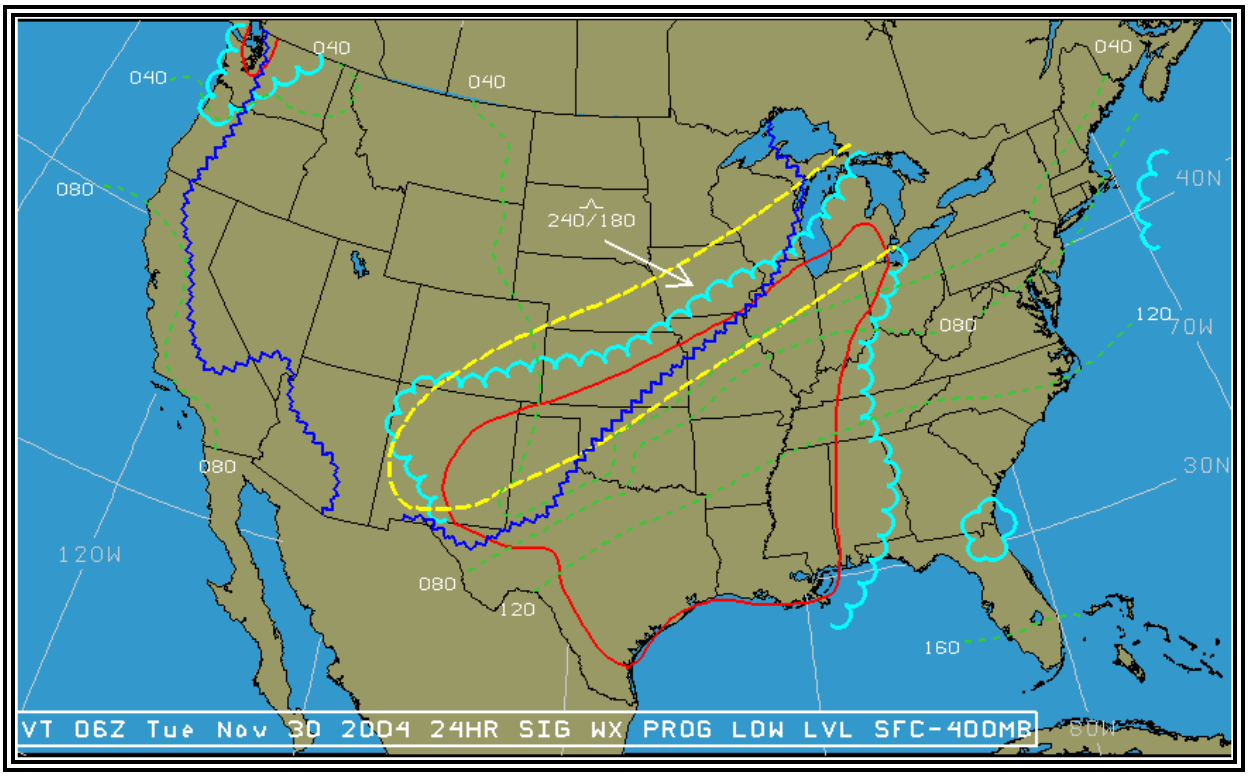


Figure 8-17. 24-hour Low-Level SIGWX Chart Example

8.3 Mid-Level Significant Weather (SIGWX) Chart

The Mid-Level Significant Weather (SIGWX) Chart (Figure 8-18) provides a forecast of significant en route weather phenomena over a range of flight levels from 10,000 ft MSL to FL450, and associated surface weather features. The chart depicts a "snapshot" of weather expected at the specified valid time.

The Mid-Level Significant Weather (SIGWX) Chart is available on the Aviation Weather Center web site at: http://aviationweather.gov/products/swm/.

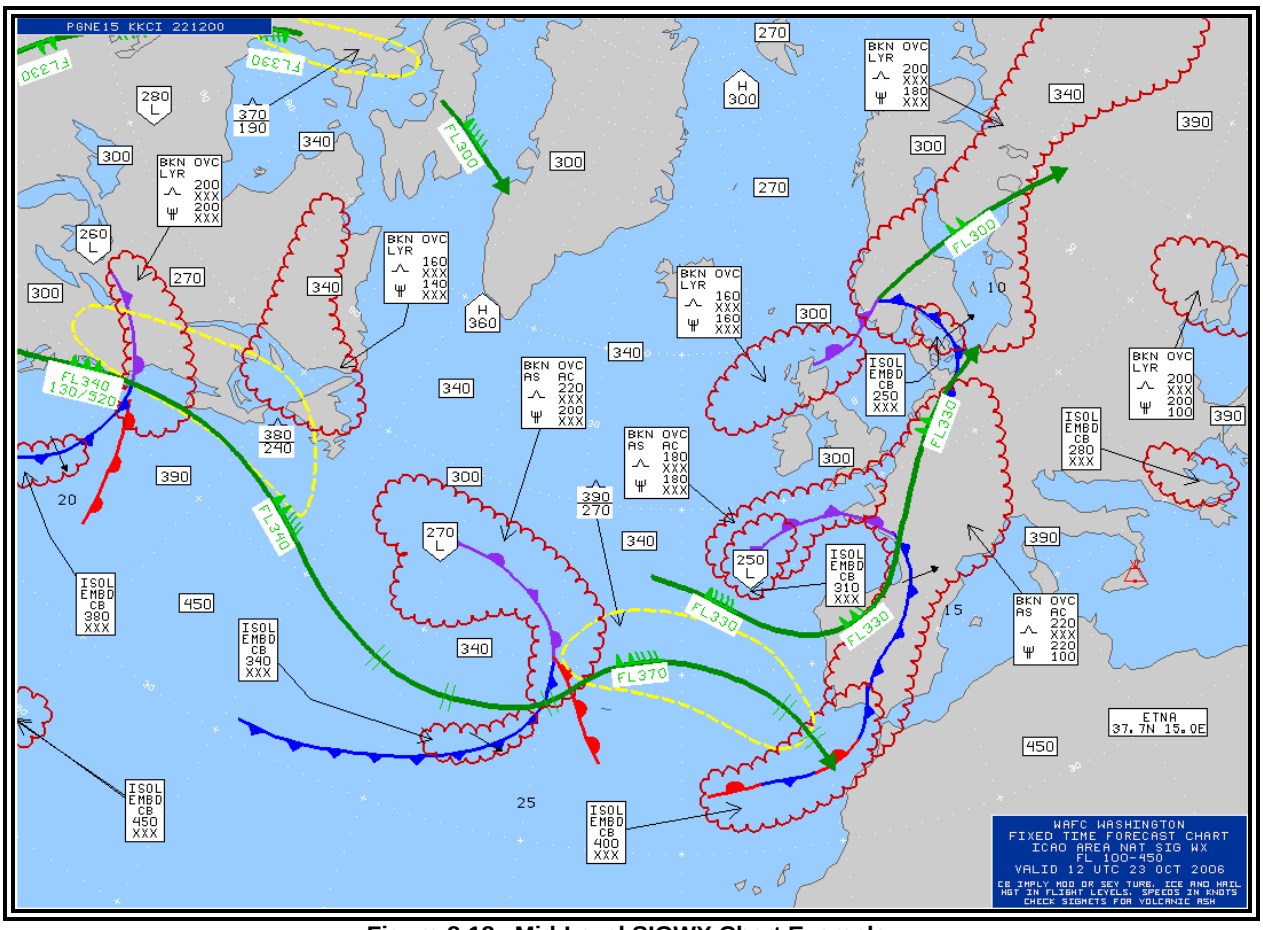


Figure 8-18. Mid-Level SIGWX Chart Example

8.3.1 Content

The Mid-Level Significant Weather (SIGWX) Chart depicts numerous weather elements that can be hazardous to aviation.

8.3.1.1 Thunderstorms

The abbreviation **CB** is only included where it refers to the expected occurrence of an area of widespread cumulonimbus clouds, cumulonimbus along a line with little or no space between individual clouds, cumulonimbus embedded in cloud layers, or cumulonimbus concealed by haze. It does not refer to isolated or scattered cumulonimbus not embedded in cloud layers or concealed by haze.

Each cumulonimbus area is identified with **CB** and characterized by coverage, bases and tops.

Table 8-3. Mid-Level SIGWX Chart Cumulonimbus Coverage

CODED	CHARACTERIZATION	MEANING
ISOL	Isolated	Less than 1/8th coverage
OCNL	Occasional	1/8th to 4/8^{ths} coverage
FRQ	Frequent	More than 4/8^{ths} coverage
EMBD	Embedded	CBs concealed by other cloud layers, haze, dust, etc.

Coverage, Table 8-3, is identified as isolated (**ISOL**) meaning less than 1/8th, occasional (**OCNL**) meaning 1/8th to 4/8^{ths}, and frequent (**FRQ**) meaning more than 4/8^{ths} coverage. Isolated and occasional **CB**s are further characterized as embedded (**EMBD**). The chart does not display isolated or scattered cumulonimbus clouds unless they are embedded in other clouds, haze, or dust.

The vertical extent of cumulonimbus layer is specified by top and base heights. Bases that extend below 10,000 feet (the lowest altitude limit of the chart) are encoded **XXX**.

Cumulonimbus clouds (**CB**s) are depicted by enclosed (red) scalloped lines (Figure 8-19). The identification and characterization of each cumulonimbus area appears within or adjacent to the outlined area. If the identification and characterization is adjacent to an outlined area, an arrow points to the appropriate cumulonimbus area.

On significant weather (SIGWX) charts, the inclusion of **CB** or the thunderstorm symbol (Figure 8-3) should be understood to include all weather phenomena normally associated with cumulonimbus or thunderstorm, namely, moderate or severe icing, moderate or severe turbulence, and hail.

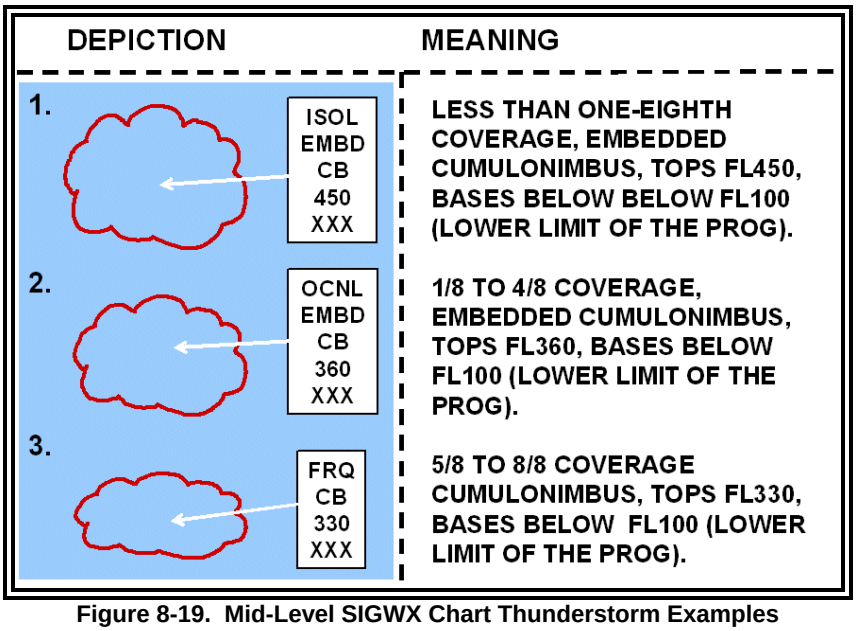


Figure 8-19. Mid-Level SIGWX Chart Thunderstorm Examples

8.3.1.2 Surface Frontal Positions and Movements

Surface fronts are depicted using the standard symbols found on the Surface Analysis Chart. (Figure 8-2). An arrow identifies the direction of frontal movement with the speed indicated in knots plotted near the arrow head (Figure 8-20).

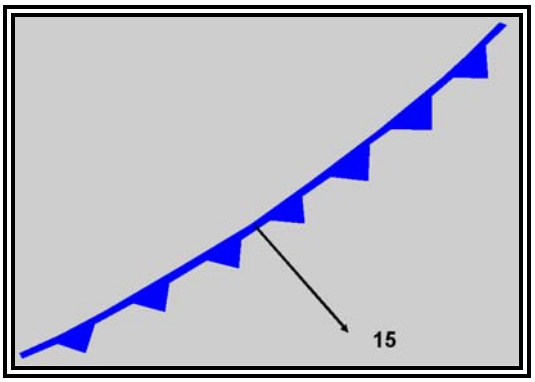


Figure 8-20. Mid-Level SIGWX Chart Surface Frontal Position and Movement Example

8.3.1.3 Jet Streams

A jet stream axis with a wind speed of more than 80 knots is identified by a bold green line (Figure 8-21). An arrowhead is used to indicate wind direction. Double-hatched, light green lines positioned along a jet stream axis identify 20 knot wind speed changes.

Symbols and altitudes are used to further characterize a jet stream axis. A standard wind symbol (light green) is placed at each pertinent position to identify wind velocity. The flight level "FL" in hundreds of feet MSL is placed adjacent to each wind symbol to identify the altitude of the jet stream axis.

Jet stream vertical depth (jet depth) forecasts are included when the maximum speed is 120 knots or more. Jet depth is defined as the vertical depths to the 80 knot wind field above and below the jet stream axis using flight levels.

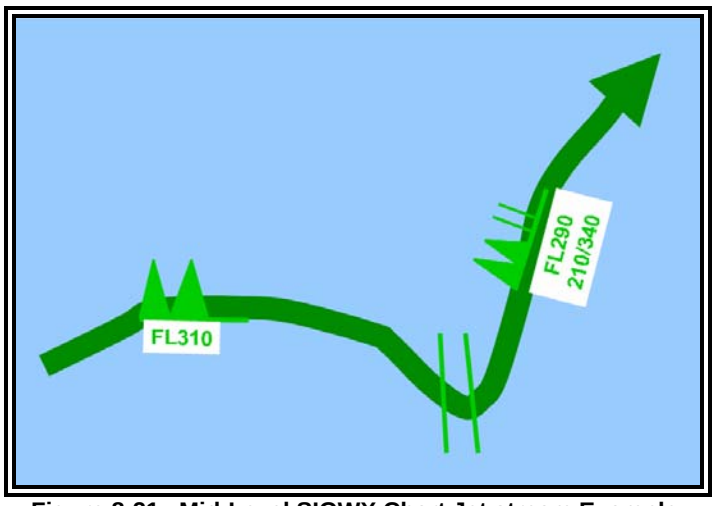


Figure 8-21. Mid-Level SIGWX Chart Jet stream Example.
Forecast maximum speeds of 100 knots at FL310 at one location and 120 knots at FL290 at another location. At the latter location, the base of the 80 knot wind field is FL210, and the top of the 80 knot wind field is FL340.

8.3.1.4 Tropopause Heights

Tropopause heights are plotted at selected locations on the chart (Figure 8-22). They are enclosed by rectangles and plotted in hundreds of feet MSL. Centers of high (**H**) and low (**L**) tropopause heights are enclosed by polygons and plotted in hundreds of feet MSL.

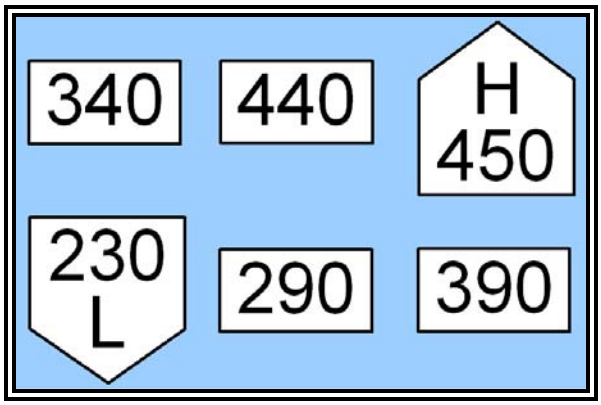


Figure 8-22. Mid-Level SIGWX Chart Tropopause Height Examples

8.3.1.5 Tropical Cyclones

Tropical cyclones are depicted by the appropriate symbol (Figure 8-23) with the storm's name positioned adjacent to the symbol. Cumulonimbus clouds meeting chart criteria are identified and characterized relative to each storm.

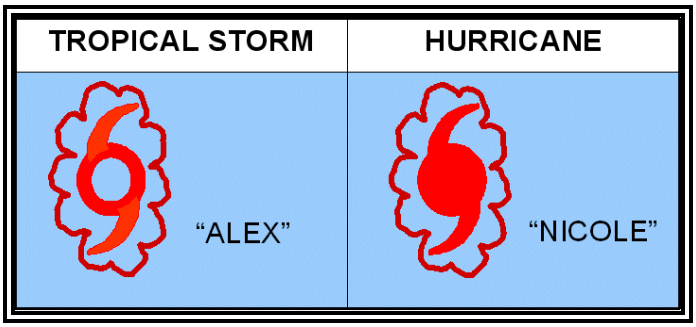


Figure 8-23. Mid-Level SIGWX Chart Tropical Cyclone Examples

8.3.1.6 Moderate or Severe Icing

Areas of moderate or severe icing are depicted by enclosed (red) scalloped lines (Figure 8-24). The identification and characterization of each area appears within or adjacent to the outlined area. If the identification and characterization is adjacent to an outlined area, an arrow points to the appropriate area.

The identification box uses the standard icing symbol (Appendix J). The vertical extent of the icing layer is specified by top and base heights. Bases which extend below the layer of the chart are identified with **XXX**.

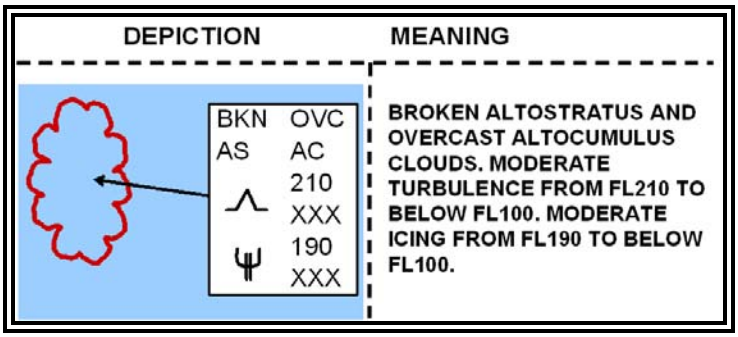


Figure 8-24. Mid-Level SIGWX Chart Icing Examples

8.3.1.7 Moderate or Severe Turbulence (in cloud or in clear air)

Forecast areas of moderate or severe turbulence associated with wind shear zones and/or mountain waves are enclosed by bold yellow dashed lines (Figure 8-25). Intensities are identified by standard symbols (Appendix J).

The vertical extent of a turbulence layer is specified by top and base heights, separated by a horizontal line. A turbulence base which extends below the layer of the chart is identified with **XXX**.

Thunderstorm turbulence is not identified.

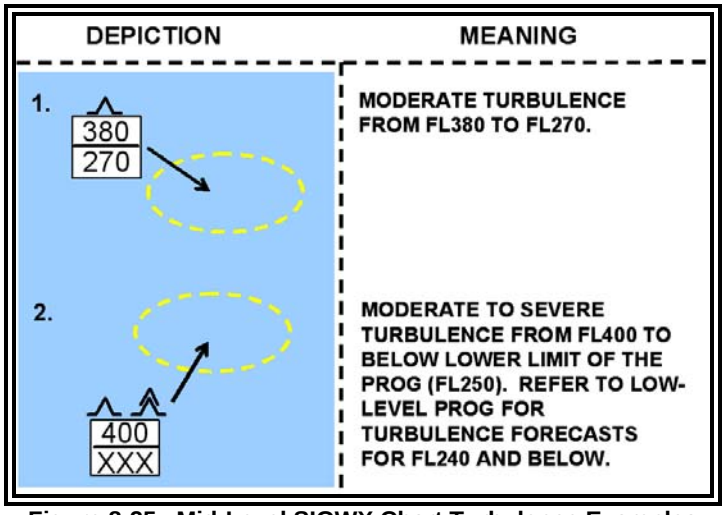


Figure 8-25. Mid-Level SIGWX Chart Turbulence Examples

Areas of moderate or severe turbulence are also depicted by enclosed (red) scalloped lines (Figure 8-24). The identification and characterization of each area appears within or adjacent to the outlined area. If the identification and characterization is adjacent to an outlined area, an arrow points to the associated area.

Standard turbulence symbols are used (Appendix J). The vertical extent of the turbulence layer is specified by top and base heights. Bases which extend below the layer of the chart are identified with **XXX**.

8.3.1.8 Cloud Coverage (non-cumulonimbus)

Clouds are enclosed within (red) scalloped lines (Figure 8-26). Cloud coverage (non-cumulonimbus) appears within or adjacent to the outlined area. If the cloud coverage is adjacent to an outlined area, an arrow points to the appropriate area.

The cloud coverage symbols are listed in Table 8-4. See Table 8-3 for cumulonimbus cloud coverage.

Table 8-4. Mid-Level SIGWX Chart Cloud Coverage (Non-cumulonimbus)

CODED	MEANING	COVERAGE
SKC	Sky Clear	$0/8^{ths}$
FEW	Few clouds	$1/8^{th}$ to $2/8^{ths}$
SCT	Scattered	$3/8^{ths}$ to $4/8^{ths}$
BKN	Broken	$5/8^{ths}$ to $7/8^{ths}$
OVC	Overcast	$8/8^{ths}$

8.3.1.9 Cloud Type

Table 8-5 shows the contractions used to identify cloud type.

Table 8-5. Mid-Level SIGWX Chart Cloud Types

CODED	MEANING
CI	Cirrus
CC	Cirrocumulus
CS	Cirrostratus
AC	Altocumulus
AS	Altostratus
NS	Nimbostratus
SC	Stratocumulus
ST	Stratus
CU	Cumulus
CB	Cumulonimbus

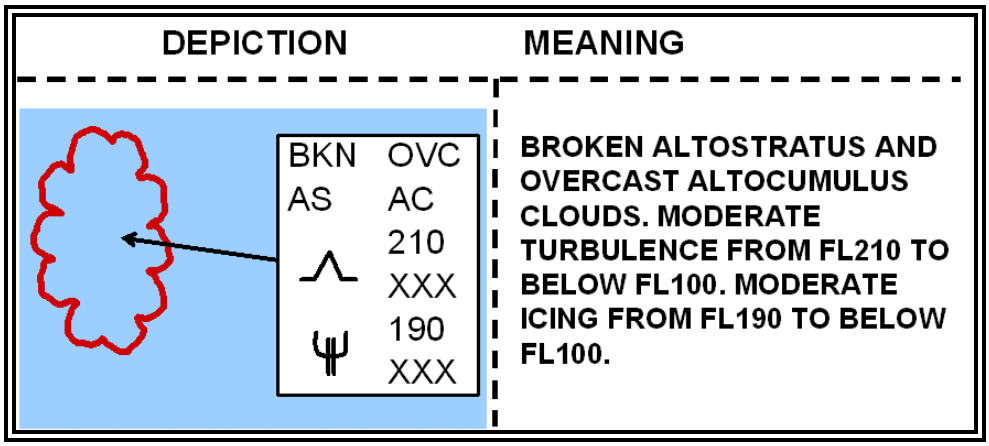


Figure 8-26. Mid-Level SIGWX Chart - Example of Moderate or Severe Icing, Moderate or Severe Turbulence (in cloud or in clear air), Clouds, and Cloud Types

8.3.1.10 Volcanic Eruptions

Volcanic eruption sites are identified by a trapezoidal symbol (Figure 8-27). The dot on the base of the trapezoid identifies the location of the volcano. The name of the volcano, as well as the latitude and longitude are noted adjacent to the symbol.

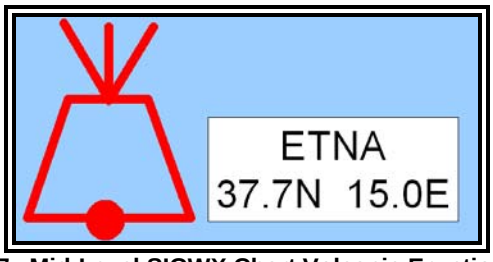


Figure 8-27. Mid-Level SIGWX Chart Volcanic Eruption Example

8.3.1.11 Release of Radioactive Materials

Radioactive materials in the atmosphere are depicted by the standard symbol shown in Figure 8-28. Information on the chart regarding the radioactive material includes the latitude/longitude of the accident site, the date and time of the accident, and a reference to check NOTAMs for further information.

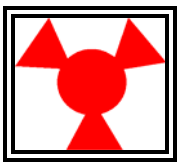
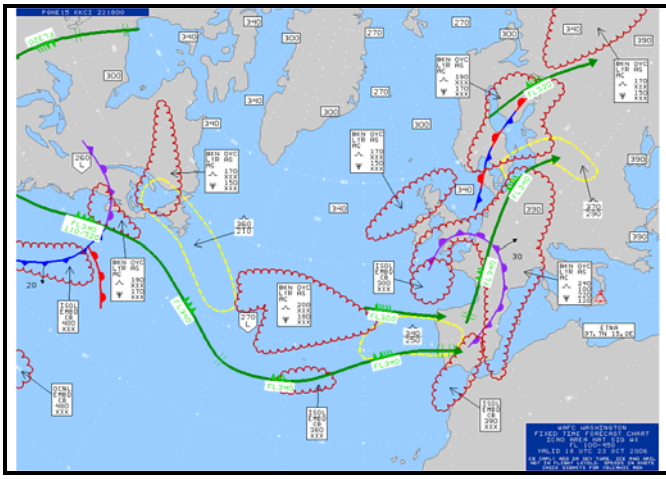


Figure 8-28. Mid-Level SIGWX Chart Release of Radioactive Materials Example

8.3.2 Issuance

The Aviation Weather Center (AWC) in Kansas City has the responsibility, as part of the World Area Forecast Center (WAFC), Washington, to provide global weather forecasts of significant weather phenomena. The AWC issues a 24-hour Mid-Level Significant Weather chart, four times daily, for the North Atlantic Ocean Region (NAT) (Table 8-6). The Mid Level Significant (WIGWX) Chart is found online at: http://aviationweather.gov/products/swm/

Table 8-6. Mid-Level SIGWX Chart Issuance Schedule

North Atlantic Ocean Region (NAT)	Valid Times (UTC)			
	Issued 1015	Issued 1615	Issued 2215	Issued 0415
	0000	0600	1200	1800

8.3.3 Use

The Mid-Level Significant Weather (SIGWX) Chart is used to determine an overview of selected flying weather conditions between 10,000 feet MSL and FL450. It can be used by airline dispatchers for flight planning and weather briefings before departure and by flight crew members during flight.

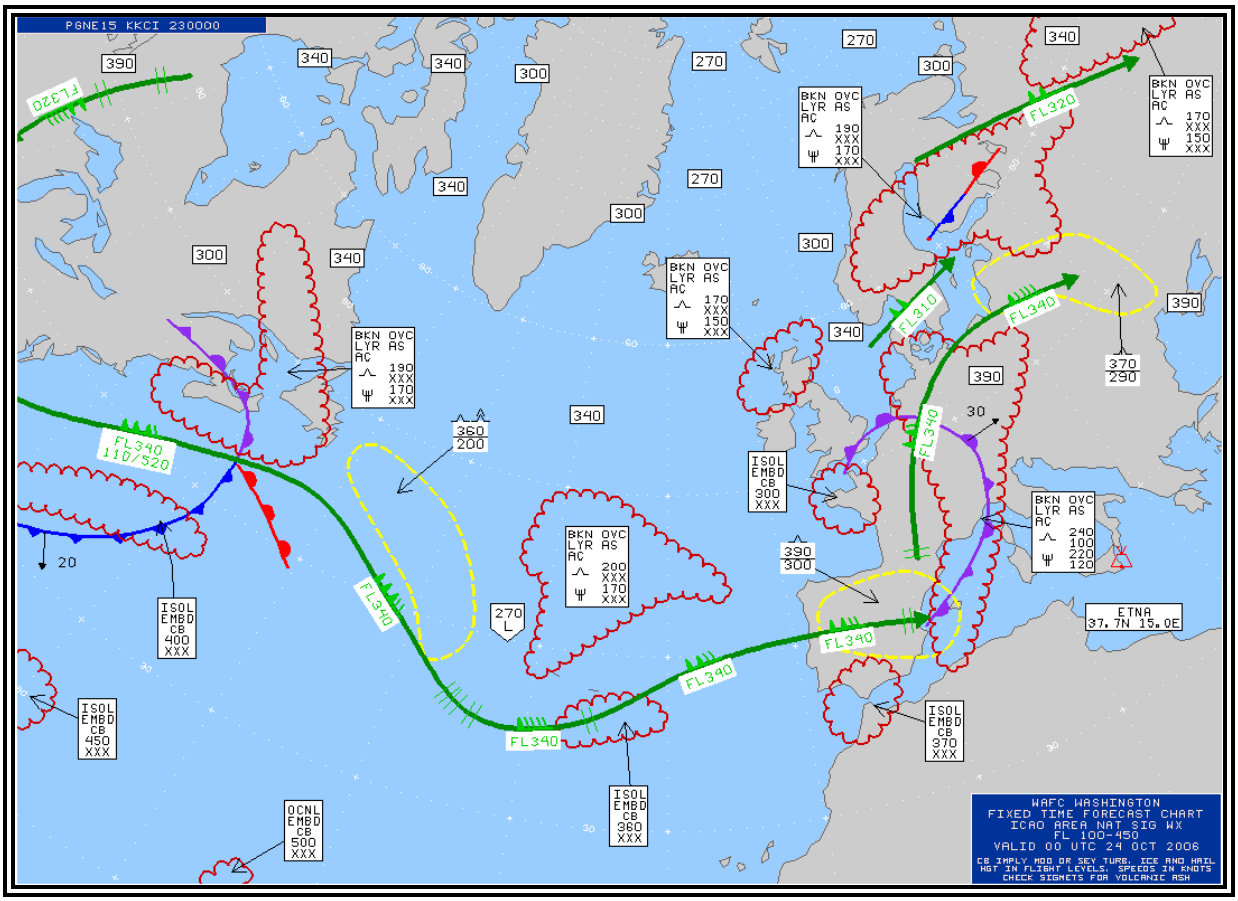


Figure 8-29. Mid-Level SIGWX Chart Example

8.4 High-Level Significant Weather (SIGWX) Charts

High-Level Significant Weather (SIGWX) Charts (Figure 8-30) provide a forecast of significant en route weather phenomena over a range of flight levels from FL250 to FL630, and associated surface weather features. Each chart depicts a "snap-shot" of weather expected at the specified valid time. They are available on the Aviation Weather Center (AWC) web site at: http://aviationweather.gov/products/swh/.

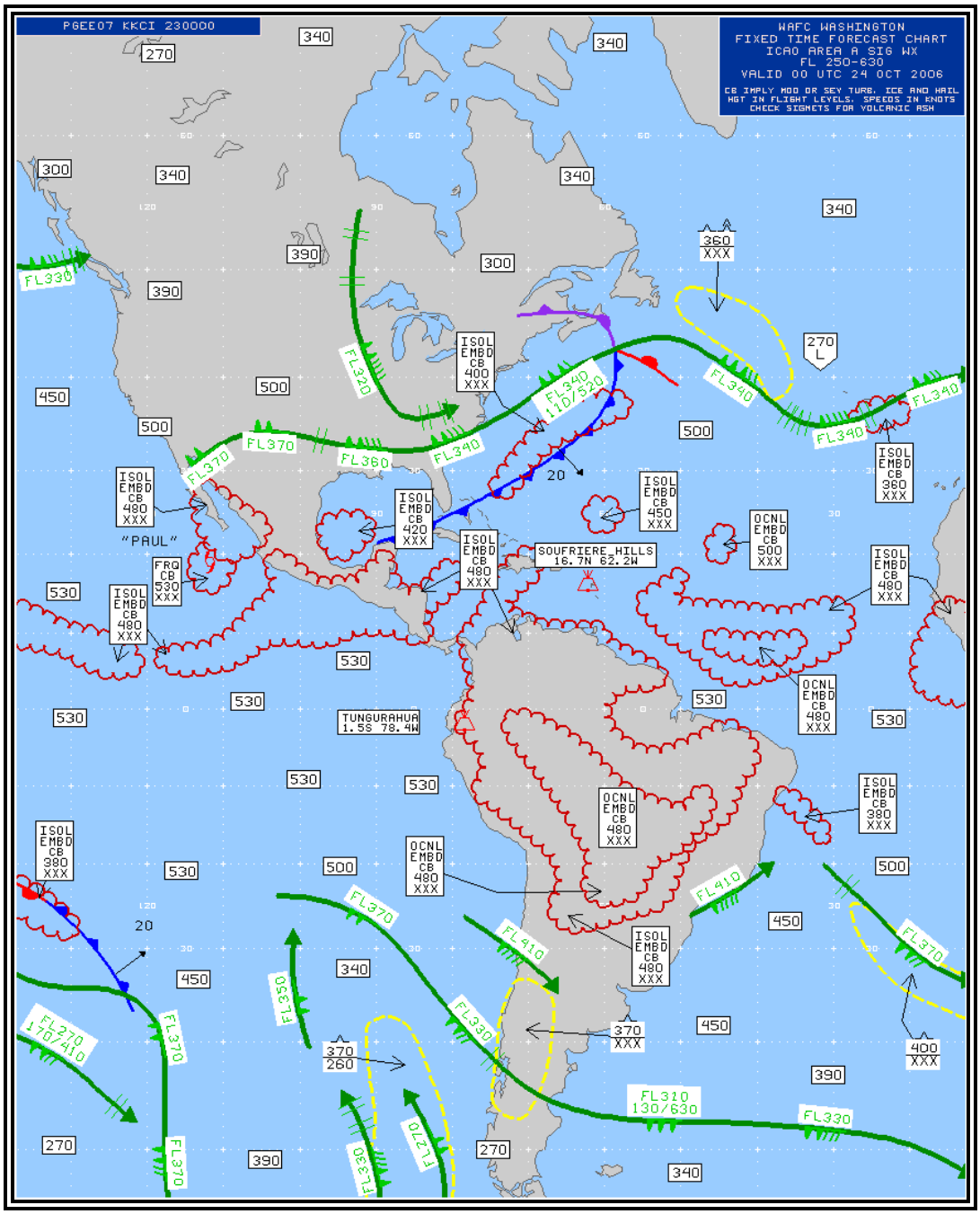


Figure 8-30. High-level SIGWX Chart Example

8.4.1 Content

8.4.1.1 Thunderstorms and Cumulonimbus Clouds

The abbreviation **CB** is only included where it refers to the expected occurrence of an area of widespread cumulonimbus clouds, cumulonimbus along a line with little or no space between individual clouds, cumulonimbus embedded in cloud layers, or cumulonimbus concealed by haze. It does not refer to isolated or scattered cumulonimbus not embedded in cloud layers or concealed by haze.

Each cumulonimbus area is identified with **CB** and characterized by coverage, bases and tops. Coverage (Table 8-3) is identified as isolated (**ISOL**) meaning less than 1/8th, occasional (**OCNL**) meaning 1/8th to 4/8^{ths}, and frequent (**FRQ**) meaning more than 4/8ths coverage. Isolated and occasional CBs are further characterized as embedded (**EMBD**). The chart will not display isolated or scattered cumulonimbus clouds unless they are embedded in clouds, haze, or dust.

The vertical extent of cumulonimbus layer is specified by top and base heights. Bases that extend below FL250 (the lowest altitude limit of the chart) are encoded **XXX**.

Cumulonimbus clouds (CBs) are depicted by an enclosed (red) scalloped lines (Figure 8-31). The identification and characterization of each cumulonimbus area will appear within or adjacent to the outlined area. If the identification and characterization is adjacent to an outlined area, an arrow will point to the associated cumulonimbus area.

On significant weather charts, the inclusion of **CB** or the thunderstorm symbol should be understood to include all weather phenomena normally associated with cumulonimbus or thunderstorm, namely, moderate or severe icing, moderate or severe turbulence, and hail.

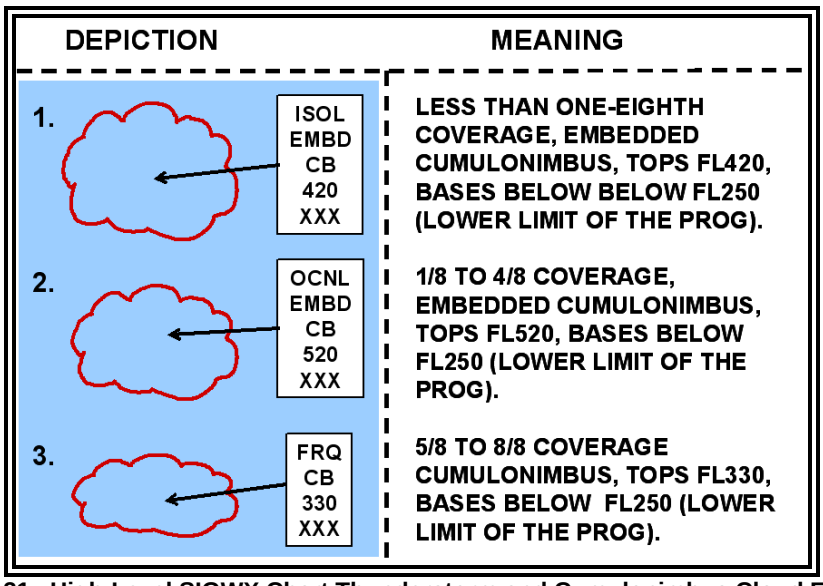


Figure 8-31. High-Level SIGWX Chart Thunderstorm and Cumulonimbus Cloud Examples

8.4.1.2 Moderate or Severe Turbulence

Forecast areas of moderate or severe turbulence (Figure 8-32) associated with wind shear zones and/or mountain waves are enclosed by bold yellow dashed lines. Intensities are identified by standard symbols (Appendix J).

The vertical extent of turbulence layers is specified by top and base heights, separated by a horizontal line. Turbulence bases which extend below the layer of the chart are identified with **XXX**.

Thunderstorm turbulence is not identified.

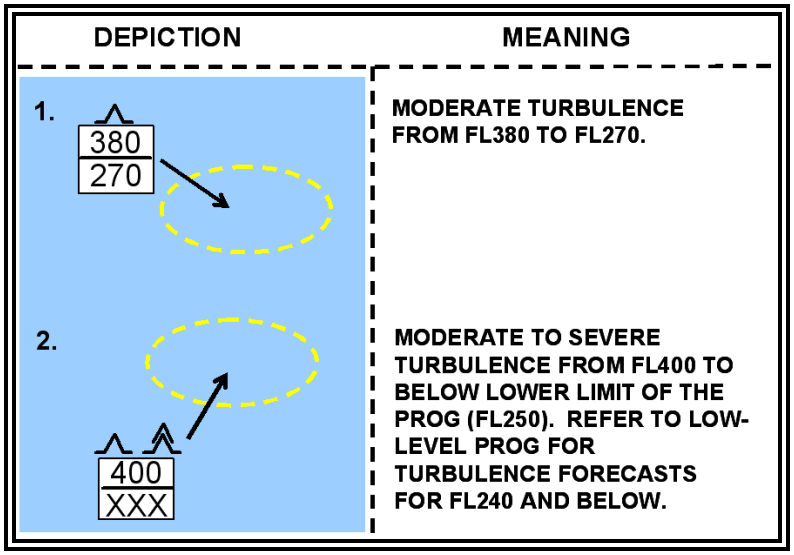


Figure 8-32. High-Level SIGWX Chart Turbulence Examples

8.4.1.3 Moderate or Severe Icing

Moderate and severe icing (outside of thunderstorms) above FL240 is rare and is not generally forecasted on High-Level Significant Weather Prog charts.

8.4.1.4 Jet Streams

A jet stream axis with a wind speed of more than 80 knots is identified by a bold green line. An arrowhead is used to indicate wind direction. Wind change bars (double-hatched, light green lines) positioned along a jet stream axis identifies 20 knot wind speed changes (Figure 8-33).

Symbols and altitudes are used to further characterize a jet stream axis. A standard wind symbol (light green) is placed at each pertinent position to identify wind velocity. The flight level **FL** in hundreds of feet MSL is placed adjacent to each wind symbol to identify the altitude of the jet stream axis.

Jet stream vertical depth (jet depth) forecasts are included when the maximum speed is 120 knots or more. Jet depth is defined as the vertical depths to the 80 knot wind field above and below the jet stream axis using flight levels. Jet depth information is placed at the maximum speed point only, normally at one point on each jet stream. When the jet stream is very long and there are several wind maxima, then each maximum should include forecasts of the vertical depth.

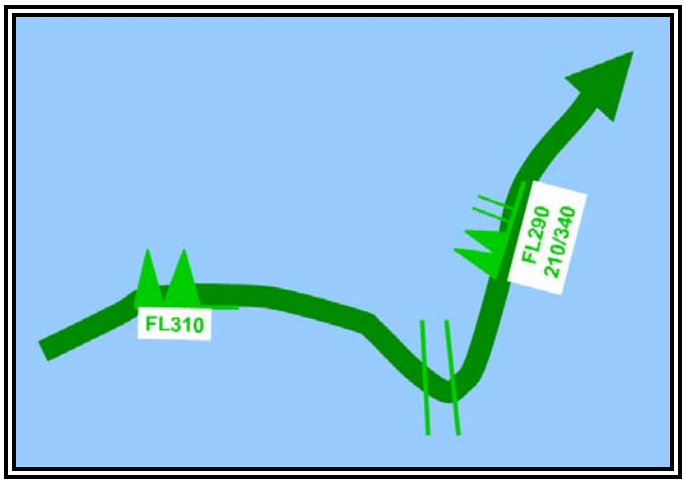


Figure 8-33. High-Level SIGWX Chart Jet stream Example
Forecast maximum speeds of 100 knots at FL310 at one location and 120 knots at FL290 at another location. At the latter location, the base of the 80 knot wind field it FL210, and the top of the 80 knot wind field is FL340.

8.4.1.5 Surface Fronts with Speed and Direction of Movement

Surface fronts are depicted using the standard symbols found on the surface analysis chart. (Figure 8-2). An arrow identifies the direction of frontal movement with the speed in knots plotted near the arrow head (Figure 8-34).

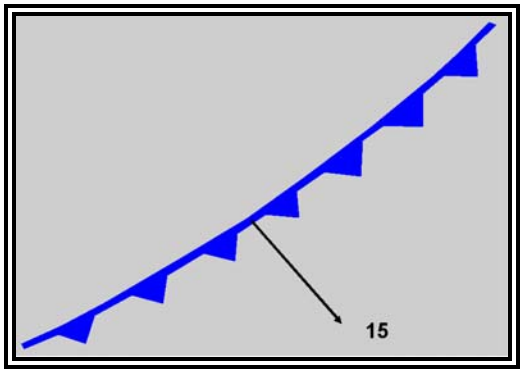


Figure 8-34. High Level SIGWX Chart Surface Front with Speed and Direction of Movement Example

8.4.1.6 Tropopause Heights

Tropopause heights are plotted at selected locations on the chart. They are enclosed by rectangles and plotted in hundreds of feet MSL (Figure 8-35). Centers of high (**H**) and low (**L**) tropopause heights are enclosed by polygons and plotted in hundreds of feet MSL.

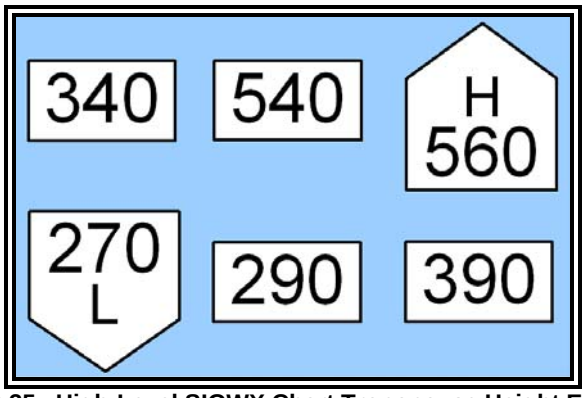


Figure 8-35. High-Level SIGWX Chart Tropopause Height Examples

8.4.1.7 Tropical Cyclones

Tropical cyclones are depicted by the appropriate symbol (Figure 8-36) with the storm's name positioned adjacent to the symbol. Cumulonimbus clouds meeting chart criteria are identified and characterized relative to each storm.

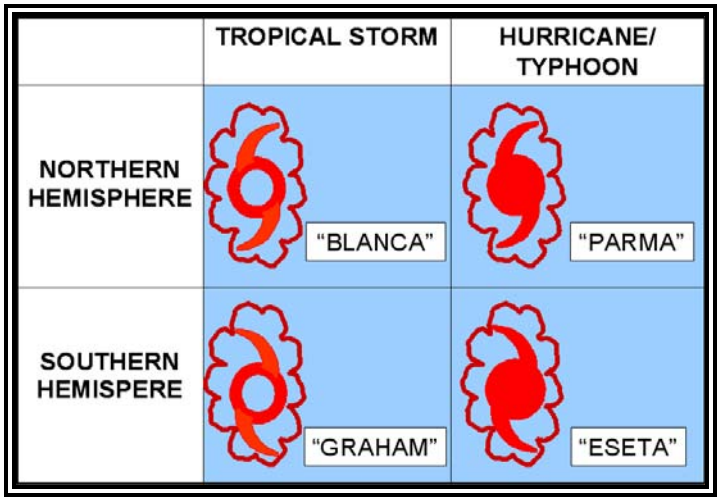


Figure 8-36. High Level SIGWX Chart Tropical Cyclone Examples

8.4.1.8 Severe Squall Lines

Severe squall lines are lines of CBs with 5/8 coverage or greater. They are identified by long dashed (white) lines with each dash separated by a **V** (Figure 8-37).Cumulonimbus clouds meeting chart criteria are identified and characterized with each squall line.

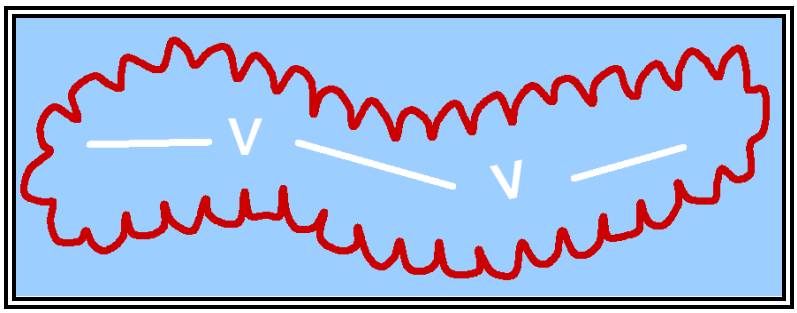


Figure 8-37. High-Level SIGWX Chart Severe Squall Line Example

8.4.1.9 Volcanic Eruption Sites

Volcanic eruption sites are identified by a trapezoidal symbol (Figure 8-38). The dot on the base of the trapezoid identifies the location of the volcano. The name of the volcano, its latitude, and its longitude are noted adjacent to the symbol.

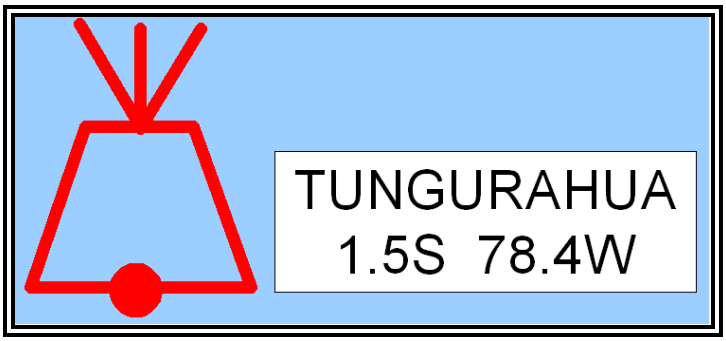


Figure 8-38. High-Level SIGWX Chart Volcanic Eruption Site Example

8.4.1.10 Widespread Sandstorms and Dust storms

Widespread sandstorms and dust storms are labeled with the appropriate symbol (Appendix I). The vertical extent of sand or dust is specified by top and base heights, separated by a horizontal line. Sand or dust which extends below the lower limit of the chart (FL240) is identified with **XXX** (Figure 8-39).

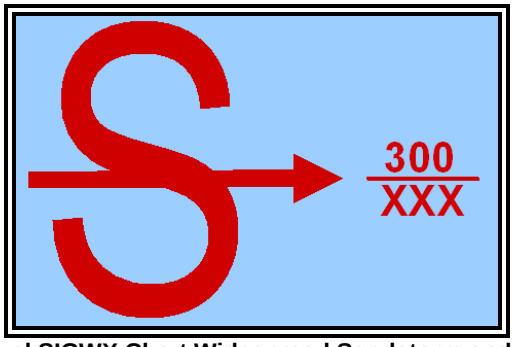


Figure 8-39. High-Level SIGWX Chart Widespread Sandstorm and Dust Storm Example

8.4.2 Issuance

In accordance with the World Meteorological Organization (WMO) and the World Area Forecast System (WAFS) of the International Civil Aviation Organization (ICAO), High-Level significant weather (SIGWX) forecasts are provided for the en-route portion of international flights. The National Weather Service (NWS) Aviation Weather Center (AWC) in Kansas City, MO provides a suite of SIGWX forecast products for the World Area Forecast Center (WAFC) in Washington, D.C. The charts are available for different ICAO areas around the world as defined in Table 8-7. The charts are not amended.