

PRIVATE PILOT SYLLABUS
Stage II
Ground Lesson 9
Interpreting Weather Data

SECTION A- THE FORECASTING PROCESS

Weather service to aviation is a joint effort of the National Weather Service(NWS), the Federal Aviation Administration(FAA), the Department of Defense(DOD), and other aviation-oriented groups and individuals.

SECTION B- PRINTED REPORTS AND FORECASTS

***Aviation Routine Weather Report (METAR)**

Provides surface weather conditions at a specified location and is presented in a coded format which is standard internationally. A METAR report contains the following sequence of elements in the following order: Type of report, station designator, date and time, modifier(as required), wind, visibility, weather, sky condition, temperature/dewpoint, altimeter, and remarks.

EXAMPLE: METAR KDPA 141853Z 16008KT 1 1/4SM BR OVC002 02/02 A2982 RMK A02
RAB15E41UPB28E31 SLP105 P0000 T00170017

- 15 = temp.
- a. *Type of report*: always appears as lead element in report. Either METAR or SPECI, the latter meaning special report. e.g.- METAR
 - b. *Station designator*: the ICAO 4-letter station identifier. Begins with "K" in the contiguous 48 states. Elsewhere, the first two letters indicate what region of the world, and the country or state the station is in. Alaska's start with "PA", Hawaii's start with "PH". e.g.- KDPA
 - c. *Date and time*: the date and time the observation is taken are transmitted in a six-digit group appended with "Z" to denote Coordinated Universal Time(UTC). The first two digits are the date followed with two digits for the hour and two digits for the minutes. e.g.- 14853Z
 - d. *Modifier*: identifies the report as an automated report with no human intervention or as a corrected report to replace an earlier report with an error. e.g.- "AUTO" or "COR".
 - e. *Wind*: the average two-minute direction and speed reported in five digits. The first three digits are the direction from which the wind is blowing to the nearest 10-degree increment referenced to TRUE north. The last two digits are the speed in knots. Calm winds are coded by 00000KT. If the wind is varying, the contraction VRB is used. A gust is reported by the letter G after the wind speed, followed by the highest reported gust. e.g.- 16008KT
 - f. *Visibility*: reported in statute miles with "SM" appended to it. Runway Visual Range(RVR) when reported is in the format: R(runway)/(visual range)FT. e.g.- 1 1/4SM
 - g. *Weather*: the weather is reported in the following format:
 1. Intensity- applies to the type of precipitation reported

2. Proximity- if required, "VC" indicates the wx is occurring 5-10 miles from the airport
3. Descriptor- the following eight are used: TS=thunderstorm, SH=showers, FZ=freezing, BL=blowing, DR=low drifting, MI=shallow, BC=patchy, PR=partial.
4. Precipitation- nine types are used: RA=rain, DZ=drizzle, SN=snow, SG=snow grains, UP=unknown precipitation(only used with AUTO), GR=hail, GS=small hail/snow pellets, PE=ice pellets, IC=ice crystals.
5. Obstructions to visibility: BR=mist(vis is 5/8-6), FG=fog, SA=sand, FU=smoke, DU=dust, HZ=haze, VA=volcanic ash, PY=spray, SQ=squall, DS=duststorm, SS=sandstorm, PO=dust/sand whirls, FC=funnel cloud/tornado, waterspout. e.g.- BR

h. *Sky condition*: reported in amount, height, type or vertical visibility.

1. SKC=sky clear below 12,000'
2. FEW= few, 0-2/8
3. SCT=scattered, 3/8-4/8
4. BKN=broken, 5/8-7/8
5. OVC=overcast, 8/8
6. VV=vertical visibility
7. CB=cumulonimbus
8. TCU=towering cumulus

Cloud bases are reported with three digits in hundreds of feet. e.g.- OVC002

i. *Temperature/Dew point*: reported in a two-digit form in degrees Celsius. Temperatures below zero are prefixed with an "M". e.g.- 02/02

j. *Altimeter*: Altimeter settings are reported in a four-digit format in inches of mercury prefixed with an "A". e.g.- A2982

k. *Remarks*: remarks are limited to reporting significant weather, the beginning and ending times of certain weather phenomena, and low-level wind shear. The contraction "RMK" precedes the remarks section.

***Terminal Aerodrome Forecast (TAF)**

The TAF is a concise statement of the expected meteorological conditions within 5SM of an airport during a specified period, usually 24 hours. The TAFs are scheduled four times daily at 0000Z, 0600Z, 1200Z, and 1800Z. They use the same codes as the METARs.

TAFs contain the following information:

a. *Type*: TAF means a routine forecast, TAF AMD means an amended forecast.

b. *Location*: The ICAO four letter identifier.

- c. *Issuance Date/Time*: a six digit group giving the date (first two digits) and the time (last four digits) in UTC.
- d. *Valid Period*: a six digit group giving the valid period, usually 24 hours, of the forecast in UTC.
- e. *Wind*: five or six digits followed by "KT". Wind gusts are denoted by "G". Variable wind is denoted by "VRB". A calm wind is shown as 00000KT.
- f. *Visibility*: prevailing visibility up to six statute miles. Visibility greater than six miles is denoted P6SM.
- g. *Weather*: same as METAR format
- h. *Sky condition*: same as METAR format
- i. *Other*: PROB40 HHhh= 40% probability of occurrence between HH and hh
 TEMPO HHhh= a temporary change expected between HH and hh
 FM HH= a permanent change starting at HH
 BECMG HHhh= a gradual change is expected between HH and hh

***Radar Weather Reports (SD)**

Radar weather reports (SD's) provide information on thunderstorms and areas of precipitation as observed by radar. These include the type, intensity, intensity trend, and location of the precipitation. They also include the echo top of the precipitation and the echo base if significant.

The contents of a SD include:

- a. Location identifier and time of observation.
- b. Echo pattern which may be described as:
 - 1. Line (LN)
 - 2. Fine Line (FINE LN)
 - 3. Area (AREA)
 - 4. Spiral band area (SPRL BAND AREA)
 - 5. Single cell (CELL)
 - 6. Layer (LYR)
- c. Coverage in tenths. (%)
- d. Type, intensity, and intensity trend.
- e. Azimuth and range in NM from the radar station of points defining the pattern.
- f. Dimensions of the echo pattern. Given when the azimuth and range define only the center line of the pattern
- g. Pattern movement. The movement of individual cells "C" and area movement "A" may also be indicated.
- h. Maximum top and location.
- i. Remarks.
- j. Digital section for preparing the radar summary chart.

*Pilot Weather Reports (PIREPs)

Aircraft in flight are the only means of directly observing cloud tops, icing, and turbulence. PIREPs are a timely and helpful observation to fill in the gap between reporting stations.

A PIREP is transmitted in the following format: (the required elements for all PIREPs are type, location, time, flight level, type aircraft, and at least one weather element)

1. UA means routine PIREP. UUA means urgent pirep
2. /OV –location using 3 letter ident
3. /TM – Time using four digits in UTC
4. /FL – Altitude or flight level using 3 digits for hundreds of feet
5. /TP – Type of aircraft giving the report
6. /SK – Sky condition given as: cloud base-coverage-cloud tops
7. /WX –Weather with visibility reported first
8. /TA – Air temperature in Celsius
9. /WV – Wind direction and speed
10. /TB – Turbulence
11. /IC – Icing
12. /RM – Remarks

All altitude references are MSL unless otherwise noted, and distances are in NM.

*Call FSS
tell give pilot report*

*Location
Time.
Altitude
Type*

*Aviation Area Forecast (FA)

An area forecast contains general weather conditions over an area the size of several states. It is used to determine forecast en route weather and to help in determining weather at airports for which TAF's are not issued. FA's are issued three times a day for six different regions.

The format of an FA has four sections:

- a. Communication and product headers
- b. Precautionary statements
- c. Synopsis section (brief summary of fronts and pressure systems)
- d. VFR clouds/WX (contains a 12-hour specific forecast followed by a 6-hour categorical outlook)

*Winds and Temperatures Aloft Forecast (FD)

Winds and temperatures aloft are forecast for specific locations in the contiguous U.S. Forecasts are made twice daily based on 0000Z and 1200Z data. No winds are forecast within 1500 feet of station elevation.

Decoding FD's:

- a. A four-digit group shows wind direction in reference to true north and wind speed in knots. The first two digits are the direction and the last two digits are the speed.
- b. A six-digit group includes forecast temperatures
- c. If wind speeds are forecast to be between 100 and 199 knots, you must subtract 50 from the direction and add 100 to the speed.

***AIRMET (WA), SIGMET (WS), and Convective SIGMET (WST)**

AIRMETs and SIGMETs are issued for the six areas corresponding to the Area Forecasts (FA)s. The maximum forecast period is 4 hr. for SIGMETs and 6 hr. for AIRMETs.

AIRMETs are issued to advise pilots of significant weather, but describes conditions at intensities lower than those which trigger SIGMETs. They are issued every six hours, or as necessary. They have fixed designators of ZULU for icing, TANGO for turbulence, and SIERRA for IFR conditions. AIRMETs are issued for conditions such as:

1. Moderate icing
2. Moderate turbulence
3. Sustained surface winds of 30 knots or more
4. IFR conditions affecting more than 50% of the area

SIGMETs advise of nonconvective weather that is potentially hazardous to all aircraft. Sigmet are based specifically on forecasts of:

- 1. Severe icing not associated with thunderstorms
- 2. Severe, extreme, or clear air turbulence not associated with thunderstorms
- 3. Duststorms, sandstorms, or volcanic ash lowering visibility to below 3 miles
- 4. Volcanic eruption

A convective SIGMET implies severe or greater turbulence, severe icing, and low-level wind shear. Convective sigmets are specifically based on:

- TS*
1. Severe thunderstorms due to:
 - a. surface winds greater than or equal to 50 knots
 - b. hail at the surface at least 3/4 inches in diameter
 - c. tornadoes
 2. Embedded thunderstorms
 3. A line of thunderstorms
 4. T-storms with a VIP intensity level of 4 affecting more than 40% of an area at least 3,000 sq. miles.

SECTION C- GRAPHIC WEATHER CHARTS

***Surface Analysis Chart**

= news
The surface analysis chart, often called a surface weather map, is transmitted every three hours. It contains a valid time and displays weather information such as wind direction and speed, temperature, dewpoint, pressure systems, and fronts.

***Weather Depiction Chart**

The weather depiction chart is prepared using surface observations and gives a quick picture of the weather conditions as of the valid time stated on the chart. It begins at 0100Z and is transmitted in three hour intervals. The chart shows areas of VFR, IFR, and marginal VFR (MVFR) weather conditions. MVFR is denoted by visibilities from 3-5 miles and ceilings from 1000-3000'. It also shows fronts, and high and low pressure centers.

***Radar Summary Chart**

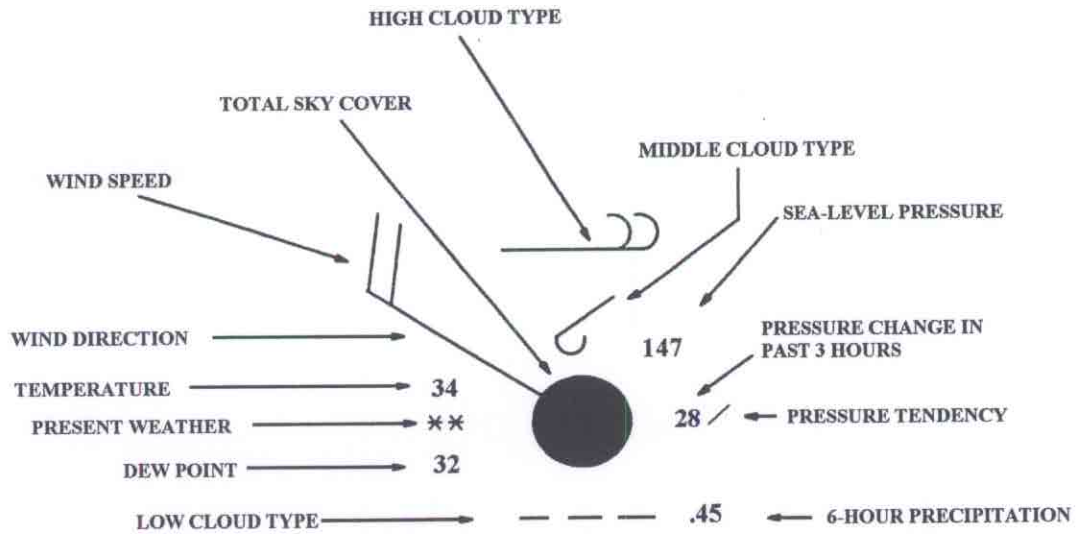
The radar summary chart identifies general areas of precipitation and/or thunderstorms. This chart displays the type of precipitation echoes, their intensity, trend, configuration, coverage, echo tops and bases, and movements.

***Satellite Weather Pictures**

Satellite pictures are usually updated every 15-30 minutes. Using two types of images, both infrared and visible imagery, analysts can determine cloud height, type, and thickness.

Color	Symbol	Description
Blue	H	High Pressure Center
Red	L	Low Pressure Center
Blue		Cold Front
Red		Warm Front
Red/Blue		Stationary Front
Purple		Occluded Front
Blue		Cold Frontogenesis
Red		Warm Frontogenesis
Red/Blue		Stationary Frontogenesis
Blue		Cold Frontolysis
Red		Warm Frontolysis
Red/Blue		Stationary Frontolysis
Purple		Occluded Frontolysis
Purple		Squall Line
Brown		Dryline
Brown		Trough
Yellow		Ridge

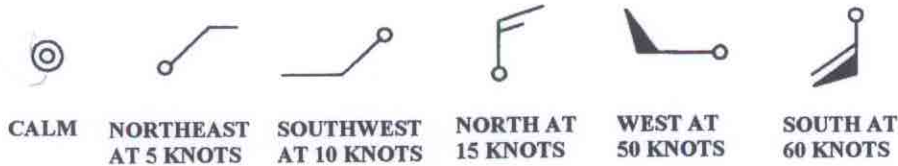
Figure 5-2. Symbols on Surface Analysis Chart.



1. Total sky cover: Overcast.
2. Temperature: 34 degrees F, Dew Point: 32 degrees F.
3. Wind: From the northwest at 20 knots (relative to true north).

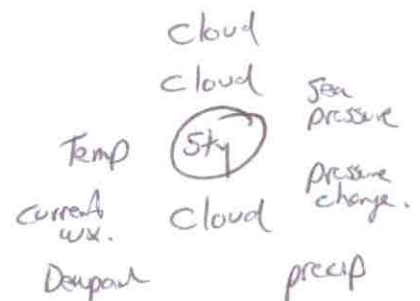
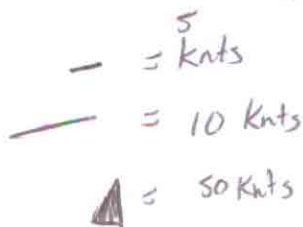
Examples of wind direction and speed

points @ wind direction



4. Present Weather: Continuous light snow.
5. Predominate low, middle, high cloud reported: Strato fractus or cumulus fractus of bad weather, altocumulus in patches, and dense cirrus.
6. Sea-level pressure: 1,014.7 millibars (mbs).
NOTE: Pressure is always shown in three digits to nearest tenth of an mb. For 1,000 mbs or greater, prefix a "10" to the three digits. For less than 1,000 mbs, prefix a "9" to the three digits.
7. Pressure change in the past 3 hours: Increased steadily or unsteadily by 2.8 mbs. The actual change is in tenths of a mb.
8. 6 - hour precipitation in hundredths of an inch: 45 hundredths of an inch.

Figure 5-3. Station Model and Explanation.



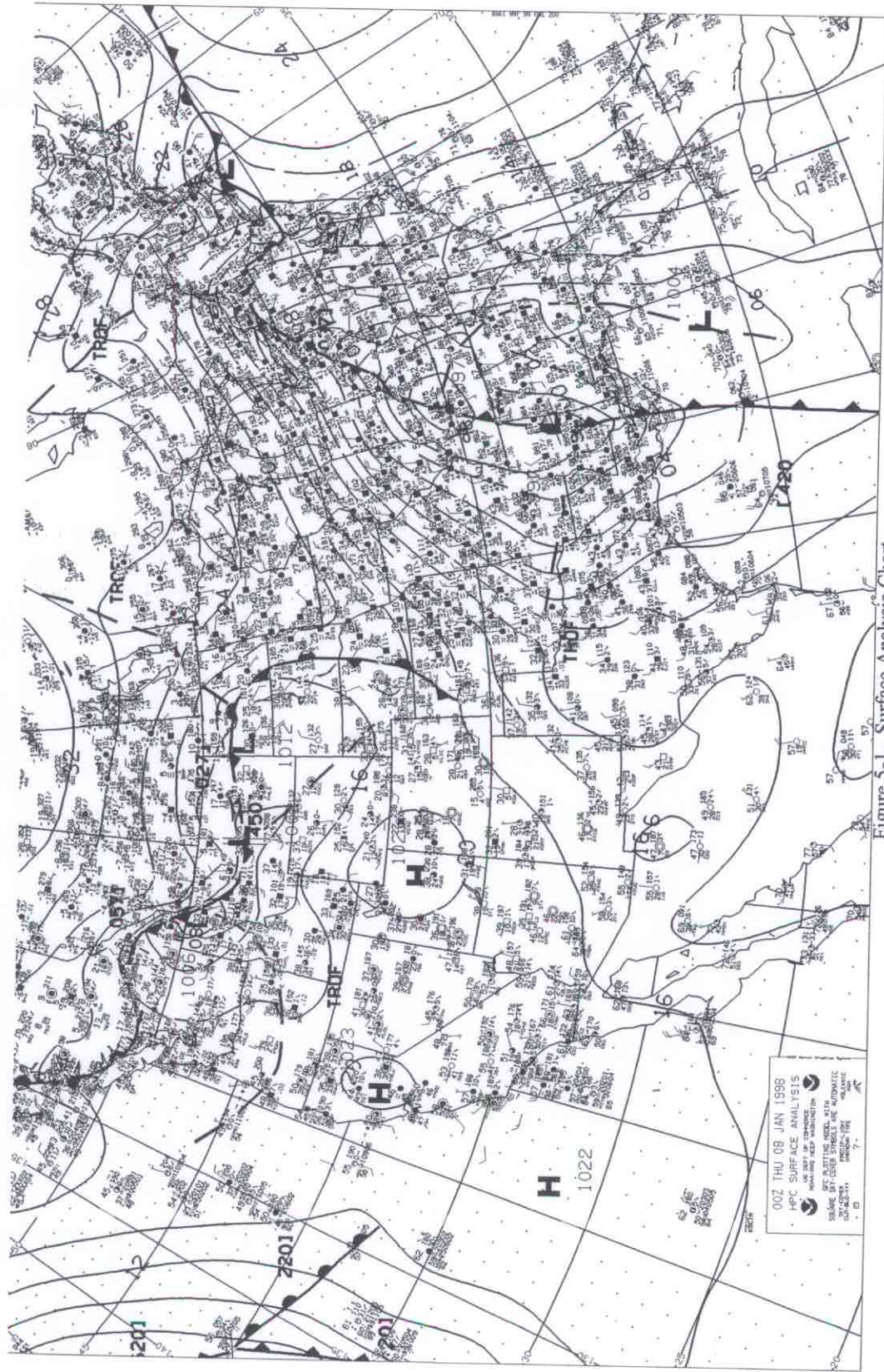


Figure 5-1. Surface Analysis Chart.

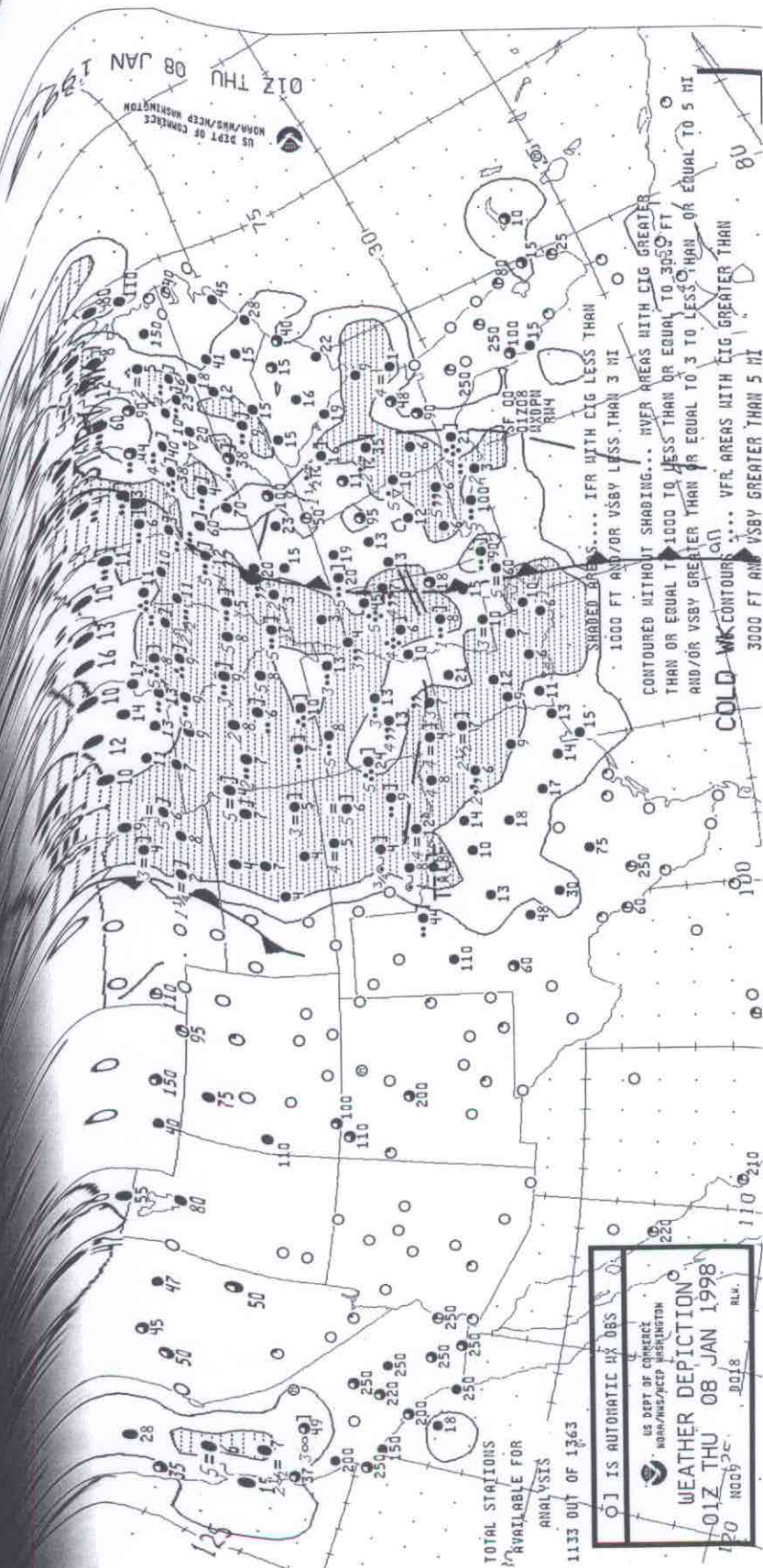


Figure 6-3. Weather Depiction Chart.

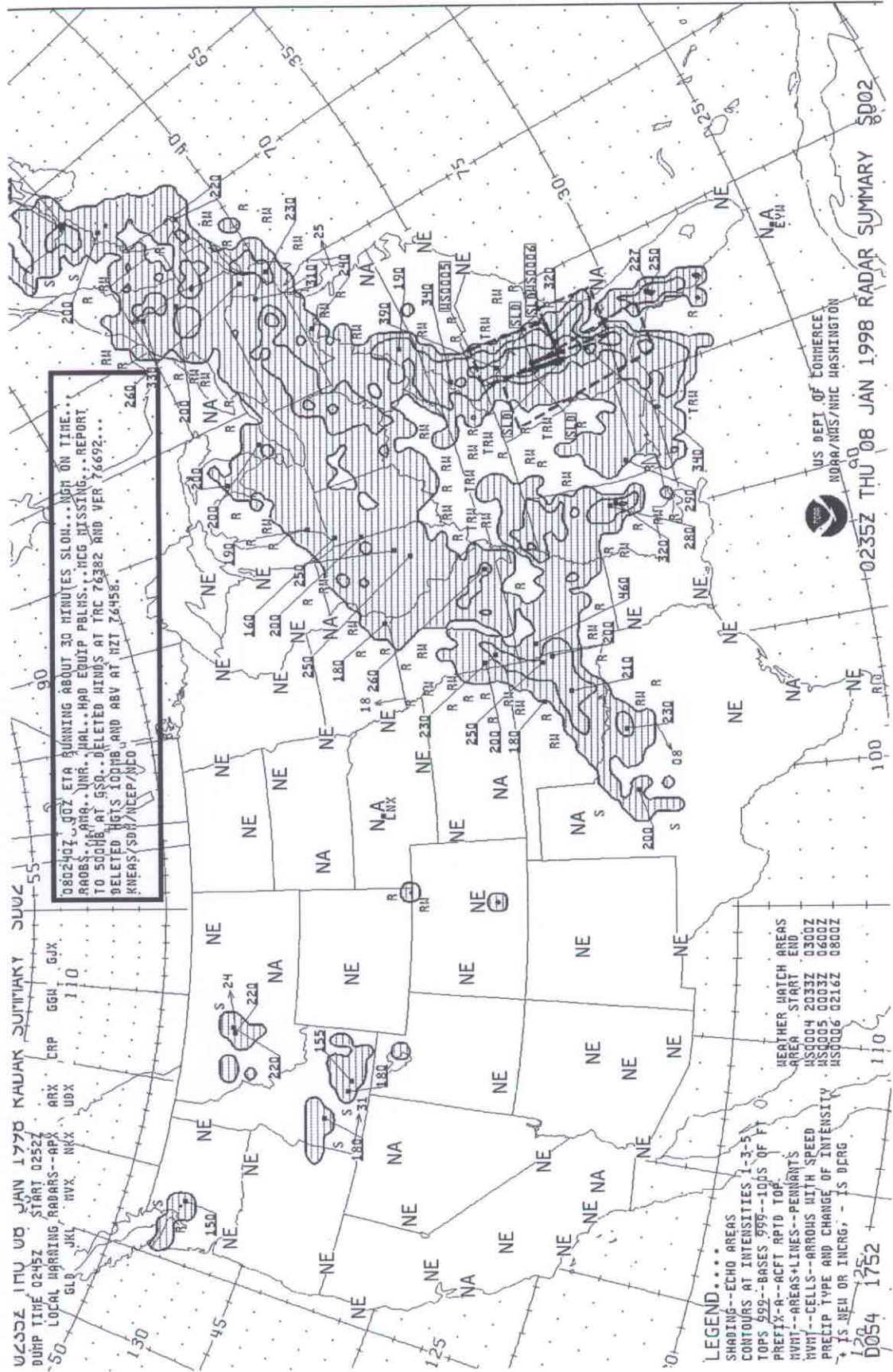


Figure 7-1. Radar Summary Chart.

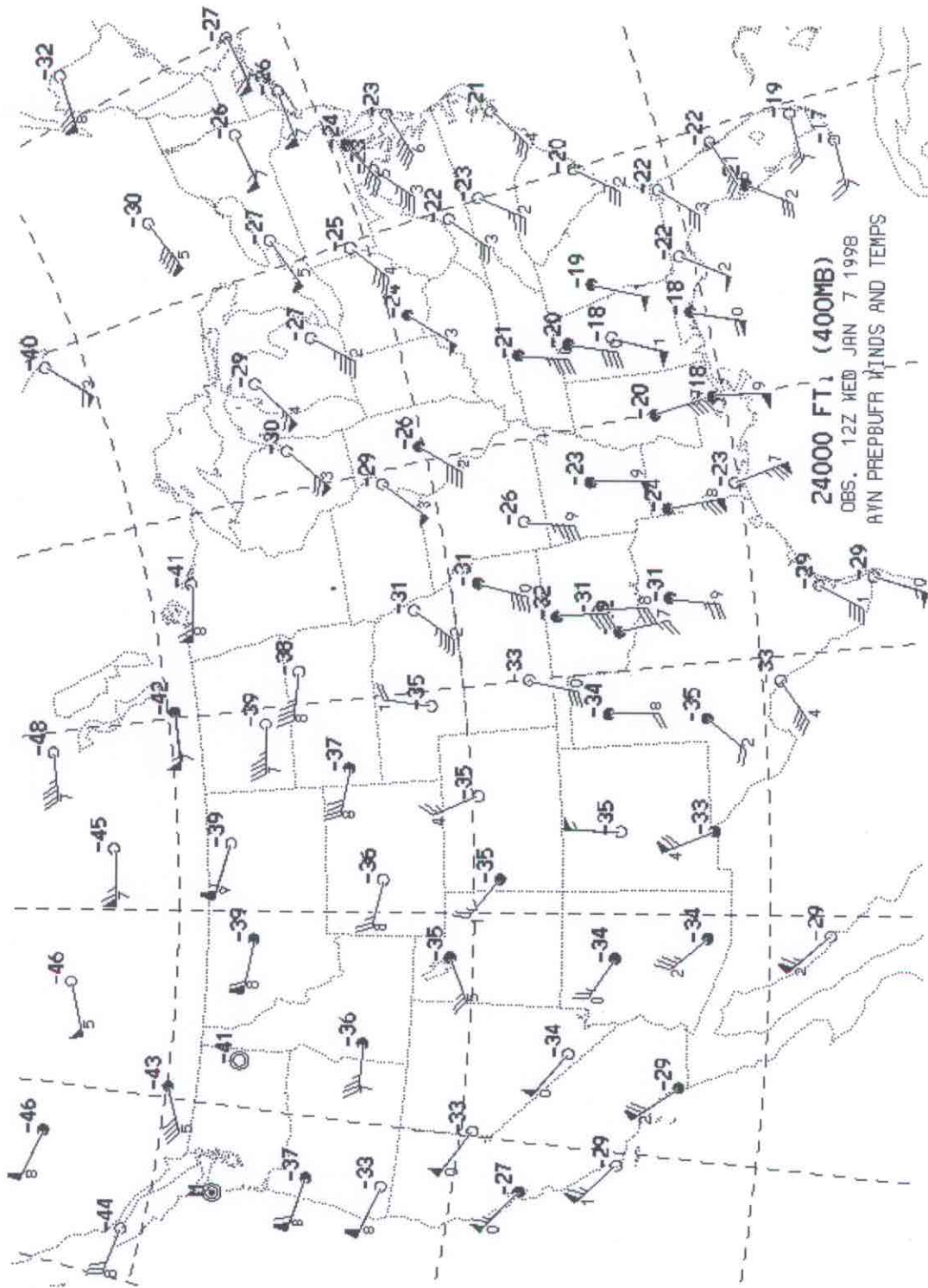


Figure 10-4. Panel from Observed Winds and Temperatures Aloft Chart.

6.11 VOLCANIC CONDITIONS (Continued)

Weather Packet

- E. It may become necessary to shut down and then restart engines to prevent exceeding EGT limits. Volcanic ash may block the pitot system and result in unreliable airspeed indications.
- F. If you see a volcanic eruption and have not been previously notified of it, you may have been the first person to observe it. In this case, immediately contact ATC and alert them to the existence of the eruption. Do not become unnecessarily alarmed if there is merely steam or very low-level eruptions of ash.
- G. When landing at airports where volcanic ash has been deposited on the runway, be aware that even a thin layer of dry ash can be detrimental to braking action. Wet ash on the runway may also reduce effectiveness of braking. Reverse thrust should be limited to the minimum practical to reduce the possibility of reduced visibility and engine ingestion of airborne ash.
- F. When departing from airports where volcanic ash has been deposited it is recommended that pilots avoid operating in visible airborne ash. Allow ash to settle before initiating takeoff roll. It is also recommended that flap extension be delayed until initiating the before takeoff checklist and that a rolling takeoff be executed to avoid blowing ash back into the air.

VOLCANIC ACTIVITY REPORTING

Volcanic activity in Alaska and the Russian Far East, is monitored by the USGS Alaska Volcano Observatory. The Alaska Volcano Observatory describes concerns regarding possible or ongoing volcanic activity with "Level of Concern Codes" as in table 6-2.

Table 6-2. VOCANIC "CONCERN CODES"

CODE	DEFINITION
GREEN	Volcano is normal dormant status
YELLOW	Volcano is restless
ORANGE	Explosive or non-explosive eruption is possible within a few days
RED	Major explosive eruption in progress or expected within 24 hours

For areas of the world not covered by the Alaska Volcano Observatory, NOTAMS are issued by local authorities describing the location and approximate ash plume tops of active volcanoes. Additionally, crews are instructed to contact Southern Air Operations Control for additional details regarding volcanic activity worldwide.

6.12 KEY TO U.S. TAF AND METAR

Figure 6-1.

KEY TO AERODROME FORECAST (TAF) AND AVIATION ROUTINE WEATHER REPORT (METAR)

TAF KPIT 091730Z 091818 15005KT 5SM HZ FEW020 WS010/31022KT
FM1930 30015G25KT 3SM SHRA OVC015 TEMPO 2022 1/2SM + TSRA OVC008CB
FM0100 27008KT 5SM SHRA BKN020 OVC040 PROB40 0407 1SM - RA BR
FM1015 18005KT 6SM - SHRA OVC020 BECMG 1315 P6SM NSW SKC

METAR KPIT 091955Z COR 22015G25KT 3/4SM R28L/2600FT TSRA OVC010CB
18/16 A2992 RMK SLP045 T01820159

Forecast	Explanation	Report
TAF	Message type: <u>TAF</u> -routine or <u>TAF AMD</u> -amended forecast, <u>METAR</u> -hourly, <u>SPECI</u> -special or <u>TESTM</u> -non-commissioned ASOS report	METAR
KPIT	ICAO location indicator	KPIT
091730Z	Issuance time: ALL times in UTC "Z", 2-digit date, 4-digit time	091955Z
091818	Valid period: 2-digit date, 2-digit beginning, 2-digit ending times	
	In U.S. <u>METAR</u> : <u>COR</u> rected ob; or <u>AUTO</u> mated ob for automated report with no human intervention; omitted when observer logs on	COR
15005KT	Wind: 3 digit true-north direction, nearest 10 degrees (or <u>Va</u> riable); next 2-3 digits for speed and unit, <u>KT</u> (KMH or MPS); as needed, <u>G</u> ust and maximum speed; 00000KT for calm; for <u>METAR</u> if direction varies 60 degrees or more, <u>Va</u> riability appended, e.g. 180 <u>V</u> 260	22015G25KT
5SM	Prevailing visibility: in U.S., <u>S</u> tatute <u>M</u> iles & fractions; above 6 miles in <u>TAF</u> <u>P</u> lus <u>6SM</u> . (Or, 4-digit minimum visibility in meters and as required, lowest value with direction)	3/4SM
	Runway Visual Range: <u>R</u> ; 2-digit runway designator <u>L</u> eft, <u>C</u> enter, or <u>R</u> ight as needed; <u>T</u> , <u>M</u> inus or <u>P</u> lus in U.S., 4-digit value, <u>F</u> ee <u>I</u> in U.S., (usually meters elsewhere); 4-digit value <u>Va</u> riability 4-digit value (and tendency <u>D</u> own, <u>U</u> p or <u>N</u> o change)	R28L/2600FT
HZ	For significant present, forecast and recent weather, see table on next page.	TSRA
FEW020	Cloud amount, height and type: <u>S</u> ky <u>C</u> lear 0/8, <u>F</u> EW 1/8-2/8, <u>S</u> caTtered 3/8-4/8, <u>B</u> roKeN 5/8-7/8, <u>Q</u> VerCast 8/8; 3-digit height in hundreds of ft; <u>T</u> owering <u>C</u> umulus or <u>C</u> umuloni <u>M</u> Bus in <u>METAR</u> ; in <u>TAF</u> , only <u>CB</u> . <u>V</u> ertical <u>V</u> isibility for obscured sky and height "VV004". More than 1 layer may be reported or forecast. In automated <u>METAR</u> reports only, <u>C</u> lea <u>R</u> for "clear below 12,000 feet"	OVC010CB
	Temperature: degrees Celsius; first 2 digits, temperature "T" last 2 digits, dew-point temperature; <u>M</u> inus for below zero, e.g., M06	18/16
	Altimeter setting: indicator and 4 digits; in U.S., <u>A</u> -inches and hundredths; (<u>Q</u> -hectoPascals, e.g., Q1013)	A2992

6.13 KEY TO WMO TAF AND METAR

Figure 6-3.

IDENTIFICATION		AERODROME ACTUAL WEATHER - METAR AND SPECI DECODE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		CAVOK	REPLACES VISIBILITY, WEATHER AND CLOUD IF THESE ARE FORECAST TO BE OK (see earlier definition)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
METAR or SPECI	CCCC	Indicator of UTC In individual messages, time of observation in hours and minutes UTC. In bulletins, time of observation in bulletin header instead.	<table border="1"> <tr> <td>Forecast cloud</td> <td>N₁N₂N₃N₄N₅N₆(cc)</td> <td>Cloud type - only CB</td> </tr> <tr> <td>Forecast weather</td> <td>W'W'</td> <td>Forecast height of base of cloud</td> </tr> <tr> <td>Forecast visibility</td> <td>VVVV</td> <td>Forecast cloud amount</td> </tr> <tr> <td>Forecast wind</td> <td>ddd(ddd)MKT or MFS</td> <td>Forecast significant weather. See Table</td> </tr> <tr> <td>Change indicator and time</td> <td>TTTT or MOISD</td> <td>Forecast surface visibility in metres 9999-10 km or more</td> </tr> <tr> <td>Change and time</td> <td>TTGGgg</td> <td>Forecast maximum wind speed (gust)</td> </tr> <tr> <td>Supplementary information</td> <td>TKOFRWVDD₁ or WSR₁ or RWYD₁ or LRG</td> <td>Indicator of Gust</td> </tr> <tr> <td>Pressure</td> <td>Q₁RRR</td> <td>Forecast wind speed</td> </tr> <tr> <td>Temp and dew point</td> <td>TT/TT₂</td> <td>Forecast wind direction in degrees true, rounded to nearest ten degrees (VRB = VARIABLE)</td> </tr> <tr> <td>Clouds</td> <td>N₁N₂N₃N₄N₅N₆(cc)</td> <td>00000 = calm</td> </tr> <tr> <td>Present weather</td> <td>W'W'</td> <td>Associated time group in hours and minutes UTC</td> </tr> <tr> <td>Runway visual range</td> <td>RDD, VVVV</td> <td>Can be AT or FM - FROM or TL - TLL</td> </tr> <tr> <td>Visibility</td> <td>VVVV</td> <td>BECMG = BECOMING or see over for definitions TEMPO = TEMPORARY NOSIG = NO SIGNIFICANT CHANGE</td> </tr> <tr> <td>Surface wind</td> <td>ddd(ddd)MKT or MFS</td> <td>Runway designator - for parallel runways, may have LL, L, C, R or RR appended. (L=left; C=centre; R=right)</td> </tr> <tr> <td>Forecast cloud</td> <td>N₁N₂N₃N₄N₅N₆(cc)</td> <td>RUNWAY</td> </tr> <tr> <td>Forecast weather</td> <td>W'W'</td> <td>TAKE OFF and/or LANDING</td> </tr> <tr> <td>Forecast visibility</td> <td>VVVV</td> <td>Wind Shear</td> </tr> <tr> <td>Forecast wind</td> <td>ddd(ddd)MKT or MFS</td> <td>Recent weather since last routine report of operational significance</td> </tr> <tr> <td>Change indicator and time</td> <td>TTTT or MOISD</td> <td>Indicator of recent weather. See Table.</td> </tr> <tr> <td>Change and time</td> <td>TTGGgg</td> <td>QNH in whole hectopascals or inches, tenths and hundredths of an inch depending on indicator</td> </tr> <tr> <td>Supplementary information</td> <td>TKOFRWVDD₁ or WSR₁ or RWYD₁ or LRG</td> <td>Indicator of QNH in hectopascals. If Q=A then QNH is in inches.</td> </tr> <tr> <td>Pressure</td> <td>Q₁RRR</td> <td>Dew-point temperature in whole degrees Celsius (if below 0°C preceded by M)</td> </tr> <tr> <td>Temp and dew point</td> <td>TT/TT₂</td> <td>Temperature in whole degrees Celsius (if below 0°C preceded by M)</td> </tr> <tr> <td>Clouds</td> <td>N₁N₂N₃N₄N₅N₆(cc)</td> <td>Cloud And Visibility OK. Replaces visibility RVR, present weather and cloud if: 1) Visibility is 10 km or more, 2) No cumulonimbus cloud and no cloud below 1500 metres (5000 ft) or below the highest minimum sector altitude whichever is greater, and 3) No precipitation, thunderstorm, sandstorm, duststorm, shallow fog or low drifting dust, sand or snow</td> </tr> <tr> <td>Present weather</td> <td>W'W'</td> <td>Cloud type - only CB (Cumulonimbus) or TCU (Towering cumulus) indicated</td> </tr> <tr> <td>Runway visual range</td> <td>RDD, VVVV</td> <td>Height of base of clouds in units of 30 metres (100ft)</td> </tr> <tr> <td>Visibility</td> <td>VVVV</td> <td>Cloud amount: SCT = SCATTERED (half or less than half the sky covered) BKN = BROKEN (more than half but less than OVC) OVC = OVERCAST (entire sky covered)</td> </tr> <tr> <td>Surface wind</td> <td>ddd(ddd)MKT or MFS</td> <td>Replaced when sky is obscured and information on visibility is available by: VVVVN₁N₂N₃N₄N₅N₆</td> </tr> <tr> <td>Forecast cloud</td> <td>N₁N₂N₃N₄N₅N₆(cc)</td> <td>Vertical visibility in units of 30 metres (100 feet) VV = Vertical visibility unavailable</td> </tr> <tr> <td>Forecast weather</td> <td>W'W'</td> <td>Indicator of Vertical Visibility</td> </tr> <tr> <td>Forecast visibility</td> <td>VVVV</td> <td>Replaced when there are no clouds and CAVOK is not appropriate by: SKC SKY Clear</td> </tr> <tr> <td>Forecast wind</td> <td>ddd(ddd)MKT or MFS</td> <td>PVR tendency</td> </tr> <tr> <td>Change indicator and time</td> <td>TTTT or MOISD</td> <td>Runway visual range in metres (one minute mean maximum over last ten minutes)</td> </tr> <tr> <td>Change and time</td> <td>TTGGgg</td> <td>Indicator of significant variation</td> </tr> <tr> <td>Supplementary information</td> <td>TKOFRWVDD₁ or WSR₁ or RWYD₁ or LRG</td> <td>Runway visual range in metres (one minute mean minimum over last ten minutes)</td> </tr> <tr> <td>Pressure</td> <td>Q₁RRR</td> <td>Runway designator - for parallel runways may have LL, L, C, R or RR</td> 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See Table	Change indicator and time	TTTT or MOISD	Forecast surface visibility in metres 9999-10 km or more	Change and time	TTGGgg	Forecast maximum wind speed (gust)	Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG	Indicator of Gust	Pressure	Q ₁ RRR	Forecast wind speed	Temp and dew point	TT/TT ₂	Forecast wind direction in degrees true, rounded to nearest ten degrees (VRB = VARIABLE)	Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	00000 = calm	Present weather	W'W'	Associated time group in hours and minutes UTC	Runway visual range	RDD, VVVV	Can be AT or FM - FROM or TL - TLL	Visibility	VVVV	BECMG = BECOMING or see over for definitions TEMPO = TEMPORARY NOSIG = NO SIGNIFICANT CHANGE	Surface wind	ddd(ddd)MKT or MFS	Runway designator - for parallel runways, may have LL, L, C, R or RR appended. (L=left; C=centre; R=right)	Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	RUNWAY	Forecast weather	W'W'	TAKE OFF and/or LANDING	Forecast visibility	VVVV	Wind Shear	Forecast wind	ddd(ddd)MKT or MFS	Recent weather since last routine report of operational significance	Change indicator and time	TTTT or MOISD	Indicator of recent weather. See Table.	Change and time	TTGGgg	QNH in whole hectopascals or inches, tenths and hundredths of an inch depending on indicator	Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG	Indicator of QNH in hectopascals. If Q=A then QNH is in inches.	Pressure	Q ₁ RRR	Dew-point temperature in whole degrees Celsius (if below 0°C preceded by M)	Temp and dew point	TT/TT ₂	Temperature in whole degrees Celsius (if below 0°C preceded by M)	Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Cloud And Visibility OK. Replaces visibility RVR, present weather and cloud if: 1) Visibility is 10 km or more, 2) No cumulonimbus cloud and no cloud below 1500 metres (5000 ft) or below the highest minimum sector altitude whichever is greater, and 3) No precipitation, thunderstorm, sandstorm, duststorm, shallow fog or low drifting dust, sand or snow	Present weather	W'W'	Cloud type - only CB (Cumulonimbus) or TCU (Towering cumulus) indicated	Runway visual range	RDD, VVVV	Height of base of clouds in units of 30 metres (100ft)	Visibility	VVVV	Cloud amount: SCT = SCATTERED (half or less than half the sky covered) BKN = BROKEN (more than half but less than OVC) OVC = OVERCAST (entire sky covered)	Surface wind	ddd(ddd)MKT or MFS	Replaced when sky is obscured and information on visibility is available by: VVVVN ₁ N ₂ N ₃ N ₄ N ₅ N ₆	Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Vertical visibility in units of 30 metres (100 feet) VV = Vertical visibility unavailable	Forecast weather	W'W'	Indicator of Vertical Visibility	Forecast visibility	VVVV	Replaced when there are no clouds and CAVOK is not appropriate by: SKC SKY Clear	Forecast wind	ddd(ddd)MKT or MFS	PVR tendency	Change indicator and time	TTTT or MOISD	Runway visual range in metres (one minute mean maximum over last ten minutes)	Change and time	TTGGgg	Indicator of significant variation	Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG	Runway visual range in metres (one minute mean minimum over last ten minutes)	Pressure	Q ₁ RRR	Runway designator - for parallel runways may have LL, L, C, R or RR	Temp and dew point	TT/TT ₂	Indicator of RVR	Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Detection of lowest visibility (eight points of compass) where required	Present weather	W'W'	Minimum horizontal visibility in metres 9999 = 10 km or more	Runway visual range	RDD, VVVV	Wind speed units used	Visibility	VVVV	Maximum wind speed (gust) - if necessary	Surface wind	ddd(ddd)MKT or MFS	Indicator of Gust - if necessary	Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Mean wind speed: (ten minute mean or since discontinuity)	Forecast weather	W'W'	Mean wind direction in degrees true rounded off to nearest ten degrees (VRB = VARIABLE)	Forecast visibility	VVVV	00000 = calm	Forecast wind	ddd(ddd)MKT or MFS	Followed when there is a variation in wind direction of 60° or more and wind speed > 5000 metres by: ddd(ddd)MKT or MFS	Change indicator and time	TTTT or MOISD	Other extreme direction of wind (measured clockwise)	Change and time	TTGGgg	Indicator of Variability	Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG	Extreme direction of wind	Pressure	Q ₁ RRR	Abbreviated decode of METAR and SPECI For details of codes see WMO Manual on Codes, WMO Publication No. 306	Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and 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point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast 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RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'		Forecast visibility	VVVV		Forecast wind	ddd(ddd)MKT or MFS		Change indicator and time	TTTT or MOISD		Change and time	TTGGgg		Supplementary information	TKOFRWVDD ₁ or WSR ₁ or RWYD ₁ or LRG		Pressure	Q ₁ RRR		Temp and dew point	TT/TT ₂		Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Present weather	W'W'		Runway visual range	RDD, VVVV		Visibility	VVVV		Surface wind	ddd(ddd)MKT or MFS		Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)		Forecast weather	W'W'	
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Runway visual range	RDD, VVVV	Can be AT or FM - FROM or TL - TLL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Surface wind	ddd(ddd)MKT or MFS	Runway designator - for parallel runways, may have LL, L, C, R or RR appended. (L=left; C=centre; R=right)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Clouds	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Cloud And Visibility OK. Replaces visibility RVR, present weather and cloud if: 1) Visibility is 10 km or more, 2) No cumulonimbus cloud and no cloud below 1500 metres (5000 ft) or below the highest minimum sector altitude whichever is greater, and 3) No precipitation, thunderstorm, sandstorm, duststorm, shallow fog or low drifting dust, sand or snow																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Present weather	W'W'	Cloud type - only CB (Cumulonimbus) or TCU (Towering cumulus) indicated																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Runway visual range	RDD, VVVV	Height of base of clouds in units of 30 metres (100ft)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Surface wind	ddd(ddd)MKT or MFS	Replaced when sky is obscured and information on visibility is available by: VVVVN ₁ N ₂ N ₃ N ₄ N ₅ N ₆																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Forecast cloud	N ₁ N ₂ N ₃ N ₄ N ₅ N ₆ (cc)	Vertical visibility in units of 30 metres (100 feet) VV = Vertical visibility unavailable																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Forecast visibility	VVVV	Replaced when there are no clouds and CAVOK is not appropriate by: SKC SKY Clear																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Forecast wind	ddd(ddd)MKT or MFS	Followed when there is a variation in wind direction of 60° or more and wind speed > 5000 metres by: ddd(ddd)MKT or MFS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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6.12 KEY TO U.S. TAF AND METAR (Continued)

Figure 6-2.

KEY TO AERODROME FORECAST (TAF) AND AVIATION ROUTINE WEATHER REPORT (METAR) - Continued		
Forecast	Explanation	Report
WS010/31022KT	In U.S. TAF, non-convective low level ($\leq 2,000$ ft) Wind Shear; 3-digit height (hundreds of ft); "T", 3-digit wind direction and 2-3 digit wind speed above the indicated height, and unit, KT In METAR, ReMark indicator & remarks. For example: Sea-Level Pressure in hectoPascals & tenths, as shown: 1004.5hPa; Temp/dew-point in tenths °C, as shown: temp. 18.2°C, dew-point 15.9°C	RMK SLP045 T01820159
FM1930	From and 2-digit hour and 2-digit minute beginning time; indicates significant change. Each FM starts on new line, indented 5 spaces.	
TEMPO 2022	TEMPO rary: changes expected for ≤ 1 hour and in total, \leq half of 2-digit hour beginning and 2-digit hour ending time period	
PROB40 0407	PROB ability and 2-digit percent (30 or 40); probable condition during 2-digit hour beginning and 2-digit hour ending time period	
BECMG 1315	BECOM ing: change expected during 2-digit hour beginning and 2-digit hour ending time period	

Table of Significant Present, Forecast and Recent Weather - Grouped in categories and used in the order list below; or as needed in TAF, **No Significant Weather**.

QUALIFIER			
Intensity or Proximity			
- Light	"no sign"	Moderate	+ Heavy
VC Vicinity: but not at aerodrome; in U.S. METAR, between 5 and 10SM of the point(s) of observation; in U.S. TAF, 5 to 10SM from center of runway complex (elsewhere within 8000m)			
Descriptor			
MI Shallow	BC Patches	PR Partial	TS Thunderstorm
BL Blowing	SH Showers	DR Drifting	FZ Freezing
WEATHER PHENOMENA			
Precipitation			
DZ Drizzle	RA Rain	SN Snow	SG Snow grains
IC Ice crystals	PE Ice pellets	GR Hail	GS Small hail/snow pellets
UP Unknown precipitation in automated observations			
Obscuration			
BR Mist ($\leq 5/8$ SM)	FG Fog ($\leq 5/8$ SM)	FU Smoke	VA Volcanic ash
SA Sand	HZ Haze	PY Spray	DU Widespread dust
Other			
SQ Squall	SS Sandstorm	DS Duststorm	PO Well developed dust/sand whirls
FC Funnel cloud	+FC tornado/waterspout		

- Explanations in parentheses "()" indicate different worldwide practices.
- Ceiling is not specified; defined as the lowest broken or overcast layer, or the vertical visibility.
- NWS TAFs exclude turbulence, icing & temperature forecasts; NWS METARs exclude trend fcsts
- Although not used in US, **Ceiling And Visibility OK** replaces visibility, weather and clouds if: visibility ≥ 10 km; no cloud below 5000 ft (1500 m) or below the highest minimum sector altitude, whichever is greater and no CB; and no precipitation, TS, DS, SS, MIFG, DRDU, DRSA or DRSN.

March 1996
 NOAA/PA 96052

UNITED STATES DEPARTMENT OF COMMERCE
 National Oceanic and Atmospheric Administration—National Weather Service

6.14 CHART INTERPRETATION

The U.S. National Meteorological Center (NMC), near Washington, D.C., is to function as a component of the World Area Forecast System (WAFS). This system has been designed by the International Civil Aviation Organization (ICAO) to provide forecasts of enroute meteorological conditions of the greatest possible accuracy and in a standardized form for international civil flight operations.

NMC is designated in the WAFS as both a World Area Forecast Center and a Regional Area Forecast Center (RAFC). Its main function as a World Area Forecast Center is to prepare global forecasts in grid-point form of upper winds and upper air temperatures and to supply the forecasts to associated RAFCs. One of its main RAFC functions is to prepare and supply to users charts of forecast winds and temperatures and of forecast significant weather.

Upper winds are to be depicted on NMC charts by means of arrow shafts with pennants (50 knots each) and feathers (full feathers, 10 knots; half feathers, 5 knots). The arrows indicate direction of wind flow related to true north. A small number near the pennant or feather end of each arrow gives the tens digit of forecast wind direction. Temperatures are depicted in circles and unsigned temperatures are negative. (See Chart on page 6-35.)

Significant weather is limited to the occurrence or expected occurrence of meteorological conditions considered to be of concern to aircraft operations. NMC significant weather chart is to cover the atmospheric envelope from flight level 250 (FL 250) to flight 600 (FL 600), i.e., from 25,000 to 60,000 feet.

This chart covers North and Central America, the Caribbean and the Atlantic, Europe and the Mediterranean. (See Chart on page 6-36.)

The meteorological conditions required by ICAO to be depicted on significant weather charts are the following:

- A. Active thunderstorm;
- B. Tropical cyclones;
- C. Severe squall lines;
- D. Moderate or severe turbulence (in cloud or clear air);
- E. Moderate or severe icing;
- F. Hail;
- G. Widespread sandstorm / duststorm;

6.14 CHART INTERPRETATION (Continued)

- H. Cumulonimbus cloud associated with A to G above;
- I. Surface positions of well-defined convergence zones;
- J. Surface positions, speed and direction of movement of frontal systems associated with significant enroute weather phenomena;
- K. Tropopause heights; and
- L. Jetstreams.

Required thunderstorm activity is to be depicted by means of the abbreviation, or symbol, "CB". By definition, this symbol is to refer to the occurrence of an area of widespread cumulonimbus clouds or cumulonimbus along a line with little or no space between individual clouds, or cumulonimbus clouds embedded in cloud layers or concealed by haze. It does not refer to isolated or scattered cumulonimbus clouds not embedded in cloud layers or concealed by haze.

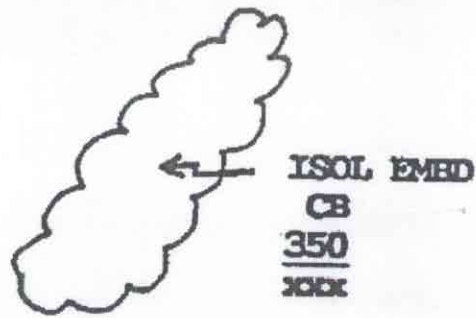
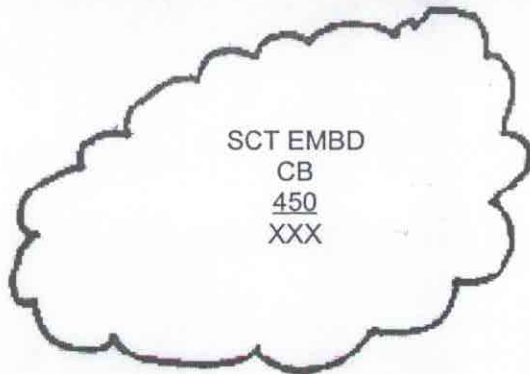
The depiction of meteorological conditions on NMC significant weather charts is to follow the conventions given below.

Depiction of Cumulonimbus Clouds (CB)

In the areas for which NMC is responsible to prepare significant weather charts, the area coverage of CB above FL 250 is expected to exceed 4/8 infrequently. Also, as noted before, forecasts of isolated or scattered CB not embedded in cloud layers or concealed in haze are not to be included in NMC's significant weather charts. Accordingly, CB data will normally be identified as ISOL EMBD CB (isolated embedded CB), SCT EMBD CB (scattered embedded CB), ISOL CB IN HAZE (isolated CB in haze), or SCT CB IN HAZE (scattered CB in haze). In rare instances, CB coverage above FL 250 may exceed 4/8; in these instances, CB activity should be described as FRQ CB (cumulonimbus clouds with little or no separation). The meanings of these area coverage terms are: ISOL, less than 1/8; SCT, 1/8 to 4/8; and FRQ, 5/8 to 8/8.

CB bases are considered certain to be below FL 240 and will be shown as XXX CB tops are to be expressed in hundreds of feet. The area to which the forecast applies will be shown by scalloped lines. Examples:

6.14 CHART INTERPRETATION (Continued)

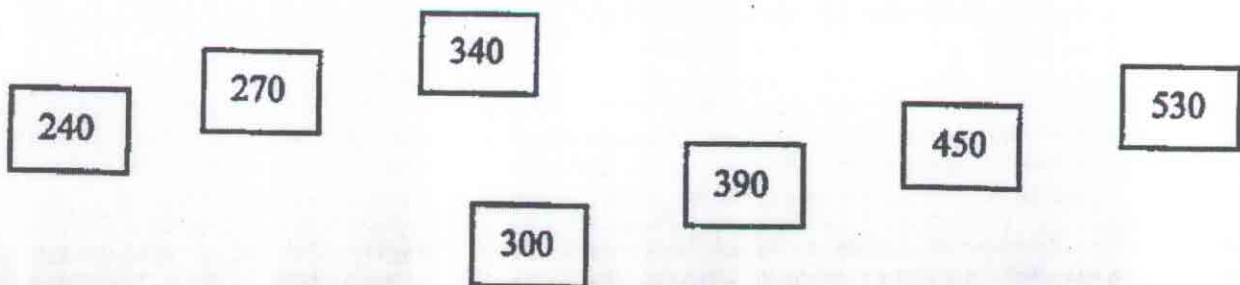


Meaning: Scattered (1/8 to 4/8 aerial coverage) embedded cumulonimbus clouds with bases below FL 240 and tops forecast to reach FL 450.

Meaning: Isolated (less than 1/8 aerial coverage) embedded cumulonimbus clouds with bases below FL 240 and tops forecast to reach FL 350.

Depiction of Tropopause Heights

Tropopause heights are to be depicted in hundreds of feet as 240, 270, 300, 340, 390, 450, and 530. Other heights may be used occasionally to define areas of very flat tropopause slope. Heights depicted are enclosed in small rectangular blocks with the center of the box representing the point being forecast. Sufficient heights are shown to satisfactorily depict the tropopause pattern. Examples:

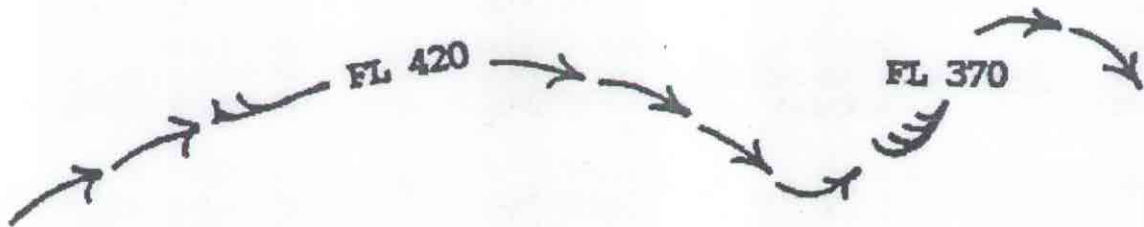


Meaning: Tropopause heights forecast to be at FL 240, FL 270, etc.

6.14 CHART INTERPRETATION (Continued)

Depiction of Jetstreams

The height and maximum wind speed of jetstreams having a core speed of 80 knots or greater are shown. Height is given as flight level (FL). Points along the jetstream at which the maximum wind speed is forecast are depicted with shafts, pennants and feathers. The height and core speed should be shown near each end of the heavy line and at sufficiently close intervals to give a good indication of speed and/or height changes.

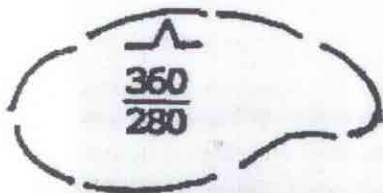


Meaning: A jetstream with forecast maximum speeds of 100 knots at a height of 42,000 feet at one location and 90 knots at a height of 37,000 feet at another location. Wind speed along other portions is forecast to be less. Wind directions are indicated by the orientation of arrow shafts in relation to true north.

Depiction of Clear Air Turbulence

Areas of forecast moderate or greater clear air turbulence (CAT) are bounded by heavy dashed lines. Clear air turbulence is interpreted as including all turbulence (including windshear induced and mountain-wave induced) not caused by convective activity. Areas are labeled with the appropriate symbol and the vertical extent in hundreds of feet.

Examples:



Meaning: An area of forecast moderate CAT, vertical extent from FL 280 to FL 360.



Meaning: An area of forecast severe CAT, vertical extent from below FL 240 to FL 320.

6.14 CHART INTERPRETATION (Continued)

Depiction-of Severe Squall Lines

Severe squall lines are depicted within areas of CB activity by the symbol:



Example of depiction of severe squall line and associated CB activity:



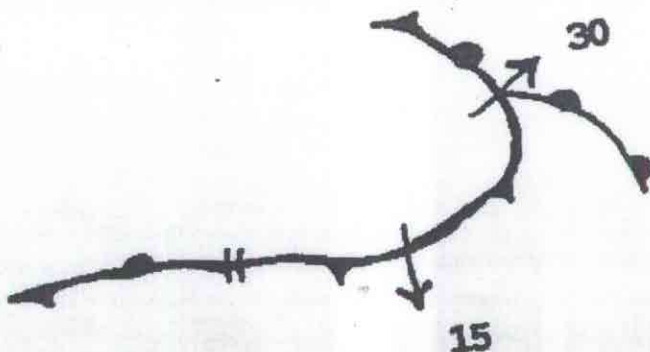
Meaning: Forecast severe squall line with associated CB, coverage 5/8 to 8/8, bases below FL 240 and tops forecast to reach FL 500.

Depiction of Convective Turbulence, Icing in CB Clouds, and Hail

The label of each significant weather chart has a statement which is to read: SYMBOL CB IMPLIES HAIL, MODERATE OR GREATER TURBULENCE AND ICING

Depiction of Fronts

Forecast surface position and speed (knots) and direction of movement of frontal systems associated with significant weather are depicted. Example:

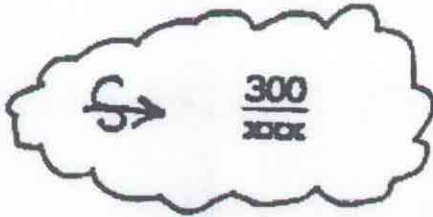


Meaning: A frontal system forecast to be at the position and with the orientation indicated at the valid time of the prognostic chart. Forecast movement related to true north and speed in knots are indicated by arrow shafts and adjacent figures.

6.14 CHART INTERPRETATION (Continued)

Depiction of Widespread Sandstorm or Duststorm

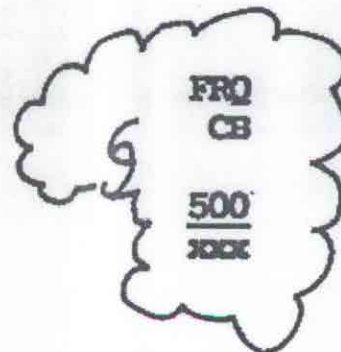
Areas of these phenomena are enclosed by scalloped lines and labeled by symbol and vertical extent. Example:



Meaning: Widespread sandstorm or duststorm, bases below FL 240 (i.e., at the surface), tops FL 300.

Depiction of Tropical Cyclones

Areas of associated cumulonimbus activity, if meeting the previously given criteria (ISOL EMBD CB, SCT EMBD CB, ISOL CB IN HAZE, FRQ CB), are enclosed in scallops, with the vertical extent. Examples:



Meaning: Forecast position of a tropical cyclone with no associated active thunderstorm area.

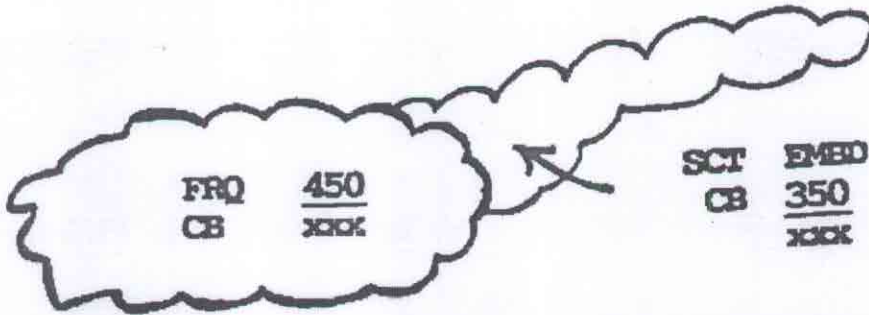
Meaning: An active thunderstorm area (5/8 to 8/8 aerial coverage, bases below FL 240, tops FL 500) associated with a tropical cyclone.

- Note: 1. The names of tropical cyclones, when relevant, will be entered adjacent to the symbol.
2. Significant weather charts depicting the tropical cyclone symbol will have a statement to the effect that the latest tropical cyclone advisory, rather than the tropical cyclone's prognostic position on the chart, is to be given public dissemination.

6.14 CHART INTERPRETATION (Continued)

Depiction of Inter-Tropical Convergence Zone

Areas of associated cumulonimbus activity, if meeting the previously given criteria (ISOL EMBD CB, SCT EMBD CB, ISOL CB IN HAZE, SCT CB IN HAZE, FRQ CB) are enclosed in scallops, with the vertical extent. Example:



Meaning: Forecast position of inter-tropical convergence zone, with associated active thunderstorm areas, coverage respectively FRQ (5/8 to 8/8), bases below FL 240, tops FL 450; and scattered (1/8 to 4/8), bases below FL 240, tops FL 350.

6.14. CHART INTERPRETATION (Continued)

Figure 6-6. Sig Weather Prog

