

# Guide to Aviation Weather Reports

## Current Weather Reports

### Aviation Routine Weather Report (METAR):

- Represents current conditions at a specific airport at the observation time.
- Routine observation reports (METAR) issued every hour. Special reports (SPECI) issued when needed to report significant weather changes.
- Valid times: reflect the current conditions at the time of observation.
- Winds given in relation to True North and speeds given in knots.

### Sample METAR Report:

SPECI MDH 2015Z 22015G25 200V290 5SM +SHRA SCT025 BKN040 00/M03 A2980  
RMK RAB10

Type of Report	SPECI	Special Report
Station Designator	MDH	Carbondale, IL
Time of Report	2015Z	2015 Zulu
Wind Direction, Speed & Character	2215G25 200V290	Wind 220 Deg. @ 15 Kts. Gusts to 25, varying in direction from 200 to 290
Visibility	5SM	5 Statute Miles
Weather and Obstructions to Vision	+SHRA	Heavy Rain Showers
Sky Condition and Ceiling	SCT025 BKN040	2500 Scattered; Ceiling 4000 Broken
Temperature and Dew Point	00/M03	Temperature 00° C/ Dewpoint minus 03° C
Altimeter Setting	A2980	Altimeter Setting 29.80
Remarks and Coded Data	RMK RAB10	Rain Began at 2010 Zulu

### ASOS, AWOS, AUTOB, & RAMOS:

- Computer Automated Surface Reporting Systems
- Format similar to Aviation Routine Weather Reports (METAR)

### Pilot Reports (UA, UUA):

- Represents current conditions as reported by pilots.
- Issued at the time of observation.
- Valid at the time of observation.

### Sample Pilot Report:

CGI UA /OV FAM210035 /TM 2213 /FL 090 /TP C172 /SK 030 SCT 060  
BKN 80 /WX FV20 /TA -05 /WV 260025 /TB LGT-MDT BLO 060 /IC  
LGT RIME ICIP /RM SMTH ABV 060

CGI	Station Report was Filed Under	CGI	Cape Girardeau, MO
/UA	Type of Pilot Report	UA	Routine Pilot Report
/OV	Location	FAM 210035	210 Radial From FAM at 35 Miles
/TM	Time (in Zulu)	2213	2213 Zulu
/FL	Altitude/ Flight Level	090	9,000 Feet MSL
/TP	Aircraft Type	C172	Cessna 172
/SK	Sky Coverage	030 SCT 060 BKN 080	3000 Scattered; 6000 Broken; Up to 8000
/WX	Flight Visibility and Weather	FV20	Flight Visibility of 20 Miles
/TA	Air Temperature (Celsius)	-05	Temperature of Minus 5 Degrees Celsius
/WV	Wind Direction and Speed	260025	Wind Direction of 260 at 25 Knots
/TB	Turbulence	LGT-MDT BLO 060	Light to Moderate Turbulence Below 6000
/IC	Icing	LGT RIME ICIP	Light Rime Icing in Clouds and Precipitation
/RM	Remarks	SMTH ABV 060	Smooth Above 6000 Feet

## Forecasts

### International Terminal Aerodrome Forecast (TAF):

- Description of surface weather expected to occur within 5 nautical miles of the airport. VC covers area out to 10 nautical miles.
- Issued four times daily (at 0000Z, 0600Z, 1200Z, 1800Z).
- Valid for 24 hours.

### Sample Terminal Forecast:

TAF KSPI 241135Z 241212 11014KT P6SM BKN100 BECMG 1416 14020G30KT  
FM2200 13023G35KT P6SM OVC070 PROB40 2204 5SM -SHRA OVC040  
FM0400 17018G28KT 5SM -SHRA OVC040 TEMPO 0610 2SM -TSRA OVC020CB  
FM1000 24015G25KT 3SM FZRAPE OVC020

Terminal forecast at Springfield, Illinois generated at 1135 zulu on the 24th day of the month, valid from the 24th at 12 zulu until 12 zulu the following day. From 12 zulu, winds 110 at 14 knots, greater than 6 miles visibility, 10,000 foot broken. Between 1400 and 1600 zulu, becoming wind 140 at 20 gusting to 30 knots. From 2200 zulu, wind 130 at 23 gusting to 35, greater than 6 miles visibility, 7000 foot overcast. Between 2200 and 0400 zulu there is a 40% change of winds 220 at 04 knots with 5 statute miles visibility and light rain showers, and overcast clouds at 4000 feet. From 0400 zulu winds from 170 at 18 knots gusting to 28 knots, five statute miles visibility with light rain showers, and overcast clouds at 4000 feet. A temporary change is expected between 0600 and 1000 zulu of 2 statute miles visibility with thunderstorms and light rain, with an overcast cloud layer at 2000 feet with cumulonimbus type clouds. From 1000 zulu, winds 240 at 15 knots gusting to 25 knots, three statute miles visibility with freezing rain and ice pellets, and an overcast cloud layer at 2000 feet.

- FM2200: From 2200 Zulu...
- BECMG 1416: Between 1400 and 1600 Zulu the weather will become...
- TEMPO 0610: Between 0600 and 1000 Zulu the weather may temporarily be...
- PROB30 1822: Between 1800 and 2200 Zulu there is a 30% probability the weather will become...
- PROB40 2204: Between 2200 and 0400 Zulu there is a 40% probability the weather will become...

### Winds and Temperatures Aloft Forecast (FD):

- Forecasted for specific locations.
- Issued twice daily at 12 and 00 Zulu.
- Valid for use at specified times.
- Winds based on True North and speeds given in knots, temperatures given in degrees C.

FD  
BASED ON 121200Z DATA  
VALID 121800Z FOR USE 1700-2100Z TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
CGI	2110	2315+10	2422+04	2635-04	2535-18	2444-30	245945	246755	246862
EVV	2212	2115+09	2325+03	2625-05	3531-15	2542-27	265842	256352	256762
STL	9900	2418+11	2625+01	2219-07	2330-17	2435-30	244145	244854	731960

Cape Girardeau winds aloft at 3000 feet are 210 degrees at 10 knots (2110).  
Winds aloft at 3000 feet at St. Louis are light and variable (9900). Winds aloft at  
Evansville at 9000 feet are 230 degrees of 25 knots with a temperature aloft of +3  
degrees Celsius. Winds aloft at St. Louis at 39,000 feet are 230 at 119, with a  
temperature aloft of -60 degrees Celsius.

- Winds aloft are not reported within 1,500 feet of station elevation.
- Temperatures aloft are not reported for the 3,000 foot level or within 2,500 feet of station elevation.

**Area Forecast (FA):**

- A forecast of general weather conditions over an area the size of several states.
- Issued three times daily.
- Forecast valid for 12 hours plus a 6 hour outlook (IFR, MVFR, VFR).
  - IFR: less than 1,000 foot ceilings, and/or less than 3 SM visibility.
  - MVFR: 1,000 - 3,000 foot ceilings, 3-5 SM visibility.
  - VFR: ceilings greater than 3,000 feet, visibility greater than 5 SM.

**Sample Area Forecast:**

CHIC FA 101045  
 SYNOPSIS AND VFR CLDS/WX  
 SYNOPSIS VALID UNTIL 110500  
 CLDS/WX VALID UNTIL 102300...OTLK VALID 102300-110500  
 ND SD NE KS MN IA MO WI MI IN KY

SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.  
 TSTMS IMPLY SVR OR GRT TURBC SVR ICG LLWS AND IFR CONDS.  
 NON MSL HGTS DENOTED BY AGL OR CIGS.

SYNOPSIS...WRMFRT EXTDD FROM A LOW OVER THE OK PNHDL EWD AND  
 SEWD ACRS ERN/SERN OK. STNRY FNT WILL EXTDD EWD ACRS ERN KS AND  
 CNTRL MO. CFDNT EXTDS SWWD ACRS NWRN ND. BY 05Z, CFDNT WILL  
 MOVE SEWD AND EXTDD FROM WRN UPR MI THRU NWRN WI AND NWRN IA  
 INTO NRN NE PNHDL...LUNDY...

MO  
 WRN HALF...CIGS 40 OVC 80. OCNL IP-R. 13Z CIGS 10-20 OVC. VSBYS  
 3-5R. OTLK...MVFR CIGS.  
 ELSW...80 SCT-BKN 250. 23Z CIGS 50 OVC 100. CHC R. OTLK...MVFR  
 CIGS R S.

IL  
 80-120 SCT-BKN 140..CI ABV. 16-18Z CIGS 50 BKN-OVC. 19-22Z CIGS  
 30 OVC OCNL 10 OBSCD. VSBYS 3S-. OTLK...MVFR CIGS S.

Chicago area forecast for the tenth day of the month, from 1045 Zulu. Synopsis valid until 0500 Zulu on the 11th, clouds and weather valid until 2300 Zulu on the 10th, outlook valid from 2300 Zulu on the 10th until 0500 Zulu on the 11th.

See Airmet Sierra for IFR conditions and mountain obscurations. Thunderstorms imply severe or greater turbulence, severe icing, low level windshear, and IFR conditions.

Synopsis: A warm front extends from a low over the Oklahoma panhandle eastward and southeastward across eastern/southeastern Oklahoma. A stationary front will extend eastward across eastern Kansas and central Missouri. A coldfront extends southwestward across northwestern North Dakota. By 0500 Zulu, the coldfront will move southeastward and extend from western Upper Michigan thru northwestern Wisconsin and northwestern Iowa, into the northern Nebraska panhandle. Forecast prepared by Mr. Lundy.

Forecast for Missouri: The western half of Missouri, ceiling 4,000 feet tops at 8,000 feet, occasional light ice pellets and light rain. By 1300 Zulu, ceilings 1,000 to 2,000 feet overcast, visibilities 3 to 5 miles with light rain. Outlook marginal VFR due to ceilings. The rest of the state, clouds 8,000 feet scattered to broken up to 25,000 feet. By 2300 Zulu, ceilings 5,000 feet overcast with tops at 10,000 feet, with a chance of light rain. Outlook marginal VFR due to ceilings, rain and snow.

Forecast for Illinois: Clouds 8,000 to 12,000 feet scattered to broken with tops at 14,000 feet, with cirrus clouds above. Between 1600 and 1800 Zulu, ceilings 5,000 feet broken to overcast. Between 1900 and 2200 Zulu ceilings 3,000 overcast, occasionally 1,000 obscured, visibility 3 miles with light snow. Outlook marginal VFR due to ceilings.

**Airmets (WA):**

- Advises of weather that may be hazardous to single engine aircraft, other light aircraft, and VFR pilots.
- Valid for 6 hours, if the conditions are expected to occur beyond the forecast period, then the airmet must be reissued.
- Items covered by airmets include moderate icing, moderate turbulence, sustained surface winds greater than 30 knots, extensive mountain obscuration, and ceilings less than 1,000 feet and/or visibilities less than 3 miles over 50% of the area at one time.

**Sample Airmet:**

CHIT WA 101345  
AIRMET TANGO FOR TURBC VALID UNTIL 102000  
  
AIRMET TURBC...KS NE IA MO WI IL OK TX AR LA  
FROM MSN TO FAM TO LCH TO SAT TO CDS TO GRI TO MCW TO MSN  
OCNL MDT TURBC BLO 80 DUE TO STG SLY LOW LVL FLOW. CONDS CONTG  
BYD 20Z THRU 020Z.

Chicago Airmet Tango for the 10th day of the month from 1345 Zulu until 2000 Zulu, covering the states of Kansas, Nebraska, Iowa, Missouri, Wisconsin, Illinois, Oklahoma, Texas, Arkansas, and Louisiana. In the area bordered by MSN-FAM...MCW-MSN, occasional moderate turbulence below 8,000 feet due to a strong southerly low-level flow. These conditions are expected to occur beyond the forecast period, thru 0200 Zulu.

**Sigmets (WS):**

- Advises of weather that may be potentially hazardous to all aircraft, other than convective activity.
- Valid for 4 hours, if the activity is expected to continue beyond the forecast period, then the sigmet must be reissued.
- Items covered by sigmets include, severe icing, severe or extreme turbulence, and sandstorms, duststorms, or volcanic ash which lower the visibility below 3 miles.

**Sample Sigmet:**

CHIA WS 101710  
SIGMET ALFA 1 VALID UNTIL 102110  
MO WI IL IN  
FROM MSN TO FWA TO EVV TO FAM TO IRK TO BDF TO MSN  
OCNL SVR ICING ABV FRZLVL EXPCD.  
FRZLVL 080 N TO 120 S.  
CONDS CONTG BYD 2100Z.

Chicago Sigmet Alfa, for the 10th day of the month at 1710 Zulu, until 2110 Zulu, covering the states of Missouri, Wisconsin, Illinois, and Indiana. In the area bordered by MSN-FWA...BDF-MSN, occasional severe icing is expected above the freezing level. The freezing level varies from 8,000 feet in the southern portions of the area to 12,000 feet in the northern portions. Conditions are expected to continue beyond 2100 Zulu.

### Convective Sigmets (WST):

- Advises of convective activity that may be hazardous to all aircraft.
- ~~Issued~~ Issued every hour at the hour plus 55 minutes.
- Valid ~~for up to 2 hours~~, will be issued every hour the convective activity exists.
- Items covered by convective sigmets include: severe thunderstorms (surface winds greater than 50 knots; 3/4 inch hail or greater at the surface; or tornadoes), embedded thunderstorms, lines of thunderstorms, or level 4 or greater thunderstorms affecting 40% or more of an area of at least 3,000 square miles.

### Sample Convective Sigmet:

MKCC WST 221755  
CONVECTIVE SIGMET 19C  
KS OK  
FROM 30E TO 20E GAG  
DVLPG LINE TSTMS 25 MI WIDE MOVG FROM 2315 TOPS 450.  
HAIL TO 1 IN...WIND GUSTS TO 55  
FCST TO 1955Z  
LINE WILL CONT INTSFYG AND MOV NEWD 25-30 KTS THRU  
1955Z. HAIL TO 2 IN PSBL

Kansas City Convective Sigmet 19C, valid from 1755 Zulu until 1955 Zulu, covering Kansas and Oklahoma. From 30 miles east of GAG to 20 miles east of GAG, a 25 mile wide line of thunderstorms will develop. The line is moving from 230 at 15 knots, with tops at 45,000 feet. Hail greater than 1 inch in diameter is expected with wind gusts as strong as 55 knots. The line will continue to intensify thru 1955 Zulu, and move northeastward at 25 to 30 knots. Hail of up to 2 inches in diameter is possible.

### Weather Charts

#### Surface Analysis Chart:

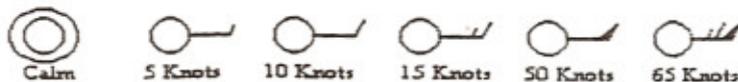
- Illustrates the location of fronts (including type, intensity, and character), pressure systems, isobars (lines of equal pressure), troughs, and ridges, along with station model information.
- ~~Issued every three hours~~ Issued every three hours.
- Valid only at the time of observation.

#### Sample Station Model:

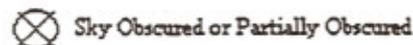
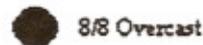
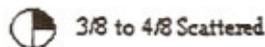
73 147  
\*\* O 28/  
65 — .25

High Cloud Type	—	Scattered Cirrus Clouds
Medium Cloud Type	—	Thin Alto-Stratus Clouds
Low Cloud Type	—	Fracto-Stratus or Fracto-Cumulus (Scud)
Temperature	75	75 Degrees Farenheit
Dew Point	65	65 Degrees Farenheit
Present Weather	**	Continuous Snow
Sea Level Pressure	147	1014.7 Millibars
3 Hour Pressure Change	28	2.8 Mb Pressure Change (Last 3 Hours)
Pressure Tendency	/	Increasing Over the Last 3 Hours
6 Hour Precipitation	.25	.25 Inches Over the Last 6 Hours

### Station Model Wind Direction and Speed Indicators:



### Station Model Sky Cover Symbols:



### Weather Depiction Chart:

- Illustrates fronts, areas of IFR, marginal VFR, and VFR, and station ceilings, visibilities, and current weather.

- Issued every three hours, starting at 0100 Zulu.

- Valid only at the time of observation.

- Uses similar symbols to the surface analysis chart to depict station sky cover and present weather. Ceiling height (or the height of the lowest layer if scattered) is denoted below the station, in hundreds of feet. Visibilities (in statute miles) and present weather are denoted to the left of the station.

### Radar Summary Charts:

- Illustrates areas of precipitation based on a collection of radar reports. Radar Summary charts display the type of precipitation, shape, intensity, trend, movement, coverage, echo tops/bases, and weather watch areas.

- Issued every hour.

- Valid at the time of observation (hour plus 35 minutes).

- Contoured areas indicate areas of precipitation. The 1st contour indicates weak to moderate intensity (VIP 1&2), the 2nd contour indicates strong to very strong intensity (VIP 3&4), the 3rd contour indicates intense to extreme intensity (VIP 5&6).

### Special Radar Summary Symbols:

NE	No echos observed
NA	Observations unavailable
OM	Out for maintenance
LM	Little movement
\\_	Line or area movement at 15 knots
--	Cell movement at 35 knots
+	Intensity increasing
-	Intensity decreasing

### Significant Weather Prognostic Charts (12 and 24 Hour):

- Illustrates forecasted precipitation, turbulence, freezing levels, frontal movement, pressure systems, and areas of IFR or marginal VFR.
- Issued four times daily (every 6 hours).
- Valid for the forecasted time specified in the lower left corner of the respective panel.
- The upper panels illustrate turbulence, freezing levels, and areas of IFR and marginal VFR, at the 12 and 24 hour forecasted times.
- The lower panels illustrate precipitation, frontal movement, and pressure systems, at the 12 and 24 hour forecasted times.
- Precipitation bordered by smooth lines indicate continuous or intermittent (stable) precipitation, precipitation bordered by broken (dot-dash) lines indicate showery precipitation or thunderstorms.
- Shaded areas of precipitation indicate precipitation covering more than half of the area. Unshaded areas of precipitation indicate precipitation covering less than half of the area.

### Significant Weather Prognostic Charts (36 and 48 Hour):

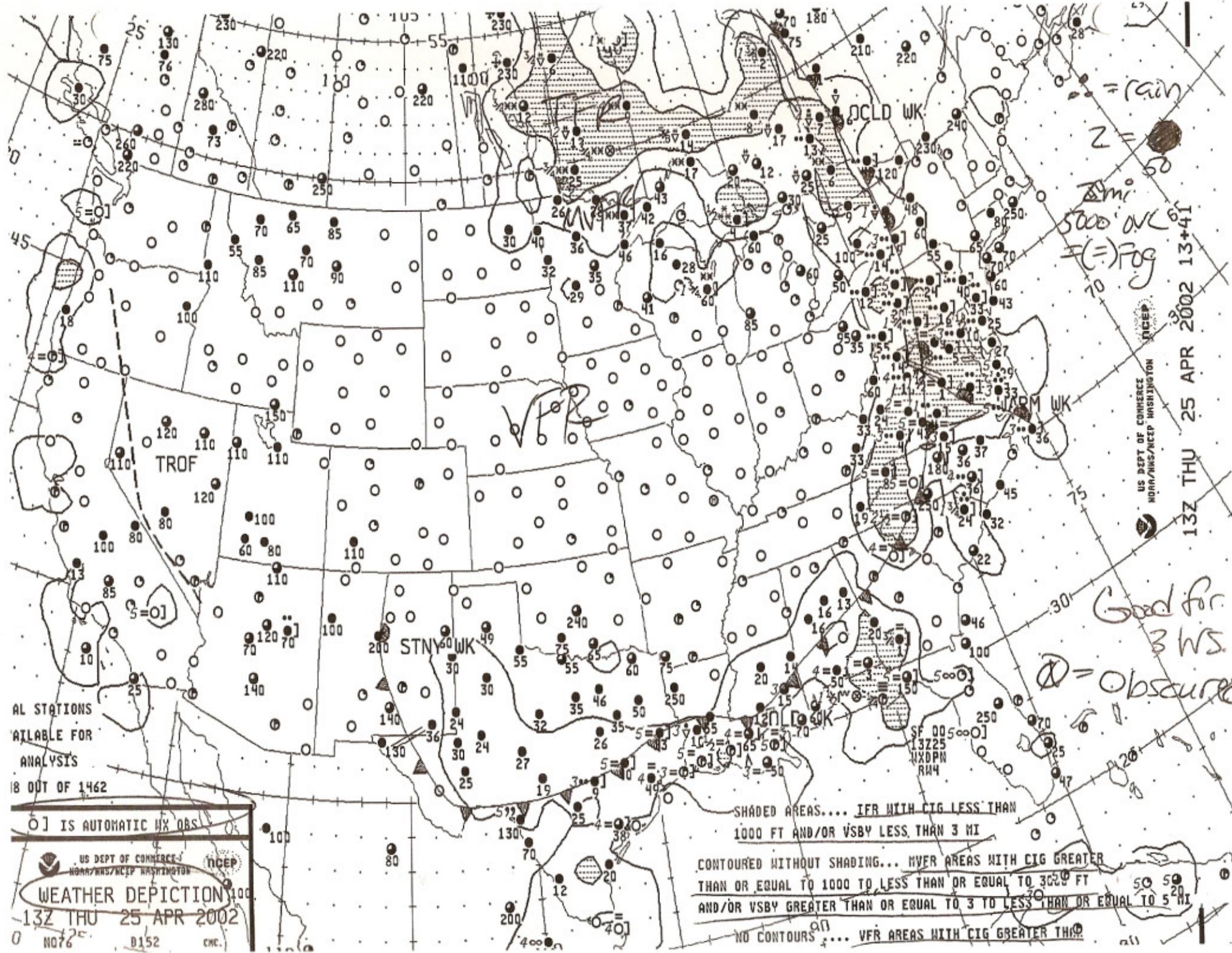
- Contain similar information to the 12 and 24 hour prognostic charts.
- Issued twice daily, based on 0000 Zulu and 1200 Zulu information.
- Valid for the forecasted time specified in the lower left corner of the respective panel.
- The 36 and 48 hour prognostic charts use the same symbols as the 12 and 24 hour prognostic charts, except no freezing precipitation is forecasted, scalloped lines indicate areas of overcast clouds (not areas of marginal VFR), and a prognostic discussion is included to explain the reasoning for the forecast.

### Source:

- Aviation Weather Services (AC 00-45D) (Section 2 thru 8).

## Common Weather Symbols:

Definition	Textual	Weather Depiction, Surface Analysis, & Prognostic Charts	Radar Summary
Rain	RA	•	R
Rain Showers	SHRA	• ▽	RW
Thunderstorms	TS	☉	T
Drizzle	DZ	·	L
Snow	SN	*	S
Snow Showers	SHSN	* ▽	SW
Freezing Rain	FZRA	~	ZR
Freezing Drizzle	FZDZ	~	ZL
Ice Pellets	PE	△	IP
Hail	GS or GR	▲ ▽	HAIL
Haze	HZ	∞	
Mist	BR	=	
Fog	FG	≡	
Smoke	FU	f	
Snow Grains	SG	—	
Heavy	+	+	
Light	-	-	
Increasing			+
Decreasing			-



= (rain)  
 Z = 50  
 Δ mi  
 5000' OK  
 (=) Fog

US DEPT OF COMMERCE  
 NOAA/NWS/NCEP WASHINGTON

13Z THU 25 APR 2002 13+41

Good for  
 3 WS  
 ⊙ = Obscured

ALL STATIONS  
 AVAILABLE FOR  
 ANALYSIS  
 18 OUT OF 1462

○] IS AUTOMATIC WX OBS  
 US DEPT OF COMMERCE  
 NOAA/NWS/NCEP WASHINGTON  
 WEATHER DEPICTION  
 13Z THU 25 APR 2002  
 NO 76 0152 CMC

SHADED AREAS... IFR WITH CIG LESS THAN  
 1000 FT AND/OR VSBY LESS THAN 3 MI  
 CONTOURED WITHOUT SHADING... MFR AREAS WITH CIG GREATER  
 THAN OR EQUAL TO 1000 TO LESS THAN OR EQUAL TO 3000 FT  
 AND/OR VSBY GREATER THAN OR EQUAL TO 3 TO LESS THAN OR EQUAL TO 5 MI  
 NO CONTOURS... VFR AREAS WITH CIG GREATER THAN

Issued every 6 hr. Good for 12 hr.

