

Pre-Flight Planning

Reference Guide

Graphical Products

- Surface Analysis
- Weather Depiction
- Radar Summary
- Constant Pressure Analysis
- Composite Moisture Stability
- Low-Level Significant WX Prognostic
- Convective Outlook
- Winds and Temperatures Aloft

Textual Products

- Aviation Routine Weather Report (METAR)
- Terminal Aerodrome Forecast (TAF)
- Area Forecast (FA)
- Airmets (WA)
- Sigmets (WS)
- Convective Sigmet (WST)
- Winds & Temperatures Aloft (FD)
- Center Weather Advisory (CWA)
- Transcribed Weather Broadcast (TWEB)
- Pilot Reports (UA/UUA)

Information compiled from Aviation Weather and Weather Services, Irvin N. Gleim and www.aviationweather.gov.

Graphical Weather Products

Graphical Products at a Glance:

<u>Type/General Description:</u>	<u>Frequency:</u>	<u>Valid period:</u>
Surface Analysis Displays front and pressure system positions along with detailed WX info as observed at various locations	Every 3 hrs	Observation
Weather Depiction A 'de-cluttered' surface analysis that summarizes WX conditions by showing broad areas of IFR and MVFR	Every 3 hrs	Observation
Radar Summary Displays precipitation echoes along with type, trend, movement, and intensity	Hourly	Observation
Constant Pressure Analysis Displays condition (temp, wind, temp-dew point spread) of the atmosphere at a given pressure level	Every 12 hrs	Observation
Composite Moisture Stability Used to approximate atmospheric characteristics with respect to stability, freezing levels, moisture content, and humidity	Every 12 hrs	Observation
Low-Level Significant WX Prognostic Forecasts areas of significant weather and precipitation in 12 and 24 hr blocks	Every 6 hrs	24 hrs
Convective Outlook Gives an easy-to-see visual representation of the areas in which thunderstorm activity is expected to develop	5x daily	To 12z next day
Winds and Temperatures Aloft Graphical version of the textual FD product	Every 12 hrs	12 hrs

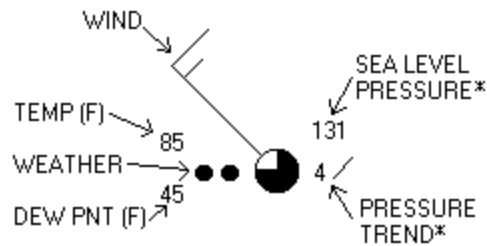
Surface Analysis Chart

Description: The Surface Analysis Chart is an observation of several meteorological factors at various locations across the country. It can be used to identify pressure systems, location of fronts, and weather conditions such as wind, temperature, sky coverage, and precipitation at the observation sites.

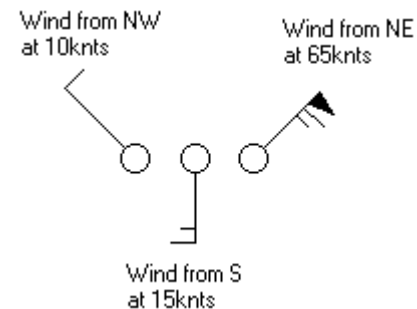
Issue Frequency/Valid Times: This chart is computer generated every 3 hours and is valid at the time of observation.

Symbol Meanings: (see example chart on following page)

Station Model:



Wind Barb Examples:



*Sea Level Pressure in (mb), read: 1013.1mb
 *Pressure Trend: increasing, 0.4mb in last 3hrs

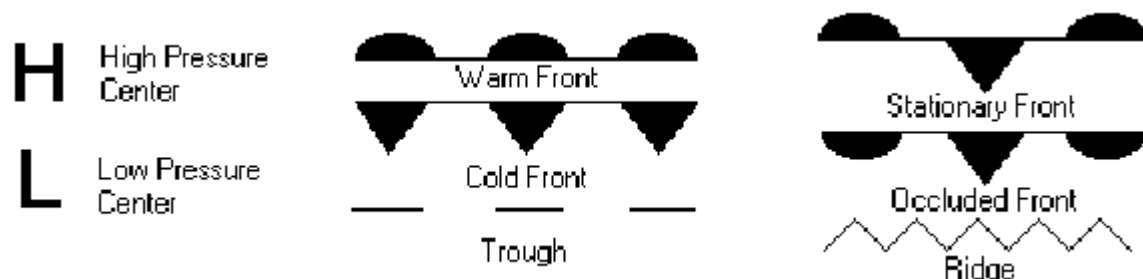
Sky Coverage:

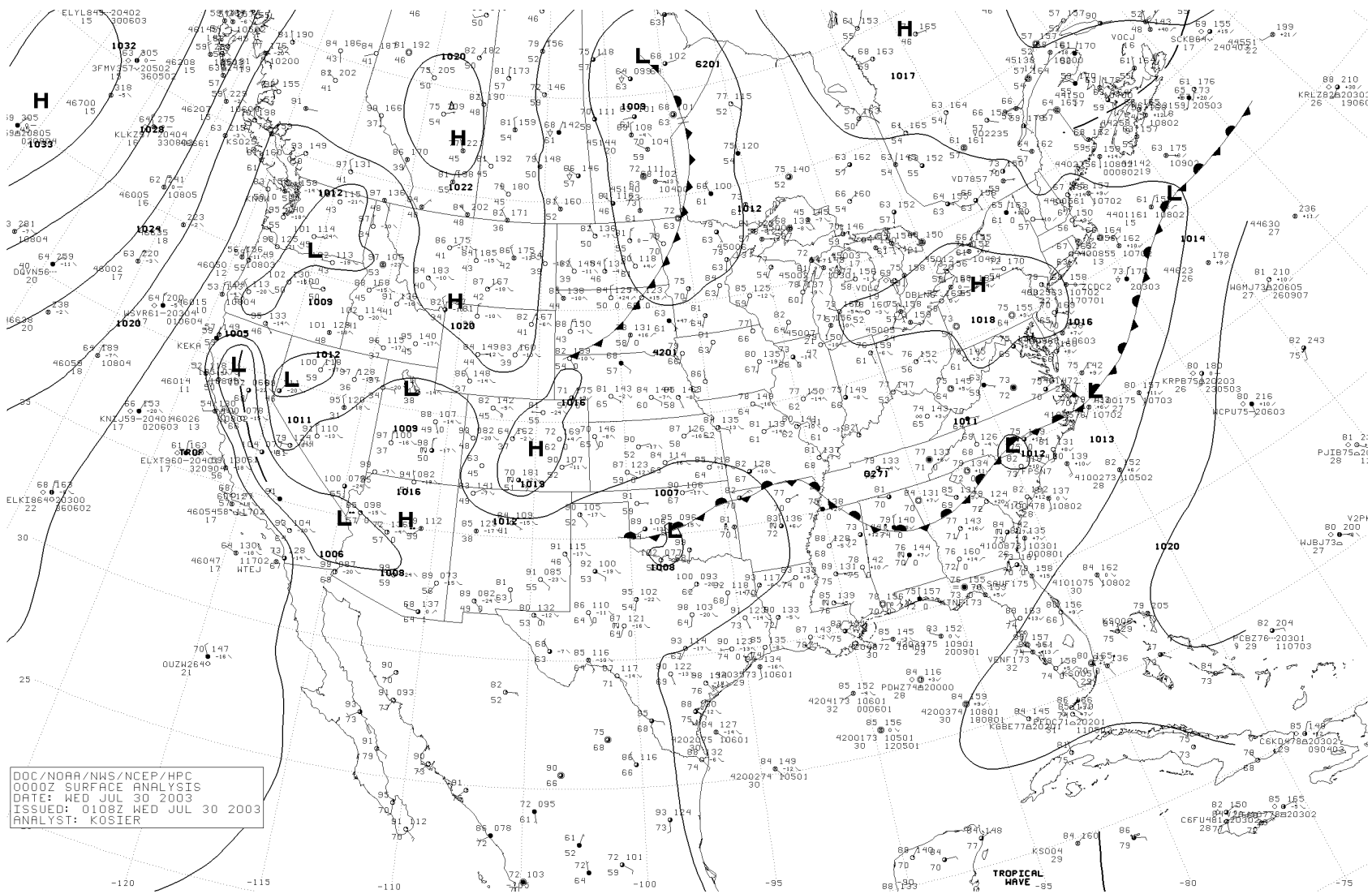
- Overcast
- Broken
- Scattered
- Few
- Clear
- Breaks in overcast
- Total sky obscuration (fog)
- Sky coverage info missing

Common Precipitation/Weather Types:

- Stable atmosphere rain (light, moderate, heavy)
- Stable atmosphere snow (lgt, moderate, heavy)
- Drizzle (stable atmosphere)
- Rain/Snow showers (unstable atmosphere)
- Fog
- Haze
- Thunderstorm
- Freezing rain

Common Pressure Systems/Fronts:





DOC/NOAA/NWS/NCEP/HPC
 0000Z SURFACE ANALYSIS
 DATE: WED JUL 30 2003
 ISSUED: 0108Z WED JUL 30 2003
 ANALYST: KOSIER

TROPICAL WAVE

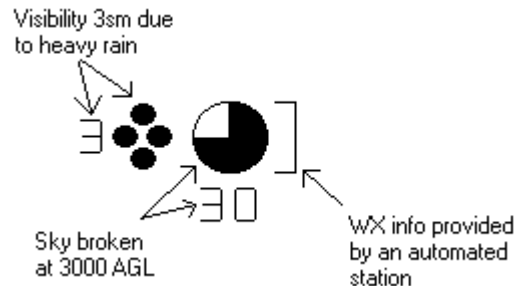
Weather Depiction Chart

Description: The Weather Depiction Chart is generated from METAR observations and includes information on visibility, current weather (rain, snow, fog, etc), sky coverage, and ceiling, if applicable. This information is then more broadly characterized into areas of VFR, MVFR, and IFR conditions.

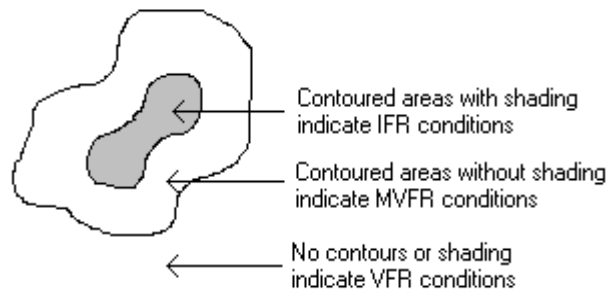
Issue Frequency/Valid Period: This chart is computer generated every 3 hours and is valid at the time of observation.

Example: see example chart on following page

Sample Station Plotting:



Contouring/Shading:



Functionality/Other Notes:

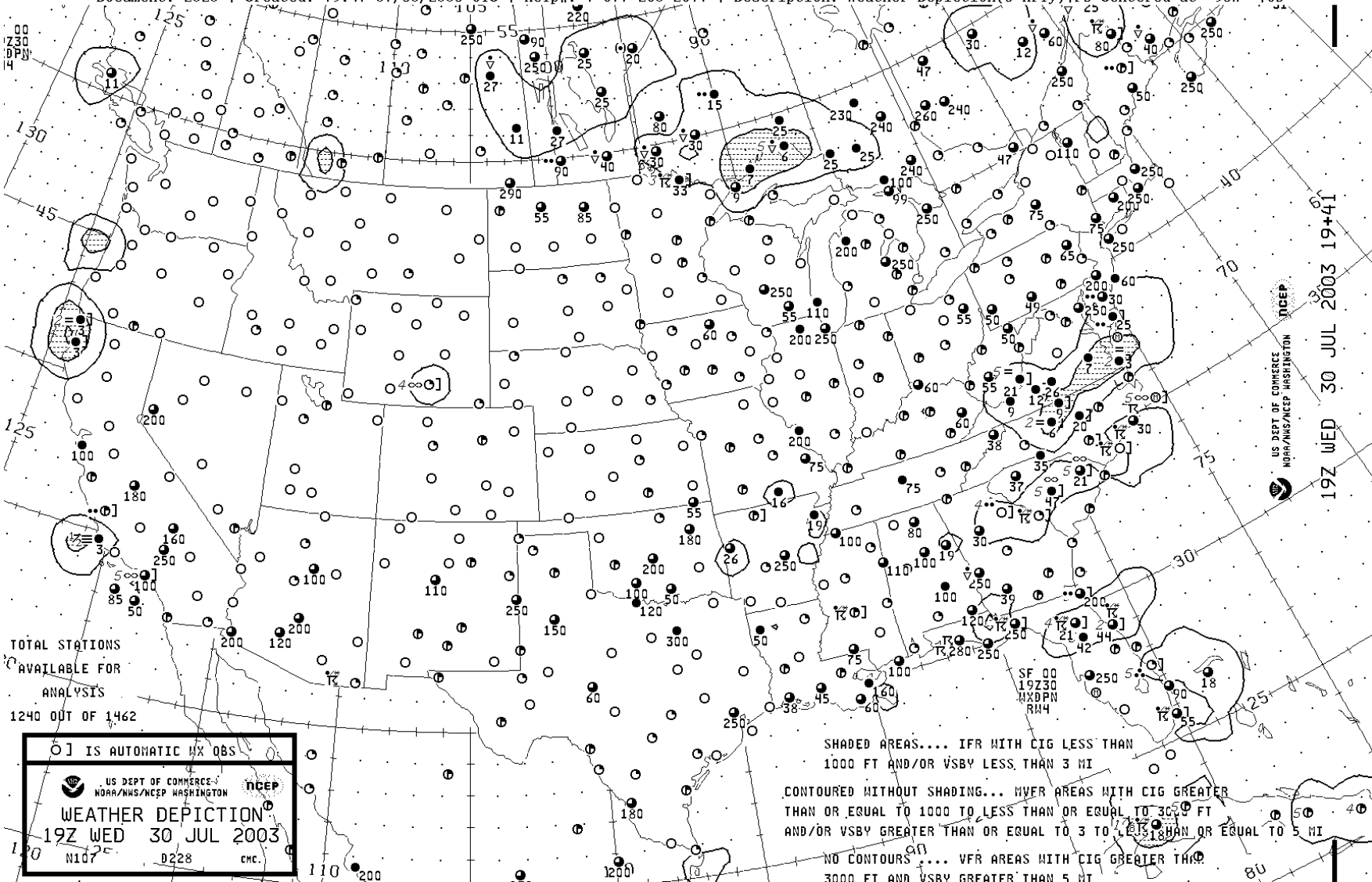
Definitions: VFR: ceiling greater than 3000' **and** visibility greater than 5sm
MVFR: ceiling 1000'-3000' **or** visibility 3-5sm
IFR: ceiling less than 1000' **or** visibility less than 3sm

Symbols: Refer to explanation of symbols for the Surface Analysis Chart, as the same symbols for sky coverage, weather, and obstructions to visibility are used on the Weather Depiction Chart.

The Weather Depiction Chart is helpful in that it gives pilots a quick birds-eye view of the weather conditions likely to be encountered in flight.

There is a time delay between the actual observations and the generation of the chart.

Since this chart only utilizes information from specific stations, weather conditions between these stations may not be represented on the chart.



TOTAL STATIONS
AVAILABLE FOR
ANALYSIS
1240 OUT OF 1462

○] IS AUTOMATIC WX OBS

US DEPT OF COMMERCE
NOAA/NWS/NCEP WASHINGTON

WEATHER DEPICTION

19Z WED 30 JUL 2003

N107 D228 CMC

SHADED AREAS.... IFR WITH CIG LESS THAN
1000 FT AND/OR VSBY LESS THAN 3 MI

CONTOURED WITHOUT SHADING... MVFR 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
3000 FT AND VSBY GREATER THAN 5 MI

NCEP
 US DEPT OF COMMERCE
 NOAA/NWS/NCEP WASHINGTON
 19Z WED 30 JUL 2003 19+41

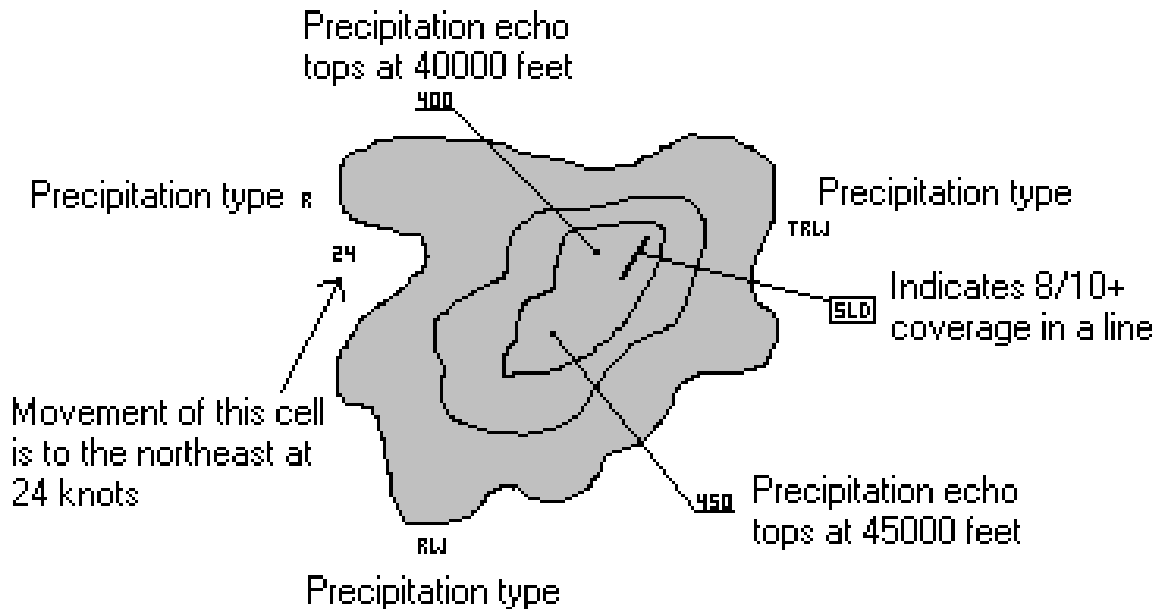
Radar Summary Chart

Description: The Radar Summary Chart is a graphical representation of the textual radar weather reports (SD). It displays areas of precipitation and includes information on those areas relating to intensity, movement, type of precipitation, and echo tops. The chart will also display Severe Weather Watches, if active.

Issue Frequency/Valid Period: This chart is issued every hour, 35 minutes past the hour and is valid at the time of observation.

Example: (see sample chart on following page)

Sample Precipitation Echo



Functionality/Other Notes:

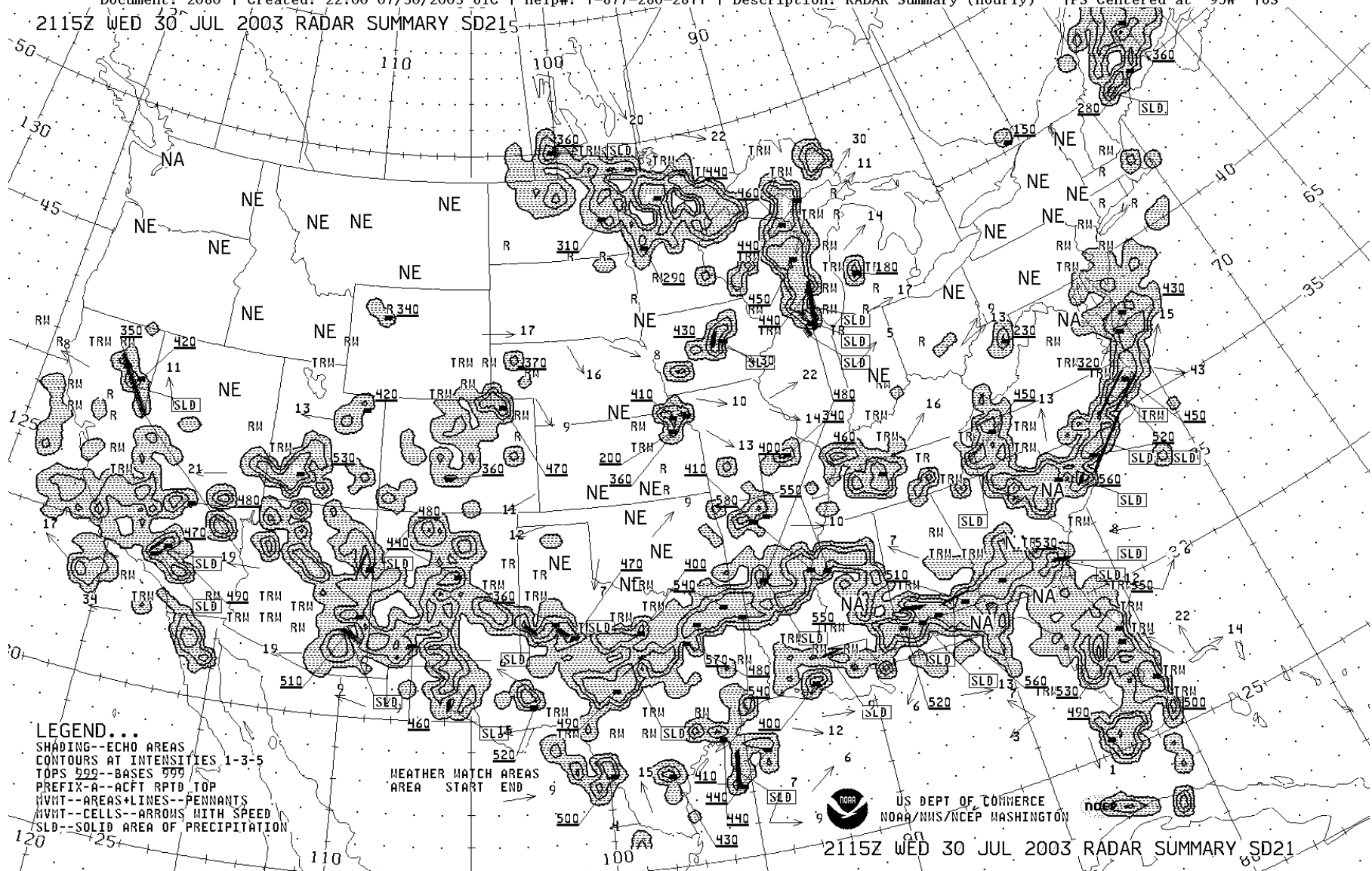
Contouring: 1st level of contouring indicates light to moderate precipitation
2nd level of contouring indicates heavy to very heavy precipitation
3rd level of contouring indicates intense to extreme precipitation

Precipitation Type: R – rain RW – rain showers (unstable atmosphere)
S – snow SW – snow showers (unstable atmosphere)
T – thunderstorm NA – not available NE – no echoes
OM – out for maintenance LM – little movement

Radar detects only precipitation, not clouds or fog. Assume that cloud heights are greater than the printed echo tops.

Current radar echo information can be supplied in-flight by flight watch on 122.0Mhz

2115Z WED 30 JUL 2003 RADAR SUMMARY SD215

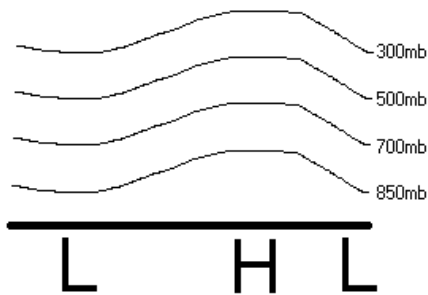


Constant Pressure Analysis Chart

Description: The Constant Pressure Analysis chart is computer generated from balloon-radiosonde observations. These radiosondes measure temperature, moisture, and wind direction/speed. Charts are plotted to depict a constant pressure level (i.e. 850mb, 700mb, 500mb, 300mb, 250mb, and 200mb). With this information, a pilot can determine winds aloft, temperature/dew point spread, and pressure trends.

Issue Frequency/Valid Period: Constant Pressure Analysis Charts are issued twice daily (every 12 hours) as radiosonde observation data becomes available.

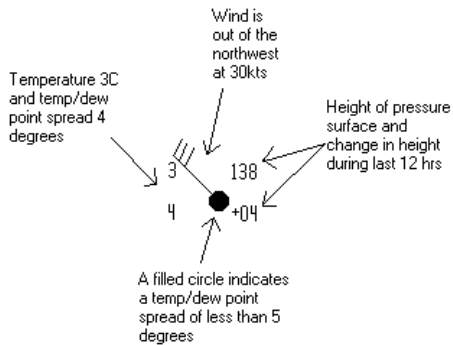
Explanation: A Constant Pressure Analysis Chart attempts to plot a 3-dimensional surface, 2-dimensionally. Each chart plots the height of a given pressure level (i.e. 700mb). The height of the pressure level will vary, depending on the pressure of the atmosphere at a given location. Generally, the higher the pressure, the higher the pressure level will be. See below:



Depending on atmospheric pressure, the height of a given pressure level will change.

Each Constant Pressure Analysis Chart is a top-down view of a given pressure level.

Plotted Data:



A square station plotting indicates an aircraft provided the observation.

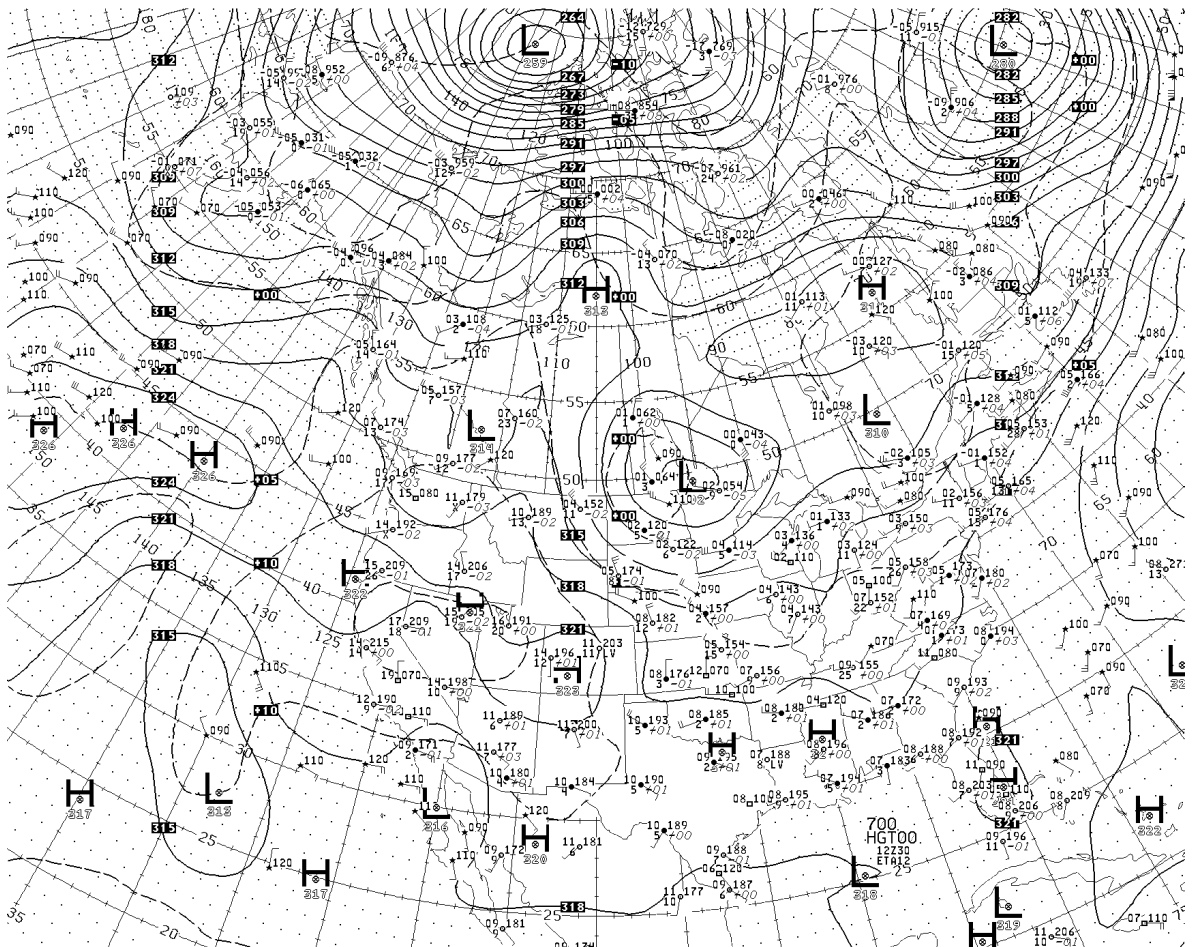
A star plotting indicates a satellite provided the observation.

Functionality/Other Notes:

In order to select the appropriate Constant Pressure Analysis Chart for your flight, reference your cruising altitude to the following: 850mb: $\pm 5000'$, 700mb: $\pm 10000'$, 500mb: $\pm 18000'$, 300mb: $\pm 30000'$, 250mb: $\pm 34000'$, 200mb: $\pm 39000'$.

Lines of constant temperature (isotherms) are drawn as bold dashed lines.

Lines of constant wind velocity (isotachs) are drawn as short, fine dashed lines.



D278 .. 700MB ANALYSIS HEIGHTS/TEMPERATURE VALID 12Z WED 30 JUL 2003

US DEPT OF COMMERCE
NOAA/NWS/NCEP WASHINGTON

Composite Moisture Stability Chart

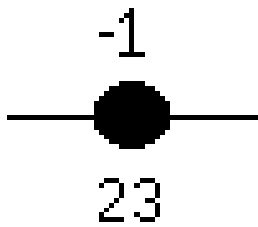
Description: The Composite Moisture Stability Chart is a compilation of various types of data observed by radiosondes. It includes information on atmosphere stability, likelihood of convective activity, moisture content of the air as compared to normal, freezing level information, and relative humidity.

Issue Frequency/Valid Period: This chart is issued every 12 hours and is valid at the time of observation.

Chart Layout:

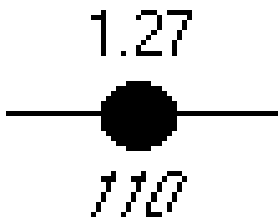
-Lifted Index -K index	Precipitable water panel
Freezing Level Panel	Average Relative Humidity Panel

Lifted/K index Panel:



This panel gives the stability of the atmosphere (lifted index) as a number (top). A negative number indicates an unstable atmosphere. A positive number indicates a stable atmosphere. The likelihood of convective activity (k-index) is also displayed as a number (bottom). A K-index of less than 15 indicates little chance of convective activity, while a value near 40 is almost a 100% chance. A filled-in circle indicates a lifted index of 0 or less.

Precipitable Water Panel:



This panel indicates the amount of moisture present in the atmosphere at given locations. The top number is the amount of water vapor that would accumulate (in inches) if all vapor between the surface and the 500mb pressure level was condensed. The bottom number gives a percentage of the top number compared to what is normally observed. A filled-in circle indicates precipitable water in excess of 1 inch.

Freezing Level Panel:



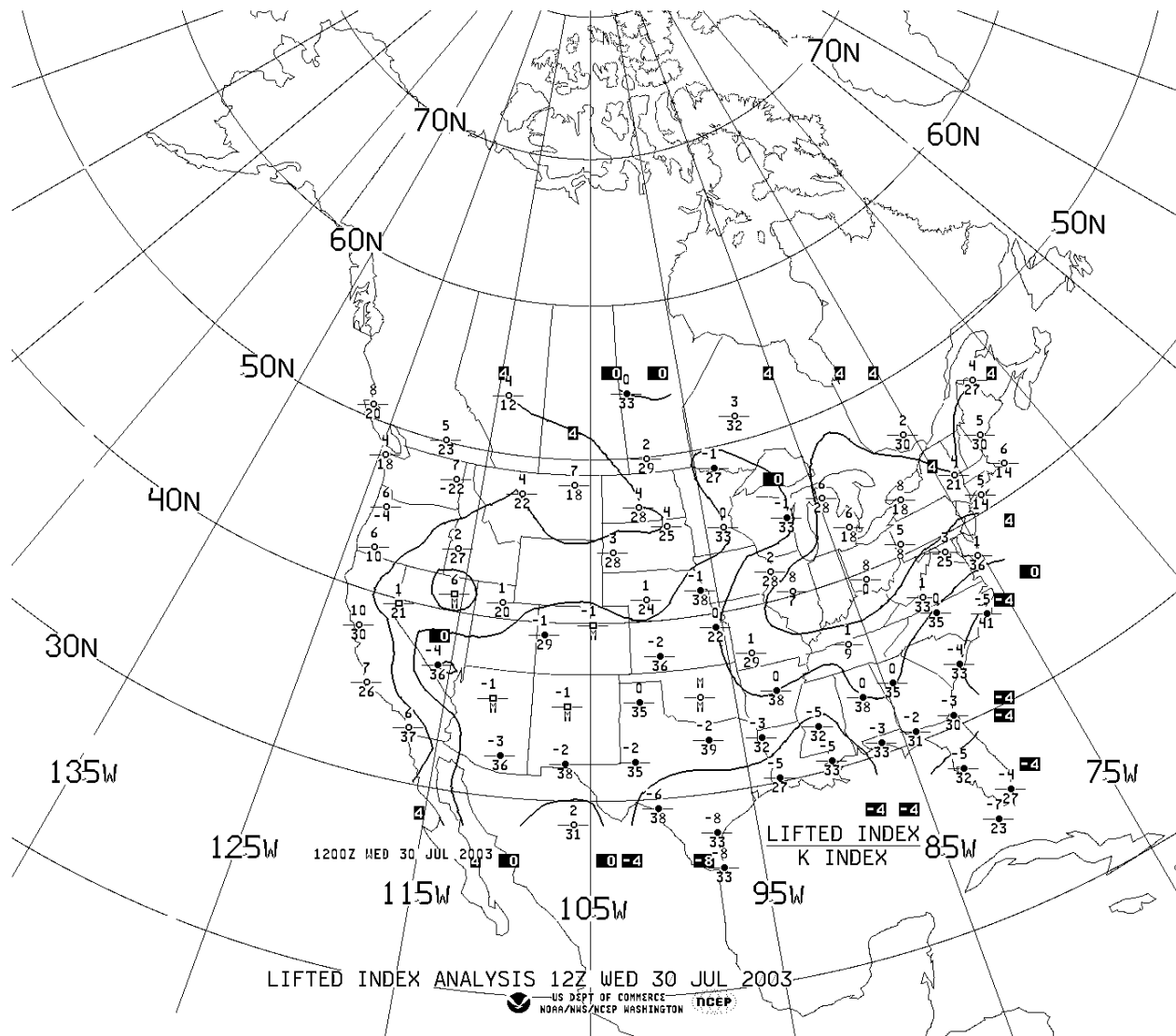
This panel displays the observed freezing level at each station and this is plotted in hundreds of feet MSL. If the surface temperature is below freezing, a "BF" is printed at the station. Multiple freezing levels would be printed on top of each other.

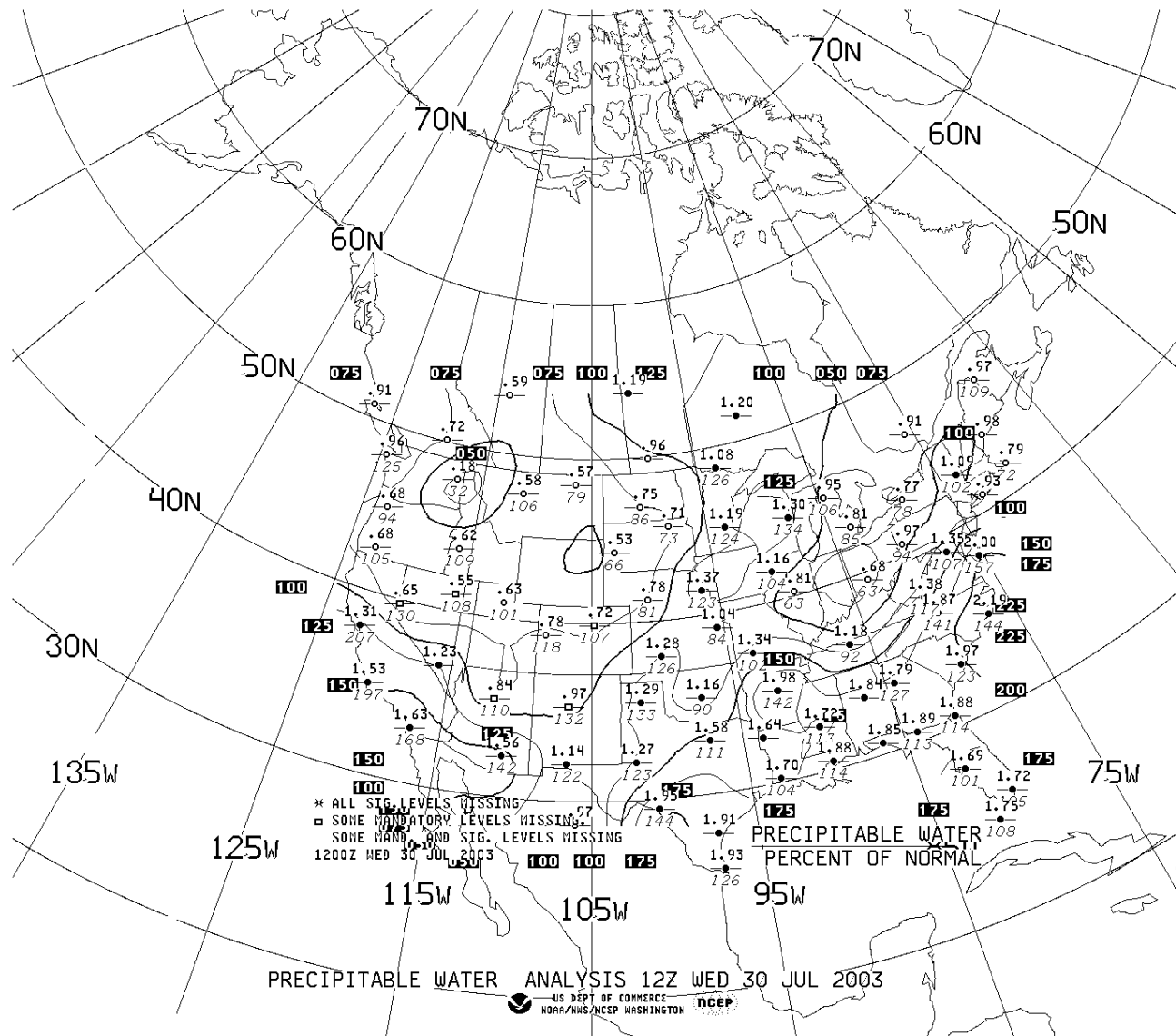
Average Relative Humidity Panel:

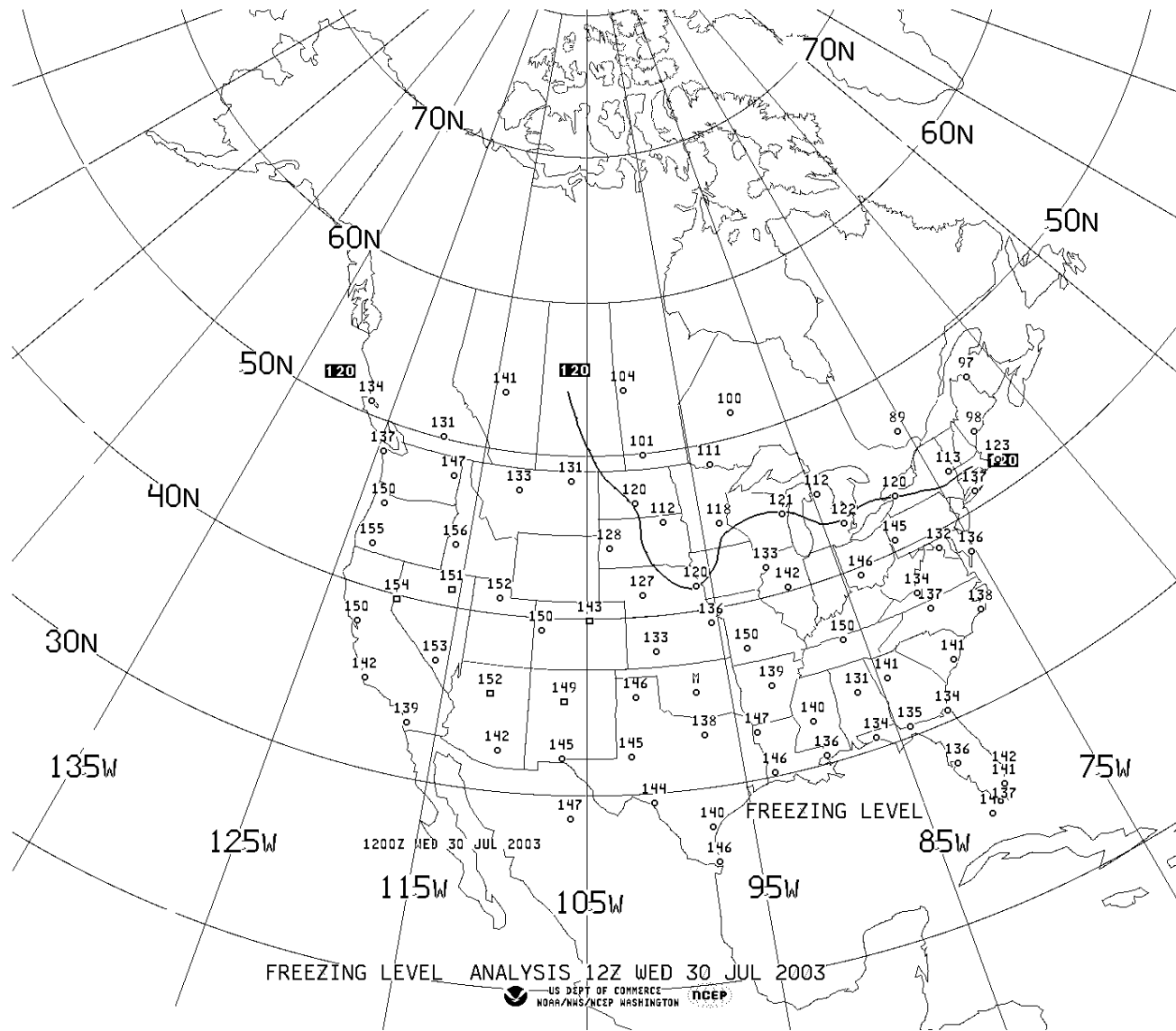


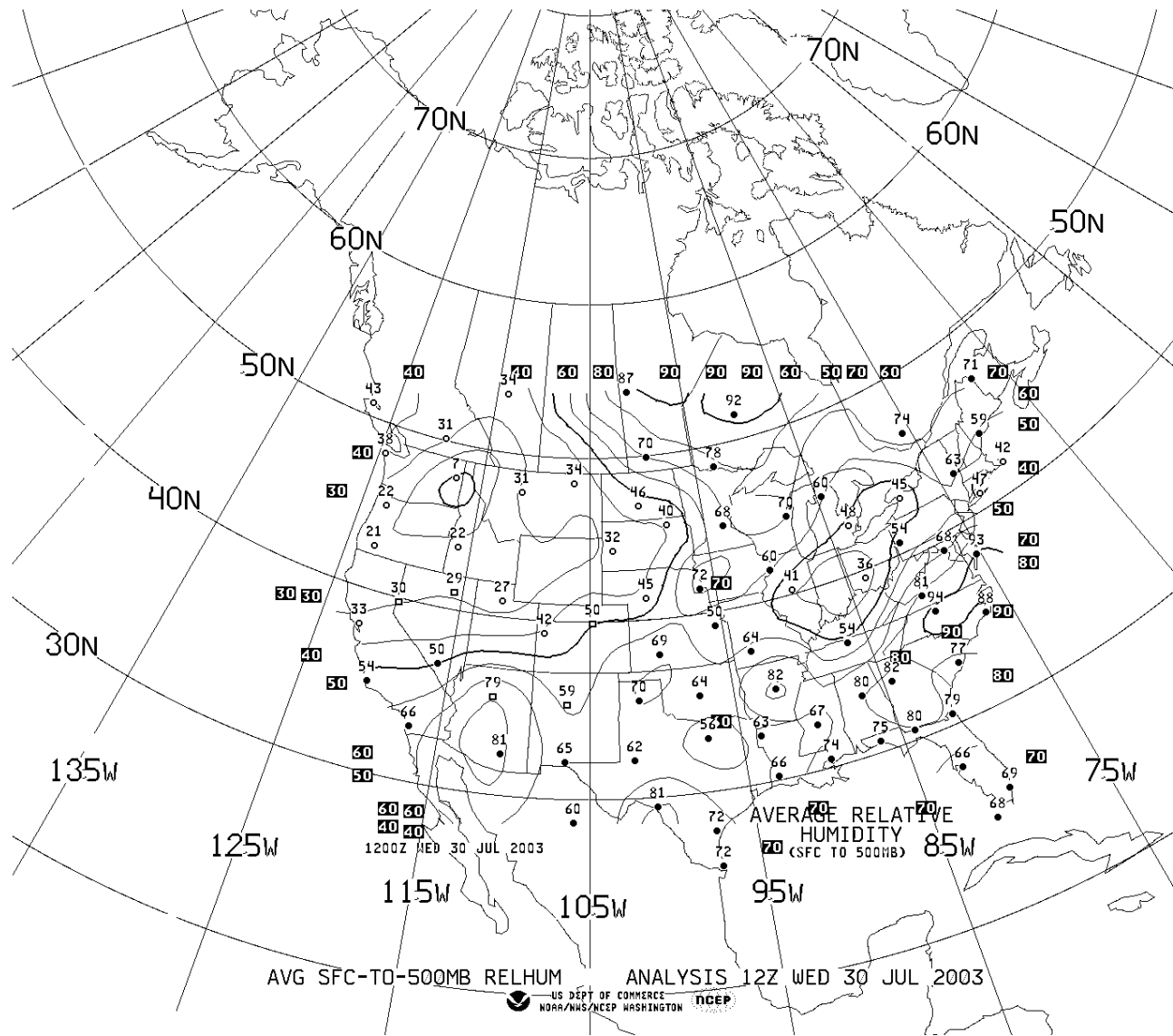
This panel displays the average relative humidity between the surface and the 500mb pressure level at each station. Relative humidity is a measure of the water content in air as a percentage of capacity. A filled-in circle indicates a RH of greater than 50%.

Individual examples of each of the above panels are on the following pages.









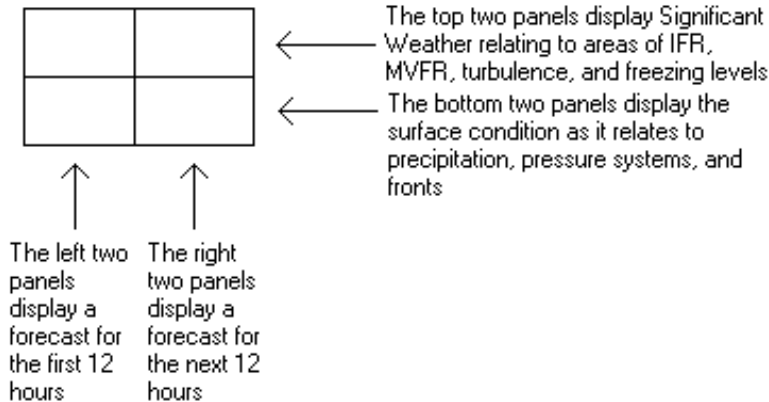
Low-Level Significant Weather Prognostic

Description: The Low-Level Significant Weather Prognostic chart is a four-panel forecast of weather conditions including areas of IFR or MVFR, turbulence, freezing levels, precipitation, fronts, and pressure systems. It covers that portion of the atmosphere from the surface to the 400mb pressure level ($\pm 24,000'$ MSL).

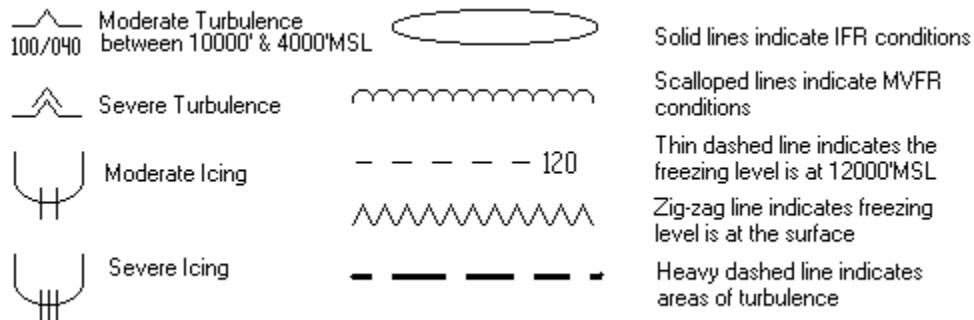
Issue Frequency/Valid Period: The Low-Level Significant Weather Prognostic chart is issued four times daily (every 6 hours) and is valid for a total of 24 hours.

Example: (see sample chart on following page)

Chart Layout



Significant Weather (Upper Panels) Common Symbols:

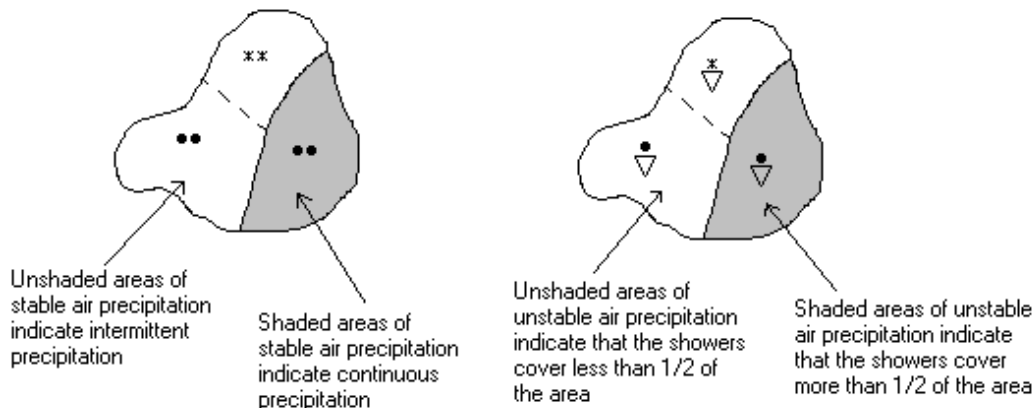


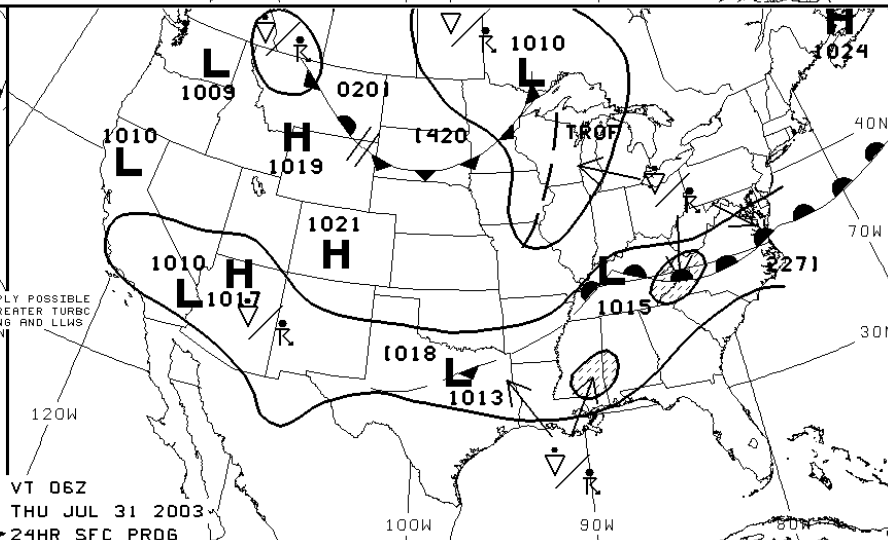
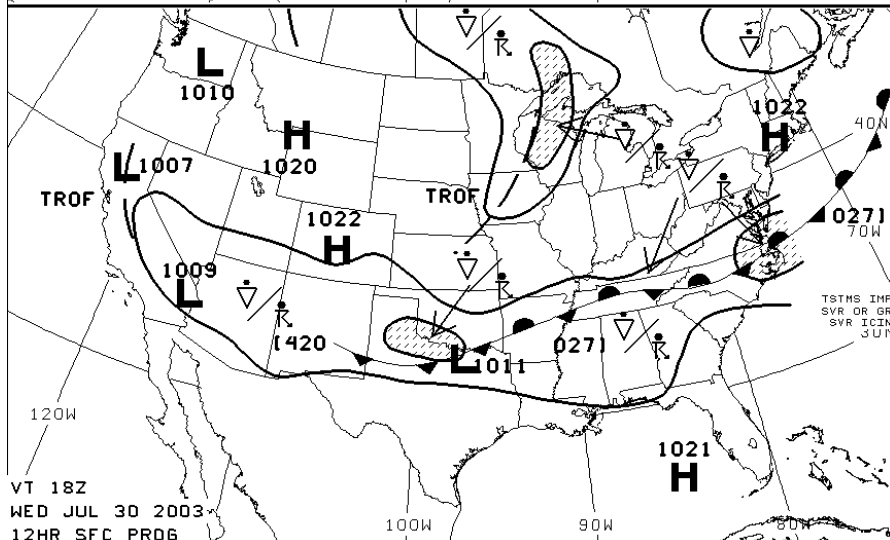
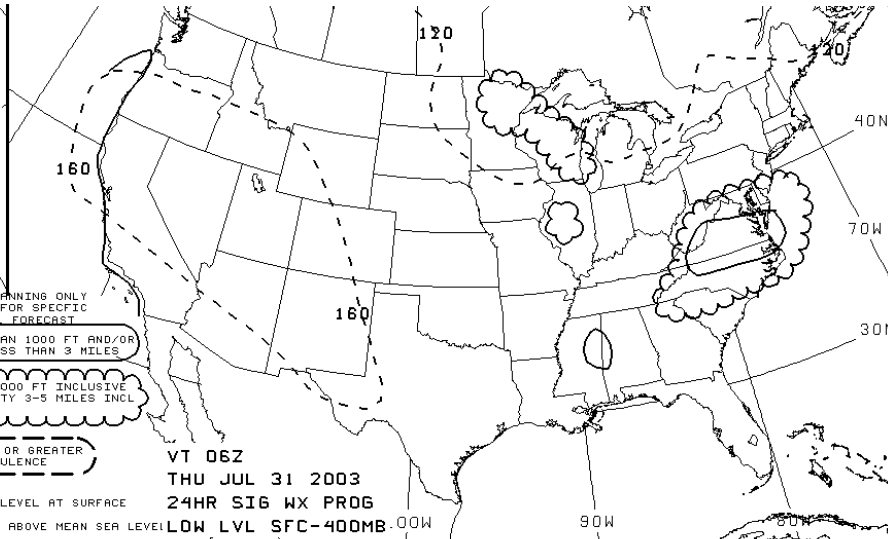
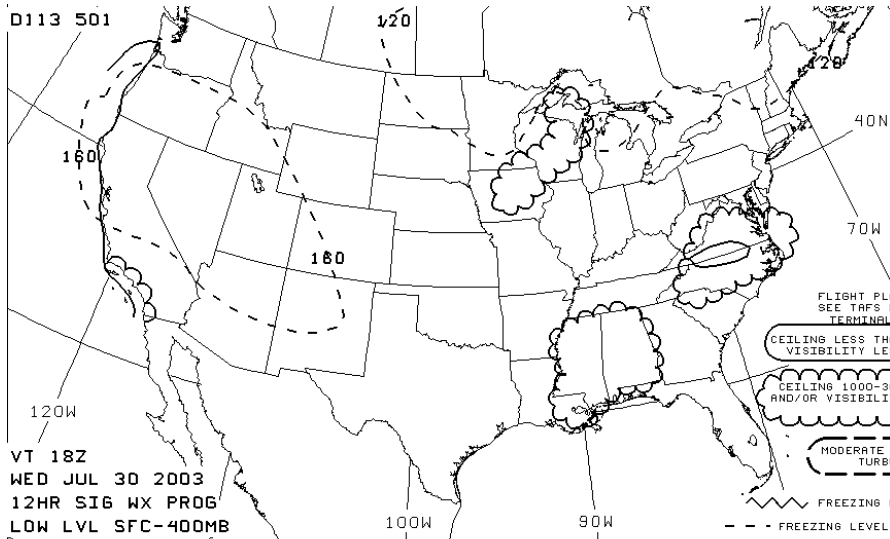
Surface Prognostic (Lower Panels) Shading/Contouring:

(see also, Surface Analysis Chart symbols)

Stable Air Precipitation (no triangle)

Unstable Air Precipitation (with triangle)



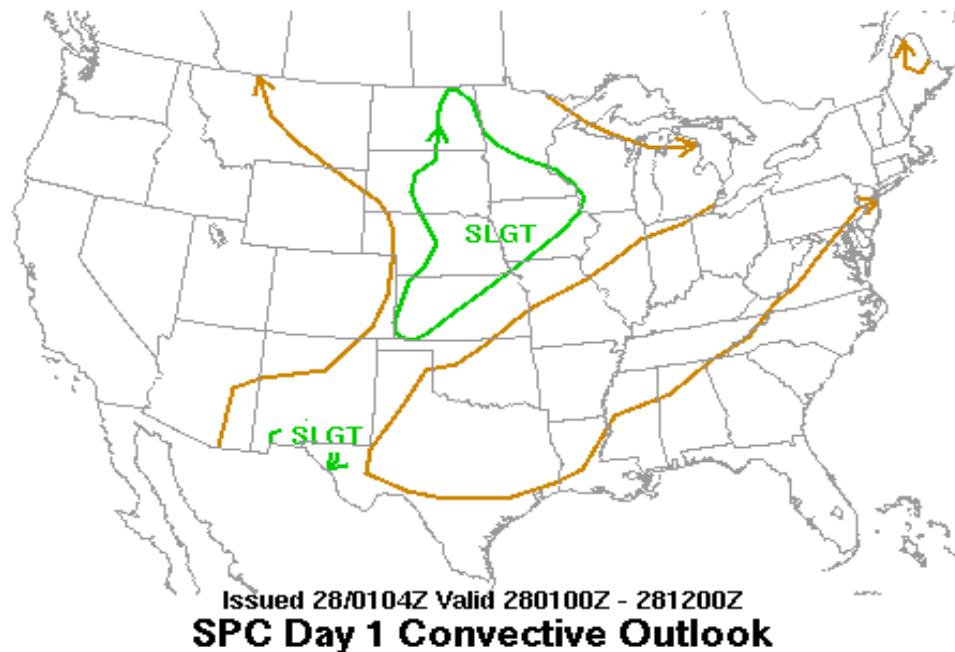


Convective Outlook Chart

Description: The Convective Outlook Chart serves to identify general areas of the country where thunderstorm activity is expected to develop.

Issue Frequency/Valid Period: Two Convective Outlook Charts are issued, the Day 1 Convective Outlook is issued five times daily and each is valid until 1200zulu the following day. The Day 2 Convective Outlook is issued twice daily and is valid from 1200zulu to 1200zulu on the next day.

Example:



Functionality/Other Notes:

While looking in the same direction as the arrowhead, thunderstorm activity is forecast to develop in areas to the right of the line.

This chart is for general planning purposes only and provides no specific information to circumnavigate thunderstorms. This chart should be used in conjunction with an Area Forecast, Convective SIGMET, or Radar Summary Chart.

Areas with text, such as SLGT above, do NOT indicate the likelihood of thunderstorm activity, as this is forecast in *any* area to the right of a line, but indicate areas where more severe or damaging thunderstorms are predicted. See below:

- SLGT – Predicted 5-29 hail reports, 3-5 tornados, 5-29 wind events
- MDT – Predicted 30+ hail reports, 6-19 tornados, 30+ wind events
- HIGH – Predicted at least 20 tornados (at least 2 of which are rated F3 or higher, 50+ winds events, and 80mph damaging winds.

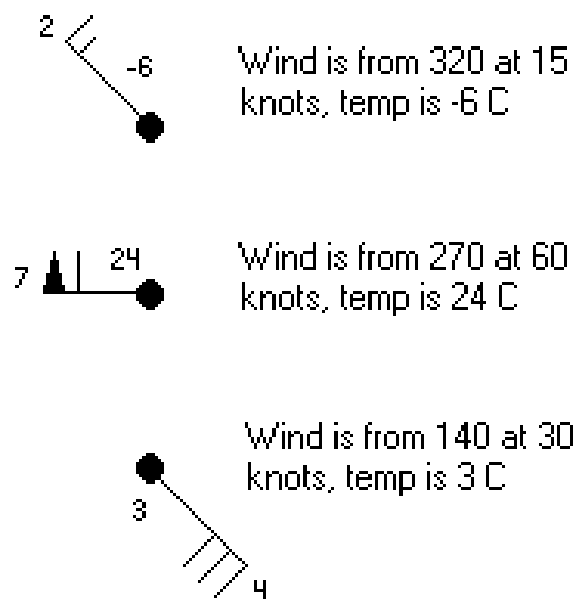
Winds and Temperatures Aloft Charts

Description: Winds and Temperatures Aloft Charts are issued both as forecasts and observations. The forecast is simply a graphical representation of the textual FD product. The observation is a graphical representation of the actual wind and temperature observed by radiosondes.

Issue Frequency/Valid Period: Both charts are issued twice daily (at 00Z and 12Z). The observations are valid at the time of observation and the forecasts are valid for 12 hours.

Example:

Wind Barb Explanation:



Functionality/Other Notes:

Forecast charts are issued for 6000', 9000', 12000', 18000', 24000', 30000', 34000', and 39000', each has its own separate panel.

Observation charts are issued for 1000-2000AGL, 14000', 24000', and 34000'.

The type of chart (forecast or observation) and level are printed at the bottom.

The number printed at the end of the wind barb is the second digit of the 3-digit direction of the wind. In the bottom example above, the wind barb is pointing from the southeast, with a 4 printed. This indicates the wind is from 140 degrees.

A "99" printed next to the station circle without a wind barb indicates wind is calm or light and variable.

Textual Weather Products

Textual Products at a Glance:

<u>Type/General Description:</u>	<u>Frequency:</u>	<u>Valid period:</u>
Aviation Routine Weather Rpt. (METAR) WX observation at an airport including winds, temps, sky condition, pressure	Hourly	Observation
Terminal Aerodrome Forecast (TAF) Airport forecast including winds, sky condition, precip types, and visibility	Every 6 hrs	24 hrs
Area Forecast (FA) Forecast for large regions including clouds heights, precip types, visibility, and general atmospheric condition	Every 8 hrs	18 hrs
Airmets (WA) Outlines areas of weather events affecting primarily smaller aircraft, including IFR conditions, turbulence, and icing conditions	Every 6 hrs	6 hrs
Sigmets (WS) Outlines areas of significant weather events affecting all aircraft including icing, turbulence, blowing dust/ash/sand, and volcanic eruptions	As needed	4 hrs
Convective Sigmet (WST) Outlines areas of significant weather events relating to convective (thunderstorm) activity	Hourly	2 hrs
Winds & Temperatures Aloft (FD) Forecasts wind direction and velocity and temperatures at various levels of the atmosphere	Every 12 hrs	As noted
Center Weather Advisory (CWA) Current significant weather event info not discussed in a prior WA, WS, WST disseminated to pilots by ARTCC	As needed	2 hrs
Transcribed Weather Broadcast (TWEB) Weather forecasts made for pre-defined, numbered routes between airports or within the vicinity of specified points	Every 6 hrs	12hrs
Pilot Reports (UA/UUA) Weather observations provided by pilots including info on temp, wind, sky condition, turbulence, and other significant weather	As needed	Observation

Aviation Routine Weather Report (METAR)

Description: A METAR is a weather observation taken at an airport and includes such information as prevailing winds, visibility, weather phenomena, sky condition, temperature/dew point, altimeter setting and remarks.

Issue Frequency/Valid Period: METARs are issued every hour at 53 minutes past the hour and are valid at the time of observation.

Example:

METAR KPRC 111253Z 22015KT 5SM +RA OVC010 25/22 A2992 RMK A02 T02530219 P0100

METAR – Aviation Routine Weather Report

KPRC – Airport of observation

111253Z – METAR issued on the 11th day of the month at 1253 zulu

22015KT – Winds are out of 220 (true) at 15 knots

5SM – Visibility is 5 statute miles

+RA – Heavy rain (heavy is indicated by the + sign)

OVC010 – Sky condition is overcast at 1000 feet AGL

25/22 – Temperature is 25 Celsius and dew point is 22 Celsius

A2992 – Altimeter setting is 29.92 inches of mercury

RMK – Specifies that remarks will follow

A02 – This wx equipment can discriminate between different precipitation types

T02530219 – Precise temp is 25.3 Celsius and dew point is 21.9 Celsius

P0100 – Precipitation in the last hour was 1.00 inches

Functionality/Other Notes:

When weather conditions change significantly before the next scheduled METAR issuance, a SPECI will be issued.

Cloud heights noted are in feet above ground level (AGL). Ceilings are defined as the lowest BKN or OVC layer aloft or, if sky obscured, the vertical visibility.

Cloud coverage or type definitions:

SKC or CLR – Clear (0/8) FEW – Few (1/8-2/8)

SCT – Scattered (3/8-4/8) BKN – Broken (5/8-7/8) OVC – Overcast (8/8)

VV – Vertical Visibility CB – Cumulonimbus TCU – Towering
Cumulous

Common precipitation types:

RA – rain DZ – drizzle SN – snow UP – unknown precipitation

Common obstructions to visibility:

FG – fog BR – mist FU – smoke HZ – haze DU – dust

Descriptors to visibility or precipitation types:

TS – thunderstorm SH – showers FZ – freezing
BL – blowing BC – patches DR – low drifting

All wind directions are referenced to True North.

Terminal Aerodrome Forecast (TAF)

Description: A TAF is a forecast of weather conditions expected for the next 24 hours within a 5 statute mile radius of an airport. The forecast includes such information as wind, visibility, sky conditions, and weather phenomena.

Issue Frequency/Valid Period: TAFs are issued every 6 hours (four times daily) and have a forecast period of 24 hours.

Example:

TAF KPRC 111730Z 111818 24015G25KT 5SM DU FEW250
FM2100 22015KT P6SM SKC BECMG 0103 18010KT P6SM SCT080
FM1000 21005KT P6SM BKN020 PROB30 1014 4SM RA OVC015
FM1400 22020KT P6SM BKN030CB TEMPO 1618 VRB20G30KT 4SM +RA BKN015CB

1st Line: Terminal aerodrome forecast for Prescott, AZ issued at 1730zulu on the 11th day of the month, valid from 1800zulu on the 11th to 1800zulu on the 12th, winds 240 at 15, gusting to 25, 5 statute miles visibility in dust, few clouds at 25,000 AGL

2nd Line: After 2100zulu, wind 220 at 15, greater than 6 statute miles visibility, clear skies, between 0100 and 0300zulu, weather will gradually change to 180 at 10, greater than 6 statute miles visibility, scattered clouds at 8000 AGL

3rd Line: After 1000zulu, wind 210 at 5, greater than 6 statute miles visibility, sky broken at 2000 AGL, 30% chance between 1000 and 1400zulu that weather will be 4 statute miles visibility in moderate rain, sky overcast at 1500 AGL

4th Line: After 1400zulu, wind 220 at 20, greater than 6 statute miles visibility, sky broken at 3000 AGL, cumulonimbus, between 1600 and 1800zulu occasional periods of variable winds at 20, gusting to 30, 4 statute miles visibility in heavy rain and sky broken at 1500 AGL, cumulonimbus

Functionality/Other Notes:

If a TAF does not exist for your destination airport, refer to the FA.

A TAF amendment (AMD) is issued when it is determined the current TAF no longer accurately forecasts the expected weather. The TAF AMD will have a valid period of less than 24 hrs.

Time elements:

FM1400 – read as: after 1400zulu, NOT from 1400 to 0000

BECMG 0103 – read as: gradual change between 0100 and 0300

TEMPO 0103 – read as: occasionally between 0100 and 0300

PROB30 – read as: a 30% chance of the weather occurring

Weather phenomena, such as rain (RA) or snow (SN), use the same abbreviations as METAR reports.

All wind directions are referenced to True North.

Area Forecast (FA)

Description: The Area Forecast provides a forecast of general weather conditions (cloud coverage and levels, precipitation, and visibility) over a multi-state region. Its primary purpose is to provide information for enroute weather conditions and to estimate weather for airports that do not have TAFs issued.

Issue Frequency/Valid Period: Area Forecasts are issued every 8 hours (three times daily) and are valid for a total period of 18 hours.

Example:

Header: SLCC FA 110945
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 120400
CLDS/WX VALID UNTIL 112200...OTLK VALID 112200-120400
ID, MT, WY, NV, UT, CO, AZ, MN

Salt Lake City area forecast (SLC) with clouds and weather section (C) issued at 0945zulu on the 11th day of the month. Synopsis portion is valid for 18hrs (until 0400zulu on the 12th). VFR Clouds and Weather portion is valid for 12hrs (until 2200zulu on the 11th). Outlook portion is valid for 6 hrs (from 2200zulu on the 11th to 0400zulu on the 12th)

Precautionary

Statements: SEE AIRMET SIERRA FOR IFR CONDITIONS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HEIGHTS DENOTED BY AGL OR CIG.

These are statements to remind aviators that the specifics on IFR conditions or mountain obscuration will be contained in an AIRMET sierra, that all thunderstorms imply severe or greater turbulence or icing, low level wind shear, and IFR conditions, and that all cloud heights, unless otherwise noted, are given with reference to height above Mean Sea Level.

Synopsis: ALF...LARGE UPR LVL RDG OVR FA RGN. AT SFC...MOD WLY
WNDS. CDFNT NE CO THRU SW AZ.

The Synopsis is a forecast of the general condition of the atmosphere at upper levels (ALF) and at the surface (AT SFC). Some references to strong winds, low visibilities or ceilings, or other significant weather phenomena may be made. The example above reads: At upper levels of the atmosphere exists a large upper level ridge over the entire area forecast region. At the surface exist moderate westerly winds and a cold front from Northeastern Colorado to Southwestern Arizona.

VFR Clouds and Weather:

AZ
NW QTR...SKC. OTLK...VFR.
RMNDR... SCT150. ISOL -TSRA. CB TOP FL350. OTLK...VFR.

**VFR Clouds
and Weather
(continued...)**

This section includes cloud coverage, precipitation, and visibility information and is divided by state, and each state, into regions. Each region has a 12hr specific forecast and a 6hr categorical outlook. The outlook covers its own 6hr time frame, and is NOT a summary of the specific forecast before it.

The above example reads:

*Northwest quarter of Arizona: 10z-22z: clear skies. Outlook for 22z-04z: VFR
Remainder of Arizona: 10z-22z: scattered clouds at 1500MSL. Isolated light
thunderstorms and rain. Cumulonimbus cloud tops reaching to flight level 350
(35000 feet). Outlook for 22z-04z: VFR*

Functionality/Other Notes:

Definitions for Outlook categories: VFR, MVFR, IFR:

IFR – Ceiling below 1000' **or** visibility below 3 statute miles

MVFR – Ceiling between 1000' and 3000' **or** visibility 3-5 miles

VFR – Ceiling above 3000' **and** visibility above 5 miles.

If the outlook forecasts other than VFR weather, the cause for the IFR or MVFR will be given. Example: OTLK...IFR CIG (ceilings)

Coverage terms for weather phenomena are listed below:

ISOL – Isolated (single cells are small areas <3000sq. mi.)

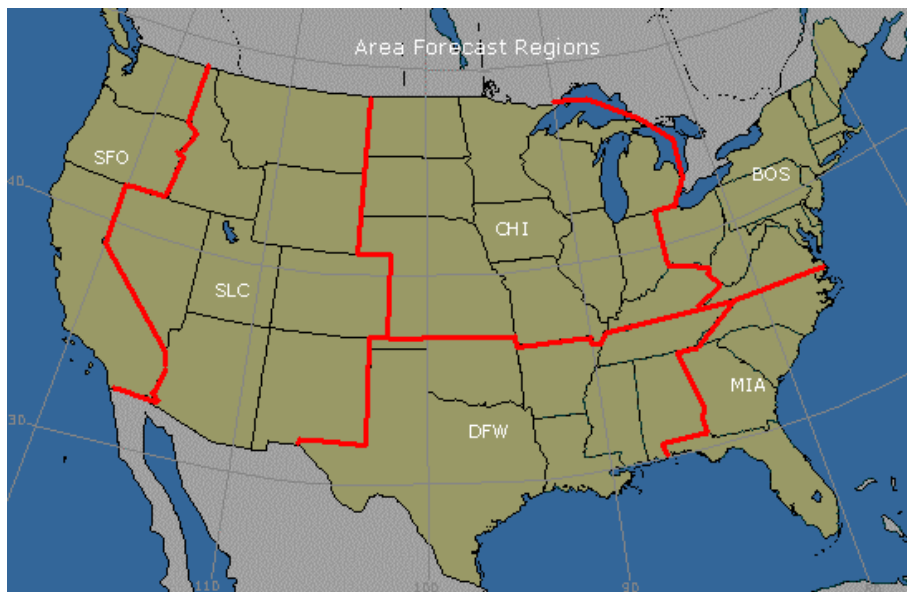
WDLY SCT – Widely scattered (<25% of area affected)

SCT/AREAS – Scattered or areas (25-54% of area affected)

NMRS/WDSPRD – Numerous or wide spread (>54% of area affected)

Combine the cloud levels given in the FA with temperatures given in the FD to estimate if icing conditions will exist along your route of flight.

The lower 48 states are divided into six regions, and FAs are issued by region (see below).



AIRMET (WA)

Description: AIRMETs are advisories of significant weather phenomena, but less severe than those forecast in a SIGMET.

Issue Frequency/Valid Period: AIRMETs are issued every 6 hours and are valid for 6 hours.

Weather Phenomena are divided into 3 AIRMET types:

AIRMET Sierra:

-Widespread IFR conditions
-Mountain obscuration

AIRMET Tango:

-Moderate Turbulence
-Low level wind shear
-Surface winds ≥ 30 kts

AIRMET Zulu:

-Freezing level heights
-Moderate Icing

Example (AIRMET Sierra):

SLCS WA 111345

AIRMET SIERRA UPDT 2 FOR IFR AND MTN OBSCN VALID UNTIL 112000

NO SGFNT IFR EXP OUTSIDE OF CNVTV ACT.

AIRMET MTN OBSCN...AZ MN

FROM ABQ TO DRK TO 30W FMN TO FMN TO ABQ

MTNS OCNL OBSC CLDS AND PCPN/BR.

Line 1: Salt Lake City region sierra (SLC, S) AIRMET (WA) issued on the 11th day of the month at 1345zulu

Line 2: This is the second sierra AIRMET of the day and is valid until 2000zulu (6hrs)

Line 3: IFR conditions are not expected outside of convective activity

Line 4: An AIRMET for mountain obscuration exists in Arizona and New Mexico

Line 5: The region is bounded by a line drawn from Albuquerque to Drake to 30 miles west of Farmington to Farmington and back to Albuquerque

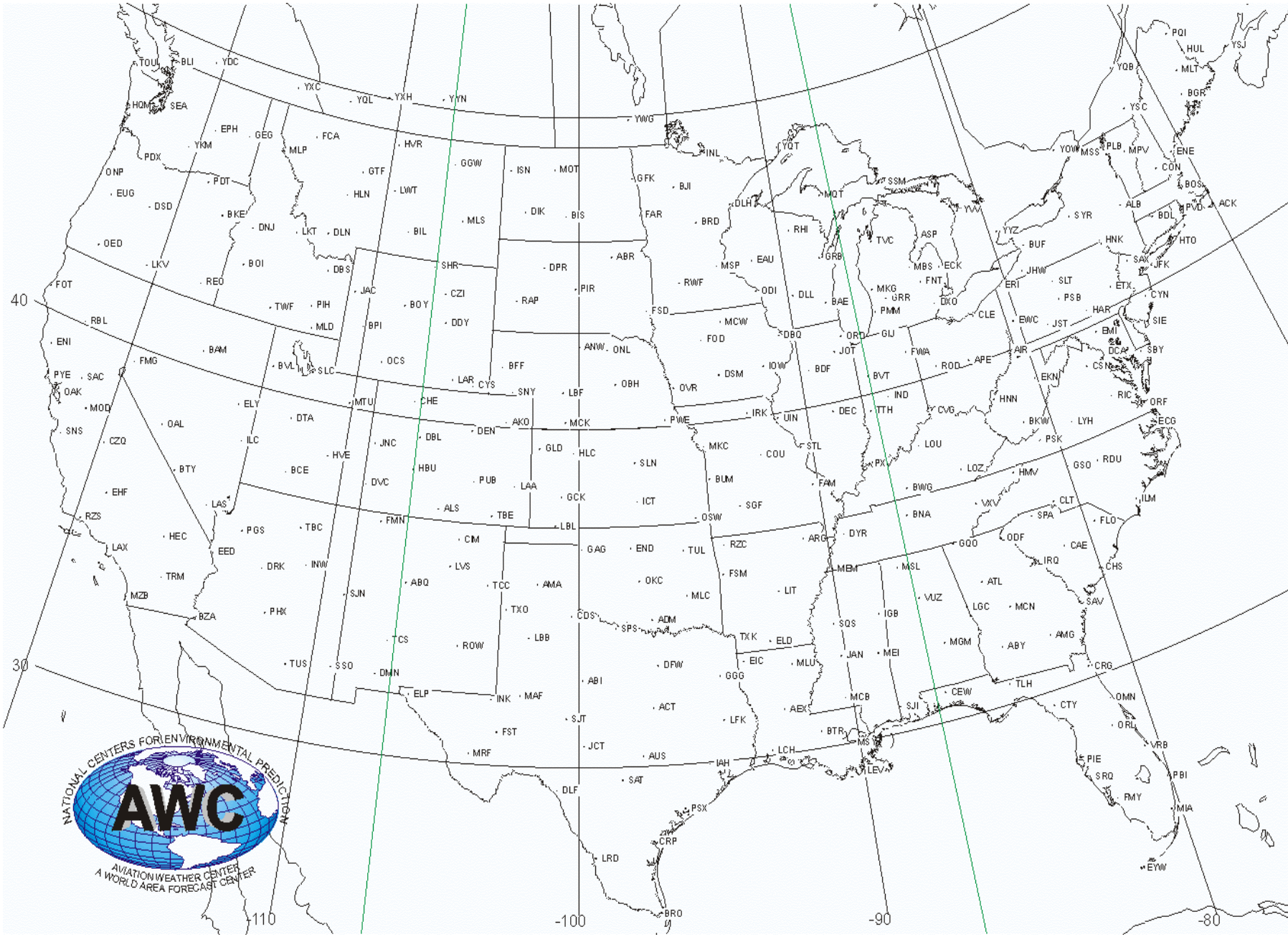
Line 6: Mountains occasionally obscured by clouds, precipitation, and mist.

Functionality/Other Notes:

AIRMETs are helpful for enroute flight planning and should be used in conjunction with FAs, WSs, and WSTs.

After determining if the valid period covers your flight time (example above: 1345z to 2000z), see if any AIRMETs exist for your states of travel (example above: AZ, NM). If so, use the map provided on the following page to plot the affected area(s) with the referenced VORs (example above: ABQ, DRK, FMN).

AIRMETs are issued by the same regions as Area Forecasts. Arizona lies within the Salt Lake City (SLC) region.



110

-100

-90

-80

SIGMET (WS)

Description: SIGMETs are advisories of significant non-convective weather phenomena that are more severe than those covered under AIRMETs.

Issue Frequency/Valid Period: SIGMETs are issued as the weather phenomena occur and when issued, are valid for 4 hours.

Weather phenomena causing SIGMET issuances:

1. Severe icing not associated with thunderstorms
2. Severe or greater turbulence not associated with a thunderstorm or clear air turbulence (CAT)
3. Blowing dust, ash, or sand lowering visibility to below 3 statute miles
4. Volcanic eruption

Example:

SLCR WS 121800
SIGMET ROMEO 2 VALID UNTIL 122200
CO, UT, AZ, NM
FROM DEN TO ABQ TO DRK TO DVC TO DEN
SEV TURB BLW FL180 DUE TO STG WLY FLOW

Line 1: Salt Lake City Region Romeo (SLC, R) SIGMET (WS) issued on the 12th day of the month at 1800zulu

Line 2: This is the second SIGMET issued for this particular weather event (labeled as Romeo) and is valid until 2200zulu (4hrs)

Line 3: This SIGMET exists within the states of Colorado, Utah, Arizona, and New Mexico

Line 4: The region is specifically bounded by a line drawn from Denver to Albuquerque to Drake to Dove Creek and back to Denver

Line 5: Severe turbulence exists below Flight Level 180 (18000') due to a strong westerly flow

Functionality/Other Notes:

SIGMETs are helpful for enroute flight planning and should be used in conjunction with FAs, WAs, and WSTs.

After determining if the valid period covers your flight time (example above: 1800z to 2200z), see if this SIGMET exists for your states of travel (example above: CO, UT, AZ, NM). If so, use the map provided to plot the affected area(s) with the referenced VORs (example above: DEN, ABQ, DRK, DVC)

SIGMETs are issued by the same regions as Area Forecasts. Arizona lies within the Salt Lake City (SLC) region.

Each weather phenomenon is assigned a letter identifier (such as Romeo above) as a name, but the letter itself has no significance, as do S, T, and Z in AIRMETs. The example above was the second issuance of a SIGMET due to turbulence in that region; the first SIGMET issued for this particular turbulence event would have been labeled as 'ROMEO 1'.

Convective SIGMET (WST)

Description: Convective SIGMETs are advisories of significant convective weather phenomena.

Issue Frequency/Valid Period: Convective SIGMET bulletins are issued hourly, whether or not convective activity exists, are valid for 2 hours, and are accompanied by an outlook, which is valid for an additional 4 hours.

Weather phenomena causing Convective SIGMET issuances:

1. Severe thunderstorms as defined by any of the following: surface winds ≥ 50 kts, hail at the surface $\geq \frac{3}{4}$ ", tornados
2. Embedded thunderstorms (meaning the thunderstorm is surrounded by other clouds, making them difficult to see)
3. Line of thunderstorms
4. Large area of thunderstorms with heavy rain (specifically: thunderstorms producing heavy or greater precipitation affecting 40% or more of an area at least 3000 sq. mi.)

Example:

```
MKCW WST 121800
CONVECTIVE SIGMET 01W
VALID UNTIL 2000Z
AZ
FROM TUS TO PHX TO DRK
LINE TS 20NM WIDE MOV FROM 22030KT. TOPS TO FL500.

OUTLOOK VALID 122000-130000Z
NO WST ISSUANCES EXPCD
```

Line 1: Convective SIGMET (WST) issued for the western third of the USA (indicated by the W after MKC) on the 12th day of the month at 1800zulu

Line 2: This is the first Convective SIGMET for the western third of the USA (01W)

Line 3: The bulletin is valid until 2000zulu (2hrs)

Line 4: States affected in this WST: Arizona

Line 5: The region affected is along a line drawn from Tucson to Phoenix to Drake

Line 6: A line of thunderstorms 20 nautical miles wide is moving from 220 at 30knots. Cloud tops extend to flight level 500 (50000')

Lines 7 & 8: No Convective SIGMET issuances are expected during the outlook (2000z-2400z)

Functionality/Other Notes:

Any Convective SIGMET implies severe or greater turbulence, icing, and low-level wind shear.

Convective SIGMETs are helpful for enroute flight planning and should be used in conjunction with FAs, WAs, and WSs.

After determining if the valid period covers your flight time (example above: 1800z to 2000z), see if this Convective SIGMET exists for your states of travel (example above: AZ). If so, use the map provided to plot the affected area(s) with the referenced VORs (example above: TUS, PHX, DRK)

Convective SIGMETs are issued nationally out of Kansas City (MKC), but are defined by the eastern (E), central (C), or western (W) thirds of the nation.

Winds and Temperatures Aloft (FD)

Description: The FD is a forecast of wind direction and temperature at various levels of the atmosphere over selected airports.

Issue Frequency/Valid Period: Forecasts are made from the 12z and 00z radiosonde observations for use during the specified time intervals.

Example:

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

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
PRC			2412+05	2520+01	2635-06	2745-18	277630	268941	761252

This forecast is based on the data collected at 1200zulu on the 12th day of the month and is valid between 1700 and 2100zulu.

FT refers to the level of the atmosphere (3000', 6000', etc).

At 9000'MSL above Prescott, the winds are forecast to be out of 240 (true) at 12knots, and the temperature forecast to 5 degrees Celsius.

Functionality/Other Notes:

Temperatures are not forecast within 2500' of the ground.

Winds are not forecast within 1500' of the ground, and when forecast, are referenced to True North.

"9900+05" means the wind is light and variable with a temperature of 5C.

When wind speed exceeds 100knots, a 5 is added to the first number of the wind direction. Example: "761252" (seen to the far right above) is read as wind 260 at 112knots, temperature -52C.

Combine the cloud levels obtained in the FA with the temperatures from the FD to determine if icing conditions may be encountered in flight.

Center Weather Advisory (CWA)

Description: A CWA is a statement of current or developing adverse weather conditions affecting air traffic within the jurisdiction of a particular Air Route Traffic Control Center (ARTCC).

Issue Frequency/Valid Period: CWAs are issued as needed and are valid for a maximum of 2 hours.

Example:

ZAB1 CWA 121300
ZAB CWA 101 VALID UNTIL 121500
FROM TUS TO DUG TO SJN TO TUS
AREA OF WDSPRD TS MOV FROM 27025KT TOPS TO FL500

Lines 1&2: This CWA was issued by Albuquerque Center on the 12th day of the month at 1300zulu and is valid until 1500zulu (2hours). In the 1st line, the "1" after "ZAB" indicates this CWA is this first weather phenomenon to occur for the day. In the 2nd line, the "101" refers to the phenomenon number (the 1st "1"), and that this CWA is the 1st issuance for this particular phenomenon ("01")

Line 3: Affected area is inside a line drawn from Tucson to Douglas to St. John to Tucson

Line 4: There is an area of wide spread thunderstorms within the region in line 3 moving from 270 at 25knots with cloud tops to flight level 500 (50000')

Functionality/Other Notes:

A CWA may be issued in three different situations:

1. To supplement or change information from an existing WA, WS, or WST.
2. When WA, WS, or WST conditions exist and one has not yet been issued, a CWA is issued for quick dissemination to pilots by ARTCC.
3. When other weather conditions exist that affect the safe flow of air traffic.

Transcribed Weather Broadcast (TWEB)

Description: TWEBs are weather forecasts made for pre-defined routes between airports or within the vicinity of specified points (usually major airports). They should be used for planning the enroute portion of a flight.

Issue Frequency/Valid Period: TWEBs are issued every 6 hours (4x daily) and are valid for 12 hours.

TWEBs are divided into 3 types:

Route: This forecast of strong wind, visibility, weather phenomena, and sky coverage is developed for an area within 50nm of a pre-defined, numbered route between airports (see next page).

Vicinity: This forecast includes the same information as a route forecast, but is developed for an area within a 50nm radius of a specified point (usually a major airport)

Synopsis: This forecast is very similar to the synopsis portion of the Area Forecast and includes information on the general condition of the atmosphere (pressure systems, frontal movement, etc) within a specified region, smaller than that covered in the Area Forecast.

Example of a TWEB route forecast:

391 TWEB 121402 KPRC-KFLG-KINW-KGUP. ALL HGTS AGL XCP TOPS. P6SM SCT070...AFT 18Z 5SM RA BKN050...AFT 00Z P6SM SCT CI.

391 – Route number of the forecast (see map next page)

*TWEB 121402 – TWEB forecast valid from 1400zulu on the 12th to 0200zulu on the 13th
KPRC-KFLG-KINW-KGUP – Route 391 is from Prescott to Flagstaff to Winslow to Gallup*

ALL HGTS AGL XCP TOPS – All cloud heights are in AGL, except cloud tops

P6SM SCT070 – Greater than 6 statute miles visibility, scattered clouds at 7000'AGL

*AFT 18Z 5SM RA BKN050 – After 1800zulu, 5 statute miles visibility in moderate rain
broken cloud layer at 5000'AGL*

AFT 00Z P6SM SCT CI – Greater than 6 statute miles visibility, scattered cirrus clouds

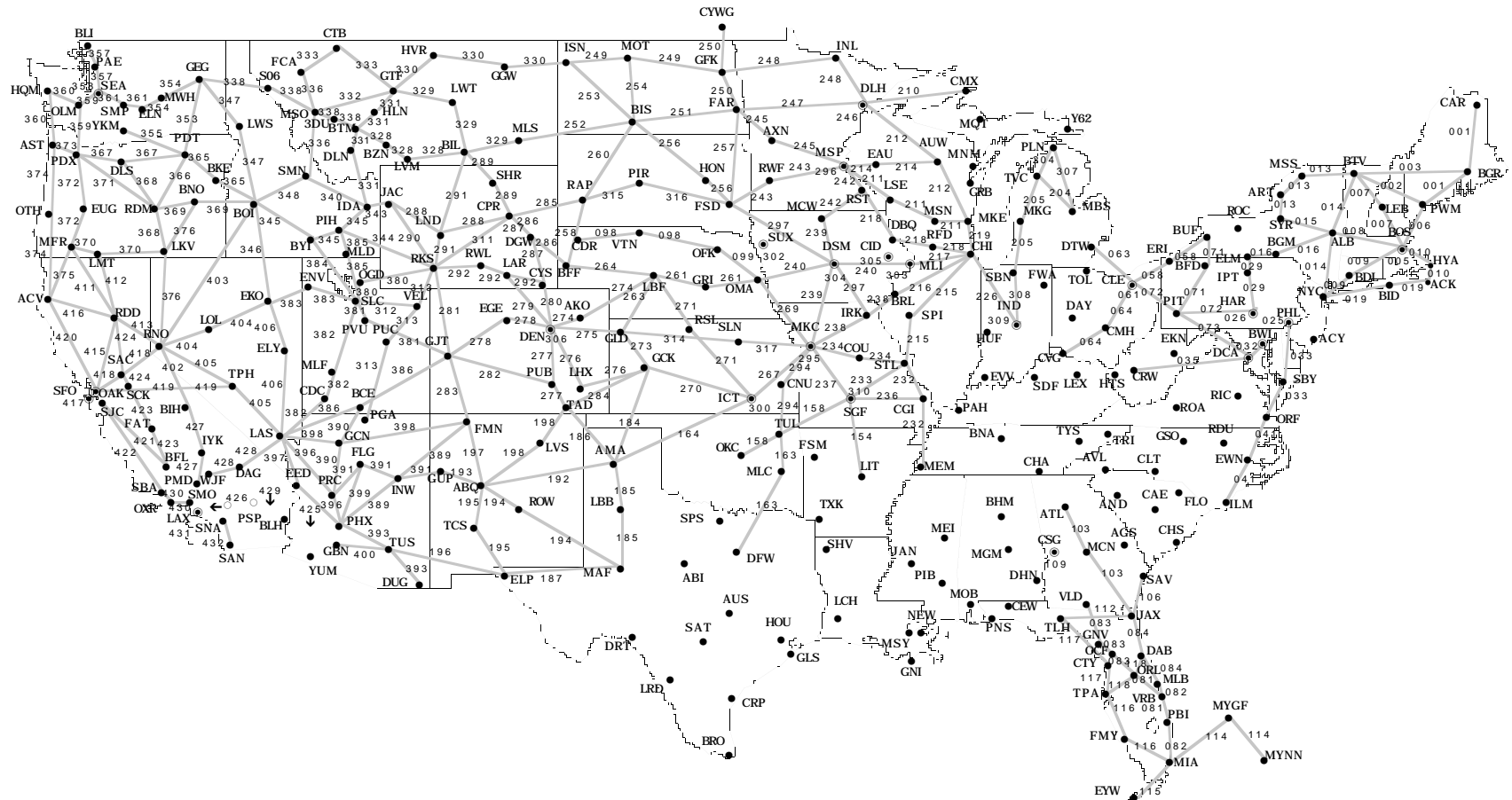
Functionality/Other Notes:

TWEBs are disseminated textually and through selected VHF navigational aids (as indicated on a VFR sectional or IFR enroute chart).

TWEBs are useful as they provide a forecast of weather conditions along a specific route, and therefore may be more specific than an area forecast.

When an airport along a TWEB route does not have a TAF issued, a “NIL TWEB” will be issued for that particular route or vicinity forecast, meaning that no TWEB is available at the time.

TWEB Route Map



TWEB ROUTE LEGEND

- Local Vicinity Forecast
- Local Area Forecast
- 235 Route Forecast (Number)

NOTE: The letter "K" precedes all airport identifiers in the Continental United States.

Pilot Reports (UA/UUA)

Description: UAs are reports of weather conditions actually experienced by pilots. These reports reflect the only method of directly observing many weather conditions such as turbulence, icing, or cloud tops.

Issue Frequency/Valid Period: UAs are issued by pilots as the need arises and are valid at the time of the observation.

Example:

UA/OV DRK090020/TM 2100/FL 120/TP PA-44/SK OVC130/WX FV 10SM RA/TA M03
/WV 27055KT/TB SMTH/IC LGT RIME/RM NONE

UA – Routine Pilot Report (UUA means “urgent” pilot report and include hazardous events)

OV DRK090020 – Location: Drake VOR 090 radial at 20NM

TM 2100 – Time of report: 2100zulu

FL 120 – Altitude: 12,000’ MSL

TP PA-44 – Aircraft type: Piper Seminole

SK OVC130 – Sky cover: overcast at 13,000’ MSL

WX FV 10SM RA – Weather: flight visibility 10 statute miles in moderate rain

TA M03 – Temperature: minus 3 degrees Celsius

WV 27055KT – Wind direction 270, velocity 55knots

TB SMTH – Turbulence: none/smooth

IC LGT RIME – Icing: light rime

RM NONE – Remarks: none

Functionality/Other Notes:

At least six items are required for each pilot report issued: type of report (UA/UUA), location, time, flight level (altitude), type of aircraft, and at least one weather element.

UAs can be submitted through Flight Watch (122.0Mhz nationwide) or through the nearest FSS communications outlet.

How to classify turbulence or icing:

<i>Turbulence:</i>	<u>Light:</u>	Occupants may feel a slight strain against the seatbelt and loose objects may be somewhat displaced.
	<u>Moderate:</u>	Occupants feel a definite strain against the seatbelt and loose objects are moved.
	<u>Severe:</u>	Occupants are violently forced against the seatbelt and loose objects are tossed around.
	<u>Extreme:</u>	Aircraft is violently tossed about and almost impossible to control. Structural damage possible.
<i>Icing:</i>	<u>Rime:</u>	Rough or milky ice that forms as supercooled water drops freeze to aircraft surface immediately after contact.
	<u>Clear:</u>	Clear or glossy ice that forms as supercooled water drops slowly freeze after contact with aircraft surface.
	<u>Mixed:</u>	Mixed ice is a combination of the two.