

SIGNIFICANT WEATHER PROGNOSTIC CHARTS

Significant weather prognostic charts (progs) (Figure 11-1) portray forecasts of selected weather conditions at specified valid times. Each valid time is the time at which the forecast conditions are expected to occur. Forecasts are made from a comprehensive set of observed weather conditions. The observed conditions are extended forward in time and become forecasts by considering atmospheric and environmental processes. Forecasts are made for various periods of time. A 12-hour prog is a forecast of conditions which has a valid time 12 hours after the observed data base time, thus a 12-hour forecast. A 24-hour prog is a 24-hour forecast, and so on. For example, a 12-hour forecast based on 00Z observations is valid at 12Z. Altitude information on the prog charts is referenced to mean sea level (MSL) and compatible with aviation. Altitudes below 18,000 feet are true altitudes while above 18,000 feet are pressure altitudes or flight levels (FL). The prog charts for the conterminous United States are generated for two general time periods. Day 1 progs are forecasts for the first 24-hour period. Day 2 progs are forecasts for the second 24-hour period. Day 1 prog charts are prepared for two altitude references in the atmosphere. Forecast information for the surface to 24,000 feet is provided by the low-level significant weather prog chart. Forecast information from above 24,000 to 60,000 feet is provided by the high-level significant weather prog chart. The day 2 prog chart is prepared without regard to altitude and is provided by the 36- and 48-hour surface prog chart.

U.S. LOW-LEVEL SIGNIFICANT WEATHER (SIG WX) PROG

The low-level significant weather prog chart (Figure 11-1) is a day 1 forecast of significant weather for the conterminous United States. Weather information provided pertains to the layer from surface to FL240 (400 mbs.) The information is provided for two forecast periods, 12 hours and 24 hours. The chart is composed of four panels. The two lower panels depict the 12- and 24-hour surface progs that are produced at Hydrometeorological Prediction Center (HPC) in Camp Springs, Maryland. The two upper panels depict the 12- and 24-hour significant weather progs that are produced at the Aviation Weather Center (AWC) in Kansas City, Missouri. The chart is issued four times a day; and the observation data base times for each issuance are 00Z, 06Z, 12Z, and 18Z.

SURFACE PROG PANELS

The surface prog panels display forecast positions and characteristics of pressure systems, fronts, and precipitation.

Surface Pressure Systems

Surface pressure systems are depicted by pressure centers, troughs, and, on selected panels, isobars. High and low pressure centers are identified by "Hs" and "Ls" respectively. The central pressure of each center is specified. Pressure troughs are identified by long dashed lines and labeled "TROF." Isobars are shown on selected panels. Isobars are drawn as solid lines and portray pressure patterns. The value of each isobar is identified by a two-digit code placed on each isobar. Isobars are drawn with intervals of 8 mbs relative to the 1,000 mb isobar. Note that this interval is larger than the 4-mb interval used on the surface analysis chart. The 8-mb interval provides a less sensitive analysis of pressure patterns than the 4-mb interval. Occasionally, nonstandard isobars will be drawn using 4-mb intervals to highlight patterns with weak pressure gradients. Nonstandard isobars are drawn as dashed lines. Examples of standard isobars drawn are the 992; 1,000; and 1,008 mb isobars.

Fronts

Surface fronts are depicted on each panel. Formats used are the standard symbols and three-digit characterization code used on the surface analysis chart. (See Section 5.)

Precipitation

Solid lines enclose precipitation areas. Symbols specify the forms and types of precipitation. (See Table 11-1.) A mix of precipitation is indicated by the use of two pertinent symbols separated by a slash. Identifying symbols are positioned within or adjacent to the precipitation areas. Precipitation conditions are described further by the use of shading. Stable precipitation events are classified as continuous or intermittent. Continuous precipitation is a dominant and widespread event and, therefore, shaded. Intermittent precipitation is a periodic and patchy event and unshaded. Shading is also used to characterize the coverage of unstable precipitation events. Areas with more than half coverage are shaded, and half or less coverage are unshaded. (See Table 11-2.) A bold dashed line is used to separate precipitation with contrasting characteristics within an outlined area. For example, a dashed line would be used to separate an area of snow from an area of rain.

Table 11-1 Standard Weather Symbols














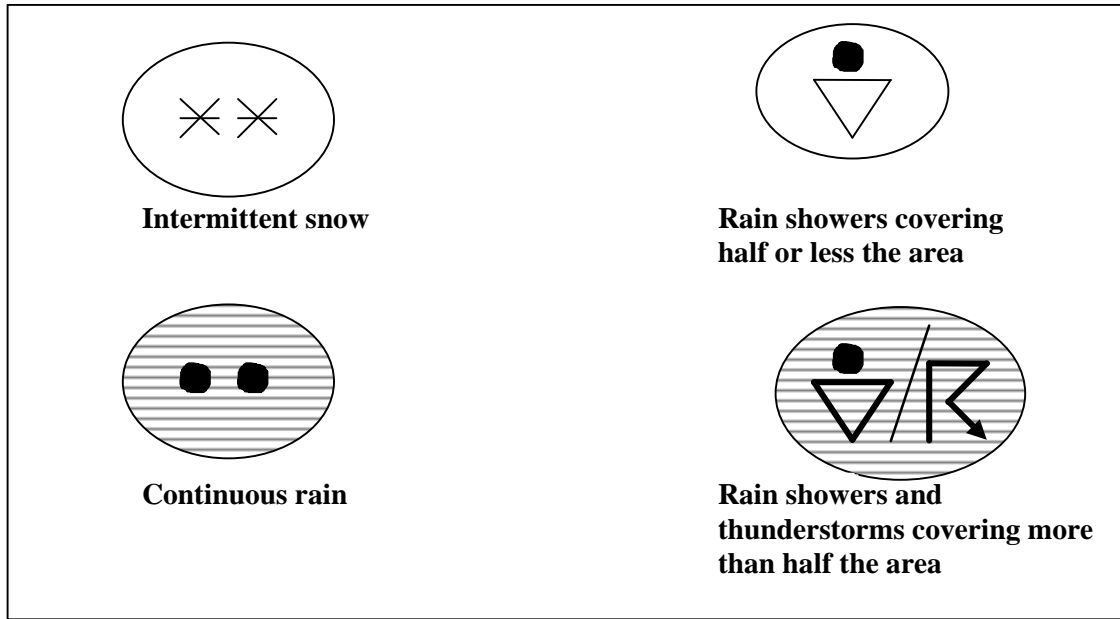
	
Moderate turbulence	Rain shower
	
Severe turbulence	Snow Shower
	
Moderate icing	Thunderstorm
	
Severe icing	Freezing rain
	
Rain	Tropical storm
	
Snow	Hurricane (Typhoon)
	
Drizzle	

Table 11-2 Significant Weather Prog Symbols



SIGNIFICANT WEATHER PANELS

The significant weather panels display forecast weather flying categories, freezing levels, and turbulence for the layer surface to FL240. A legend on the chart illustrates symbols and criteria used for these conditions. (See Figure 11-1.)

Weather Flying Categories

The weather flying categories are visual flight rules (VFR), marginal VFR (MVFR), and instrument flight rules (IFR). Ceiling and visibility criteria used for each category are the same as used for the weather depiction chart. (See Section 6.) IFR areas are enclosed by solid lines. MVFR areas are enclosed by scalloped lines. All other areas are VFR.

Freezing Levels

The surface freezing level is depicted by a zigzag line and labeled "SFC." The surface freezing level separates above-freezing from below-freezing temperatures at the Earth's surface. Freezing levels aloft are depicted by thin, short dashed lines. Lines are drawn at 4,000-foot intervals beginning at 4,000 feet and labeled in hundreds of feet. For example, "80" identifies the 8,000-foot contour. Freezing level heights are referenced to MSL. The lines are discontinued where they intersect corresponding altitudes of the Rocky Mountains. The freezing level values for locations between lines is determined by linear interpolation. For example, the freezing level midway between the 4,000 and 8,000 foot lines is 6,000 feet. Areas with forecast multiple freezing levels have lines drawn to the highest freezing level. For example, with freezing levels forecast at 2,000, 6,000, and 8,000 feet, the analysis is drawn to the 8,000 foot value. Notice that not all freezing levels are identified with a multiple freezing level event. Information about the 2,000- and 6,000-foot freezing levels in this example would not be displayed. Surface-based multiple freezing levels are located over areas which have below-freezing temperatures at the surface and above-freezing temperatures within at least one layer aloft. Freezing rain and freezing drizzle (freezing precipitation) are associated with surface-based multiple freezing levels. The

intersection of the surface freezing level line and freezing level contours encloses an area with surface-based multiple freezing levels.

Turbulence

Areas of moderate or greater turbulence are enclosed by bold, long dashed lines. Turbulence intensities are identified by symbols. The vertical extent of turbulence layers is specified by top and base heights in hundreds of feet. Height values are relative to MSL with the top and base heights separated by a line. A top height of "240" indicates turbulence at or above 24,000 feet. (The upper limit of the prog is 24,000 feet.) The base height is omitted where turbulence reaches the surface. For example, "080/ " identifies a turbulence layer from the surface to 8,000 feet MSL. Thunderstorms always imply a variety of hazardous conditions to aviation including moderate or greater turbulence. Generally, turbulence conditions implied with thunderstorms is not depicted on the chart. However, for added emphasis, moderate to severe turbulence surface to above 24,000 feet is depicted for areas that have thunderstorms with more than half coverage on the surface prog. Intensity symbols and layer altitudes appear within or adjacent to the forecast area.

USING THE CHART

The low-level significant weather prog chart provides an overview of selected flying weather conditions up to 24,000 feet for day 1. Much insight can be gained by evaluating the individual fields of pressure patterns, fronts, precipitation, weather flying categories, freezing levels, and turbulence displayed on the chart. In addition, certain inferences can be made from the chart. Surface winds can be inferred from surface pressure patterns. Structural icing can be inferred in areas which have clouds and precipitation, above freezing levels, and in areas of freezing precipitation. The low-level prog chart can also be used to obtain an overview of the progression of weather during day 1. The progression of weather is the change in position, size, and intensity of weather with time. Progression analysis is accomplished by comparing charts of observed conditions with the 12- and 24-hour prog panels. Progression analysis adds insight to the time-continuity of the weather from before flight time to after flight time. The low-level prog chart makes the comprehension of weather details easier and more meaningful. A comprehensive overview of weather conditions does not provide sufficient information for flight planning. Additional weather details are required. Essential weather details are provided by observed reports, forecast products, and weather advisories. Weather details are often numerous. An effective overview of observed and prog charts allows the many essential details to fit into place and have continuity.

36- AND 48-HOUR SURFACE PROG

The 36- and 48-hour surface prog chart (Figure 11-2) is a day 2 forecast of general weather for the conterminous United States. The chart is an extension of the day 1 U.S. low-level significant weather prog chart issued from the same observed data base time. These two prog charts make up a forecast package. The chart is issued twice daily. The observation data base times for each issuance are 00Z and 12Z. For example, a chart issued based on 00Z Tuesday observations has a 36-hour valid time of 12Z Wednesday and a 48-hour valid time of 00Z Thursday. The chart is composed of two panels and a forecast discussion. The two panels contain the 36- and 48-hour surface progs.

SURFACE PROG PANELS

The surface prog panels display forecast positions and characteristics of pressure patterns, fronts, and precipitation.

Surface Pressure Systems

Surface pressure systems are depicted by pressure centers, troughs, and isobars. Formats used for each feature are the same as used for the surface prog panels of the U.S. low-level significant weather prog chart.

Fronts

Surface fronts are depicted by using the standard symbols and three-digit characterization code used on the surface analysis chart. (See Section 5.)

Precipitation

Precipitation areas are outlined on each panel. Formats used to locate and characterize precipitation are the same as used for the surface prog panels of the U.S. low-level prog chart.

FORECAST DISCUSSION

The forecast discussion is a discussion of the day 1 and day 2 forecast package. The discussion will include identification and characterization of weather systems and associated weather conditions portrayed on the prog charts.

USING THE CHART

The 36- and 48-hour surface prog chart provides an outlook of general weather conditions for day 2. The 36- and 48-hour prog can also be used to assess the progression of weather through day 2.

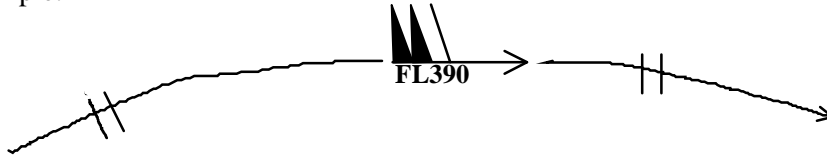
HIGH-LEVEL SIGNIFICANT WEATHER PROG

The high-level significant weather prog (Figures 11-3 and 11-4) is a day 1 forecast of significant weather. Weather information provided pertains to the layer from above 24,000 to 60,000 feet (FL250-FL600). The prog covers a large portion of the Northern Hemisphere and a limited portion of the Southern Hemisphere. Coverage ranges from the eastern Asiatic coast eastward across the Pacific, North America, and the Atlantic into Europe and northwestern Africa. The prog extends southward into northern South America. The area covered by the prog is divided into sections. Each section covers a part of the forecast area. Some sections overlap. The various sections are formatted on polar or Mercator projection background maps and issued as charts. Each prog chart is issued four times a day. The valid times are 00Z, 06Z, 12Z, and 18Z. Conditions routinely appearing on the chart are jet streams, cumulonimbus clouds, turbulence, and tropopause heights. Surface fronts are also included to add perspective. Other conditions will appear on the chart as pertinent. They are tropical cyclones, squall lines, volcanic eruption sites, and sandstorms and dust storms.

Jet Streams

Jet streams with a maximum speed of more than 80 knots are identified by bold lines. Jet stream lines lie along the core of maximum winds. Arrowheads on the lines indicate the orientation of each jet stream. Double hatched lines positioned along the jet core identify changes of wind speed. These speed indicators are drawn at 20-knot intervals and begin with 100 knots. Wind speed maximums along the jet core are characterized by wind symbols and altitudes. A standard wind symbol (shaft, pennants, and barbs) is placed at each pertinent position to identify velocity. The altitude in hundreds of feet prefaced with "FL" is placed adjacent to each wind symbol.

Example:



Cumulonimbus Clouds

Cumulonimbus clouds (CBs) are thunderstorm clouds. Areas of CBs meeting select criteria are enclosed by scalloped lines. The criteria are widespread CBs within an area or along a line with little or no space between individual clouds, and CBs are embedded in cloud layers or concealed by haze or dust. The prog does not display isolated or scattered CBs (one-half or less coverage) which are not embedded in clouds, haze, or dust. Cumulonimbus areas are identified with "CB" and characterized by coverage and tops. Coverages are identified as isolated (ISOL), occasional (OCNL), and frequent (FRQ). Isolated and occasional CBs are further characterized as embedded (EMBD.) Coverage values for the identifiers are: isolated - less than 1/8; occasional - 1/8 to 4/8; and frequent - more than 4/8. Tops are identified in hundreds of feet using the standard top and base format. Bases extend below 24,000 feet (below the prog's forecast layer) and are encoded "XXX." The identification and characterization of each cumulonimbus area will appear within or adjacent to the outlined area. Thunderstorms always imply a variety of aviation hazards including moderate or greater turbulence and hail.

Examples:

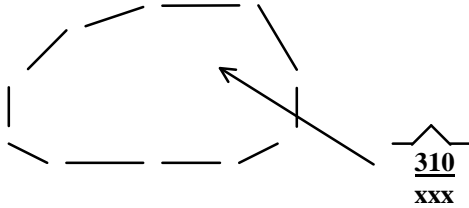


Turbulence

Areas of moderate or greater turbulence are enclosed by bold dashed lines. Turbulence conditions identified are those associated with wind shear zones and mountain waves. Wind shear zones include speed shears associated with jet streams and areas with sharply curved flow. Turbulence associated with thunderstorms is not identified. (Thunderstorms imply turbulence.) Turbulence intensities are identified by symbols. The vertical extent of turbulence layers is specified by top and base heights in hundreds of feet. Turbulence bases which extends below the layer of the chart are identified with "XXX." Top and

base heights are separated by a line. Height values are pressure altitudes. For example, "310/XXX" identifies a layer of turbulence from below FL240 to FL310.

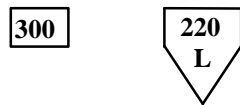
Example:



Tropopause Heights

Tropopause heights are plotted in hundreds of feet at selected locations. Heights are enclosed by rectangles. Centers of high and low heights are identified with "H" and "L" respectively along with their heights and enclosed by polygons.

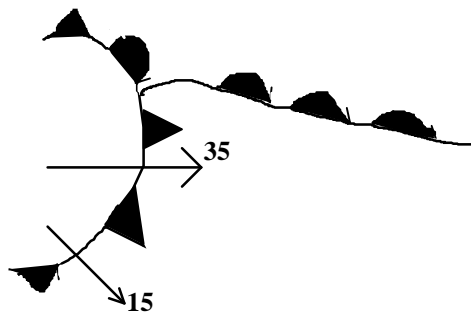
Examples:



Surface Fronts

Surface fronts are depicted on the prog to provide added perspective. Symbols used are the standard symbols used on the surface analysis chart. Movements of fronts are identified at selected positions. A vector with a number plotted adjacent to the vector identifies the direction and speed of movement. (See Section 5.)

Example:



Tropical Cyclones

The positions of hurricanes, typhoons, and tropical storms are depicted by symbols. The only difference between the hurricane/typhoon symbol and tropical storm symbol is the circle of the hurricane/typhoon symbol is shaded in. When pertinent, the name of each storm is positioned adjacent to the symbol. Cumulonimbus cloud activity meeting chart criteria is identified and characterized relative to each storm.

Example:



Squall Lines

Severe squall lines are lines of CBs with 5/8 coverage or greater. Squall lines are identified by long dashed lines, and each dash is separated by a "v." Cumulonimbus cloud activity meeting chart criteria is identified and characterized with each squall line.

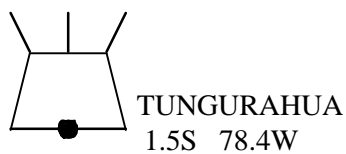
Example:



Volcanic Eruption Sites

Volcanic eruption sites are identified by a trapezoidal symbol. The dot on the base of the trapezoid locates the latitude and longitude of the volcano. The name of the volcano, its latitude, and its longitude are noted adjacent to the symbol. Pertinent SIGMETs containing information regarding volcanic ash will be in effect.

Example:



Sandstorms and Dust Storms

Areas of widespread sandstorms and dust storms are labeled by symbol. The symbol with the arrow depicts areas of widespread sandstorm or dust storm, while the symbol without the arrow depicts severe sandstorm or dust haze.

Example:



USING THE CHART

The high-level sig weather prog is used to get an overview of selected flying weather conditions above 24,000 feet. Much insight can be gained by evaluating jet streams, cumulonimbus clouds, turbulence, associated surface fronts, significant tropical storm complexes including tropical cyclones, squall lines, sandstorms, and dust storms.

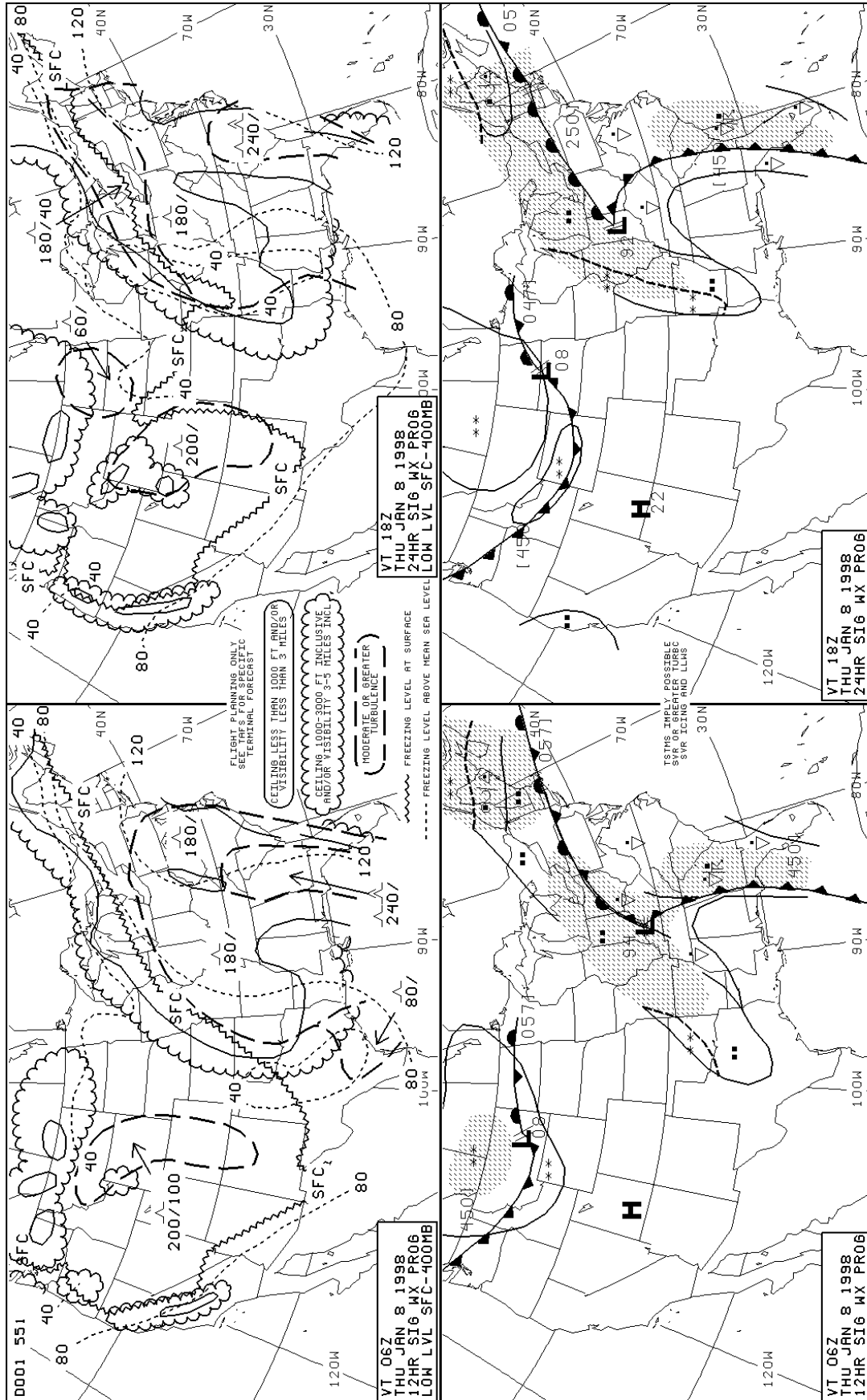
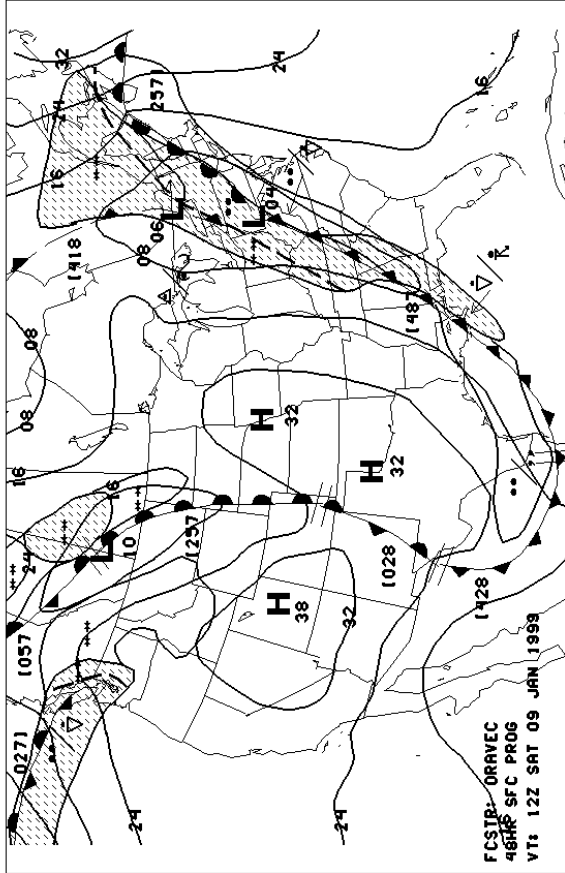
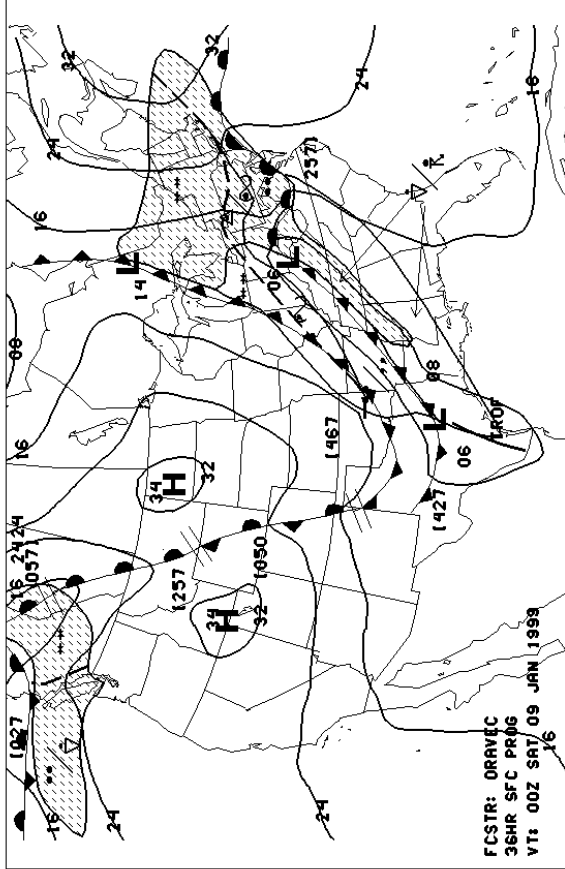


Figure 11-1. U.S. Low-Level Significant Weather Prog.



FCSTR: ORAVEC
48HR SFC PROG
VT: 12Z SAT 09 JAN 1999

TO SPREAD NEMD TONIGHT THRU THE CNTRL APPALACHIANS AND INTO THE MID ATL AND NERN U.S. ON FRI IN ASSOC WITH A LEAD AREA OF HARR ADECTION PUSHING NEMD AHEAD OF THE AMPLIFYING UPSTREAM TROF. A CHANGE OVR TO A MIX BAG OF PCPN IS LIKELY ACRS NEARLY ALL OF THE NERN U.S. FRI INTO SAT AS WARMER AIR WL STREAM NEMD AHEAD OF THE UPSTREAM AMPLIFYING TROF. ACRS THE LOWER MS VALLEY/CNTRL GULF COAST...LOCALLY HWY RAINS HL LIKELY CONT INTO AT LEAST TONIGHT ALONG A STNRY FRONTAL BNDY ACRS THIS REGION. FRONTAL CONVECTION SHOULD THEN SPREAD NEMD INTO THE TN VALLEY FRI INTO SAT AS LOW TO MID LEVEL DYNAMICS STRENGTHEN ALONG THE AFOREMENTIONED N-S STRENGTHENING FRONTAL BNDY. ACRS THE MID SECTION OF THE NATION...A REINFORCING SHOT OF ARCTIC AIR HL CONT TO PUSH QUICKLY SHD INTO THE NRN PLAINS TONIGHT AND THEN SHD ACRS THE REMINDER OF THE PLAINS FRI INTO SAT. POST FRONTAL LIGHT SNOWS LIKELY IN THE ARCTIC AIR ACRS THE NRN PLAINS FROM TONIGHT INTO EARLY SAT. ADDITIONAL LIGHT SNOWS MAY STREAK SEND INTO THE NRN PLAINS ON SAT AHEAD OF A DEVELOPING ALBERTA CLIPPER PUSHING SEND ALONG THE ARCTIC FRONT. TRANQUIL WX FOR THE GIBASIN AND W THIS PERIOD AS SFC HIGH PRESSURE BUILDS IN RESPONSE TO THE UPSTREAM AMPLIFYING RIDGE. THIS GIBASIN SFC RIDGE HL STRENGTHEN THE SANTA ANA'S ACRS SRN CA BY SAT WITH HIGH WINDS POSSIBLE. ORAVEC/FORECAST OPERATIONS BRANCH
[PLEASE NOTE THE HPC WEB ADDRESS HAS CHANGED! GRAPHICS ARE NOW



FCSTR: ORAVEC
36HR SFC PROG
VT: 00Z SAT/09 JAN 1999

NCEP PROGNOSTIC DISCUSSION FROM 1200Z THU JAN 07 1999
HYDROMETEOROLOGICAL PREDICTION CENTER...NWS...CAMP SPRINGS MD
REF 12 TO 48 HR MANUAL GRAPHICS

THE LATEST MODEL RUNS ARE IN GOOD AGRANT WITH THE OVERALL TREND OF AMPLIFICATION TO THE BROAD CYCLONIC FLOW ACRS THE U.S. AS THE UPR RIDGE BUILDS OVR THE NERN PAC AND A DOWNSTREAM TROF AMPLIFIES OVR THE MS VALLEY. THERE ARE...HOWEVER...SOME FAIRLY SOFTN DIFFS WITH THE DETAILS OF THIS AMPLIFICATION AND THE ASSOC SFC FEATURES. ATTH...WE PREFER THE NGM/AVN SOLN WHICH IS FCSTG A SLIGHTLY MORE AMPLIFIED TROF DIGGING SEND BY EARLY SAT INTO THE MID MS VALLEY GIVEN THE AMPLITUDE OF THE UPSTREAM NERN PAC UPR RIDGE. IN ADDITION...THE ETA HAS SHOWN SOME PROBLEMS THIS YEAR IN SIMILAR FLOW REGIMES IN NOT FCSTG ENOUGH AMPLIFICATION TO DIGGING VORTS. THE SENSIBLE WX EFFECTS FROM THIS MORE AMPLIFIED SOLN WOULD BE A SLOWER END PUSH TO THE MAIN N-S BAROCLINIC BNDY STRENGTHENING OVR THE OH VALLEY FRI INTO SAT THAN THE ETA IS SUGGESTING. THIS MORE AMPLIFIED UPR TROF SHOULD ALSO SUPPORT INCREASED POST FRONTAL PCPN DEVELOPING OVR THE MID MS VALLEY LATE FRI AND SPREADING NEMD INTO THE OH VALLEY BY EARLY FRI. THIS POST FRONTAL PCPN HL LIKELY BE CHANGING FROM RAIN TO SNOW AS THE TROF AMPLIFIES AND PULLS IN COLDER AIR WITH POSSIBLE ACCUMULATIONS IN THE 3 TO 6" RANGE. ACCUMULATING SNOWS ALSO LIKELY

Figure 11-2. U.S. Low-Level 36- and 48-hour Significant Weather Prog.

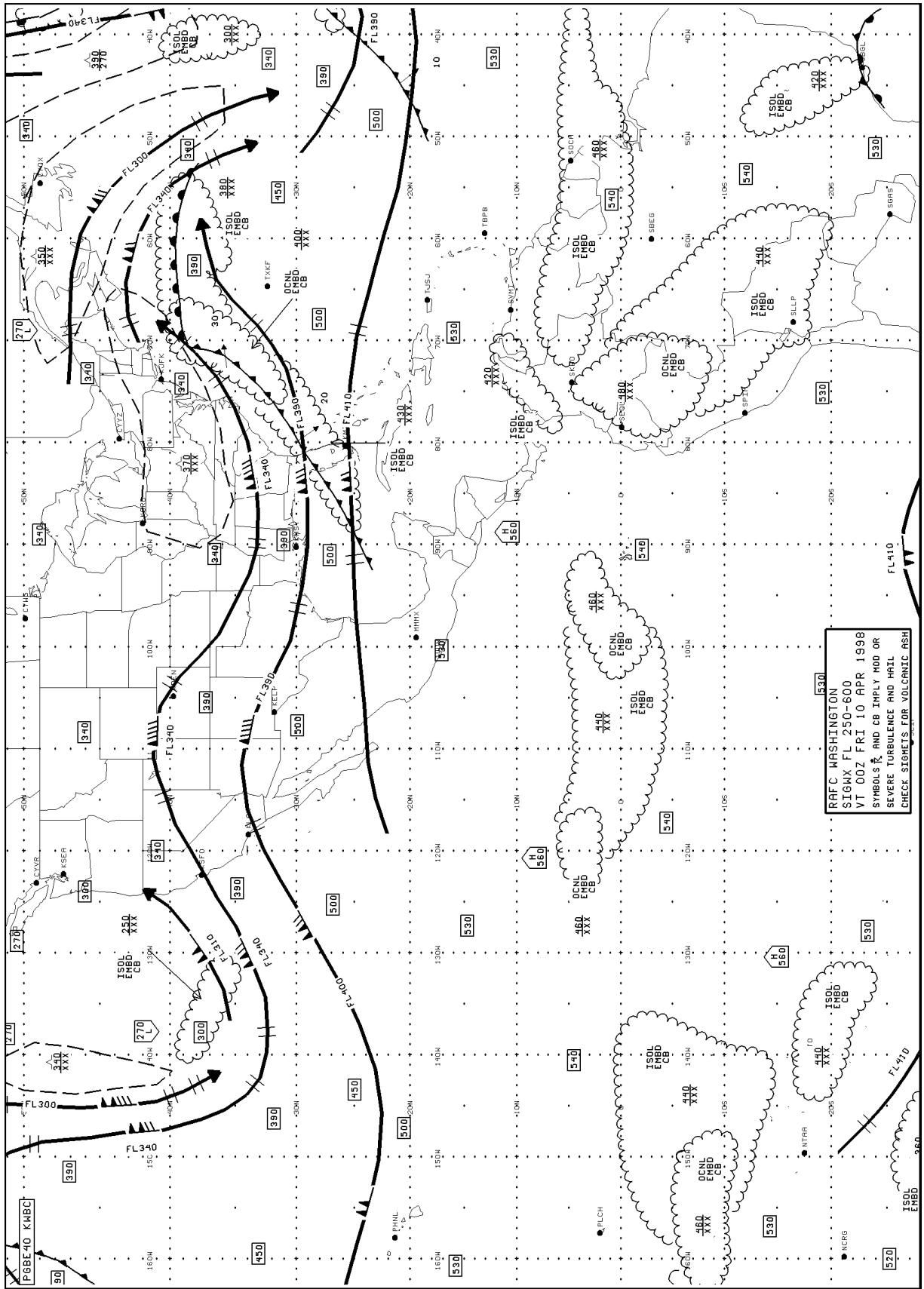


Figure 11-3. U.S. High-Level Significant Weather Prog.