

# GUIDELINES TO HIGH LEVEL SIGNIFICANT WEATHER PROGNOSTIC CHARTS

## OBJECTIVES

- To examine and understand High Level SIGWX Charts
- Acquaint yourself with the symbols used in High Level SIGWX charts
- Practice reading the High Level SIGWX charts

## INTRODUCTION

The High-Level Significant Weather Prog is derived from forecasts for both domestic and international flights. The U.S. National Meteorological Center (NMC), near Washington D.C., is a component of the World Area Forecast System (WAFS). NMC is designated in the WAFS as both a World Area Forecast Center and a Regional Area Forecast Center (RAFC). The main function of the NMC as a WAFS, is to prepare global forecasts in grid-point form of upper winds and upper air temperatures and to supply the forecasts to associated RAFCs. An important RAFC function is to supply users with forecast winds and temperatures aloft along with significant weather forecast charts.

The High-Level Significant Weather Prog, encompasses airspace from 25,000 feet to 60,000 feet pressure altitude over the conterminous U.S., Mexico, Central America, portions of South America, the western Atlantic, and eastern Pacific. These charts are issued at times as covered in the Low Level SIGWX Progs - <http://www.awc-kc.noaa.gov/awc/hilvl.html>

The following weather is depicted on the charts:

- a. active thunderstorms
- b. severe squall lines
- c. tropical cyclone(s)
- d. from 10,000 feet MSL to flight level 250, clouds associated with a) through c) above
- e. above flight level 250, cumulonimbus cloud associated with a) to c) above
- f. moderate or severe turbulence (in cloud or clear air)
- g. moderate or severe icing
- h. widespread sandstorm/duststorm(s)
- i. surface positions of well-defined convergence zones
- j. surface positions, speed and direction of movement of frontal systems
- k. tropopause heights
- l. jetstreams
- m. volcanic activity, including the name of the volcano, latitude and longitude, the date and time of the first eruption, and a reminder to check any SIGMETs for further information.


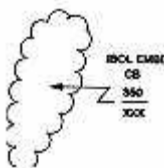

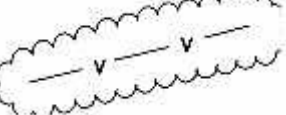
## DEVELOPMENT

**a. & b. Thunderstorms and Associated Squall Lines** - The abbreviation "CB", is used to depict possible thunderstorm activity. By definition, this symbol refers to either the occurrence or expected occurrence of an area of widespread cumulonimbus clouds along a line with little or no space between individual clouds or cumulonimbus clouds embedded in cloud layers or concealed by haze or dust. It does not refer to isolated or scattered (occasional) cumulonimbus clouds that are not embedded in cloud layers or concealed by haze or dust. The symbol "CB" automatically implies moderate or greater turbulence and icing and these conditions are not depicted separately.


CB data will normally be identified as ISOL EMBD CB (isolated embedded CB), OCNL EMBD CB (occasional embedded CB), ISOL CB in HAZE (isolated CB in haze), or OCNL CB in HAZE (occasional CB in haze). In rare instances, CB coverage above FL240 may exceed 4/8 coverage; in these instances, CB activity will be described as FRQ CB (frequent cumulonimbus with little or no separation). The meanings of these area coverage terms are: ISOL (less than 1/8), OCNL (1/8 to 4/8) and FRQ (5/8 to 8/8).

Base and top of clouds are indicated by figures below and above a short line (—). CB bases below FL240 are shown as XXX. CB tops are expressed in hundreds of feet MSL. Tops above the upper limits are shown as “ABV 630”. The area the forecast applies to is enclosed by scalloped lines.

For example:

 <p>OCNL EMBD CB 450 XXX</p>	Occasional (1/8 to 4/8 area coverage) embedded cumulonimbus clouds with bases below FL240 and tops forecast to reach FL450.
 <p>ISOL EMBD CB 350 XXX</p>	Isolated (less than 1/8 area coverage) embedded cumulonimbus clouds with bases below FL240 and tops forecast to reach FL350.
 <p>— V — V —</p>	Severe Squall Line - Severe squall lines are lines of CB's of 5/8's coverage or greater and pose a significant hazard to aviation.
	Severe squall lines depicted within areas of CB activity.

### c. Tropical Cyclones

The symbol  depicts tropical cyclones.

Areas of associated cumulonimbus activity within the tropical storm, if meeting the previously given criteria (ISOL EMBD CB, OCNL EMBD CB, ISOL CB IN HAZE, OCNL CB IN HAZE, FRQ CB), are enclosed by scalloped lines and labeled with the vertical extent. For example,



indicates a thunderstorm area (5/8 to 8/8 coverage) with bases below FL240, tops 500 associated with a tropical cyclone.

Notes:

1. The names of tropical cyclones, when relevant, are entered adjacent to the symbol.
2. A significant weather chart depicting the tropical cyclone symbol will state that the latest tropical cyclone advisory is to be given public dissemination, rather than the tropical cyclone's forecast position on the chart.

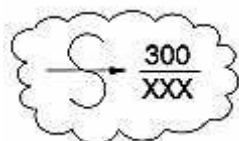
**f. Turbulence** - Areas of forecast moderate or greater clear air turbulence (CAT) are bounded by large, dashed lines. Clear air turbulence includes all turbulence (wind shear induced and mountain wave induced) not caused by convective activity. Areas are labeled with appropriate turbulence symbol and the vertical

extent is given in hundreds of feet MSL, both shown below. For example,

Symbol	Meaning	Symbol	Meaning
	Moderate Turbulence		Rain Shower
	Severe Turbulence		Snow Shower
	Moderate Icing		Thunderstorm
	Severe Icing		Freezing Rain
	Rain		Tropical Storm
	Snow		Hurricane (typhoon)
	Drizzle		

	An area forecast moderate CAT with vertical extent from FL280 to FL360.
	An area of forecast severe CAT with vertical extent from below FL240 to FL320.
	Note: The symbol CB implies hail, moderate or greater turbulence, and icing.

**h. Sand/Duststorms** - Areas of widespread sandstorms (BN) and duststorms (BD) are enclosed by scalloped lines and labeled by symbol and vertical extent. For example,



indicates widespread sandstorm or duststorm with bases below FL240 (at the surface) and tops forecast to reach FL300.

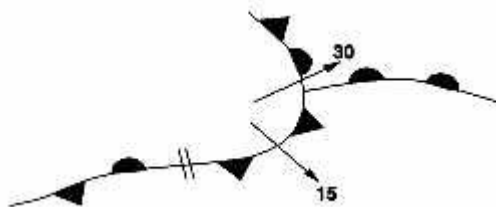
**i. Convergence Zones** - Convergence zones are areas of active thunderstorm activity. These zones are enclosed by scalloped lines and labeled with the vertical extent of the CBs. Note that the CBs must meet the previous given criteria (ISOL EMBD- CB, OCNL EMBD CB, ISOL CB IN HAZE OCNL CB IN HAZE, FRQ CB). Recall that the classic convergence zone is the ITCZ (Inter-Tropical Convergence Zone). For example:



The forecast position of convergence zones and the ITCZ are

shown by the associated thunderstorm areas. Here, the coverage for the frequent CBs is 5/8 to 8/8 with bases below FL240 with tops at FL450. The coverage for the occasional CBs is 1/8 to 4/8 with bases below FL240 and tops at FL350.

**j. Fronts** - The forecast surface positions, speed, and direction of movement of frontal systems associated with significant weather are depicted. Symbols are as on the surface analysis. For example:

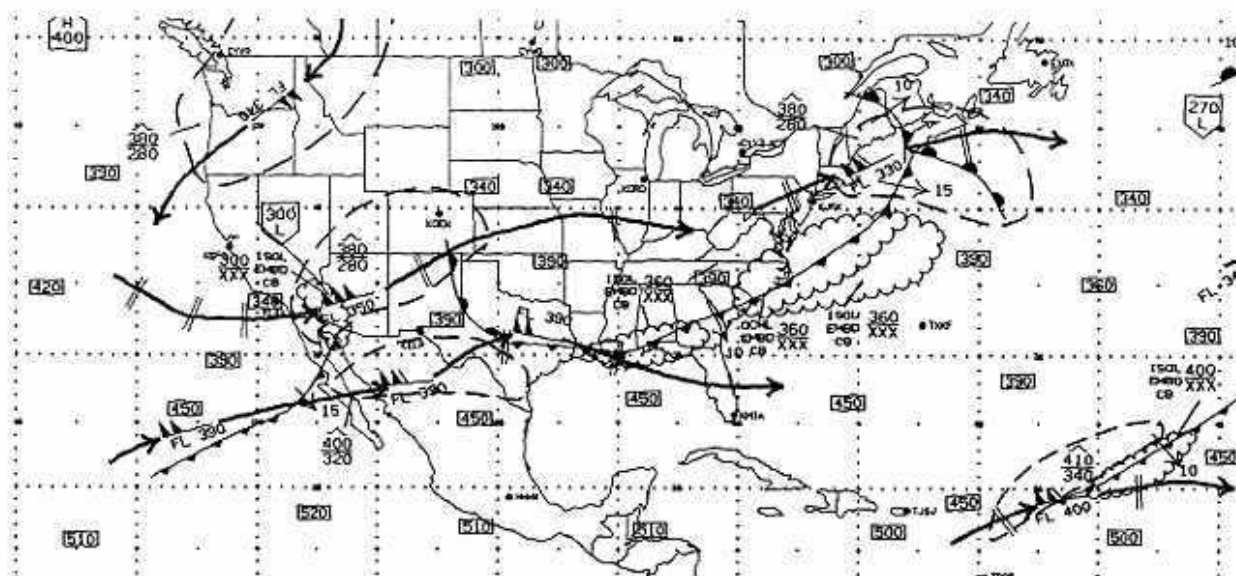


indicates a frontal system is forecast at the position and with the orientation indicated at the valid time of the prognostic chart. The forecast movement is related to true north. Speed, in knots, is indicated by arrow shafts and adjacent numbers. In this case, the occlusion is forecast to move at a speed of 30 knots while the cold front will travel at a velocity of 15 knots towards the SE.

**k. Tropopause Heights** - Tropopause heights are depicted in hundreds of feet MSL. The five sided polygon



indicates areas of high and low tropopause heights. This particular example shows a low tropopause height of 22,000 feet MSL. Other heights may be used occasionally to define areas of very flat tropopause slope. Depicted heights are enclosed in small rectangular blocks. For example,



shows the tropopause sloping from 30,000 feet in North Dakota to 39,000 feet in Oklahoma.


**l. Jet Streams** - The height and maximum wind speed of jet streams having a core speed of 80 knots or greater are shown. The height is given as a flight level (FL). The beginning of the line shows a core speed of 80 knots. A double, hatched line across the jet stream core indicates a speed increase or decrease. The double, hatched line indicates 20 knot changes at 100 knots, 120 knots, 140 knots or higher. The maximum core speed along the jet stream is depicted by shafts, pennants, and feathers. For example:



indicates a jet stream with a forecast maximum speed of 130

knots at a height of 42,000 feet MSL. The extreme left line starts at 80 knots. The first hatched, double line indicates a speed increase of 20 knots to 100 knots and the second double-hatched line shows an increase of 20 knots to 120 knots. The double-hatched line to the right of the maximum speed indicates a decrease of 20 knots to 120 knots. Wind directions are indicated by the orientation of arrow shafts in relation to true north.



**m. Volcanic Activity** - Volcanic activity is indicated by a trapezoidal figure . The symbol designates the location of volcanic activity on the High Level Significant Weather Charts. The "." at the base of the symbol will be located at the latitude/longitude of the volcano. The symbol and any known information concerning the name of the volcano, latitude and longitude, the date and time of the first eruption, and a reminder to check any SIGMETs for further information will be included in the legend of the chart. For example,



Volcanic Eruption  
 Mt. Spur  
 61.3 N 152.3 W  
 At 15/1325 UTC  
 CHECK SIGMETs FOR VOLCANIC ASH