

Severe Turbulence Event January 23, 2015

TURB SIGMET
Center: KDFW
Begins: 2015-01-23T20:00:00Z
Ends: 2015-01-24T00:00:00Z
Top: 25000 ft
Base: 17000 ft

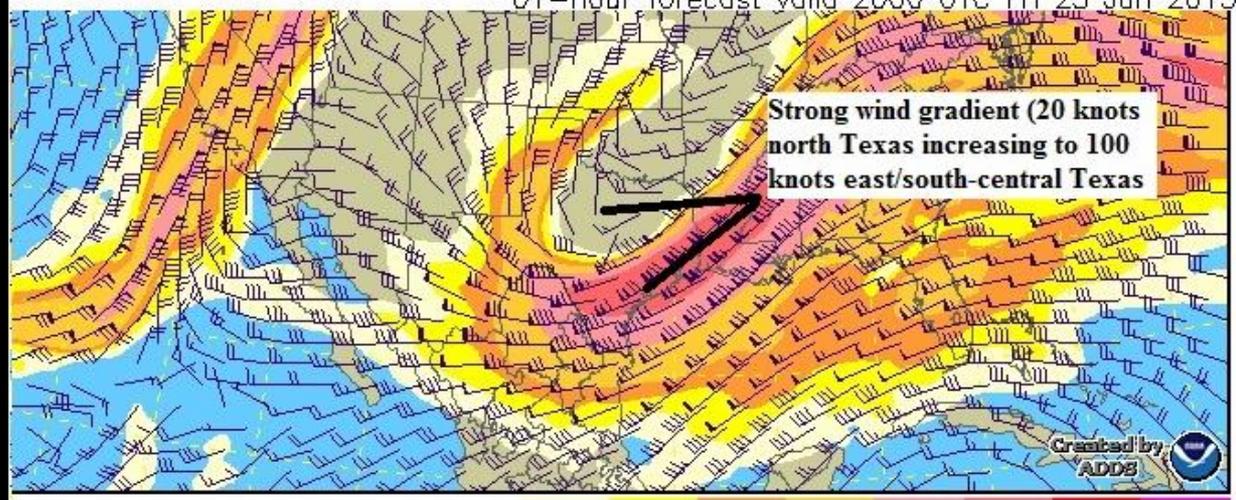
**Valid 20Z-00Z
FL170-250**

WSUS04 KFCI 232000
DFWW WS 232000
SIGMET WHISKEY 1 VALID UNTIL 240000
SIGMET
TX LA MS AND CSTL WTRS
FROM 20SSE ELD TO 20SW MHZ TO 50SW LCH TO 50N CRP TO
20NW CWK TO
20SSE ELD
OCNL SEV TURB BTN 170 AND FL250, DUE TO WNDSHR ASSOCD
WITH JTST.
CONDS CONTG BYD 0000Z.



Wind speed (kts) at 24,000 ft MSL (400 mb)

01-hour forecast valid 2000 UTC Fri 23 Jan 2015



30 40 50 60 80 100 125 150 (knots)

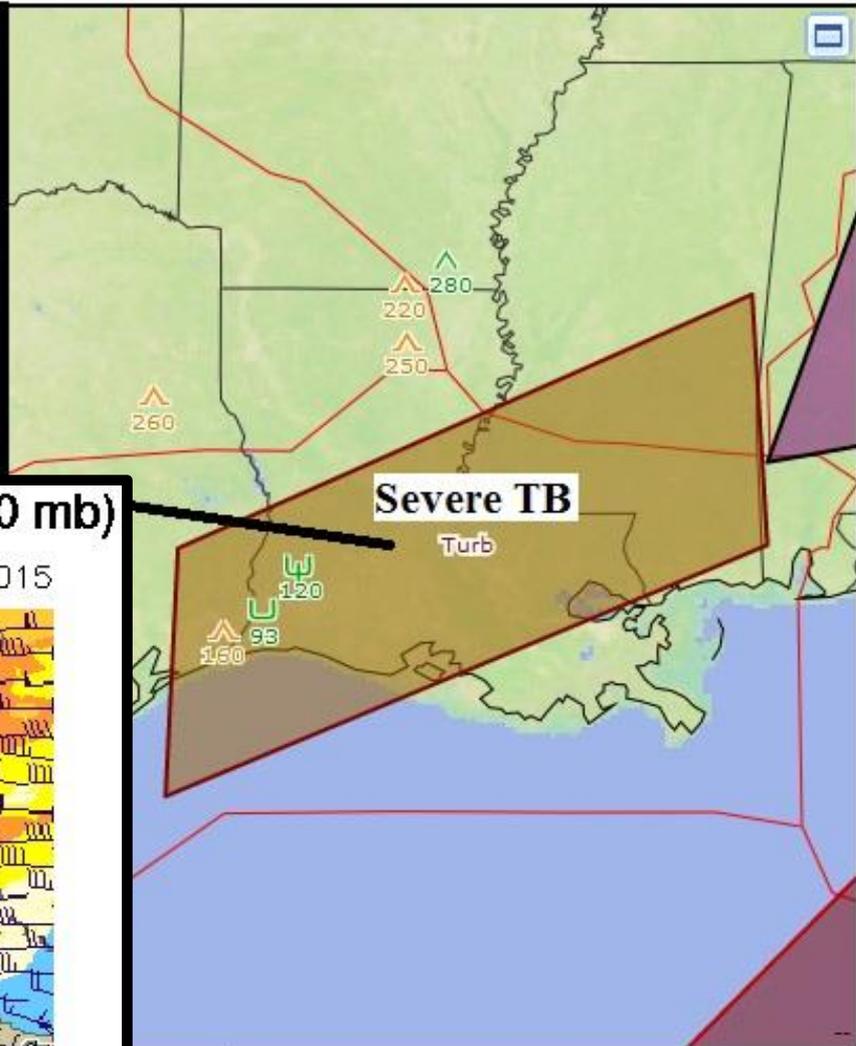
Valid at 2355 UTC 23 Jan 2015

TURB SIGMET

Center: KDFW
Begins: 2015-01-23T23:55:00Z
Ends: 2015-01-24T03:55:00Z
Top: 25000 ft
Base: 18000 ft

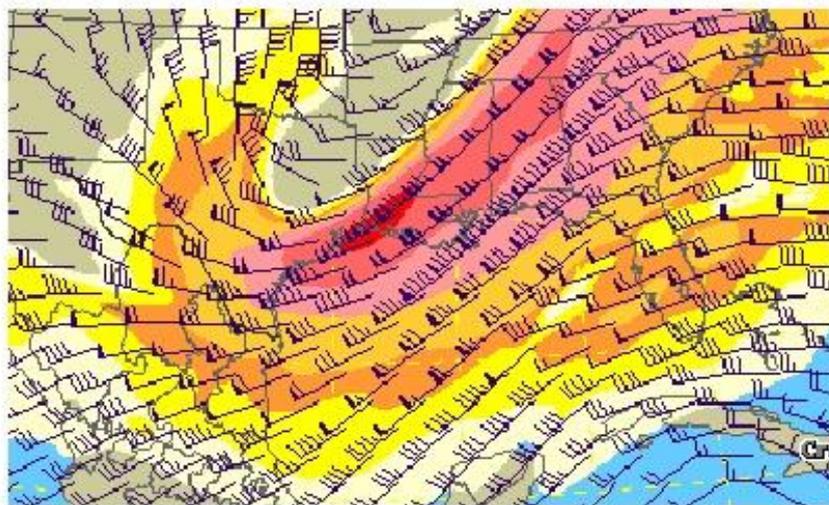
**Valid 00Z-04Z
FL180-250**

WSUS04 KKCI 232355
DFWW WS 232355
SIGMET WHISKEY 2 VALID UNTIL 240355
SIGMET
TX LA MS AND CSTL WTRS
FROM 30S IGB TO SJI TO 100SSE IAH TO 30SSE LFK TO 30S
IGB
OCNL SEV TURB BTN FL180 AND FL250. DUE TO WNDSHR
ASSOCD WITH
JTST. CONDS CONTG BYD 0355Z.



Wind speed (kts) at 24,000 ft MSL (400 mb)

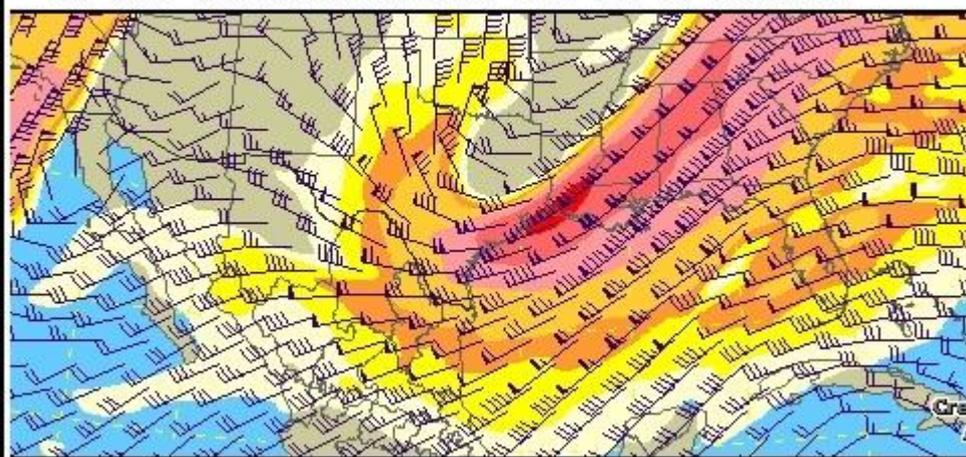
01-hour forecast valid 0200 UTC Sat 24 Jan 2015



BPT UUA /OV BPT/TM 0130/FL150/TP E145/TB MOD-SEV 150/RM MOD TO BORDERLINE SEV TB RPRTD
BY E145 AND E45X ACFT 10 E OF BPT AND OVR BPT/ FM ZHU AWC-WEB/KZHU
BPT UUA /OV BPT/TM 0212/FL180/TP E145/TB SEV 180-230/RM FM ZHU AWC-WEB/KZHU
BPT UUA /OV BPT090015/TM 0214/FL180/TP B737/TB MOD-SEV 180-210/RM FM ZHU AWC-WEB/KZHU

Wind speed (kts) at 24,000 ft MSL (400 mb)

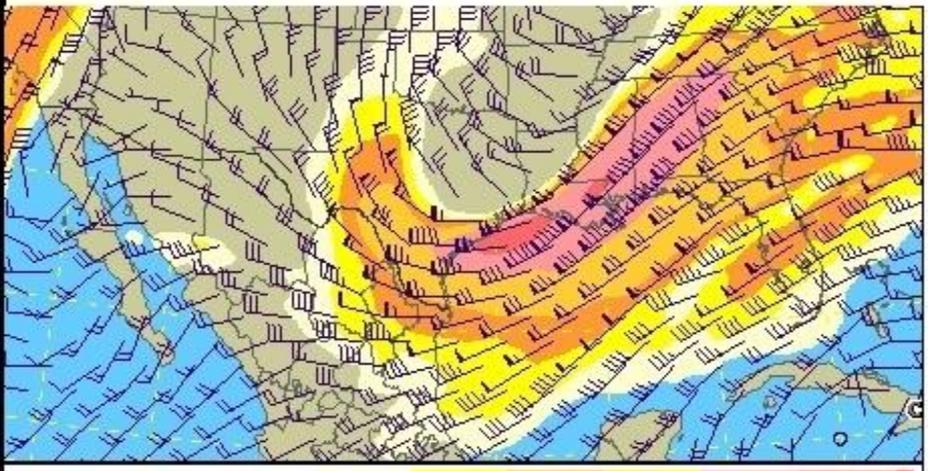
D1-hour forecast valid 0200 UTC Sat 24 Jan 2015



(Wind in knots) 30 40 50 60 80 100 125

Wind speed (kts) at 18,000 ft MSL (500 mb)

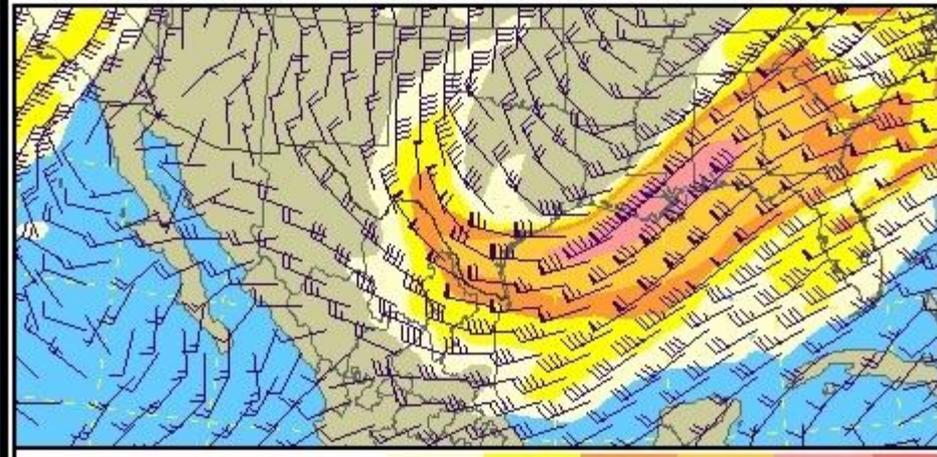
D1-hour forecast valid 0200 UTC Sat 24 Jan 2015



(Wind in knots) 30 40 50 60 80 100 125

Wind speed (kts) at 15,000 ft MSL (575 mb)

D1-hour forecast valid 0200 UTC Sat 24 Jan 2015



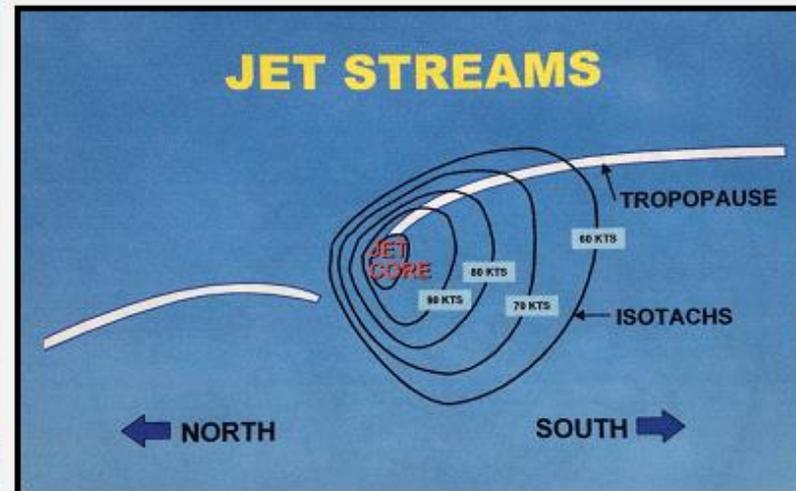
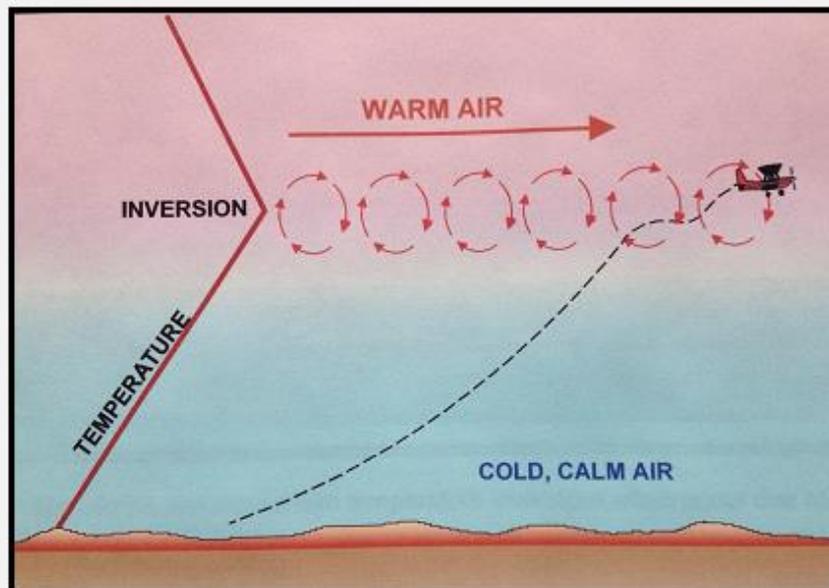
(Wind in knots) 30 40 50 60 80 100

4. Wind Shear. Wind shear is the change in wind direction and/or wind speed over a specific horizontal or vertical distance. *Atmospheric conditions where wind shear exists include: areas of temperature inversions, along troughs and lows, and around jet stream.* When the change in wind speed and direction is pronounced, quite severe turbulence can be expected. Clear air turbulence is associated at high altitudes (i.e, above 15,000 feet AGL) with the jet stream.

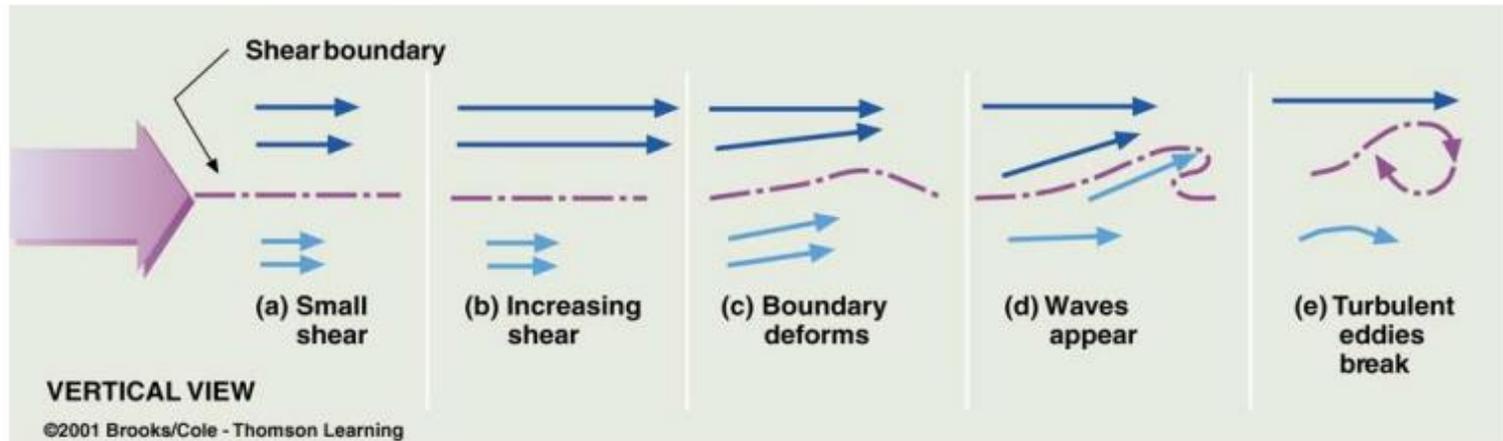
Temperature inversions are zones with vertical wind shear potential. Strong stability prevents mixing of the stable low layer with the warmer layer above. The greatest shear, and thus the greatest turbulence, is found at the tops of the inversion layer.

Turbulence associated with lows and troughs is due mainly to horizontal directional and speed shear. Turbulence is generally found along troughs at any altitude, within lows at any altitude, and poleward of lows in the mid and upper altitudes.

A jet stream is core of strong horizontal winds that follows a wavelike pattern as a part of the general wind flow. It is located where there are large horizontal differences in temperature between warm and cold air masses. Turbulence is located along strong isotach gradient zones. Most often, turbulence is located on poleward side of cyclonic jet stream. Conversely, turbulence is often located on equatorward side of the anticyclonic jet stream. Turbulence is enhanced by an "arching" (amplified) jet stream around troughs and ridges.



Turbulence Aloft (Wind Shear)



Formation of **clear air turbulence** (CAT), responsible for 'air pockets'

Wind shear occurs at all altitudes and it can be horizontal or vertical

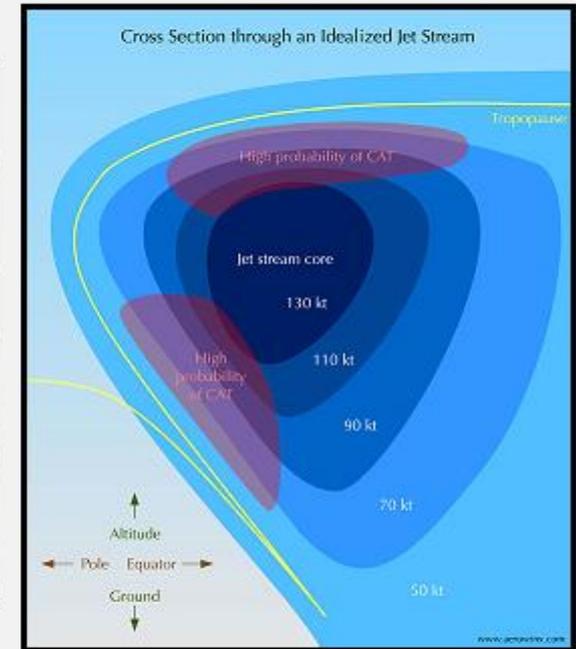
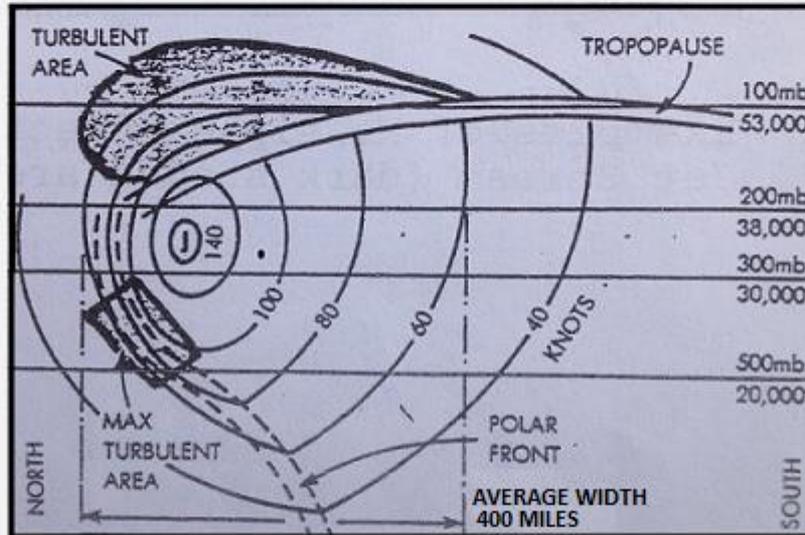
At high altitudes, shear is encountered at the jet stream with the wind increasing from less than 50 mph to 150 mph over a few miles.

CLEAR AIR TURBULENCE

Clear air turbulence is turbulence not associated with cumuliform clouds, including thunderstorms, occurring at or above 15,000 feet. Clear air turbulence is not restricted to cloud-free air (75% of all CAT encounters are in clear air).

General characteristics of clear air turbulence include:

- Occurs in patches
- Area is elongated with the wind
- Usually found above 15,000 feet
- In association with a marked change in speeds:
 - » with height (vertical shear)
 - » or in the horizontal (horizontal shear)
- 2,000 feet deep
- 20 miles wide
- 50 miles long
- transitory
- Most frequent during winter
- Least frequent during summer

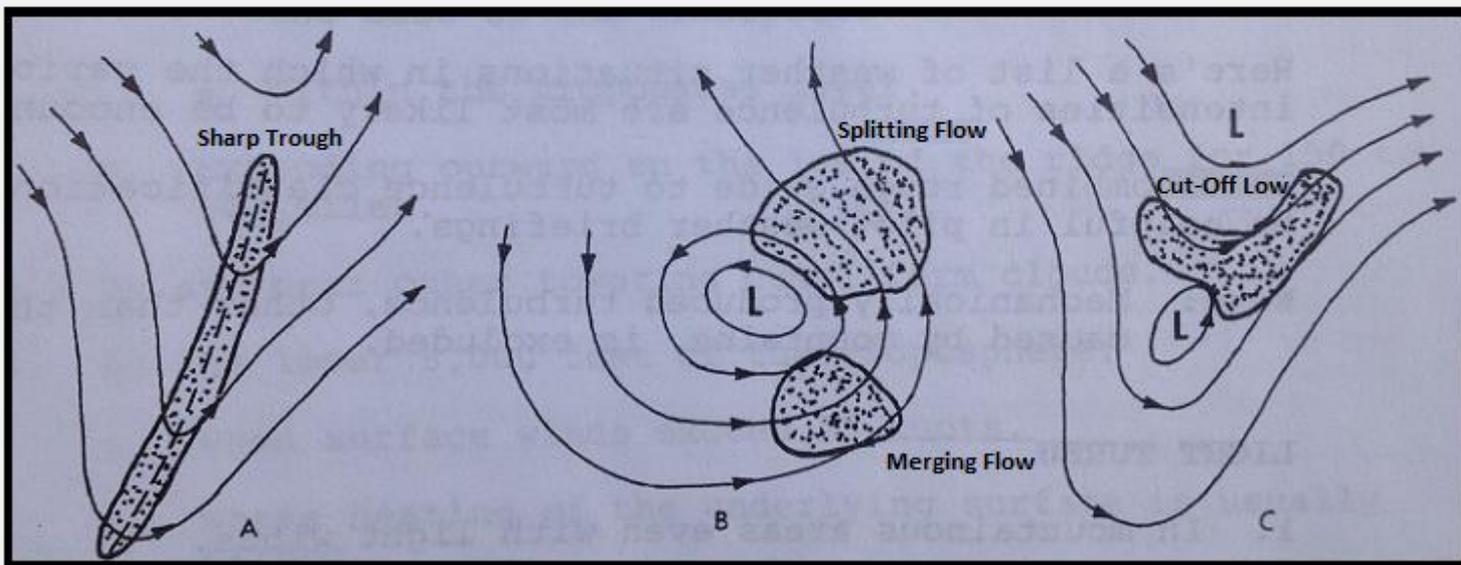


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CAT areas at high-levels are usually patchy, and these patches have variable dimensions which have been known to be as much as 10,000 feet thick, 500 miles wide, and 1,000 miles long.

The occurrence of CAT can extend to very high levels and can be associated with other windflow patterns which produce shears:

- A sharp upper level trough, especially one moving at speeds greater than 10 knots. (See Figure A. below)
- A closed low aloft, particularly if the flow is merging or splitting (See Figure B. below)
- To the northeast of a cutoff low aloft as shown in Figure C. below



The End

