High pressure

“leaf blower”, symbolized as “H”

Pushes air down and leads to clear skies

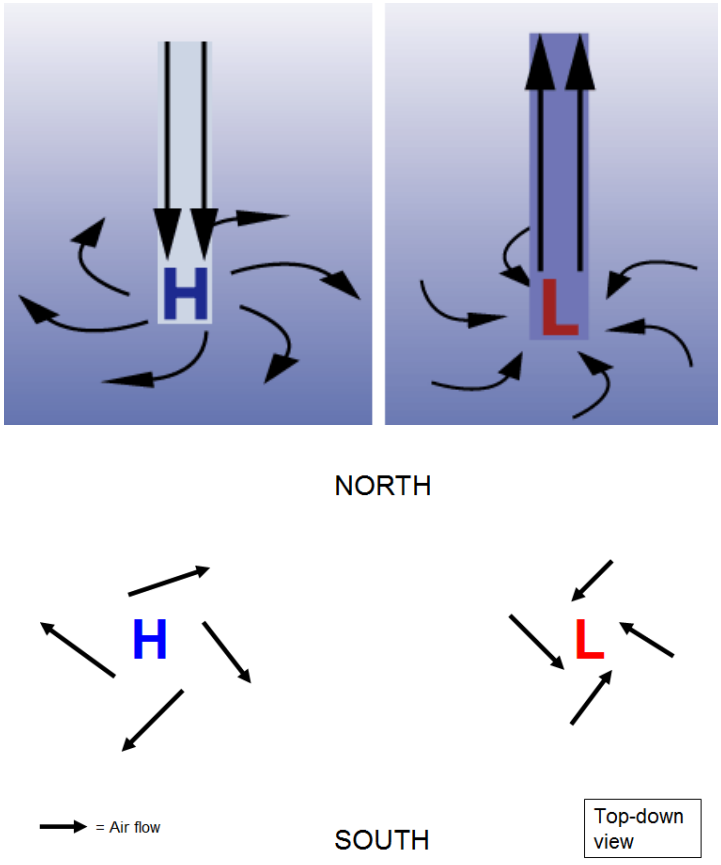
Tend to spin counter-clockwise

Low Pressure

“tornado”, symbolized as “L”

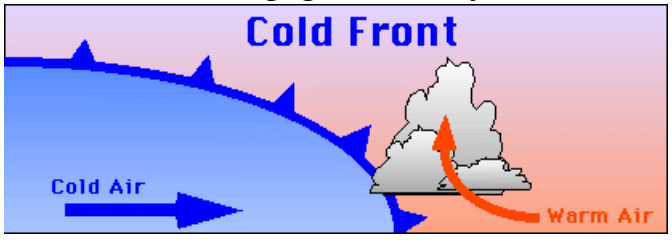
Pushes air up, lifting up moisture and leads to bad weather

Tend to spin clockwise



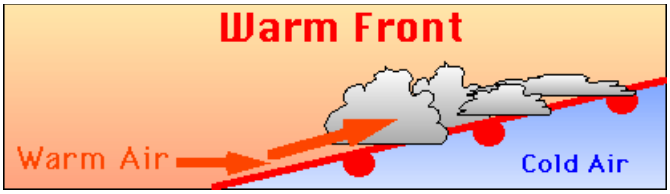
Cold Front

Moves faster, more severe weather, but brings good visibility



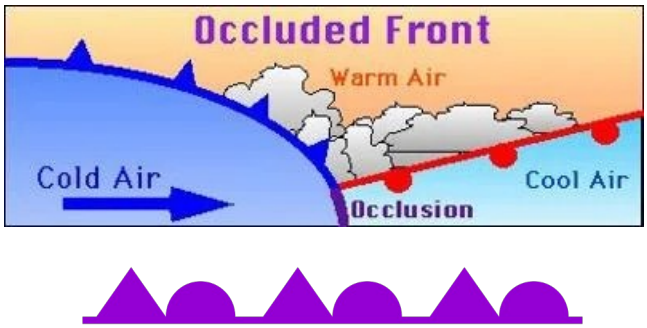
Warm Front

Moves slowly, brings showers, drizzles, light rain, poor visibility



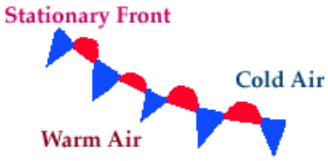
Occluded Front

A cold front overtakes a warm front. Expect warm front weather followed by cold front weather.



Stationary Front

When two air masses meet and stop moving. Conditions vary a lot, but generally a mix.

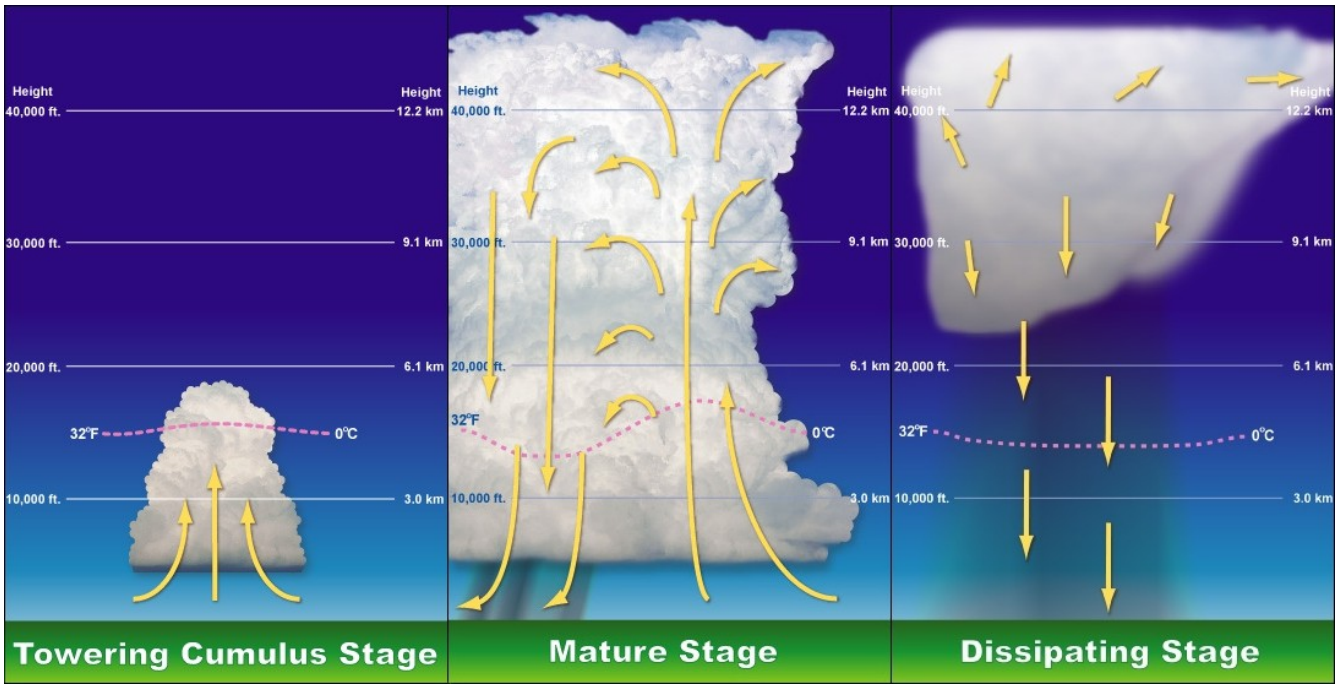


Thunderstorms

Keep at least 10 miles away

Three stages:

1. Cumulus: mostly updrafts
2. Mature: anvil-top, when rain hits the ground
3. Dissipation: death of the cloud, heavy rain



Fog

Radiation Fog

Forms on clear calm nights when the warm ground radiates heat away quickly and cools the air near the surface.

Advection “Sea” Fog

Occurs when warm moist air comes into contact with the ocean’s cool surface.

Upslope Fog

When warm moist air forced up the slope of a mountain, it cools and the water vapor condenses into fog.

Precipitation Induced Fog

When warm rain falls through cooler air, it can make the surrounding air saturated with moisture and form a thick layer of fog.

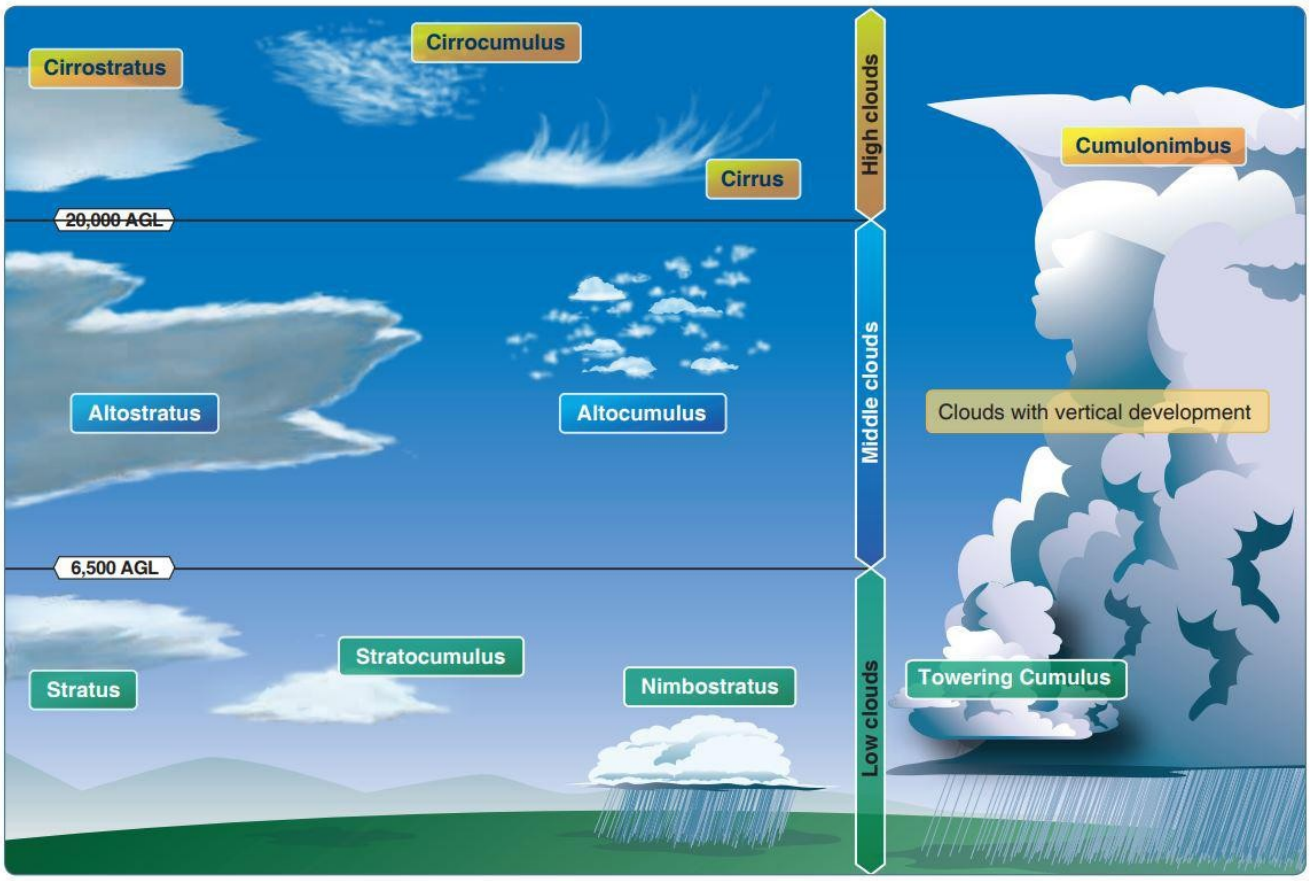
Ice Fog

Rare to find in the continental US, but ice fog is just radiation fog that forms when temperatures are at or below -25°F.

Steam Fog

A cold dry air moves over a warm body of water, it becomes saturated with moisture evaporating from the warm water and the moisture condenses into fog over the water.

Clouds



Stratus

Solid yet thin. Not much vertical development. Constant light rain can be expected.

Cirrus

High altitude and wispy thin clouds.

Cumulus

The “popcorn” you can see in the summertime. Indicative of an unstable atmosphere, turbulence below and the possibility for them to grow and become thunderstorms.

METAR

METeorological Aerodrome Report

Element	Format	Contents
ICAO identifier	XXXX	Airport ICAO identifier
Date and time	######Z	Zulu time. First two digits are day of the month
Automated observation	AUTO	Reports without it are manual
Winds	#####(G##)KT	Wind direction and speed and optional gusts in knots
Visibility	#SM	Visibility in statute miles
Precipitation	(+)(-)XX	Two digit code for precipitation. Maybe more more than one. + for heavy, - for light
Cloud Cover	XXX###	Three digit code for clouds, three numbers for flight level
Temperature and Dew Point	(M)##/(M)##	First number is outside air temperature in Celsius. Second number is dew point. M for minus.
Altimeter Setting	A####	Altimeter setting in inches of mercury, divided by 100
Station Type	A0(1)(2)	Automated station type. 1 for no precipitation discriminator, 2 for with
Sea Level Pressure	SLP###	Pressure in millibars in without either a 9 or 10 prefix
Rainfall	P####	Inches of rain in the last hour, divided by 1000
Temperature and Dew Point	T(0)(1)###(0)(1)###	0 for above 0 Celsius, 1 for below 0 Celsius. First number is temperature, second number is dewpoint, divided by 10
Maintenance Required	$	

Precipitation Code	Meaning
FC	Funnel Cloud (+ for tornado)
BC	Patches
BL	Blowing
BR	Mist (“baby rain”)
DR	Drifting
DS	Dust storm
DU	Dust
DZ	Drizzle
FG	Fog
FU	Smoke
FZ	Freezing
GR	Hail stones

GS	Snow pellets
HZ	Haze
IC	Ice crystals
MI	Shallow
PL	Ice pellets
PO	Sand/Dust devils
PR	Partial
PY	Spray
RA	Rain
SA	Sand
SG	Snow grains
SH	Showers
SN	Snow
SQ	Squalls
SS	Sand storms
TS	Thunderstorms
VA	Volcanic ash
VC	Nearby or in the vicinity

Cloud Cover Code	**Meaning**
CLR	Clear
FEW	Few
SCT	Scattered
BKN	Broken
OVC	Overcast

Example:

```
KMIW 200053Z AUTO 10019G27KT 4SM RA BR OVC100 13/12 A2973 RMK AO2 PK WND 10027/0004 LTG DSNT SE-W
SLP068 P0011 T01280117
```

KMIW, 20th, 00:53 Z, automated, 19 gusting 27 knots from heading 100, 4 statute mile visibility, rain, mist, overcast 10,000 ft, 13°C OAT, 12°C dewpoint, 29.73 inches of mercury, automated station with precipitation, peak wind was 27 knots from heading 100 at 00:04Z, distant lightning southeast and west, sea level pressure 9068 millibars, 0.11 inches of rain in the last hour, 12.8°C OAT, 11.7°C dewpoint

TAF

Terminal Area Forecast

Issued 4 times a day, unless more needed. Generally valid apply for 24 hours for a 5 mile radius.

Element	Format	Contents
Forecast period	####/####	From/To. First two digits are date, last two are hour in UTC
Visibility	(P)#SM/9999	P means probable. 6 SM is max predicted. 9999 is 7 SM or greater
Expected Change	FM######	First two digits are date, next four are Zulu time

Weather Warnings

https://pilotinstitute.com/airmets-vs-sigmets/

AIRMET

Air missions meteorological information. An AIRMET warns pilots of potentially hazardous conditions. In general, they most often affect pilots who fly light twins, sport airplanes, or single engine aircraft. Usually valid for 6 hours.

Sierra

This refers to when ceilings are less than 1000 feet.

Tango

This warns pilots of turbulence.

Zulu

This means conditions are prime for freezing or moderate icing.

SIGMET (WS)

Significant meteorological information. These denote more severe weather conditions than AIRMETs. Usually valid for 4 hours. Affects all pilots.

Convective (WST)

A convective SIGMET warns of severe storm activity.

Dust Storms, Sand Storms, and Volcanic Ash

These SIGMETs are issued not only because of the visibility challenges such phenomena can create, but because the particles can severely damage the engines of aircraft.

PIREP

Pilot reports.

- **PIREP-Turb** - Turbulence PIREPs

Figure 1: Turbulence PIREP symbols

- **PIREP-Ice** - Icing PIREPs

Figure 2: Icing PIREP symbols

Element	Code	Contents
Station identifier	XXX	Nearest weather reporting location
Report type	UA or UUA	Routine or urgent PIREP
Location	/OV	In relation to a VOR
Time	/TM	UTC
Altitude	/FL	
Aircraft Type	/TP	
Sky Cover	/SK	Cloud height and coverage
Weather	/WX	Flight visibility, precipitation, visibility, etc.
Temperature	/TA	Celsius
Wind	/WV	Direction and speed in knots
Turbulence	/TB	
Icing	/IC	
Remarks	/RM	For reporting elements not included

Aircraft Type Prefix	Manufacturer
B	Boeing. Third digit is model. 738 = 737-800
BE	Beechcraft
L	Lear
C	Cessna
PA	Piper

PC	Pilatus
E	Embraer
DH	de Havilland
A	Airbus

Example:

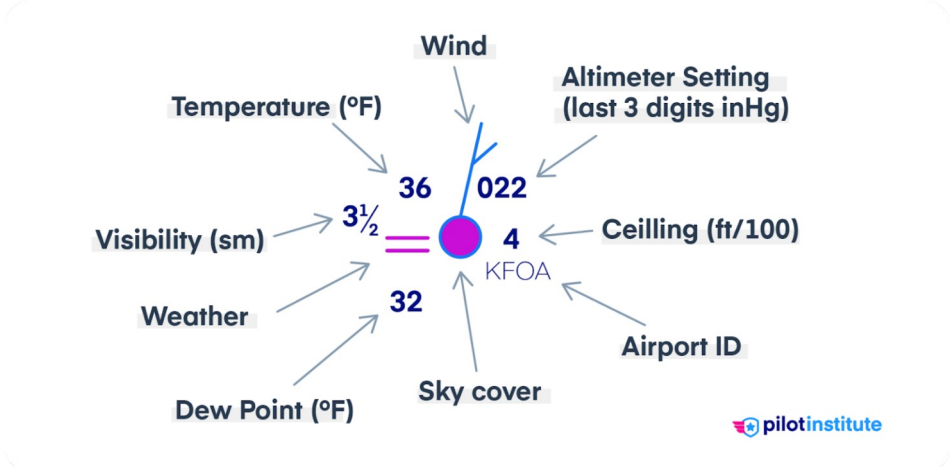
```
LVS UUA /OV ACH260005/TM 1844/FL130/TP BE36/TB MOD-SEV/RM ZAB/FDCS
```

LVS airport, urgent, 5 miles on heading 260 from ACH VOR, 18:44 Zulu, 13,000 ft, Beechcraft Bonanza, moderate to severe turbulence, remarks Albuquerque Center Flight Data Communications Specialist

Prog Charts

https://aviationweather.gov/gfa/help/#symbols

Surface Analysis / Prog Charts			
Weather Type	Symbol	Weather Type	Symbol
Cold Front		Squall Line	
Warm Front		Cold Frontolysis	
Stationary Front		Warm Frontolysis	
Occluded Front		Stationary Frontolysis	
Change of Front Type		Occluded Frontolysis	
Cold Frontogenesis		High Pressure Center	H
Warm Frontogenesis		Low Pressure Center	L
Stationary Frontogenesis		Tropical Wave	
Trough or Outflow Boundary		Tropical Depression	L T.D. XXX
Dryline		Tropical Storm	TRPCL STORM XXX
Ridge		Hurricane/Typhoon	HURCN XXX



SKY COVER

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PRESSURE TREND

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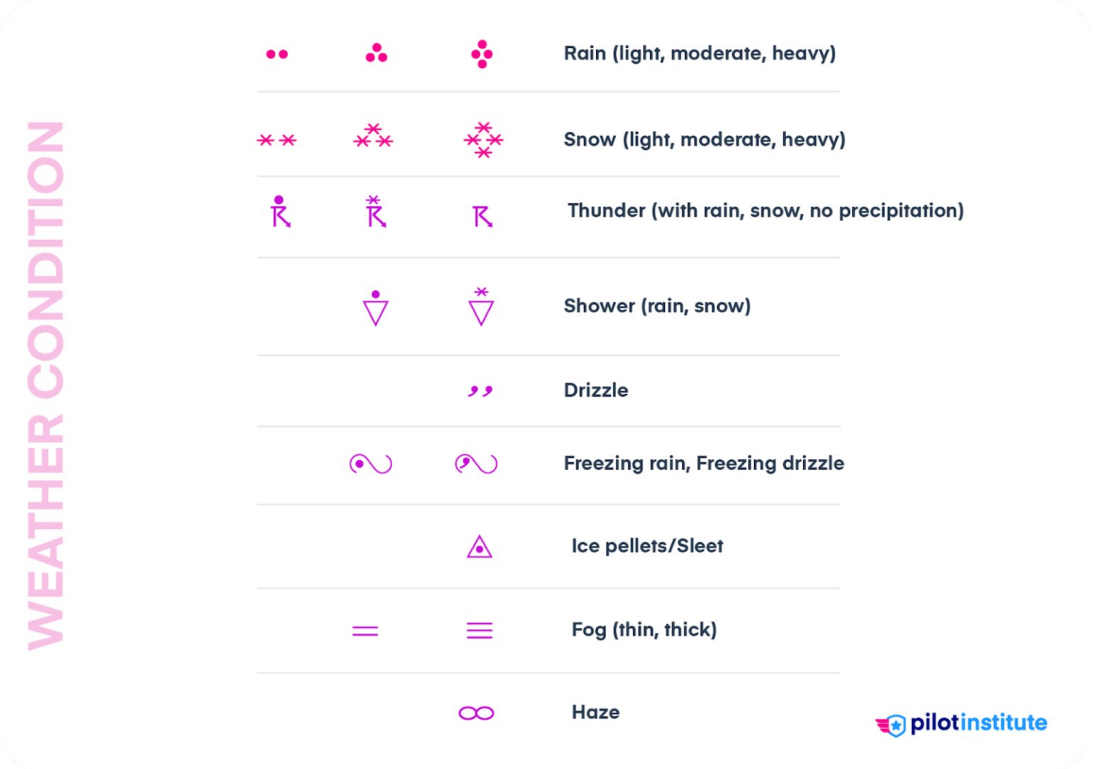
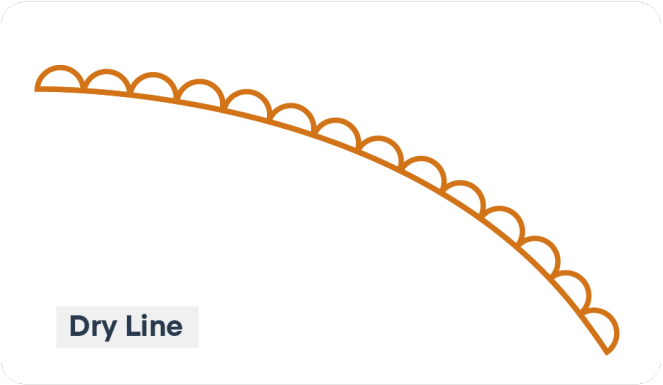
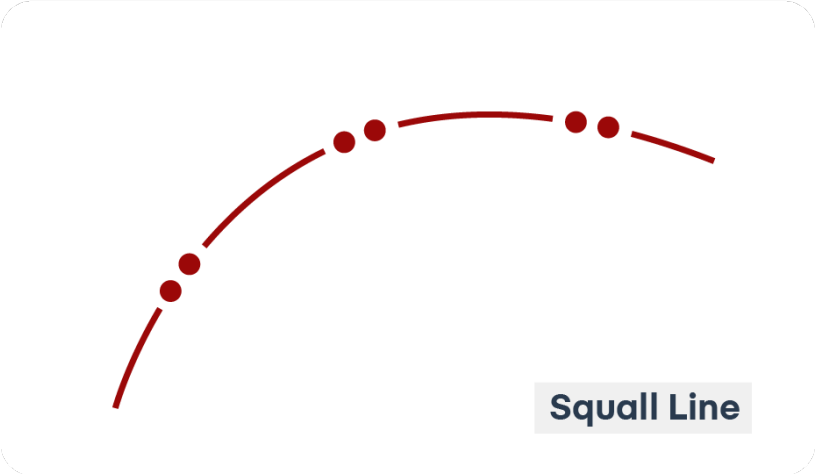


Troughs are marked as brown or yellow or black dashed lines. They feature typical low-pressure weather including gusty winds, clouds, and precipitation.

Dry lines are marked as brown lines with scallops facing the moist air mass. They separate a moist and dry air mass. They are most common in spring and early summer. They can trigger severe weather.



Squall lines are marked as a pattern of two red dots and two dashes. They represent a continuous line of thunderstorms and usually occur near severe pressure fluctuations, often just ahead of cold fronts.



Tropical waves are marked as a curved orange line. They are troughs within trade wind easterlies.

Front formation is shown with a dashed line with every segment having the front symbol.

Front dissipation is shown with a dashed line with every **other** segment having the front symbol.