

**High Clouds**

**Middle Clouds**

**Low Clouds**

**Cirrus**  
High1

**Cirrus:** Straight, nearly straight, or curved filaments, strands or hooks.

**Cirrus**  
H2

**Cirrus:** Dense white puffs with wispy edges.

**Cirrus**  
H3

**Cirrus:** Dense, anvil-shaped remains, which were originally the upper parts of **Cumulonimbus**.

**Cirrus**  
H4

**Cirrus:** Filaments, strands or hooks, increasing in coverage and generally thickening as a whole.

**Cirrostratus**  
H5

**Cirrostratus** with or without **Cirrus:** Increasing density and coverage, but coverage does not reach midway above the horizon.

**Cirrostratus**  
H6

**Cirrostratus** with or without **Cirrus:** Increasing density and covering much of, but not the entire sky.

**Cirrostratus**  
H7

**Cirrostratus:** Veil covering the whole sky, sometimes a halo around the sun or moon is present.

**Cirrostratus**  
H8

**Cirrostratus:** Veil not covering the whole sky nor increasing in coverage.

**Cirrocumulus**  
H9

**Cirrocumulus:** Thin white ripples or small puffs, which may be accompanied by some **Cirrus/Cirrostratus**.

**Altostratus**  
Mid1

**Altostratus:** Full or nearly full sky cover that is gray, shapeless and translucent; produces no halo.

**Nimbostratus**  
M2

**Altostratus:** Thick opaque coverage, no precipitation, or **Nimbostratus:** during precipitation or virga.

**Altostratus**  
M3

**Altostratus:** Translucent bands or patches in a relatively continuous layer.

**Altostratus**  
M4

**Altostratus Lenticularis:** Lens or almond shaped, often formed by air moving over hills or mountains.

**Altostratus**  
M5

**Altostratus:** One or more layers of translucent or opaque bands.

**Altostratus**  
M6

**Altostratus:** A result of the spreading tops of **Cumulus** or sides of **Cumulonimbus**.

**Altostratus**  
M7

**Altostratus:** In one or more opaque layers, sometimes with **Altostratus** or **Nimbostratus**.

**Altostratus**  
M8

**Altostratus:** Small towers, which can be similar to small **Cumulus** with wispy trails of virga.

**Altostratus**  
M9

**Altostratus:** Chaotic sky with multiple layers and kinds of **Altostratus** at several altitudes.

**Cumulus**  
Low1

**Cumulus:** Thin and ragged with continuously changing edges; forms during fair weather by daytime heating.

**Cumulus**  
L2

**Cumulus:** Moderately tall with rounded puffy tops; may occur with **Cumulus/Stratocumulus** (L4).

**Cumulus**  
L3

**Cumulonimbus:** Very tall summits, which lack sharp outlines and are not anvil-shaped.

**Stratocumulus**  
L4

**Stratocumulus:** Spread out **Cumulus** when vertical development stabilizes; sometimes can occur along with **Cumulus**.

**Stratocumulus**  
L5

**Stratocumulus:** One or more layers, not resulting from spreading **Cumulus**.

**Stratus**  
L6

**Stratus:** In a continuous layer, or **Stratus fractus:** In ragged shreds, or both, without precipitation.

**Stratus**  
L7

**Stratus- or Cumulus-fractus:** Ragged shreds during precipitation, usually seen below **Altostratus** or **Nimbostratus**.

**Cumulus / Stratocumulus**  
L8

**Cumulus/Stratocumulus:** Stratocumulus not from spreading **Cumulus**, with **Cumulus** base at a different level.

**Cumulonimbus**  
L9

**Cumulonimbus:** Very tall summits with anvil-shaped upper part.



# NOAA Cloudwise



There are ten basic cloud types arranged in three divisions based on the altitude at which they form. Low level clouds are Cumulus, Cumulonimbus, Stratus, and Stratocumulus. Middle level clouds are Altostratus and Nimbostratus. High level clouds are Cirrus, Cirrocumulus and Cirrostratus. Precipitation primarily occurs from Cumulus, Cumulonimbus and Nimbostratus.

These ten clouds are further divided into 27 classifications. Many of these classifications represent the same basic cloud type (or combinations of clouds) but in various stages of development, opacity, or sky cover.

Learn more about clouds at [www.weather.gov/jetstream](http://www.weather.gov/jetstream)

## Sky cover

The percent of sky covered by clouds. Clouds near the horizon appear to be lower, more numerous and closer together.



Sky Clear  
0%



Few  
1 - 25%



Scattered  
26 - 50%



Broken  
51 - 99%



Overcast  
100%

## Other Cloud Phenomena



**Mammatus:** Small pouch or pocket-like clouds sinking into drier air and often seen near thunderstorms.



**Fog:** A cloud on the ground which lifts from the surface and becomes **Stratus** or dissipates with heat from the sun.



**Wall Cloud:** Rotating, lowered, rain-free base of thunderstorm in area of strongest updraft, under which a tornado may form.



**Shelf Cloud:** Forms in a gust front from a squall line or thunderstorm.



**Asperitas:** Long waves that ripple through the base of the cloud near the dry/moist air boundary of a thunderstorm.



**Virga:** Precipitation that evaporates before reaching the surface.



# NOAA Weatherwise



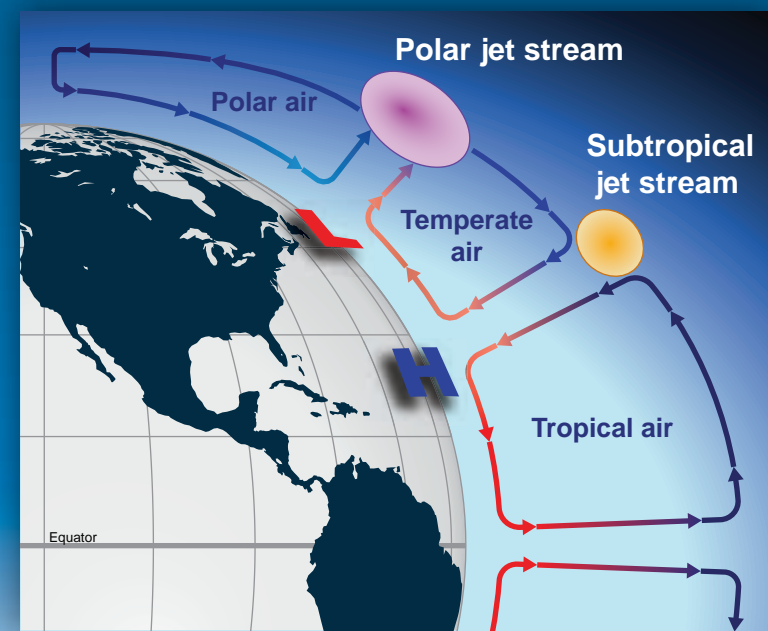
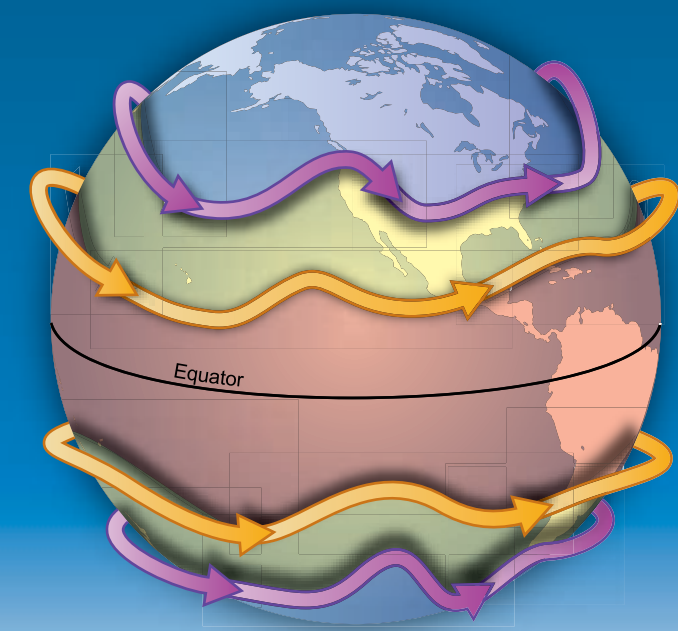
The weather we experience every day on the ground is a result of what is happening far above our heads. Up there, the air is always moving as heat energy is redistributed across the Earth. Meteorologists study air movement to make weather forecasts.

The Sun heats the Earth, which then heats the air in the atmosphere. Because the Sun hits the equator most directly, the air at the equator receives more heat energy than the air closer to the poles. This warm air rises because it is less dense than cool air.

When the warm air reaches the upper atmosphere, it can no longer rise and is forced toward the poles. As the air cools, it becomes denser and falls back toward Earth. **High-pressure** areas form where cooler air is falling towards the Earth. **Low-pressure** areas form where warm air is rising. Air circulates from areas of high pressure to areas of low pressure.

The way the air moves affects the weather. Between the large areas of circulating air, **jet streams** form. Jet streams are tube-like paths of strong wind moving from West to East around the globe. The position and strength of jet streams vary from North to South, as well as vertically throughout the atmosphere.

The location of the jet streams and their seasonal movement drive major weather patterns around the world. In the United States, cold snaps happen when the polar jet stream dips south. Heat waves can occur when the polar jet stream is very far north, allowing for warm sub-tropical air to move north.



## Be Weather-Ready wherever you are

This map shows a simplified forecast for a single, hypothetical day. The locations of the low- and high-pressure systems, jet stream, and fronts shape the weather that a given region may experience.

There can be hazardous weather anywhere, at any time. Begin each day knowing the weather forecast. If severe or extreme weather is a possibility, periodically check for forecast updates.

Be prepared with a safety plan. Have a "go-kit" with important property and documents ready in case of emergency. Have at least a three-day supply of food and water. Learn the specific recommendations for regional and seasonal weather hazards.

Learn more about weather safety at <https://weather.gov/wrn>



### South of the fronts and west of the dry line

In the orange area, weather is generally dry and mild. Approaching fronts can lead to high altitude thunderstorms over mountain peaks, resulting in strong winds at the surface. Over time the effects of the fronts will diminish.

To learn more about the characteristics of fronts, explore the rest of the map.

**Possible impacts**  
Strong surface winds can lead to dust storms and wildfires. In Southern California, the warm, dry Santa Ana winds blow towards the coast from the high desert areas. Seasonal heavy rain, even from distant thunderstorms, can lead to flash floods and debris flows in typically very dry areas.

**Weather safety**  
Be alert for dust storms, which can come with little warning — **Pull Aside, Stay Alive**. Pull far off the road and turn all car lights off. Follow evacuation orders during fires. Monitor forecasts for flash floods, which can be a risk many miles from a storm, especially in dry valleys and canyons. Don't be caught off guard; be prepared to move to higher ground.

				<b>H</b>	<b>L</b>	
<b>Cold front</b> Cold (or cooler) air replacing warmer air	<b>Warm front</b> Warmer air replacing cool (or cold) air	<b>Stationary front</b> Non-moving boundary dividing warm air from cooler air	<b>Dry line</b> Boundary dividing dry desert air from moist gulf air	<b>High pressure</b> Location of highest surface air pressure	<b>Low pressure</b> Location of lowest surface air pressure	

### North of the cold front

Strong winds from the high-pressure system carry colder, drier air into the dark blue area. As the cold front passes, precipitation ends and skies clear fairly rapidly.

**Possible impacts**  
The difference in air pressure between two points determines wind speed and direction. Large pressure differences cause very strong winds. They are more likely to occur in winter and can lead to blizzard conditions and dangerous wind chills. In mountainous areas, lightning from thunderstorms with little or no rainfall can ignite wildfires. These fires may spread rapidly when driven by strong winds associated with the thunderstorm.

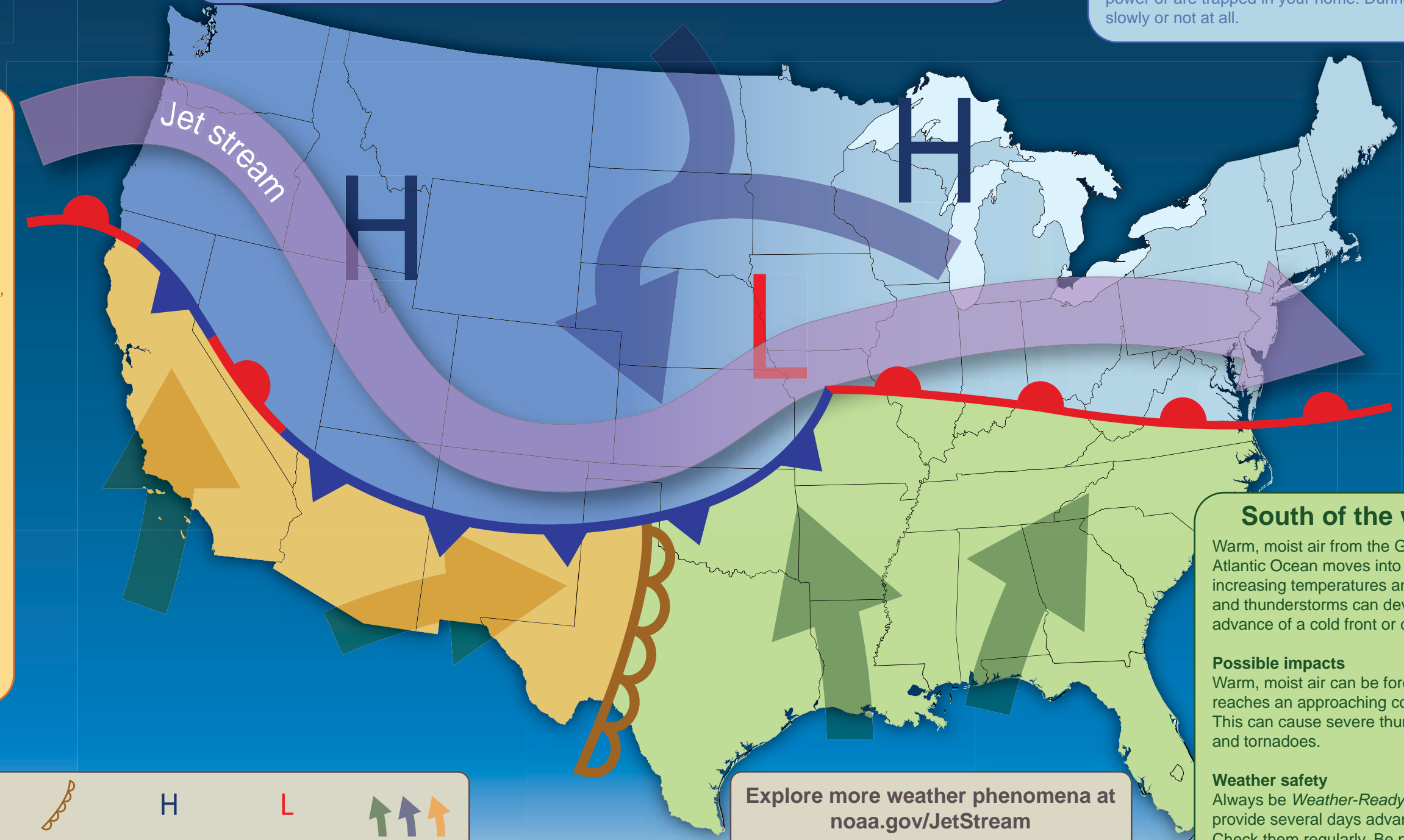
**Weather safety**  
Remember: **Ice and Snow, Take It Slow!** both on and off the road. While driving, slow down to reduce the chance of an accident on slippery roads. Don't overexert yourself when shoveling. Avoid prolonged exposure to cold temperatures, which can cause frostbite and/or hypothermia. Prepare for and be aware of potential fire hazards during dry periods.

### North of the warm front

In the light blue area, the air tends to be cool and dry. Closer to the warm front, moisture increases. As a result, clouds thicken, which can lead to rain or snow.

**Possible impacts**  
Warm fronts near areas of low-pressure can bring heavy rain, snow, or sleet. Rain can lead to flooding, while snow and sleet may result in a variety of hazards including slick roads and power outages.

**Weather safety**  
**Never** drive into flooded roadways or around a barricade. **Turn Around Don't Drown!** Know the risks of floods and plan your evacuation route. Have extra food and water in case you lose power or are trapped in your home. During winter weather, drive slowly or not at all.



### South of the warm front

Warm, moist air from the Gulf of Mexico and Atlantic Ocean moves into the green area, increasing temperatures and humidity. Showers and thunderstorms can develop along and in advance of a cold front or dry line.

**Possible impacts**  
Warm, moist air can be forced upwards as it reaches an approaching cold front and/or dry line. This can cause severe thunderstorms, flooding, and tornadoes.

**Weather safety**  
Always be *Weather-Ready* — forecasts can provide several days advance notice of storms. Check them regularly. Be prepared and **When Thunder Roars, Go Indoors** to stay safe from lightning. Know your safe place at home and work.

Explore more weather phenomena at [noaa.gov/JetStream](https://noaa.gov/JetStream)

Suggested lessons:  
Drawing Conclusions • Toasty Wind  
A Pressing Engagement • Going with the Flow