



NOAA Weatherwise



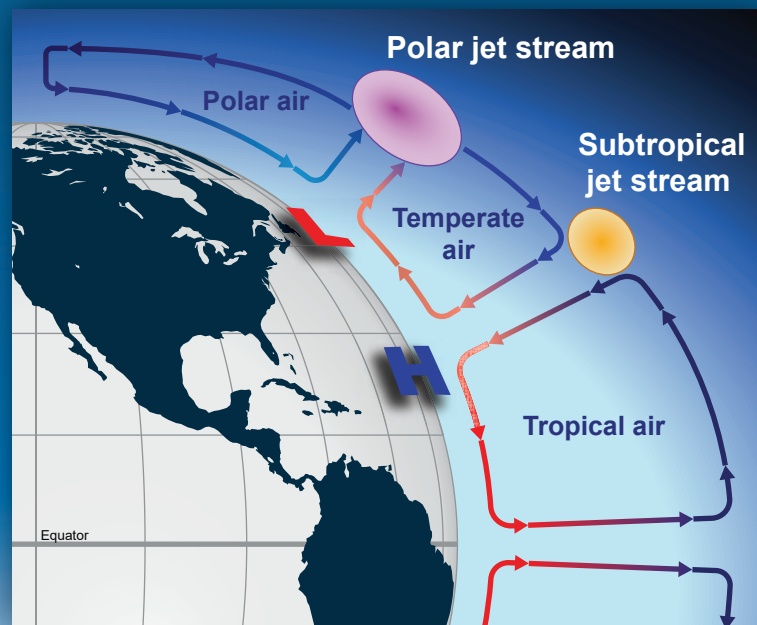
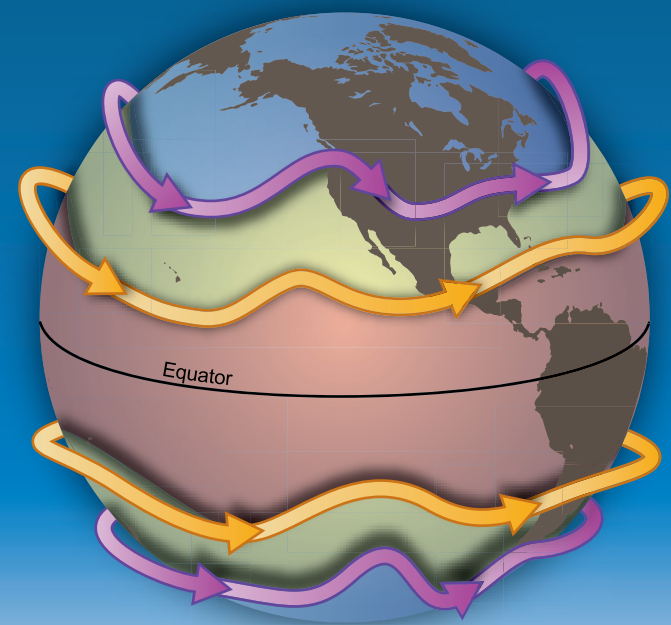
The weather we experience every day on the ground is a result of what is happening far above our heads. Up there, the air is always moving as heat energy is redistributed across the Earth. Meteorologists study air movement to make weather forecasts.

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 weatherwise 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 seasonal safety at <https://www.weather.gov/safetycampaign>.

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.

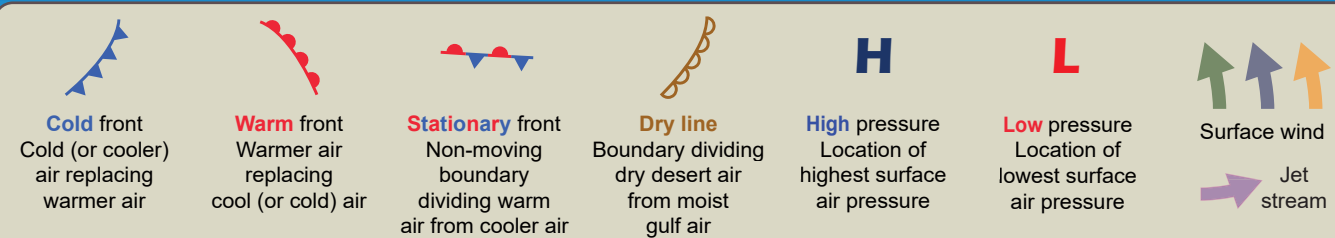
To learn more about the characteristics of fronts, explore the rest of the map.

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.



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 www.weather.gov/jetstream

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