



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.

