

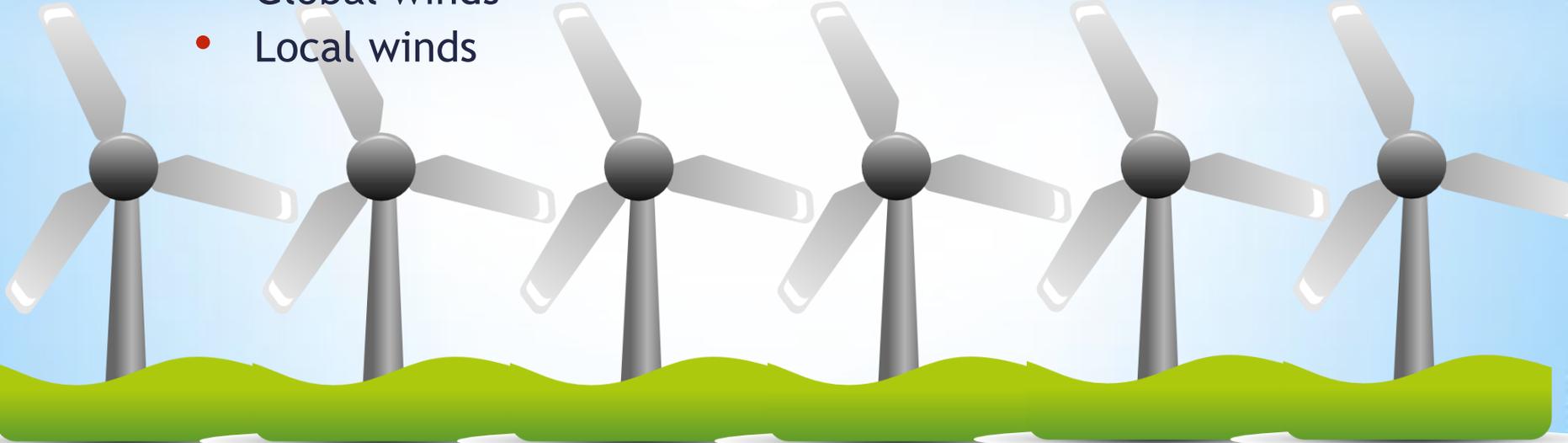


# Wind



## in the Atmosphere

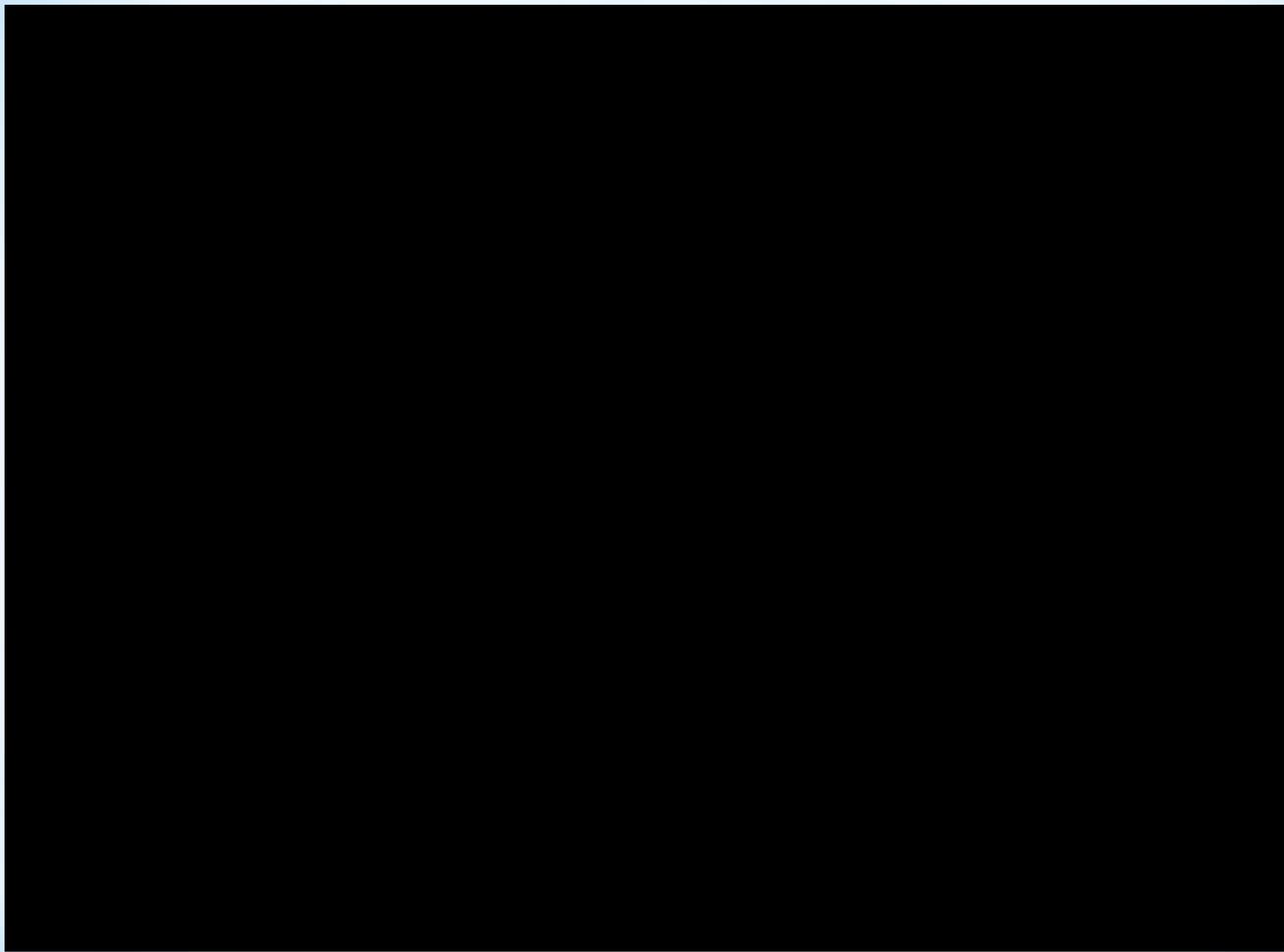
- What causes wind
- How does Earth's rotation affect wind
- Global winds
- Local winds



- \* Uneven heating causes air above Earth's surface to be different temperatures.
- \* Denser air sinks.

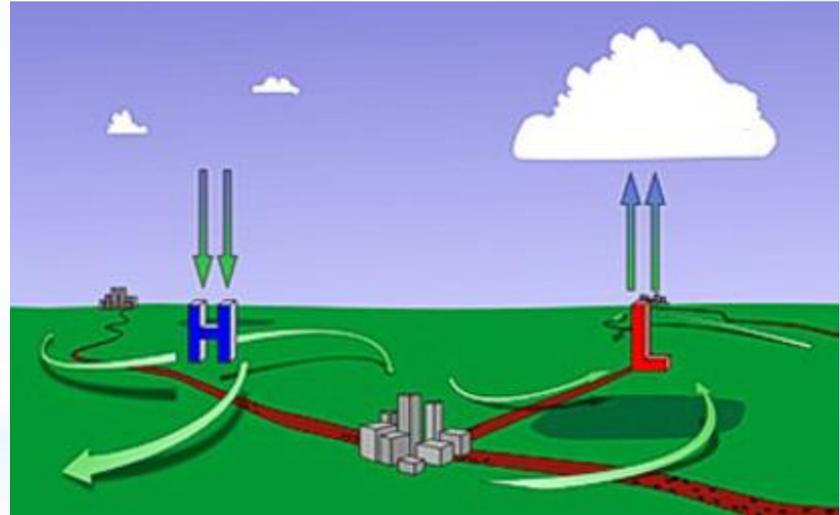
\* What causes wind?





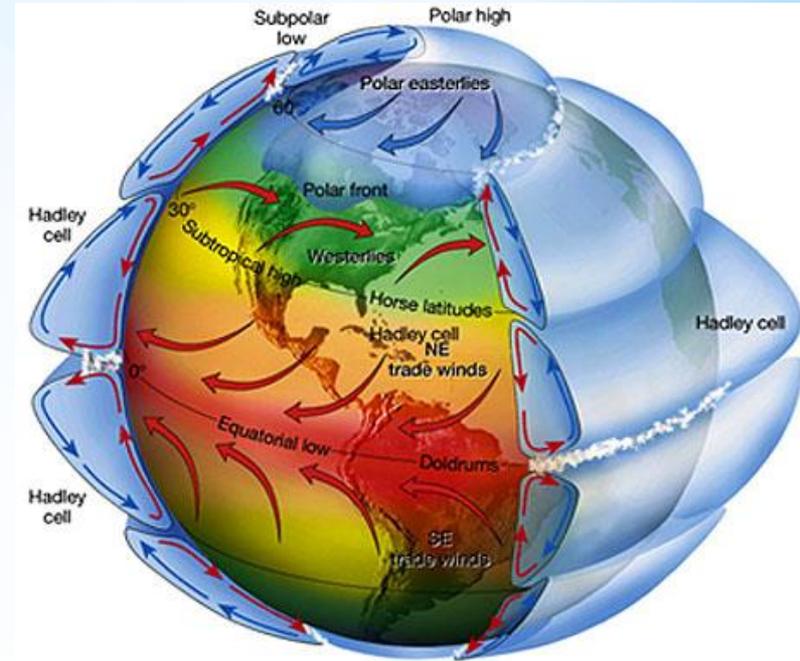
- \* When dense air sinks, it places greater pressure on the surface of Earth than warmer, less-dense air pressure.
- \* Air moves from areas of high pressure towards areas of low pressure.
- \* This movement of air caused by pressure is called wind. The greater the different in pressure the faster the air moves.

\* [pressure system](#)



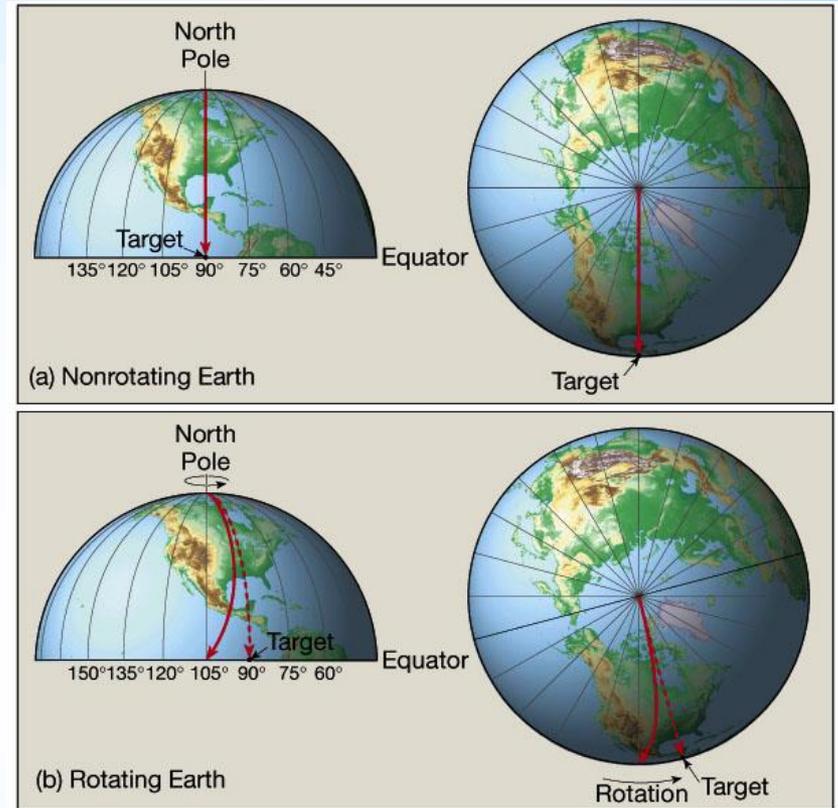
\* **What causes wind?**

- \* The most dense is at the poles
- \* The least dense air is at the equator
- \* Due to these two pressure systems, global movement of air occurs.
- \* Instead of moving in one circle between poles air moves in smaller circular patterns called **convection cells**
  - \* As the air moves is it constantly being heated and cooled forming these cells.



# \* High and Low Pressure

- \* Wind doesn't flow in a straight line because the Earth is rotating
  - \* Coriolis effect - Earth is spinning on its axis, causing air to curve
- \* Air moving in the Northern Hemisphere going north curves east and moving south curves west
- \* More distance traveled, bigger curve.



\* How does Earth's rotation affect wind?

\* Wind systems that occur at or near Earth's surface are called global winds.

\* Polar easterlies

\* Westerlies

\* Trade winds

\* Doldrums (calm area)

\* Horse latitudes (calm area)

**\* Global winds**

## Trade Winds

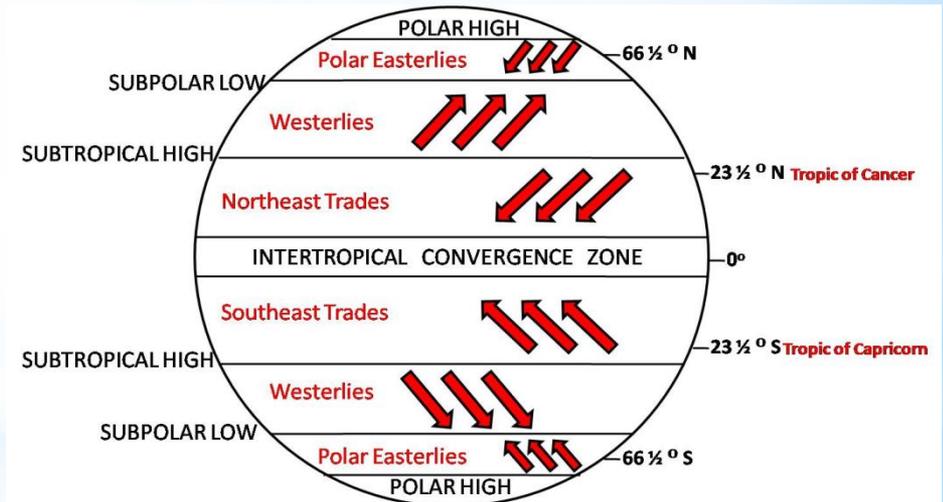
- \* Blow between 30° latitude and the equator on both hemispheres
- \* Curve to the west
- \* Sailors relied on them to sail from Europe to the Americas

## Westerlies

- \* Blow between 30° and 60° latitude in both hemispheres.
- \* Curve to the east
- \* Can carry moist air over the continental United States producing rain and snow.

## Polar Easterlies

- \* Blow between the poles and 60° latitude in both hemispheres.
- \* Curve to the west
- \* In the Northern hemisphere, polar easterlies can carry cold arctic air over the majority of the USA, producing snow and freezing weather.



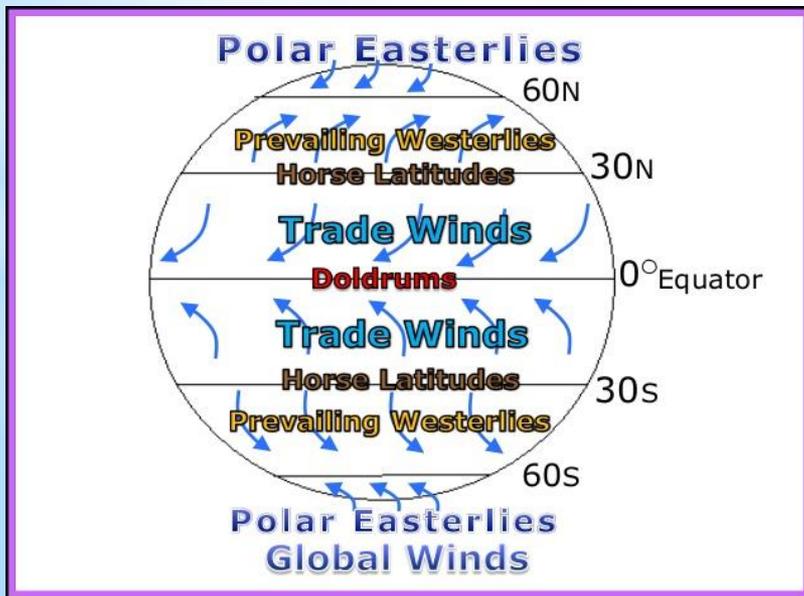
\* **Global Winds**

## Doldrums

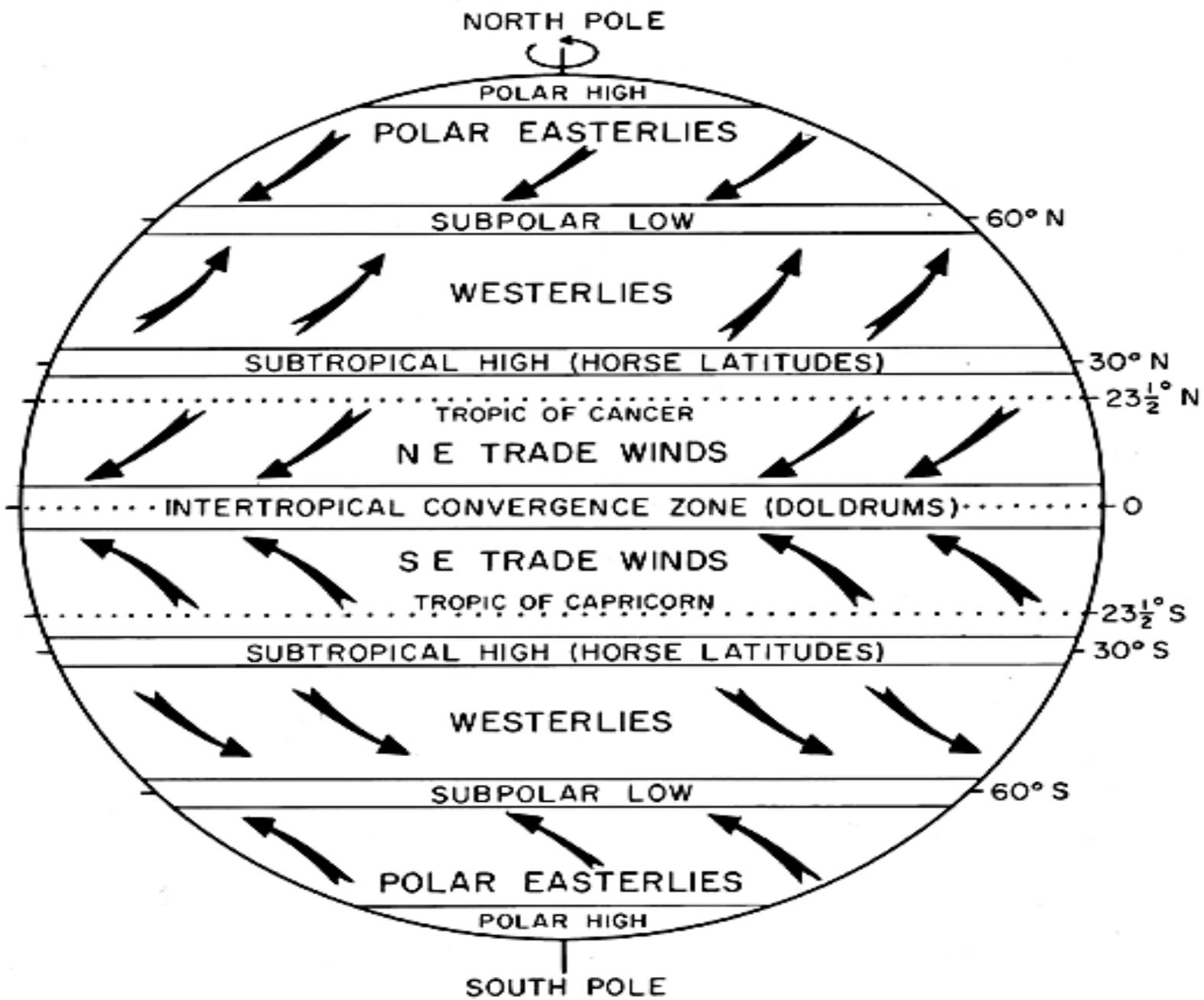
- \* The trade winds of both hemispheres meet in a calm area around the equator known as the doldrums
- \* Little wind blows here because warm, less-dense, air results in low pressure area.
- \* Doldrums means “dull” or “sluggish”

## Horse Latitudes

- \* About 30° latitude air stops moving and sinks. This forms calm areas called horse latitudes.
- \* This name was given to these areas when sailing ships carried horses from Europe to the Americas.
- \* When ships were stalled in these areas, horses were sometimes thrown overboard to save water.

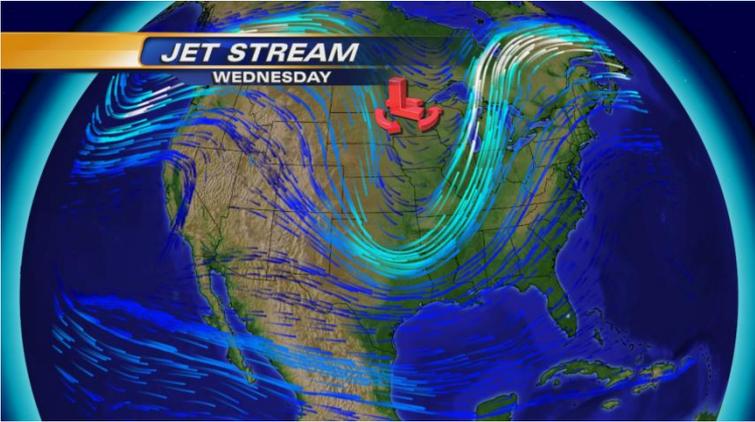


# \* Global Winds



- \* Jet Streams are narrow belts of high-speed winds moving from west to east
- \* When an airplane is traveling with a jet stream the wind helps the plane move forward. When it moves against it is more difficult to move forward.
- \* Two main jet streams are the polar jet stream and the subtropical jet stream.
- \* Jet streams follow boundaries between hot and cold air and can shift north or south.

\* Jet Streams

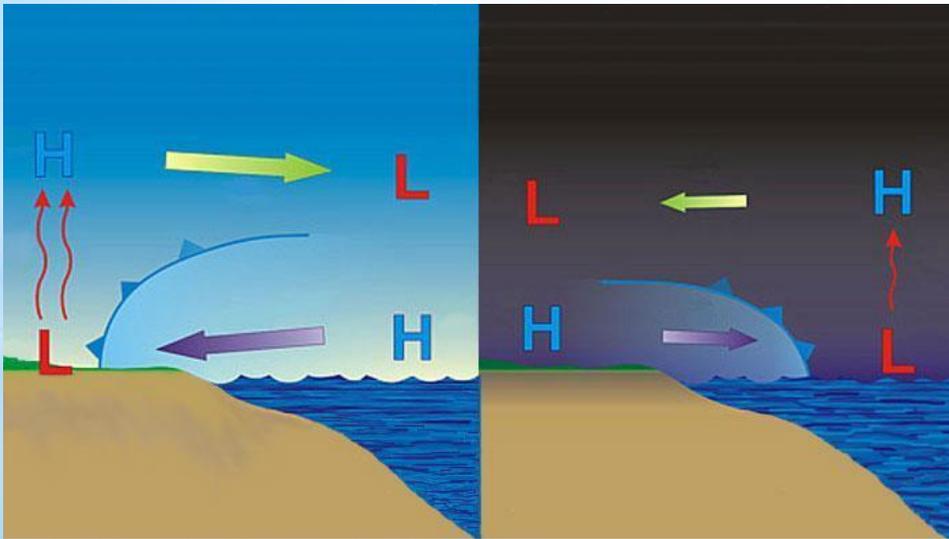


## Sea Breeze

- \* During the day, air above land becomes warmer than air above water.
- \* Colder, dense air from the water flows towards the land and pushes the land air upward.

## Land Breeze

- \* During the night, air above land cools quicker than air above water.
- \* Cooler air on land causes high-pressure zone over the land. So, wind blows from the land to the water.



\* **Local winds**

Large bodies of water take longer to heat up and cool off compared to land.

## Valley Breeze

- \* During the day, the sun warms the air along the mountain slopes faster than the air in the valley.
- \* Uneven heating causes lower pressure near mountain tops, creating valley breeze.
- \* Flows from valley up slopes of mountain.
- \* Birds float on valley breeze to conserve energy.

## \* Local winds

## Mountain Breeze

- \* At night, air along the mountain slopes cools and moves down to valley, creating mountain breeze

