

Movement of Air Masses

Air Mass – parcel of air with similar temperature and humidity throughout

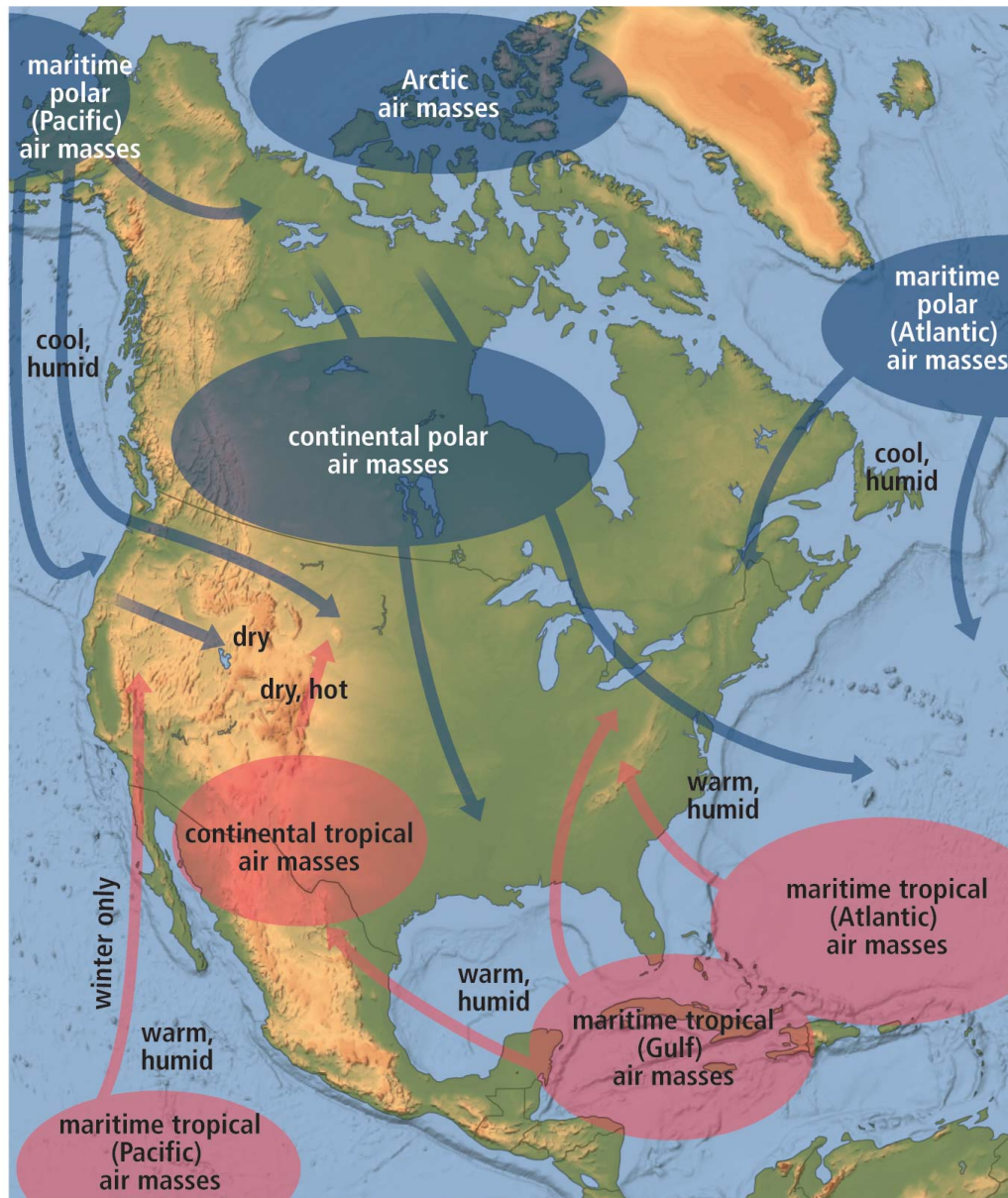


Figure 10.26 Major air masses affecting weather in North America

High Pressure Systems

- Occur when an air mass cools over an ocean or a cold region on land

- As the air cools it loses kinetic energy and becomes denser (heavier) therefore increasing atmospheric pressure
- High pressure air moves outward toward areas of lower pressure = wind
 - Earth's rotation causes air to flow clockwise around the High pressure centre (H) in the northern hemisphere
- Often bring clear skies

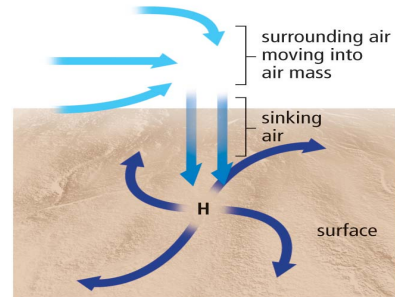


Figure 10.27 In the northern hemisphere, Earth's rotation causes wind to flow clockwise around a high pressure centre (H).

Low Pressure Systems

- Occur when an air mass travels over warm land or oceans
- Warm air rises and cools (air pressure on Earth decreases) – often condenses into clouds or precipitation (rain)
- Often bring wet weather
- Earth's rotation causes wind to flow counterclockwise around a low pressure centre (L) in the northern hemisphere.

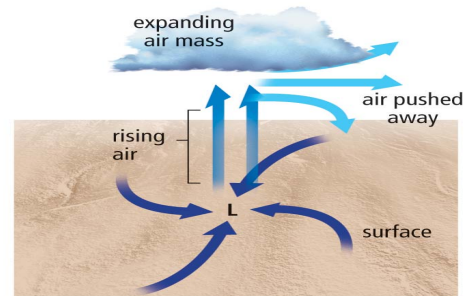


Figure 10.28 In the northern hemisphere, Earth's rotation causes wind to flow counterclockwise around a low pressure centre (L).

Prevailing Winds – winds that are typical for a certain region

Local Winds – geographic features affect winds

- Sea Breezes – caused by different rates at which land and water heat and cool

- Onshore breeze in the morning
- Offshore breeze in the evening

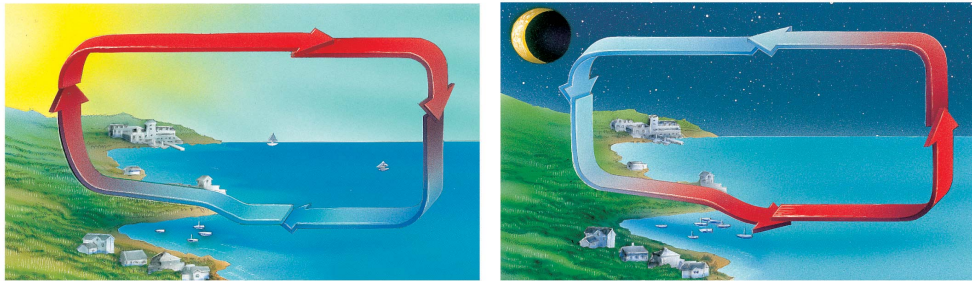


Figure 10.30 Sea breezes can be felt as far as 70 km from the coast (A). At night, convection currents reverse and an offshore breeze blows out to sea (B).

The Coriolis Effect – changes in the direction of moving air, water, or objects due to Earth’s rotation

- Causes air to deflect to the right in the northern hemisphere and to the left in the southern hemisphere

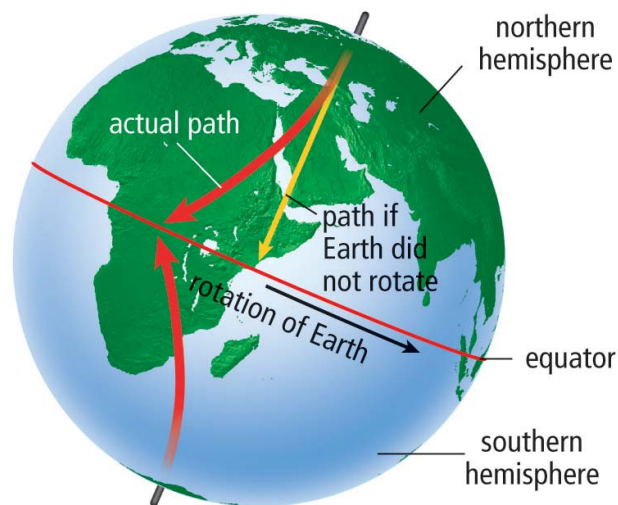


Figure 10.33 The Coriolis effect causes circulating air to curve to the side.

Global Wind Systems – large areas with similar wind patterns

1. Trade winds
2. Prevailing Westerlies
3. Polar Easterlies

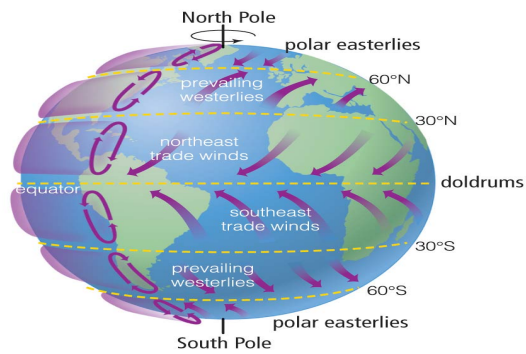
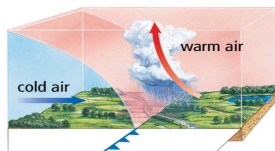


Figure 10.34 Convection currents and the Coriolis effect create Earth's global wind systems.

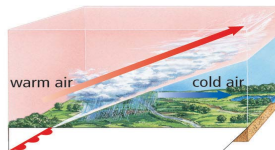
Jet streams – a band of fast moving air in the stratosphere (helps planes fly faster)

Fronts – the boundary between two air masses

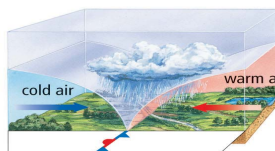
- Usually brings precipitation



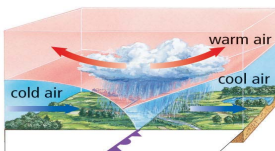
A. A cold front. Cold air advances, displacing warm air.



B. A warm front. Warm air advances, displacing cold air.



C. A stationary front. No air mass is displaced, and the front does not move.



D. An occluded front. A fast-moving cold front overtakes a warm front.

Figure 10.36 Weather fronts and symbols used on weather maps

Extreme Weather

- **Thunderstorms** – lightning, thunder, rain/hail, strong winds
 - Occur when atmospheric conditions are unstable (ex moist air rising rapidly up a mountain or within a cold air mass)
- **Tornadoes** – violent, funnel-shaped column of rotating air that touches the ground
- **Tropical Cyclones** – massive spinning storm
 - Cyclones (Indian ocean), typhoons (Pacific Ocean), Hurricanes (Atlantic Ocean)

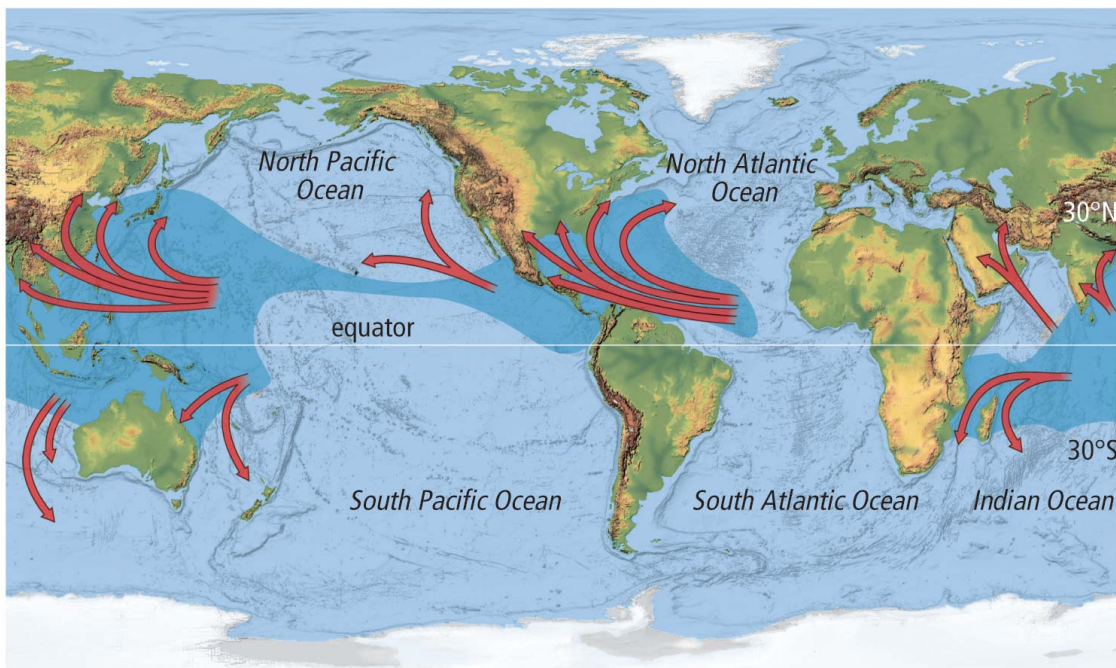


Figure 10.41 Warm waters near the equator create just the right conditions to cause hurricanes to form.