

Atmosphere & Climate Change

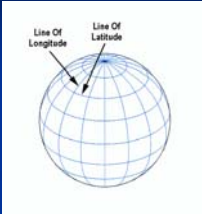
Chapter 13

Weather vs. Climate

- Weather - state of the atmosphere at a particular time in a particular place
 - Examples of data
- Climate - the long term weather observed at a particular place
 - Examples of data

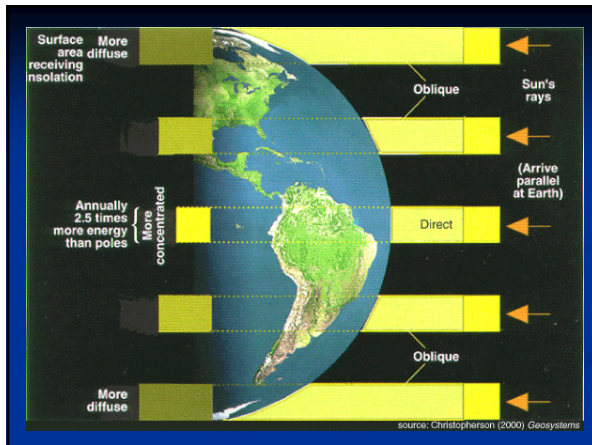
Factors that determine climate

- Latitude
 - Variation of Insolation - incoming solar radiation
- Low latitudes
 - Equator 0 degrees
 - Receives high energy
- High Latitudes
 - Poles 90 degrees north or south
 - Receive low energy

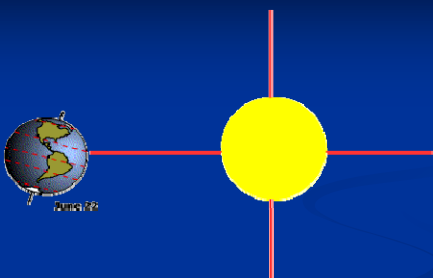


Insolation

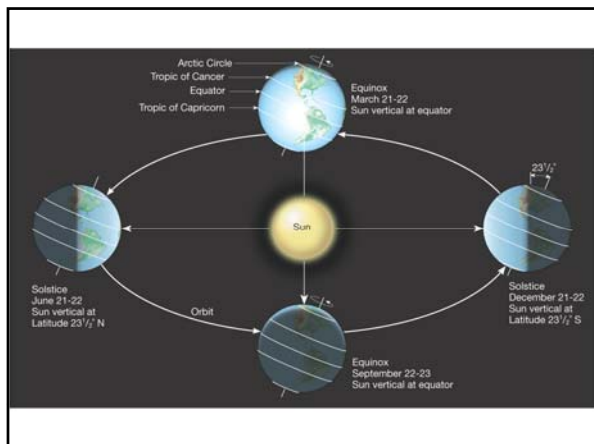
- Duration
 - Time of day
 - Longer at equator
- Angle of insolation
 - Vertical ray - more energy
 - Oblique rays - dissipated energy

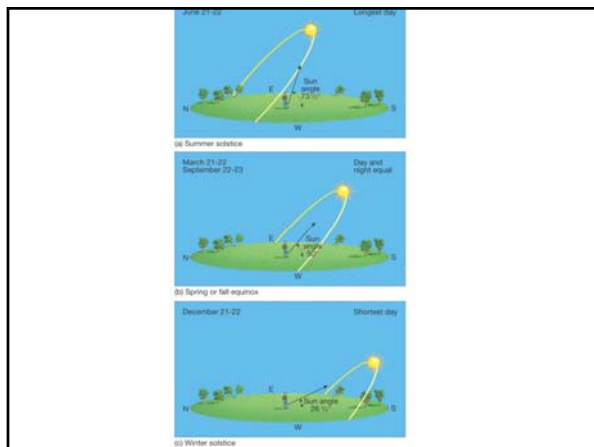


Seasonal Variation



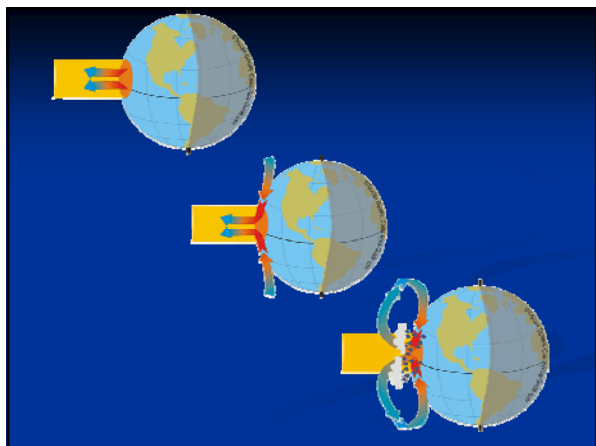
Most direct sunlight ray migrates between





Atmospheric Circulation

- Sun Warms the ground
- Air is heated and rises
- Warm air can hold more water vapor
- As air rises it cools
- Water vapor can condense to form precipitation
- Cooled dry air sinks back to the ground



Global Wind Patterns

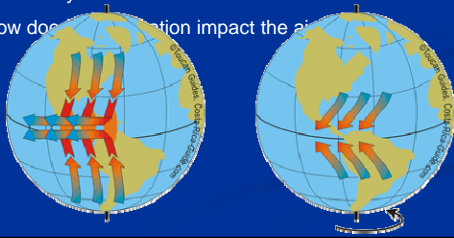
Simple model shows winds traveling toward equator

From north to south

From south to north

Caused by convection.

How does rotation impact the air?



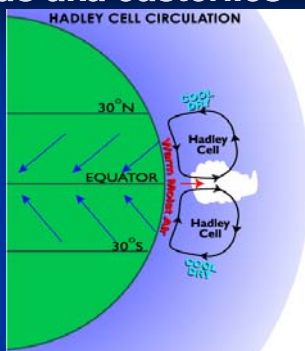
Trade Winds aka easterlies

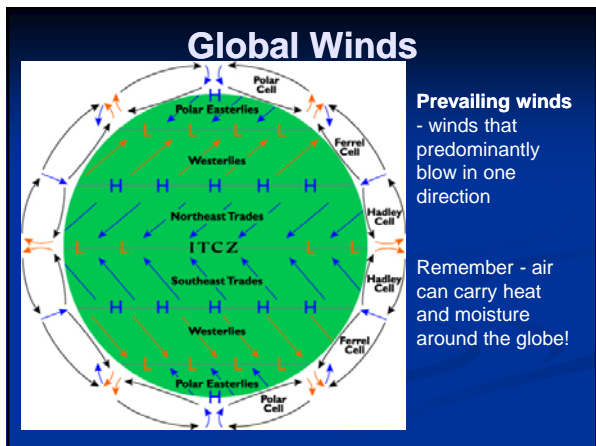
Winds are deflected west due to earth's rotation

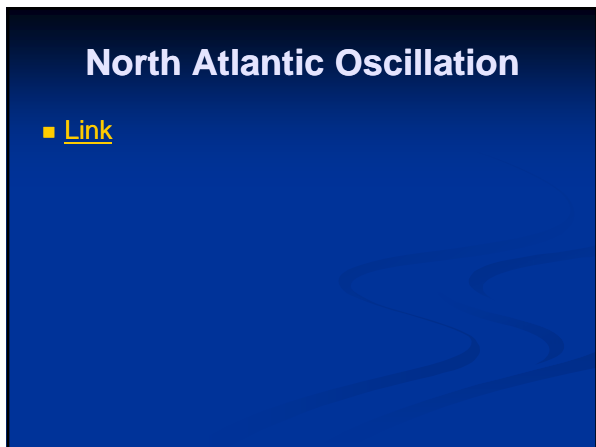
AKA - Coriolis Effect

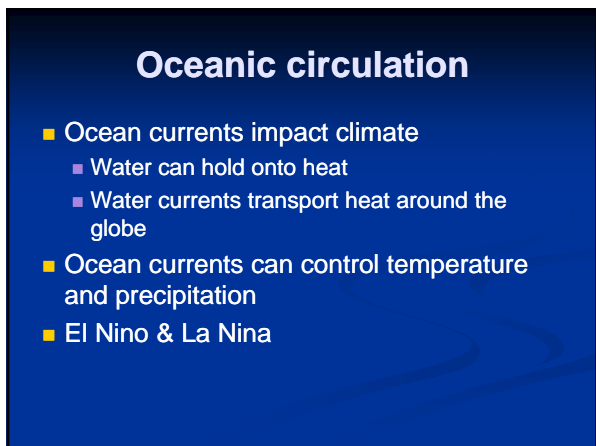
Deflection to the right - NH

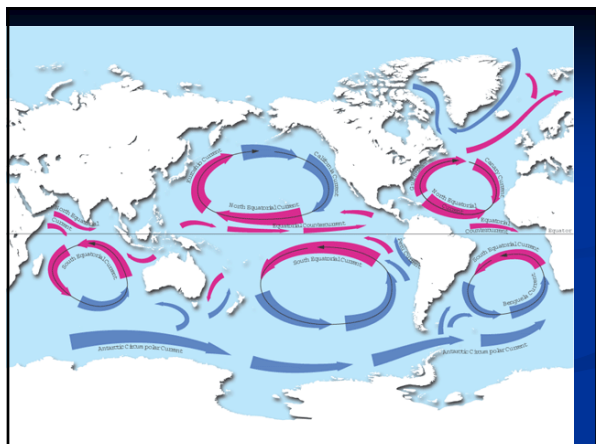
Deflection to the left - SH

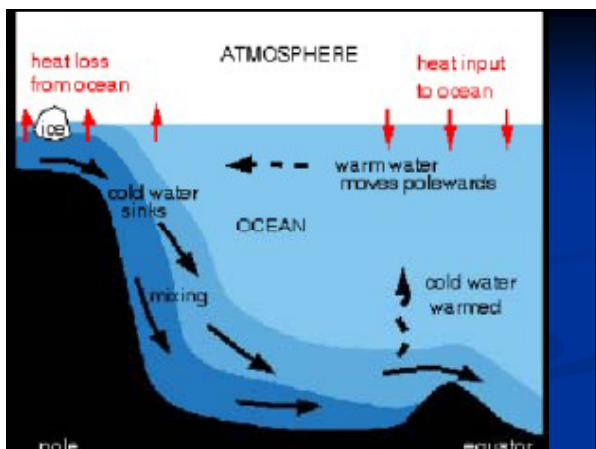


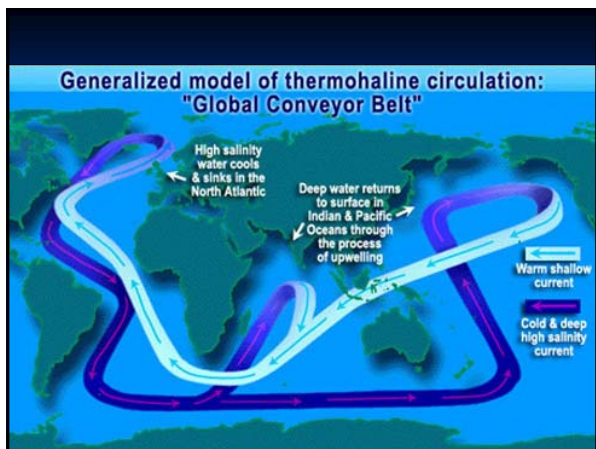


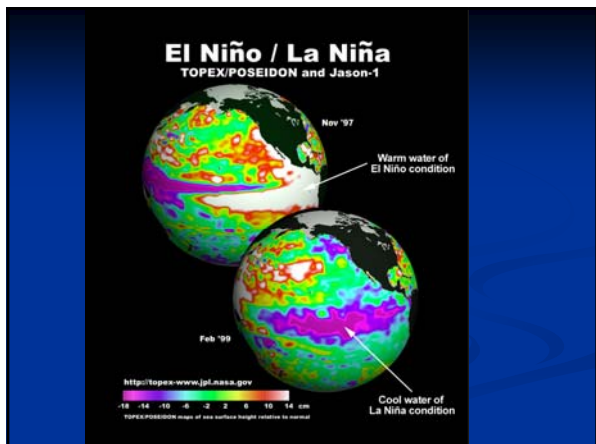


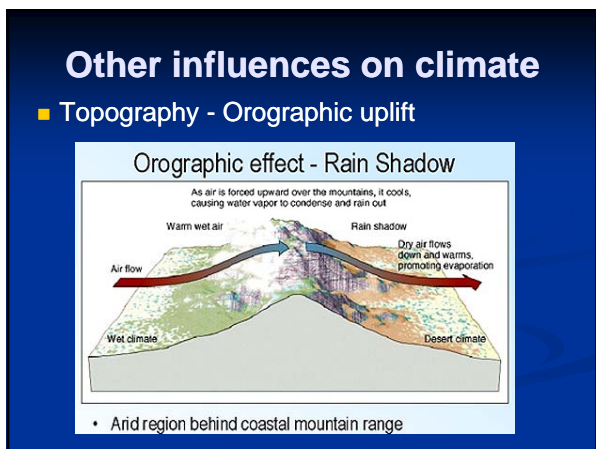








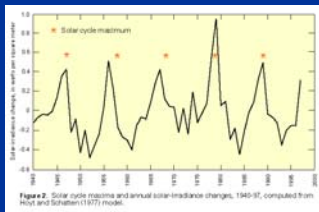


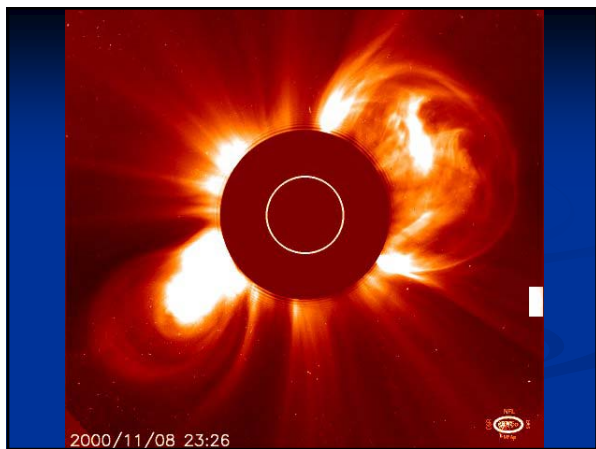




Other influences on Climate

- Solar Maxima - increased UV emitted
 - Causes ozone production
 - Ozone Absorbs UV - warms the atmosphere









- Volcanic eruptions
 - Dust remains in air up to 3 years - reflects sunlight
 - Causes long term cooling
