Climate Variables

What factors contribute to the different climate regions on Earth?
Climate Variables

- **Climate** - the overall view of a region's weather conditions over a long time span
Climate Variables

Latitude and Temperature

- Temperature is affected by latitude, the angle of insolation, intensity, and duration of sunlight

  - **Low Latitudes**: high angle of insolation
  - **High Latitudes**: low angle of insolation
Latitude and Temperature
Climate Variables

Planetary Winds

- **Prevailing Winds** - movement of air over the Earth’s surface that blows from the same direction
- Winds are caused by pressure differences
- United States has the prevailing southwesterly winds
Planetary Wind and Moisture Belts in the Troposphere
Climate Variables

Latitude and Moisture

- Moisture content varies with latitude because of the planetary winds
  - Low Pressure at the equator causes air to rise, expand, cool, and condense to form clouds and rain
  - High pressure causes air to sink and form arid regions
Latitude and Moisture
Climate Variables

Large Bodies of Water

- Oceans, seas, lakes, and bays serve to modify climate regions
- Land masses close to a body of water will be regulated by the slow rate of heating and cooling of water
  - Example: Long Island
Climate Variables

Ocean Currents

- Coastal climates are modified by ocean currents
  - Warm waters flow from the equator towards colder regions
  - Cold waters flow from the poles towards warmer region
Surface Ocean Currents
Climate Variables

Elevation

- Higher elevations are cooler due to temperatures decreasing in the troposphere
Selected Properties of Earth’s Atmosphere
Mountains

- Mountains intersect planetary winds and modify climate regions
- As the winds rise up the mountain, the air rises, expands, cools, and condenses, creating a cooler more moist region
- As the winds descend the mountain the moisture is lost creating a warm and dry region
Mountains Modifying Climate
Climate Variables

Daytime Cloud Cover

- **Clouds**: sunlight is blocked from warming up earth surface and heat energy is radiated back into space.
Climate Variables

Daytime Cloud Cover

- **No Clouds**: sunlight reaches earth's surface and heat energy warms the surface
Climate Variables

Nighttime Cloud Cover

- **Clouds**: heat energy is trapped and not allowed to reradiate back into space
Climate Variables

Nighttime Cloud Cover

- **No Clouds**: heat energy is allowed to escape and reradiate back into space