

Chapter 6

Properties of the Atmosphere

Properties of the Atmosphere

- Weather
- Meteorologist
- Structure of Atmosphere use ESRT page 14
- Air Pressure
- Mercury Barometer
- Aneroid Barometer
- Isobars
- Moist Air is less dense than dry air. Lets compare densities.
- Dry Air = 78% Nitrogen = N_2
- Moist Air = Water Vapor = H_2O
- $N+N > H+H+O$
- $14+14 > 1+1+16$
- $28 > 18$ Therefore, Water Vapor is less dense than Dry Air. That's why cloud float.

Properties of the Atmosphere

- Saturated Air
- Moisture in Air
- Sling Psychrometer
- Stationary Psychrometer
- Wet Bulb: “Wet”
- Dry Bulb: “Dry”
- **Note:** When we exercise, our body sweats. As liquid water evaporates from our skin it releases 540 grams of energy for every gram of water the changes from a liquid to water vapor.
- This is the process how our body cools itself. Therefore, the Wet Bulb thermometer is usually always lower in temperature than the Dry Bulb.
- The exception is when a given air mass is at 100% relative humidity. At this condition the Wet Bulb temperature will be the same temperature as the Dry Bulb thermometer.

Properties of the Atmosphere

- Dew Point Temperature
- Relative Humidity
- Use ESRT page 12
- Think of Dew Point temperature as the temperature of an Air Mass when it is at 100% Relative Humidity
- Rule of thumb 1: For every 10 degrees in temperature an Air Mass warms it can hold twice as much water vapor.
- Rule of thumb 2: For every 10 degrees in temperature an Air Mass cools it can hold half as much water vapor. Thus, cooling an air mass is essential for precipitation.

Properties of the Atmosphere

- Wind
- Wind always travels from High pressure areas to Low pressure areas.
- Wind Direction is labeled from the direction from which it comes from. Example, a cold North wind coming from Canada would be labeled as a North Wind.
- Sea Breeze
- Land Breeze
- Anemometer
- Coriolis Effect
- Prevailing Winds
- **Ocean Currents:** Wind makes ocean surface waves. Ocean surface waves make ocean surface currents.

Properties of the Atmosphere

- **High Pressure System**

Rotates Clockwise

Cool to Cold Temperatures

Dry Air: “Blue Sky”

Originate in Northern Latitudes

Pressure is highest in the center of the cell, remember wind blows from highest pressure towards lower pressure. Thus, wind blows away from the center of the cell.

- **Low Pressure System**

Rotates Counter Clockwise

Warm to Hot Temperatures

Moist Air: “Humid”

Originate in Southern Latitudes

Pressure is lowest in the center of the cell, remember wind blows from highest pressure towards lower pressure. Thus, wind blows towards the center of the cell.

Properties of the Atmosphere

- Warm/Hot Air Rises
- Cool/Cold Air Sinks
- Air Masses are characteristic to the environment in which they form.
- For condensation or precipitation an air mass must be at 100% relative humidity.

- Cloud Formation
- Condensation Nuclei
Smoke, Dust, Pollen,
Volcanic Ash,
Pollution

Note: Weather only happens in the Troposphere layer of Earth's Atmosphere. It's the only layer of the Atmosphere where water vapor exists.