Absolute Humidity, Specific Humidity & Relative Humidity YouTube Lecture Handouts

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Absolute Humidity, Relative Humidity, Specific Humidity & Mixing Ratio [https://www.youtube.com/watch?v=G2fSuFMpcW8]

- *Humidity* is the amount of moisture (water vapor) in the air.
- *Saturation*: When gas holds maximum water vapor at a given temperature (holding capacity increases with rising temperature)

Absolute Humidity

- Mass of water vapor divided by a unit volume of air (grams of water/cm^3 of air)
- It does not take temperature into consideration
- Absolute humidity in the atmosphere ranges from near zero to roughly 30 gm/m^3 when the air is saturated at 30 °C

Relative Humidity

- Ratio of the partial pressure of water vapor (H_2O) in the mixture to the saturated vapor pressure of water at a given temperature
- Function of both water content and temperature.
- Relative humidity is the amount of water vapor present in the air divided by the maximum amount that the air could contain at that temperature.
- Relative humidity is expressed as a percentage.
- RH is 100% if the air is saturated with water vapor and 0% if no water vapor is present in the air at all.

Specific Humidity

- Specific humidity (or moisture content) is the ratio of water vapor mass to the air parcel's total (i.e.. , including dry) mass
- Also known as humidity ratio
- Does not change with expansion or compression of air parcel
- It is grams of water vapor per kilogram of air.

Mixing Ratio

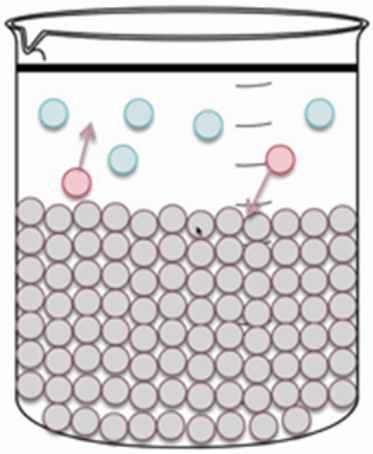
- Specific humidity is approximately equal to the "mixing ratio"
- Ratio of the mass of water vapor in an air parcel to the mass of dry air for the same parcel.

Vapor Pressure

- Measures water vapor content of air using partial pressure of the water vapor in the air

Vapor Pressure

When there is a lid on the container, the gas phase molecules are trapped… they are a vapor. The vapor creates a pressure!!



- Lid blocks exiting vapor
- Molecules in vapor phase collide with walls and cause a pressure
  - The vapor pressure!!
- Evap rate = Condense rate
  - An equilibrium!!
- Change T, change Evap rate, change P_{vap}
  - P_{vap} is temperature dependent

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