Humidity

Humidity: Amount of water vapor present in air

1. **Absolute humidity / Water vapor density:** Mass of vapor/volume of parcel (g/cc).
2. **Specific humidity:** Mass of vapor/mass of parcel (g/g of air). $q = 0.622\frac{e}{P}$
3. **Mixing ratio:** Mass of vapor/mass of dry air (g/g of dry air).
   $w = 0.622\frac{e}{P-e}$
4. **Relative Humidity:** How close air is being saturated
   Vapor content / vapor capacity $RH = \frac{q}{qs}x100$
   or
   Actual vapor pressure/saturation vapor pressure*100

Changes in relative humidity

a. Vapor content
b. Temperature change

Relative Humidity

Relative Humidity =

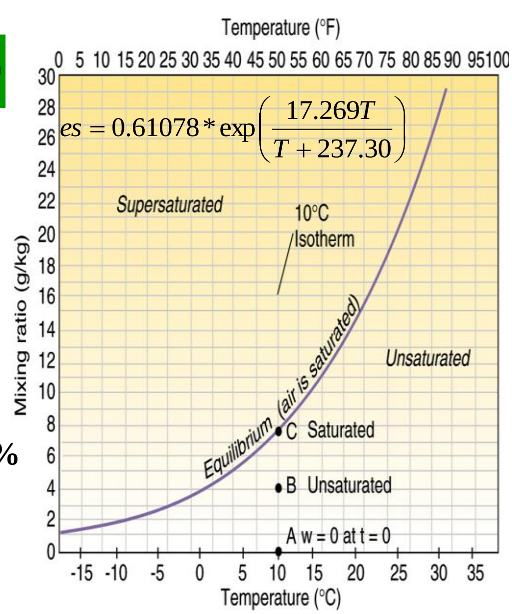
$RH = \frac{q}{qs}x100$ $RH = \frac{e}{es}x100$

$RH = \frac{w}{ws}x100$

w= mixing ratio
w_s= saturated mixing ratio
q= Specific Humidity
qs=Specific Humidity at saturation
e= Actual vapor pressure
es= Saturated vapor pressure

Previous for 10°C:
w = 4.0 g/kg w_s = 7.76 g/kg
RH = [4.0 g/kg /7.76 g/kg] x 100%
= 52%

RH equals the air's mixing ratio divided by the air's saturated mixing ratio in per cent



Saturation of Air

How can air become saturated

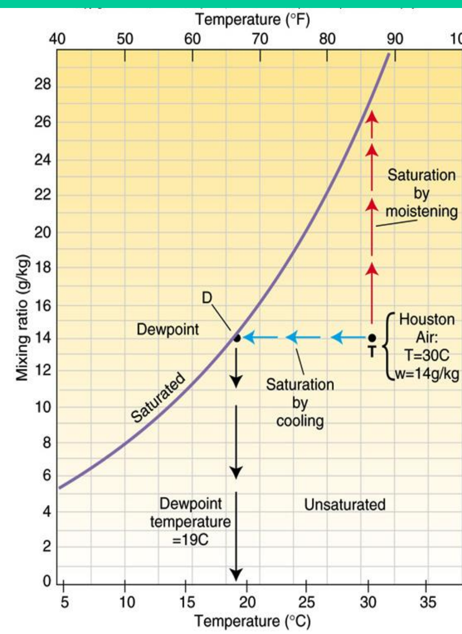
Add water vapor at a constant temperature

Reaches high saturated mixing ratio

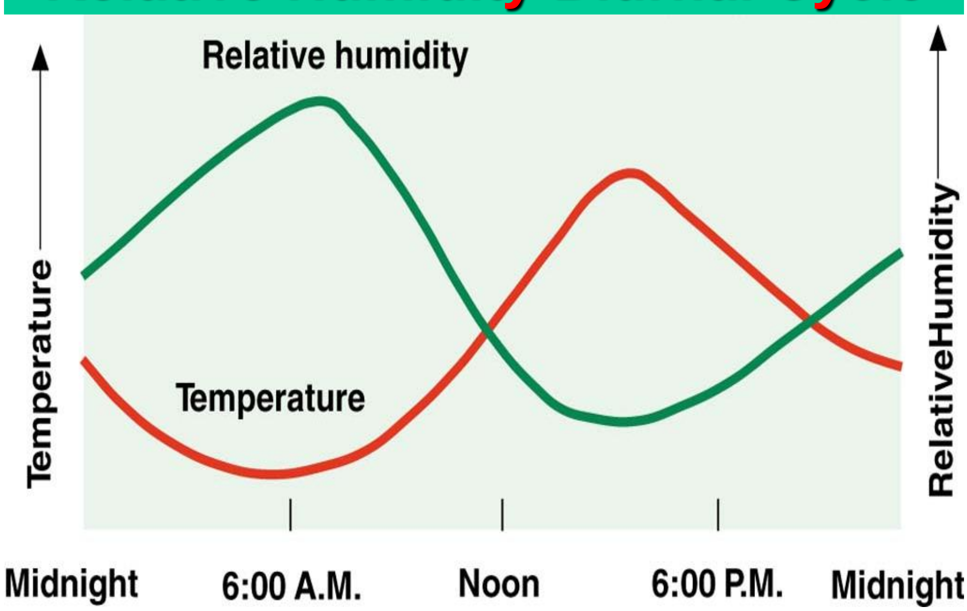
Leave the water vapor constant cool the air

Reaches low saturated mixing ratio

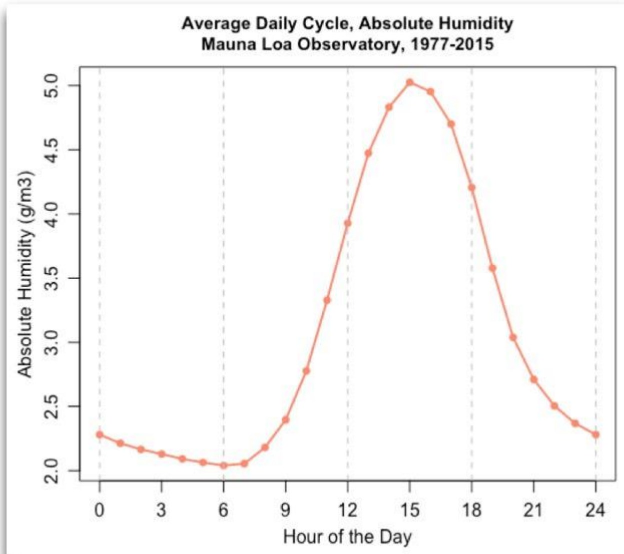
Dewpoint temperature



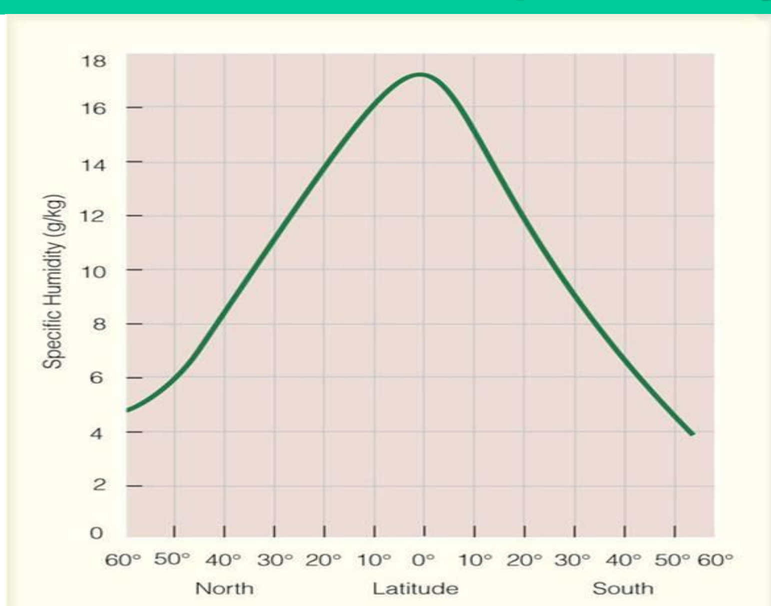
Relative Humidity Diurnal Cycle



Diurnal Cycle of Absolute Humidity



Lat. distribution of Sp Humidity



Lat. distribution of RH & VP