Exercise Lecture 2

Q1/ Use the Clausius-Clapeyron equation to find the saturation vapor pressure at T = 1°C , and T0 = 273K, e0 = 611 Pa, and Lv = 2.5x106 J/kg, Rv is 461 J/kg K) . Answer: 657 Pa

Q2/ An air sample at standard sea level pressure (1013 hPa), and with a volume of 1m3 at 20°C, contains 7 grams of water vapor, use the following when you need(T0 = 273K, e0 = 611 Pa, and Lv = 2.5x106 J/kg, Rv is 461 J/kg K,Rd=287.1J/kg.k).

a. What is the vapor pressure (use the ideal gas law and don’t forget to convert to kg)? Answer: 946 Pa

b. What is the relative humidity (you need to find the saturation vapor pressure)? Answer: 39.9%

c. What is the absolute humidity? (Absolute humidity is merely the density of the water vapor, ρv )  Answer: 7 g/m3

d. What is the mixing ratio? Answer: 0.0058 kg/kg

e. What is the specific humidity? (Use the equation$q=\frac{R\_{d}}{R\_{v}}\frac{e}{p}$), answer: 0.00581 kg/kg

f. What is the dew-point temperature? Answer: 279°K

Riddles

1. Heat energy ………(released /taken) in ……….. (evaporation/condensation) ……..(from/into) the environment.
2. Absolute and specific humidity are quite similar in concept, explain?