

ATOC 5050: Atmospheric dynamics

Exercise 5

(due in class Thursday 22 September)

1) Holton 2.8

2) Holton 2.11

3) RY 2.1: Prove that water vapor can reach saturation in the following processes:

- a) isothermal compression
- b) adiabatic expansion

4) RY 2.2: A sample of moist air has a temperature of -5°C , a pressure of 800 hPa, and a relative humidity of 65%. Compute the following properties, making appropriate assumptions when needed. (You can check your answer on a thermodynamic diagram: either Skew T logP, or the pseudo adiabatic chart)

- a) potential temperature
- b) (mass) mixing ratio
- c) dew point temperature
- d) isentropic condensation temperature
- e) wet-bulb temperature
- f) wet bulb potential temperature
- g) equivalent temperature
- h) virtual temperature
- i) density

Whew!

(Hint: Don't panic! These should be quite quick to look up and compute)