

Unit 5 ATM401, ATM601 and CHEM601**Application, analysis, and evaluation**

1. An air parcel has a specific humidity of 20g/kg at 30°C. Calculate (1) the virtual temperature, (2) for a pressure of 1020hPa the density, (3) by what percentage that density is greater or less than that of dry air at same pressure and temperature, and (4) the water vapor content of the air parcel.
2. An air parcel of 29°C and specific humidity of 24g/kg is embedded in an ambient air of 30°C with a specific humidity of 5g/kg. Calculate (1) the vertical acceleration and discuss in which direction the air parcel moves. (2) When no other forces than those related to buoyancy were present, how long would it take for the air parcel to reach 10 m from its initial location? Which assumptions do you have to make, if so and why?
3. Assume the AC breaks down and the air in the classroom has 20hPa vapor pressure and 25°C. Assume the classroom has a volume of 40m⁻³. Calculate (1) the water vapor content of the room, (2) the virtual temperature when the pressure is 900hPa.