ATM 209
Skew-T Helpful Tips: Parcel Path

1. Locate the temperature and dewpoint (Celsius) on a specific pressure surface. The temperature and dewpoint temperature use the same lines (orange isotherms, skewed up and to the right). Draw one dot (green) at the intersection of the pressure surface and the dewpoint line, and another (red) at the intersection of the pressure surface and the temperature line.

2. Find the relative humidity \(((w/w_s) \times 100\%)\). \(w\) is the mixing ratio. This is where the dewpoint is in relation to the mixing ratio line (dashed green). \(w_s\) is the saturation mixing ratio, which tells us what the mixing ratio would be if our parcel were saturated by increasing the dew point until it equals the temperature. This is found by approximating where the temperature is in relation to the mixing ratio line.

3. Now, let’s “lift” this parcel (this could occur from a front, or any other lifting mechanism. These will be discussed more in 211). Upon lifting, a parcel’s pressure will drop, and based on the “ideal gas law,” its temperature will also drop.

The temperature of an unsaturated parcel (one with RH<100%, or a different dewpoint and temperature) will decrease at the dry adiabatic lapse rate, and will follow the dry adiabats...brown lines that curve up and to the left.

Upon lifting, the dewpoint will change, but the mixing ratio will stay the same. Thus, follow the dewpoint up a mixing ratio line, the dashed green line that goes up and to the right.

4. When these two lines intersect, our parcel is now saturated! This level is called the Lifted Condensation Level, and tells us where a cloud base would be based on a parcel rising from a specific pressure level. The pressure at this level is the LCL.

5. If our parcel continues to be lifted after the LCL, it is now saturated (a cloud). Thus, due to latent heating, it now will rise at the moist adiabatic lapse rate, and will follow the moist adiabats...curved green lines that slope up and to the left.