<https://www.pmfias.com/adiabatic-lapse-rate-latent-heat-condensation/>

**Adiabatic Process: A Parcel of Rising or Falling Air**

An air bubble rises in water whereas stone sinks. This is obvious. The stone is denser (heavier than water) and it sinks whereas the air bubble is less denser (lighter than water) and it rises.

Similarly, a parcel of air rises when it is less denser than the surrounding environment and it falls when its density becomes greater than the surrounding environment(provided its in excess then required at that level).

**A Parcel of Rising Air**

When an air parcel is subjected to differential heating compared to the surrounding air, it becomes lighter (less denser) or heavier (more denser) depending on whether the air parcel is heated or cooled.

When an air parcel receives more heat than the surrounding air, its temperature increases leading to an increase in volume (Increase in Volume == Fall in Density). The air parcel becomes lighter than the surrounding air and it starts to rise. This process is non-adiabatic (there is heat exchange between the air parcel and the external environment i.e. sun’s heat/surface radiation/conduction).

But when the air parcel starts to rise(there is not enough time to have change in temperature through conduction because air is continuously rising and the change in temperature can be called adiabatic/internal), the ambient pressure on it starts to fall [The atmospheric pressure decreases with height, so the pressure on the air parcel decreases with height]. With the fall in ambient pressure, the temperature falls and the volume increases. This is adiabatic [there is no heat exchange between the air parcel and the external environment. All the temperature changes are internal. Temperature changes are only due to change in pressure or volume or both].

This fall in temperature with the rising of the air parcel is called Adiabatic Temperature Lapse. And the rate at which it happens is called Adiabatic Lapse Rate [This is Positive Adiabatic Lapse Rate as the Temperature is falling].

Similarly when an air parcel cools down(conduction), begin to fall. While falling temperature changes adiabatically.