Reflections: Atmospheres Victoria Pinnegar

Luke's Presentation on Buoyancy frequency was very interesting. The buoyancy frequency can be described as the frequency N of an air parcel which oscillates in a stable environment. The derivation made it seem very simple, and derivable utilizing newton's second law. The question of whether the frequency was imaginary was very interesting. In further investigation, the representation of Brunt-Vaisala in meteorology does not utilize a negative underneath the square root. The value of the frequency has multiple physical interpretations based off of the value. If N^2 is above 0, the air parcel will move up/down where the density of the parcel is equal to the density of the surrounding air. N^2 is 0 indicates no movement. If N^2 is less than zero, and therefore imaginary, the air parcel continuously rises unless it becomes positive again. This rising leads to convection.

Additionally, the use of infrasound in the detection of these frequency's is quite interesting. The difficulty of isolating meteor frequencies from the additional noise from the atmosphere seems very difficult. Although, as an infrasound can be used to detect severe weather, what is the distance that one of these signals can be detected. It seems like depending on the size of the infrasound, the typical spatial filtering occurs with a 50-foot diameter, though can be up to 1000 feet. Putting them in a network can range from less than 100 metres apart to as far as 10 km. In further investigation, I have found that even though the infrasound can detect severe weather, it is not in common use. Its helpful for Tornado detection, though due to noise, can give false signals.

For Vasura's Presentation, I really enjoyed the application of the simple green-house model onto Venus. It was very clear to see how much thicker Venus' atmosphere by applying the same model. It was also very interesting to see that the entire basis of the model is off of the Stefan-Boltzmann law, which is very common in astronomy. It would be very interesting to see the application of this model not only to other planets in our solar system, but to exoplanets. Temperature is an easy enough variable to determine for exoplanetary atmospheres, so after the detection of possible greenhouse gases, being applied to find the theoretical thickness would be very interesting.

For Nick's presentation, I thought the absorption features after sunset were very interesting, although I do have a few more questions. As the absorption only occurs after passing through a larger portion of the atmosphere, would it occur if the atmosphere were to increase in thickness, or does it simply occur due to the angle and therefore the specific atmospheric makeup that the glancing pass through the atmosphere takes? Also, as I was investigating further about Mars' atmosphere, I found that Mars sun sets in blue. From Nick's explanation this would indicate that the Rayleigh scattering becomes predominant during this phase. This makes sense since one of the main differences between the Earth atmosphere and Mars atmosphere is thickness. During sunset, the light is passing through more atmosphere, which in the Martian atmosphere causes it to be blue.

For Kasia's Presentation, I am quite interested in the physical reason as to why the E and F regions reflect radio waves. From what I can find, the reason it reflects consistently is because it isn't affect by atmospheric variation, purely from sun variation. The ionized gases refract the radio waves internally, which also indicates they reflect radio waves incoming from space, which would explain why we don't receive a huge amount of astronomical interference in regular radio. Although I would like to know what difference the AM vs FM radio makes.

For Callum's presentation, the chapman's function was explained very well, the function describes the atmospheric absorption around the slant of the earth's geometrics. Similar to the Buoyancy frequency you develop this relationship from starting out with the hydrostatic relationship of the atmosphere, which is fun. The absorption described by this is as it applies to ozone, so I do wonder what the Chapman's function shows over places of extreme variance, such as the ozone hole.

As for my own presentation, I found the topics which cover the droplet to precipitation to be very extensive. I was able to find entire textbooks in the library which were solely based on this topic. (i.e. Physics of drop formation in the Atmosphere by Yu. S. Sedunov). I found each of the processes very interesting. By introducing the condensation effectiveness onto CCN, the process becomes very intriguing, and the raoult's solution seems like a very simple solution for the actual condensation rate.