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API Homework 6

Weather.py

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When analyzing the data, the first observable trend, and the most obvious frankly, was as one moves closer in proximity to the equator, latitude of 0, the maximum temperature, in Fahrenheit, approaches its maximum values for a given day. As you move away from the equator, in that same day, those values drop off and proceed to drop off toward their lowest points. This has to do with the distance between the earth's surface and the sun being at its shortest at the equator. The amount of solar radiation that is absorbed, therefore, due to the distance and angle of the sun, is maxed out at this point. The opposite is true for those points furthest from the equator.

A second observable trend in this same plot is the relationship between the middle of the point formation and the tails. We are in September, a relatively warm month but with some variability for those that live in New Jersey. Given this, we see that when we observe the weather across the globe for September, we see a plot shape that has the high points at the equator and then the tails dropping off at the positive and negative latitude extremes. As the seasons change, and we approach winter in the northern hemisphere, summer in the southern hemisphere, we should expect to see the tail of which ever hemisphere is in winter to drop lower than the tail that represents the hemisphere in summer.

A third observable trend is the relationship between latitude and humidity. First, it is observable that high concentrations of humidity are possible no matter where you are on the globe. Humidity, because it is a ratio of water content and temperature, cannot exceed 100%. However, during the month of September, one expects to find the greatest concentration of humidity in the northern hemisphere, lines of latitude above the 0 mark. This is because humidity is a measurement of how moist the air is and in September, the late summer, early fall seasons in the northern hemisphere, the concentrations of moist, warm air is greater than that of the concentrations in the southern hemisphere. Of note, humidity is most likely at its most balanced point during the "shoulder" season months. Thus, one would expect to find a similar plot in April, for example, only with the data flipped, showing a greater concentration in the southern hemisphere.

A fourth observable trend in the data is the relationship between the latitude vs cloudiness plot and the humidity plot. Given that humidity is the amount of water content in the air, observed to us as moist air, as air rises, it cools. The cooling of moist air creates a stage change for water through the release of energy and the condensation process. This process is observable to us through the formation of clouds. Therefore, where you have more humidity, it follows that you should observe more clouds. This is what we see in the data. Again, a similar skew of data is observable where clouds are more prevalent above the latitude line of zero. Another interesting notion is that in September, when different air masses are colliding more frequently, concepts like overrunning and frontal interaction are more prevalent. As the variability of temperature increases, i.e. one day can be warm, the next very

cool, the presence of clouds increases as different columns of air, with different concentrations of water vapor, interact and collide.

To further highlight humidity, I placed a humidity vs temperature scatter plot at the bottom of my Jupyter notebook. What this plot displays is the relationship between humidity and temperature. As temperature increases, so does humidity. We can see that as we approach a low temperature, above the freezing line, humidity drastically drops. Below the freezing line, the air is void of water vapor; hence it feels very dry and cool. That is why in the winter, we feel like the air bites us. It is void of any water content. As the temperature approaches its maximum values, so does humidity. That is why sometimes in New Jersey in August, for example, it feels like we are in an outdoor shower. The water content is at its high point.