Homework #6 – Python API's Applied to Global Weather Patterns

Plot 1: Temperature vs Latitude

Data shows temperature is strongly correlated with latitude. As the absolute value of latitude increases, temperature decreases. However, the effect is not equal for both positive and negative latitudes. The relationship is stronger for northern latitudes. This was counter intuitive to expectations, especially since the data snapshot was taken very close to the equinox. There are a few possible explanations for this phenomenon:

1. Lag effects of latent heat due to transition from solstice to equinox.
2. Land mass is disproportionately distributed in the northern hemisphere. This would cause some randomly selected coordinates to be located in the southern oceans, where no cities are to be found close at hand and thus the API request rejected. It is noteworthy that approximately 10% of the API requests were rejected, and thus large enough to skew the overall data pattern significantly.
3. Similarly to 2 above, even if the API request was accepted, the distance between the coordinates used to select the cities and the cities themselves may be great enough that the city weather data and the actual weather at the original coordinates could be significantly different.

In accord with the reasons above, the following analysis could explain these discrepancies.

1. Analyze the failed city accesses. Why did they fail. Did they fail due to the distance?
2. For city accesses that did succeed. Compare the distance between the original coordinates and the coordinates for the city return in the API call. Is the distance such that the weather data is likely to be accurate, or such that it is likely to be inaccurate?

Plot 2: Humidity vs Latitude

Noted skew of plot to the right (towards northern latitudes) similar to the skew noted in Plot 1. The trend appears to show that locations at or near the equator (0 Latitude) are less likely to experience low humidity.

Plot 3: Cloudiness vs Latitude

Skew to northern latitudes also noted. Tendency toward quantization of Cloudiness percentage in multiples of 5, but not exclusively. It is possible that this is the result of human subjectivity or machine vision algorithms in selection of the Cloudiness percentage.

Plot 4: Wind Speed vs Latitude

Shift noted toward northern latitudes as with other plots. No apparent correlation between latitude and wind speed.