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Northwestern University Data Science Boot Camp

Homework 6 – Python APIs

The instructions for this assignment took it as a given that temperature increases as one approaches the equator. While this is true, with overall global temperatures forming a trend similar to an inverted parabola, the apex is not centered in the equator. Due to the readings being taken at the height of northern hemisphere summer (July 2nd), the distribution is centered north of the equator, with the greatest temperatures appearing around 20 north latitude.

The humidity reading provided by the Open Weather API is expressed as relative humidity, rather than absolute. This is a measure of how saturated the air is with water vapor. As air temperature increases, the absorption capacity of the air mass increases as well. A hotter air mass would therefore have a lower relative humidity than a cooler mass even if both contained the same amount of water. This is shown in the distribution of humidity over latitude, as the lowest humidity points appear in the hottest region, around 20 to 30 north. In the cooler regions towards the Artic and Antarctic circles the lowest humidity readings shown are in the range of 40-50% for similar reasons.

Neither wind speed nor cloud cover show a clear trend based on latitude. Wind speed is influenced by many factors including the temperature and air pressure of neighboring regions as well as topographic features, none of which are accounted for by latitude alone. Likewise cloudiness is affected not only by local conditions but the movement of air masses in the upper atmosphere.

There are relatively few data points in the extreme south of our data set. This is likely due to the geographic distribution of land masses across the Earth’s surface. The Earth is approximately 70% ocean, meaning that with an even distribution of random coordinate pairs scattered across the Earth’s surface most points will fall in the ocean and use a coastal city as their nearest point of reference. Since there is relatively little land below 50 south latitude as compared to the northern hemisphere and we are discarding duplicate cities, we are left with little data on the extreme south.