

Weather API Data Analysis

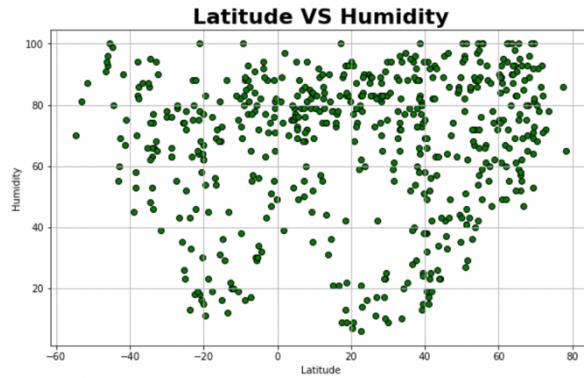
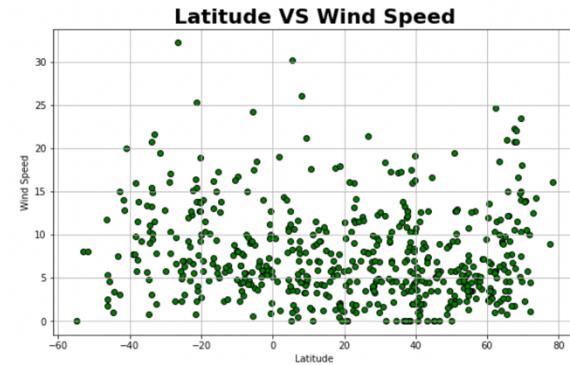
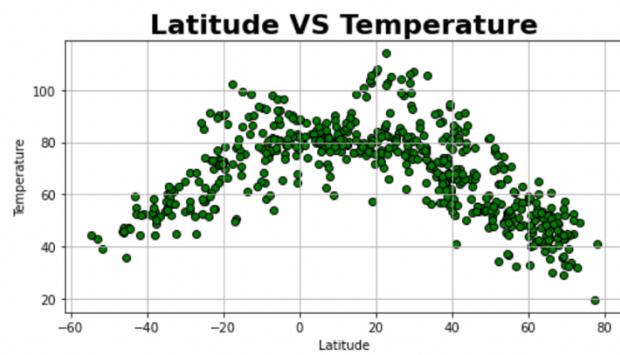
Objective: Analyze weather related to Latitude versus Temperature, Humidity, Cloudiness and Windspeed.

Data Overview: Our data contains weather information pertaining to 500 cities. The data variables include the city, country, latitude, longitude, temperature, wind, pressure and humidity.

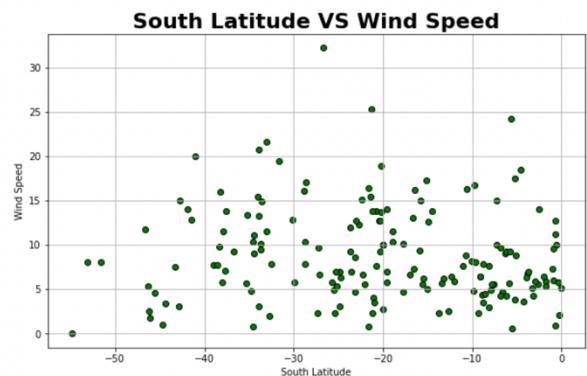
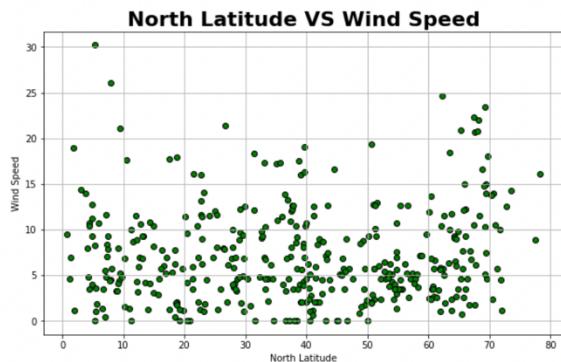
Data Insights:

Based on the latitude and temperature plots, there is a positive correlation with the temperature being higher the closer you are to zero-degree latitude (at the equator). There is also a negative correlation between latitude and temperature with temperatures being lower the farther north toward higher latitudes such as 60-80 degrees latitude. Another observation is that the windspeeds are higher in the Northern Hemisphere while the windspeeds are lower and more moderate in the Southern Hemisphere. The following pages give in depth analysis for Northern and Southern Hemisphere based on the variables of temperature, wind, pressure and humidity.

Call to Action: I recommend that the most likely location to plan a vacation would be in the Southern Hemisphere at about 10-20 degrees latitude to optimize the humidity, temperature and windspeeds as reflected in the regression models.



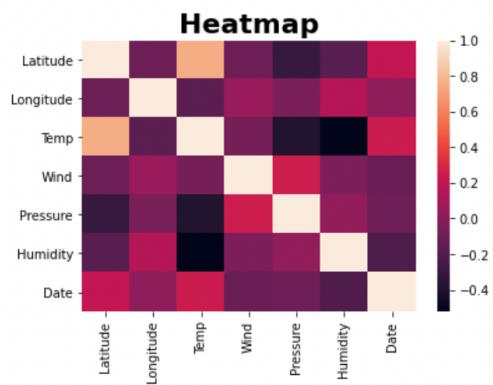
Wind Speed – Northern VS Southern Hemisphere



	Latitude	Longitude	Temp	Wind	Pressure	Humidity	Date
Latitude	1.000000	-0.052754	-0.774137	0.062122	0.028798	0.089662	-0.051238
Longitude	-0.052754	1.000000	0.099507	0.198497	-0.036456	-0.056320	0.106566
Temp	-0.774137	0.099507	1.000000	0.047364	-0.057381	-0.436538	0.093694
Wind	0.062122	0.198497	0.047364	1.000000	-0.236916	-0.105154	0.005390
Pressure	0.028798	-0.036456	-0.057381	-0.236916	1.000000	-0.050654	0.120011
Humidity	0.089662	-0.056320	-0.436538	-0.105154	-0.050654	1.000000	-0.138122
Date	-0.051238	0.106566	0.093694	0.005390	0.120011	-0.138122	1.000000

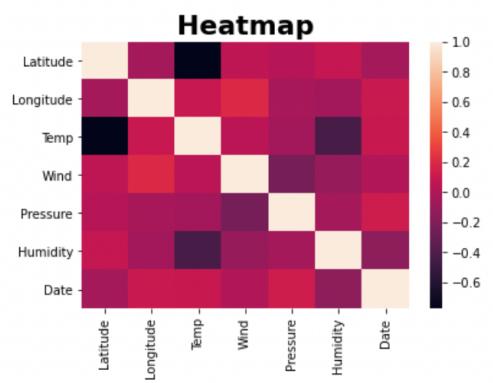
The windspeeds are higher in the Northern Hemisphere while the windspeeds are lower and more moderate in the Southern Hemisphere.

Heatmap Northern Hemisphere



According to the heatmap for the Northern Hemisphere, there is a strong negative correlation between the temperature and the latitude reflecting in cooler temperatures. There is also a slightly negative correlation between Temperature and Humidity.

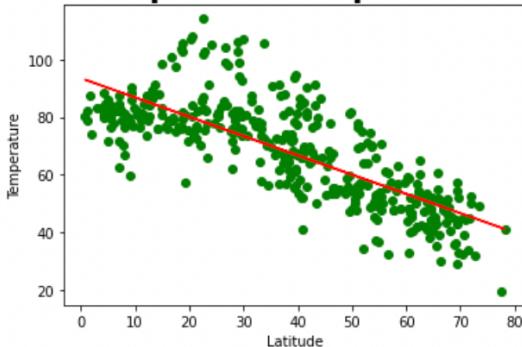
Heatmap Southern Hemisphere



According to the heatmap for the Southern Hemisphere, there is a negative correlation between the Temperature & Humidity as well as Pressure and Latitude resulting in a less humid environment. There is a positive correlation between Latitude and Temperature resulting in warmer temperatures.

Northern Regression – Temp vs Latitude

Northern Hemisphere - Temperature VS Latitude



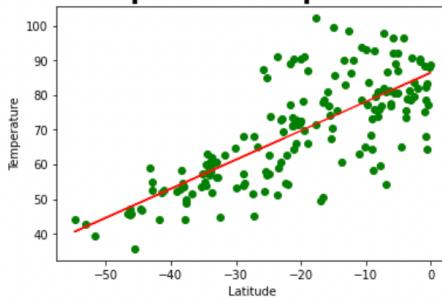
OLS Regression Results

Dep. Variable:	Temp	R-squared:	0.569			
Model:	OLS	Adj. R-squared:	0.566			
Method:	Least Squares	F-statistic:	224.2			
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	7.19e-33			
Time:	09:07:58	Log-Likelihood:	-638.25			
No. Observations:	172	AIC:	1281.			
Df Residuals:	170	BIC:	1287.			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	86.5081	1.373	63.012	0.000	83.798	89.218
Latitude	0.8378	0.056	14.974	0.000	0.727	0.948
Omnibus:	5.251	Durbin-Watson:	2.004			
Prob(Omnibus):	0.072	Jarque-Bera (JB):	5.578			
Skew:	0.258	Prob(JB):	0.0615			
Kurtosis:	3.716	Cond. No.	44.4			

There is a negative correlation between latitude and temperature. The higher the latitude, the lower the temperature.

The r-squared is: 0.5687696447059142

Southern Hemisphere - Temperature VS Latitude



Southern Regression – Temp vs Latitude

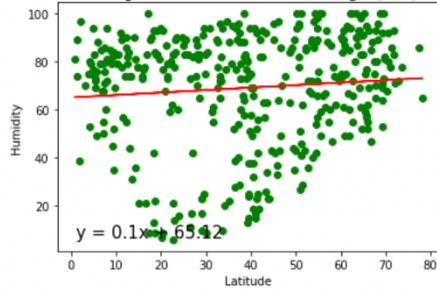
OLS Regression Results

Dep. Variable:	Temp	R-squared:	0.569			
Model:	OLS	Adj. R-squared:	0.566			
Method:	Least Squares	F-statistic:	224.2			
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	7.19e-33			
Time:	09:48:46	Log-Likelihood:	-638.25			
No. Observations:	172	AIC:	1281.			
Df Residuals:	170	BIC:	1287.			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	86.5081	1.373	63.012	0.000	83.798	89.218
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Kurtosis:	3.716	Cond. No.	44.4			

There is a positive correlation between temperature and latitude. There is an increase in temperature the closer to zero-degree latitude (at the equator).

Northern Regression – Humidity vs Latitude

Northern Hemisphere - Humidity (%) vs. Latitude

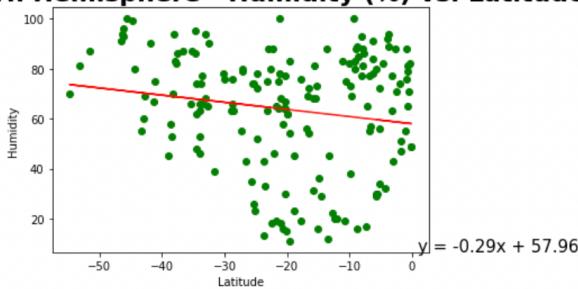


OLS Regression Results

Dep. Variable:	Humidity	R-squared:	0.008				
Model:	OLS	Adj. R-squared:	0.006				
Method:	Least Squares	F-statistic:	3.193				
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	0.0747				
Time:	09:49:51	Log-Likelihood:	-1808.1				
No. Observations:	396	AIC:	3620.				
Df Residuals:	394	BIC:	3628.				
Df Model:	1						
Covariance Type:	nonrobust						
		coef	std err	t	P> t 	[0.025	0.975
const	65.1168	2.509	25.954	0.000	60.184	70.049	
Latitude	0.1033	0.058	1.787	0.075	-0.010	0.217	
		Omnibus:	44.848	Durbin-Watson:	2.040		
		Prob(Omnibus):	0.000	Jarque-Bera (JB):	58.504		
		Skew:	-0.941	Prob(JB):	1.98e-13		
		Kurtosis:	2.940	Cond. No.	93.0		

Southern Regression – Humidity vs Latitude

Southern Hemisphere - Humidity (%) vs. Latitude



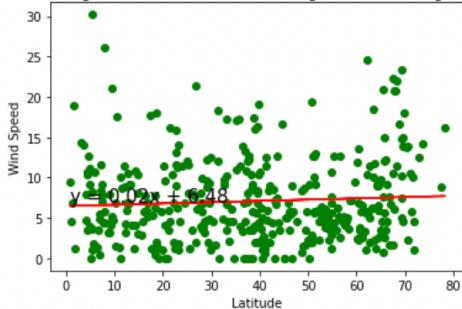
There is a slightly negative correlation between Humidity and Latitude in the Southern Hemisphere. This shows a lower humidity the closer to zero-degree latitude at the equator.

OLS Regression Results

Dep. Variable:	Humidity	R-squared:	0.028				
Model:	OLS	Adj. R-squared:	0.022				
Method:	Least Squares	F-statistic:	4.851				
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	0.0290				
Time:	09:45:27	Log-Likelihood:	-783.06				
No. Observations:	172	AIC:	1570.				
Df Residuals:	170	BIC:	1576.				
Df Model:	1						
Covariance Type:	nonrobust						
		coef	std err	t	P> t 	[0.025	0.975
const	57.9597	3.186	18.191	0.000	51.670	64.249	
Latitude	-0.2860	0.130	-2.202	0.029	-0.542	-0.030	
		Omnibus:	14.371	Durbin-Watson:	1.937		
		Prob(Omnibus):	0.001	Jarque-Bera (JB):	13.710		
		Skew:	-0.629	Prob(JB):	0.00105		
		Kurtosis:	2.426	Cond. No.	44.4		

Northern Regression – Wind vs Latitude

Northern Hemisphere - Wind Speed (mph) vs. Latitude

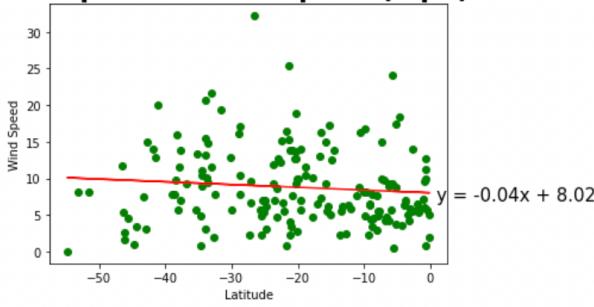


There is a slightly positive correlation between Wind Speed and Latitude in the Northern Hemisphere. This shows a slight increase in wind speed the higher the latitude.

OLS Regression Results

Dep. Variable:	Wind	R-squared:	0.004
Model:	OLS	Adj. R-squared:	0.001
Method:	Least Squares	F-statistic:	1.526
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	0.217
Time:	09:52:47	Log-Likelihood:	-1212.1
No. Observations:	396	AIC:	2428.
Df Residuals:	394	BIC:	2436.
Df Model:	1		
Covariance Type:	nonrobust		
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coef	std err	t	P> t [0.025 0.975]
const	6.4810	0.557	11.634 0.000 5.386 7.576
Latitude	0.0159	0.013	1.235 0.217 -0.009 0.041
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Omnibus:	76.773	Durbin-Watson:	1.995
Prob(Omnibus):	0.000	Jarque-Bera (JB):	127.098
Skew:	1.148	Prob(JB):	2.52e-28
Kurtosis:	4.559	Cond. No.	93.0

Southern Hemisphere - Wind Speed (mph) vs. Latitude



There is a slightly negative correlation between Wind Speed and Latitude in the Southern Hemisphere. This shows a slight decrease in wind speed the higher the closer to zero-degree latitude at the equator.

Southern Regression – Wind vs Latitude

OLS Regression Results

Dep. Variable:	Wind	R-squared:	0.009
Model:	OLS	Adj. R-squared:	0.003
Method:	Least Squares	F-statistic:	1.587
Date:	Mon, 06 Sep 2021	Prob (F-statistic):	0.210
Time:	09:53:16	Log-Likelihood:	-530.02
No. Observations:	172	AIC:	1064.
Df Residuals:	170	BIC:	1070.
Df Model:	1		
Covariance Type:	nonrobust		
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coef	std err	t	P> t [0.025 0.975]
const	8.0187	0.732	10.958 0.000 6.574 9.463
Latitude	-0.0376	0.030	-1.260 0.210 -0.096 0.021
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Omnibus:	34.065	Durbin-Watson:	2.098
Prob(Omnibus):	0.000	Jarque-Bera (JB):	53.730
Skew:	1.038	Prob(JB):	2.15e-12
Kurtosis:	4.786	Cond. No.	44.4