WeatherPy

Note

- Instructions have been included for each segment. You do not have to follow them exactly, but they are included to help you think through the steps.

In [26]:
```
# Dependencies and Setup
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import requests
import time
import json
from scipy import stats
#from config import api_key
from scipy.stats import linregress

# Import API key
#from api_keys import weather_api_key
from config import weather_api_key


# Incorporated citipy to determine city based on latitude and longitude
from citipy import citipy

# Output File (CSV)
output_data_file = "output_data/cities.csv"

# Range of latitudes and longitudes
lat_range = (-90, 90)
lng_range = (-180, 180)
```

In [27]:
```
print (weather_api_key)
```

```
3828483840e7d3f41de4bd10585da72f
```

Generate Cities List

In [28]:
```
# List for holding lat_lngs and cities
```

```
lat_lngs = []
cities = []

# Create a set of random lat and lng combinations
lats = np.random.uniform(lat_range[0], lat_range[1], size=1500)
lngs = np.random.uniform(lng_range[0], lng_range[1], size=1500)
lat_lngs = zip(lats, lngs)

# Identify nearest city for each lat, lng combination
for lat_lng in lat_lngs:
    city = citipy.nearest_city(lat_lng[0], lat_lng[1]).city_name

    # If the city is unique, then add it to a our cities list
    if city not in cities:
        cities.append(city)

# Print the city count to confirm sufficient count
len(cities)
```

Out[28]: 596

In [43]:

```
print(cities)
```

```
['angkat', 'illoqqortoormiut', 'tiznit', 'arraial do cabo', 'rio gallegos', 'petropavlovsk-kamchatskiy', 'yello
wknife', 'atuona', 'qaanaaq', 'magdagachi', 'vaini', 'varkkallai', 'ribeira grande', 'guerrero negro', 'salisbu
ry', 'nikolskoye', 'hobart', 'georgetown', 'lebu', 'aras', 'hilo', 'kipini', 'jalu', 'storm lake', 'labuan']
```

In [44]:

```
# Save config information.
#url = "http://api.openweathermap.org/data/2.5/weather?"
#api_format = "json"
#units = "metric"

# Build partial query URL
#query_url = f"{url}appid={weather_api_key}&units={units}&q="
```

In [45]:

```
print (url)
```

```
http://api.openweathermap.org/data/2.5/weather?
```

In [46]:

```
print (url+'angkat')
```

```
http://api.openweathermap.org/data/2.5/weather?angkat
```

In [47]:

```
print (url+'tiznit')
```

```
http://api.openweathermap.org/data/2.5/weather?tiznit
```

In [48]:
```
print (url+'georgetown')
```

```
http://api.openweathermap.org/data/2.5/weather?georgetown
```

In [49]:
```
cities = ['angkat', 'illoqqortoormiut', 'tiznit', 'arraial do cabo', 'rio gallegos', 'petropavlovsk-kamchatskiy
# set up lists to hold reponse info
lat = []
temp = []
city_with_data = []
```

In [50]:
```
print (cities[0])
print (cities [-1])
```

```
angkat
labuan
```

In [51]:
```
#try:
    #print(jffjj)
#except:
    #print("the line is error")
```

In [52]:
```
lat.append("Chennaiu")
print(lat)
```

```
['Chennaiu']
```

In [53]:
```
lat.append("US")
print(lat)
```

```
['Chennaiu', 'US']
```

In [54]:
```
response = requests.get(url + "city").json()
#response['main']['pressure']
#response ['wind']['deg']

#response['clouds']
#response['clouds']['all']
response
```

Out[54]:
```
{'cod': 401,
 'message': 'Invalid API key. Please see http://openweathermap.org/faq#error401 for more info.'}
```

In [55]:
```
# Loop through the list of cities and perform a request for data on each
lat= []
temp = []
hum = []
```

```
cloud = []
wind = []
lon = []
temp_main = []
temp_max = []

city_with_data = []
for city in cities:
    try:
        response = requests.get(url + city).json()
        lat.append(response['coord']['lat'])
        temp.append(response['main']['temp'])
        city_with_data.append(response['name'])
        hum.append(response['main']['humidity'])
        cloud.append(response['clouds']['all'])
        wind.append(response['wind']['speed'])
        lon.append(response['coord']['lon'])
        temp_main.append(response['main'].get('temp_main', None))
        temp_max.append(response['main'].get('temp_max', None))

    except Exception as e:
        print(f"The information {city} is missing")
        print(e)
```

```
The information angkat is missing
'coord'
The information illoqqortoormiut is missing
'coord'
The information tiznit is missing
'coord'
The information arraial do cabo is missing
'coord'
The information rio gallegos is missing
'coord'
The information petropavlovsk-kamchatskiy is missing
'coord'
The information yellowknife is missing
'coord'
The information atuona is missing
'coord'
The information qaanaaq is missing
'coord'
The information magdagachi is missing
'coord'
The information vaini is missing
'coord'
The information varkkallai is missing
'coord'
```

```
The information ribeira grande is missing
'coord'
The information guerrero negro is missing
'coord'
The information salisbury is missing
'coord'
The information nikolskoye is missing
'coord'
The information hobart is missing
'coord'
The information georgetown is missing
'coord'
The information lebu is missing
'coord'
The information aras is missing
'coord'
The information hilo is missing
'coord'
The information kipini is missing
'coord'
The information jalu is missing
'coord'
The information storm lake is missing
'coord'
The information labuan is missing
'coord'
```

In [56]:

```
print(city_with_data)
```

```
[]
```

In [57]:

```
print(f"The latitude information received is: {lat}")
print(f"The temperature information received is: {temp}")
```

```
The latitude information received is: []
The temperature information received is: []
```

In [21]:

```
# create a data frame from cities, lat, and temp
weather_dict = {
                "city": city_with_data,
                "lat": lat,
                "temp": temp,
                "humidity":  hum,
                "clouds":    cloud,
                "speed": wind,
                "lon": lon,
                "temp_main": temp_main,
                "temp_max": temp_max
```

```
}

#import numpy.ma.mrecords as mrecords
weather_data = pd.DataFrame(weather_dict)
weather_data
#print(weather_dict)
```

Out[21]:

	city	lat	temp	humidity	clouds	speed	lon	temp_main	temp_max
0	Tiznit Province	29.5833	13.71	48	0	0.61	-9.5000	None	13.71
1	Arraial do Cabo	-22.9661	23.96	92	63	2.86	-42.0278	None	23.96
2	Río Gallegos	-51.6226	10.00	62	0	3.60	-69.2181	None	10.00
3	Petropavlovsk-Kamchatskiy	53.0452	-4.00	42	20	2.00	158.6483	None	-4.00
4	Yellowknife	62.4560	-23.72	84	90	3.09	-114.3525	None	-23.33
5	Atuona	-9.8000	26.36	73	2	3.90	-139.0333	None	26.36
6	Qaanaaq	77.4840	-10.94	81	100	2.77	-69.3632	None	-10.94
7	Magdagachi	53.4500	-19.90	88	100	1.39	125.8000	None	-19.90
8	Vaini	-21.2000	28.00	74	20	5.14	-175.2000	None	28.00
9	Varkala	8.7341	30.00	70	20	2.49	76.7067	None	30.00
10	Ribeira Grande	38.5167	13.00	64	34	8.19	-28.7000	None	13.00
11	Guerrero Negro	27.9769	15.31	72	100	5.50	-114.0611	None	15.31
12	Salisbury	51.0693	8.96	100	90	4.63	-1.7957	None	10.00
13	Nikolskoye	59.7035	2.09	93	90	5.00	30.7861	None	3.00
14	Hobart	-42.8794	14.68	62	75	4.63	147.3294	None	16.11
15	George Town	5.4112	28.32	69	20	3.09	100.3354	None	30.00
16	Lebu	-37.6167	14.34	90	0	5.87	-73.6500	None	14.34
17	Aras	42.5617	9.22	87	75	6.17	-2.3560	None	9.44
18	Hilo	19.7297	20.61	73	75	2.06	-155.0900	None	23.00
19	Kipini	-2.5257	24.38	88	70	2.93	40.5262	None	24.38
20	Jalu	29.0331	10.11	53	0	1.73	21.5482	None	10.11
21	Storm Lake	42.6411	-2.02	100	1	2.57	-95.2097	None	-1.11

	city	lat	temp	humidity	clouds	speed	lon	temp_main	temp_max
22	Labuan	5.2767	27.32	74	20	2.06	115.2417	None	28.00

In [22]:
```
#Convert Raw Data to DataFrame
#Export the city data into a .csv.
#Display the DataFrame
```

In [23]:
```
#Convert Raw Data to DataFrame
# importing the module
#import pandas as pd

# saving the DataFrame as a CSV file
weather_data.to_csv('weather_data.csv', index = True)
print(weather_data.to_csv)
```

```
<bound method NDFrame.to_csv of                         city      lat   temp  humidity  clouds  speed  \
0            Tiznit Province  29.5833  13.71        48       0   0.61
1            Arraial do Cabo -22.9661  23.96        92      63   2.86
2               Río Gallegos -51.6226  10.00        62       0   3.60
3   Petropavlovsk-Kamchatskiy  53.0452  -4.00        42      20   2.00
4                Yellowknife  62.4560 -23.72        84      90   3.09
5                     Atuona  -9.8000  26.36        73       2   3.90
6                    Qaanaaq  77.4840 -10.94        81     100   2.77
7                 Magdagachi  53.4500 -19.90        88     100   1.39
8                      Vaini -21.2000  28.00        74      20   5.14
9                    Varkala   8.7341  30.00        70      20   2.49
10            Ribeira Grande  38.5167  13.00        64      34   8.19
11            Guerrero Negro  27.9769  15.31        72     100   5.50
12                 Salisbury  51.0693   8.96       100      90   4.63
13                Nikolskoye  59.7035   2.09        93      90   5.00
14                    Hobart -42.8794  14.68        62      75   4.63
15               George Town   5.4112  28.32        69      20   3.09
16                      Lebu -37.6167  14.34        90       0   5.87
17                      Aras  42.5617   9.22        87      75   6.17
18                      Hilo  19.7297  20.61        73      75   2.06
19                    Kipini  -2.5257  24.38        88      70   2.93
20                      Jalu  29.0331  10.11        53       0   1.73
21                Storm Lake  42.6411  -2.02       100       1   2.57
22                    Labuan   5.2767  27.32        74      20   2.06

         lon temp_main  temp_max
0    -9.5000      None     13.71
1   -42.0278      None     23.96
2   -69.2181      None     10.00
3   158.6483      None     -4.00
4  -114.3525      None    -23.33
```

```
5  -139.0333      None     26.36
6   -69.3632      None    -10.94
7   125.8000      None    -19.90
8  -175.2000      None     28.00
9    76.7067      None     30.00
10  -28.7000      None     13.00
11 -114.0611      None     15.31
12   -1.7957      None     10.00
13   30.7861      None      3.00
14  147.3294      None     16.11
15  100.3354      None     30.00
16  -73.6500      None     14.34
17   -2.3560      None      9.44
18 -155.0900      None     23.00
19   40.5262      None     24.38
20   21.5482      None     10.11
21  -95.2097      None     -1.11
22  115.2417      None     28.00  >
```

In [24]:

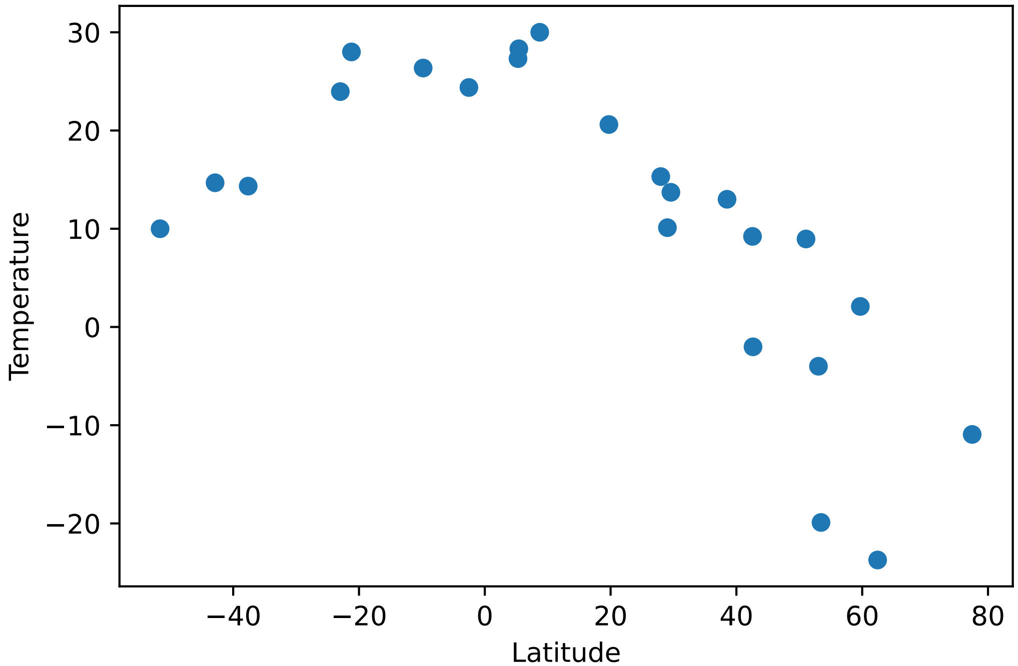
```
#Inspect the data and remove the cities where the humidity > 100%.
#Skip this step if there are no cities that have humidity > 100%.
```

In [25]:

```
#Plotting the Data
#Use proper labeling of the plots using plot titles (including date of analysis) and axes labels.
#Save the plotted figures as .pngs.
```

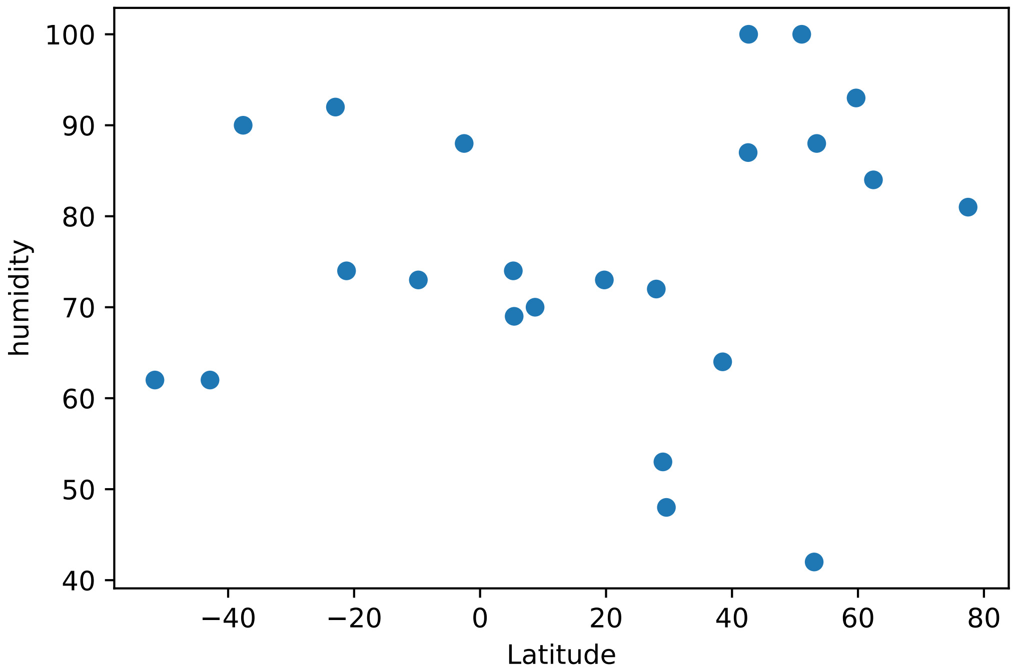
In [26]:

```
 # Create a Scatter Plot for temperature vs latitude
x_values = weather_data['lat']
y_values = weather_data['temp']
plt.scatter(x_values,y_values)
plt.xlabel('Latitude')
plt.ylabel('Temperature')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```



<Figure size 432x288 with 0 Axes>

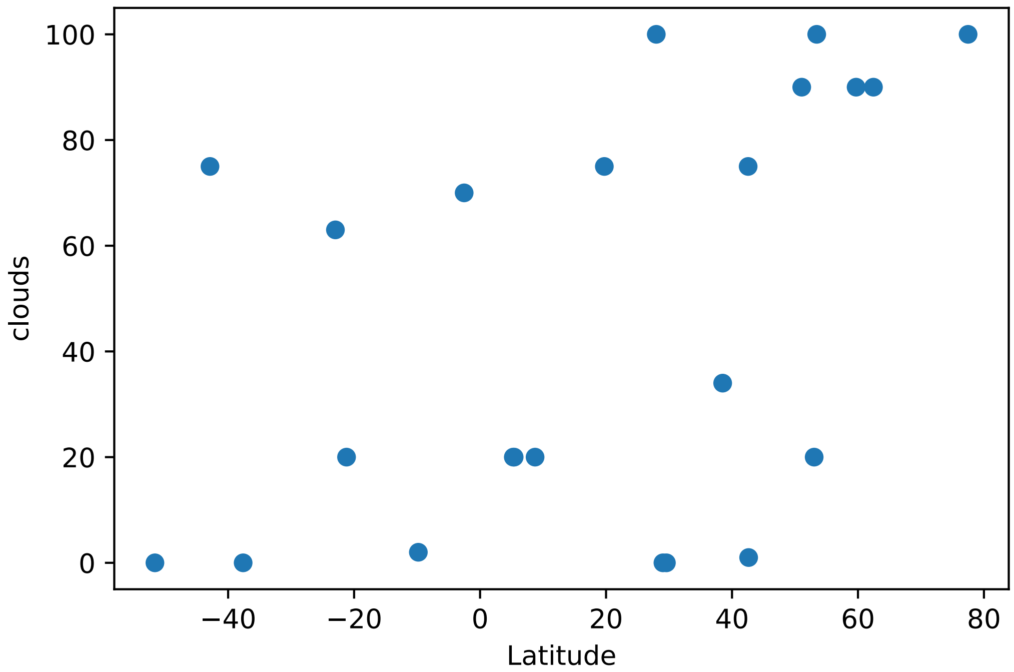
In [27]:
```
# Create a Scatter Plot for humidity (%) vs. Latitude
x_values = weather_data['lat']
y_values = weather_data['humidity']
plt.scatter(x_values,y_values)
plt.xlabel('Latitude')
plt.ylabel('humidity')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```




```
<Figure size 432x288 with 0 Axes>
```

In [28]:

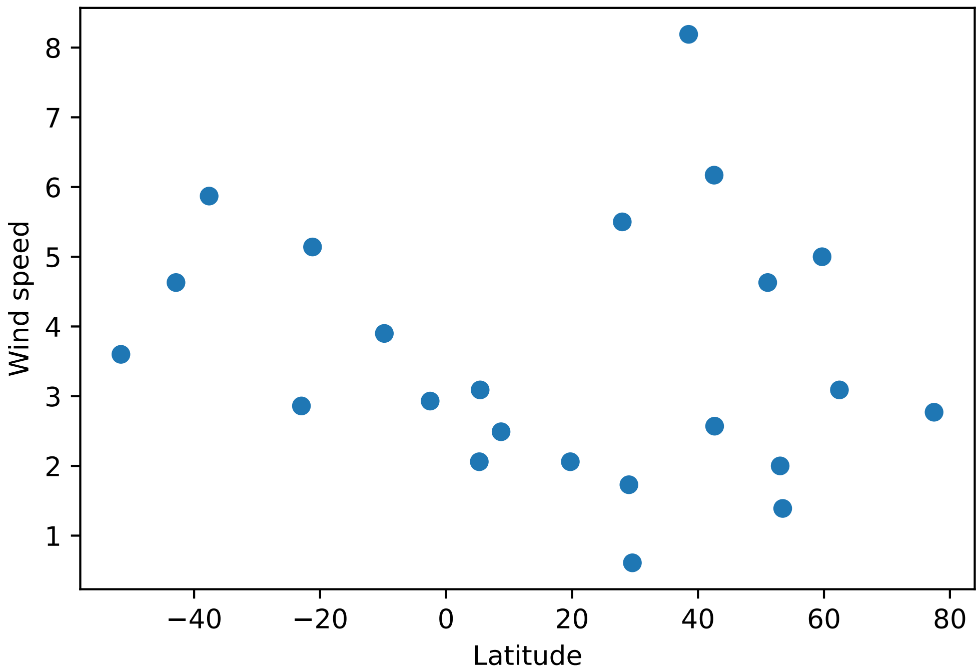
```
#Cloudiness (%) vs. Latitude
 # Create a Scatter Plot for Cloudiness (%) vs. Latitude
x_values = weather_data['lat']
y_values = weather_data['clouds']
plt.scatter(x_values,y_values)
plt.xlabel('Latitude')
plt.ylabel('clouds')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```




```
<Figure size 432x288 with 0 Axes>
```

In [29]:

```
# Create a Scatter Plot for Wind speed vs. Latitude
x_values = weather_data['lat']
y_values = weather_data['speed']
plt.scatter(x_values,y_values)
plt.xlabel('Latitude')
plt.ylabel('Wind speed')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```



<Figure size 432x288 with 0 Axes>

In [30]:
```
#weather_data["lat_sign"] = np.sign(weather_data.lat)
#print(weather_data).lat_sign
```

In [31]:
```
# create a data frame from cities, lat, and temp
North_dict = {
                "city": city_with_data,
                "lat": lat,
                "temp": temp,
                "humidity":  hum,
                "clouds":    cloud,
                "speed": wind,
                "lon": lon,
                "temp_max": temp_max
}
North_dict = pd.DataFrame(North_dict)
North_dict
```

Out[31]:

	city	lat	temp	humidity	clouds	speed	lon	temp_max
0	Tiznit Province	29.5833	13.71	48	0	0.61	-9.5000	13.71
1	Arraial do Cabo	-22.9661	23.96	92	63	2.86	-42.0278	23.96

	city	lat	temp	humidity	clouds	speed	lon	temp_max
2	Río Gallegos	-51.6226	10.00	62	0	3.60	-69.2181	10.00
3	Petropavlovsk-Kamchatskiy	53.0452	-4.00	42	20	2.00	158.6483	-4.00
4	Yellowknife	62.4560	-23.72	84	90	3.09	-114.3525	-23.33
5	Atuona	-9.8000	26.36	73	2	3.90	-139.0333	26.36
6	Qaanaaq	77.4840	-10.94	81	100	2.77	-69.3632	-10.94
7	Magdagachi	53.4500	-19.90	88	100	1.39	125.8000	-19.90
8	Vaini	-21.2000	28.00	74	20	5.14	-175.2000	28.00
9	Varkala	8.7341	30.00	70	20	2.49	76.7067	30.00
10	Ribeira Grande	38.5167	13.00	64	34	8.19	-28.7000	13.00
11	Guerrero Negro	27.9769	15.31	72	100	5.50	-114.0611	15.31
12	Salisbury	51.0693	8.96	100	90	4.63	-1.7957	10.00
13	Nikolskoye	59.7035	2.09	93	90	5.00	30.7861	3.00
14	Hobart	-42.8794	14.68	62	75	4.63	147.3294	16.11
15	George Town	5.4112	28.32	69	20	3.09	100.3354	30.00
16	Lebu	-37.6167	14.34	90	0	5.87	-73.6500	14.34
17	Aras	42.5617	9.22	87	75	6.17	-2.3560	9.44
18	Hilo	19.7297	20.61	73	75	2.06	-155.0900	23.00
19	Kipini	-2.5257	24.38	88	70	2.93	40.5262	24.38
20	Jalu	29.0331	10.11	53	0	1.73	21.5482	10.11
21	Storm Lake	42.6411	-2.02	100	1	2.57	-95.2097	-1.11
22	Labuan	5.2767	27.32	74	20	2.06	115.2417	28.00

Northern Hemisphere - Max Temp vs. Latitude Linear Regression

In [32]:
```
#Cities: Tiznit Province, Petropavlovsk-Kamchatskiy. Yellowknife, Qaanaaq, Magdagachi, Varkala, Ribeira Grande,
#Lat: 29.5833, 53.0452, 62.456, 77.484, 53.45, 8.7341, 38.5167, 27.9769, 51.0693, 59.7035, 5.4112, 42.5617, 19.
#Humidity: 67, 80, 69, 73, ,80, 62, 65, 42, 100, 65, 58, 93, 69, 90, 93, 74
##Clouds: 0, 75, 75, 68, 32, 20, 99, 98, 90, 90, 20, 90, 75, 0, 20, 20
```

```
#Speed: 0.2, 2, 1.72, 2.78, 3.15, 2.55, 11.79, 1.76, 2.06, 7, 3.6, 1.03, 3.09, 3.75, 6.17, 1.03
#temp_max: 10.96, -2, -27, -16.35, -20.63, 31, 13.79, 17.87, 6.11, -17.78, 31, 5, 24, 9.97, 5.56, 28
```

In [33]:

```
import pandas as pd
North_data = { 'cities': ['Tiznit Province', 'Petropavlovsk_Kamchatskiy', 'Yellowknife', 'Qaanaaq', 'Magdagachi
        'lat': [29.5833, 53.0452, 62.4560, 77.4840, 53.4500, 8.7341, 38.5167, 27.9769, 51.0693, 59.7035, 5.4112
        'temp_max': [10.96, -2, -27, -16.35, -20.63, 31, 13.79, 17.87, 6.11, -17.78, 31, 5, 24, 9.97, 5.56, 28]
        'humidity':[67, 80, 69, 73, 80, 62, 65, 42, 100, 65, 58, 93, 69, 90, 93, 74],
        'clouds': [0, 75, 75, 68, 32, 20, 99, 98, 90, 90, 20, 90, 75, 0, 20, 20],
        'speed': [0.2, 2, 1.72, 2.78, 3.15, 2.55, 11.79, 1.76, 2.06, 7, 3.6, 1.03, 3.09, 3.75, 6.17, 1.03]
        }

North_data = pd.DataFrame(North_data, columns = ["cities", "lat","temp_max", "humidity", "clouds", "speed"])
print (North_data)
```

```
                       cities      lat  temp_max  humidity  clouds  speed
0             Tiznit Province  29.5833     10.96        67       0   0.20
1   Petropavlovsk_Kamchatskiy  53.0452     -2.00        80      75   2.00
2                 Yellowknife  62.4560    -27.00        69      75   1.72
3                     Qaanaaq  77.4840    -16.35        73      68   2.78
4                  Magdagachi  53.4500    -20.63        80      32   3.15
5                     Varkala   8.7341     31.00        62      20   2.55
6              Ribeira Grande  38.5167     13.79        65      99  11.79
7              Guerrero Negro  27.9769     17.87        42      98   1.76
8                   Salisbury  51.0693      6.11       100      90   2.06
9                  Nikolskoye  59.7035    -17.78        65      90   7.00
10                George Town   5.4112     31.00        58      20   3.60
11                       Aras  42.5617      5.00        93      90   1.03
12                       Hilo  19.7297     24.00        69      75   3.09
13                       Jalu  29.0331      9.97        90       0   3.75
14                 Storm Lake  42.6411      5.56        93      20   6.17
15                     Labuan   5.2767     28.00        74      20   1.03
```

In [34]:

```
 # Identify incomplete rows
North_data.dtypes
```

Out[34]:

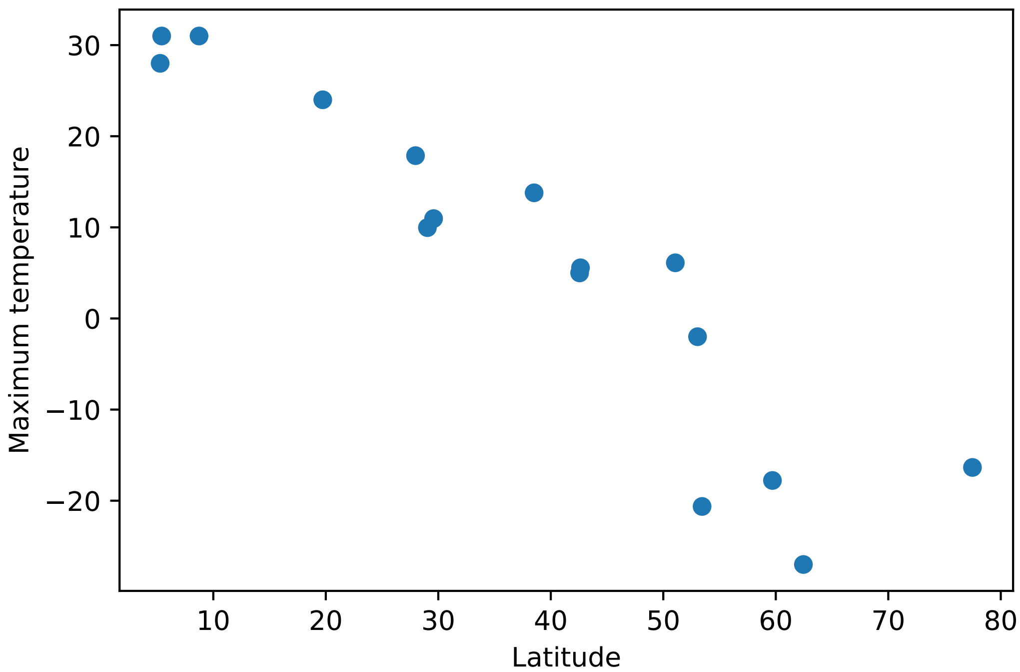
```
cities       object
lat         float64
temp_max    float64
humidity      int64
clouds        int64
speed       float64
dtype: object
```

Southern Hemisphere - Max Temp vs. Latitude Linear Regression

In [35]:

```
# Plot out maximum temperature versus latitude of country
```

```
x_values = North_data['lat']
y_values = North_data['temp_max']
plt.scatter(x_values,y_values)
plt.xlabel('Latitude')
plt.ylabel('Maximum temperature')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

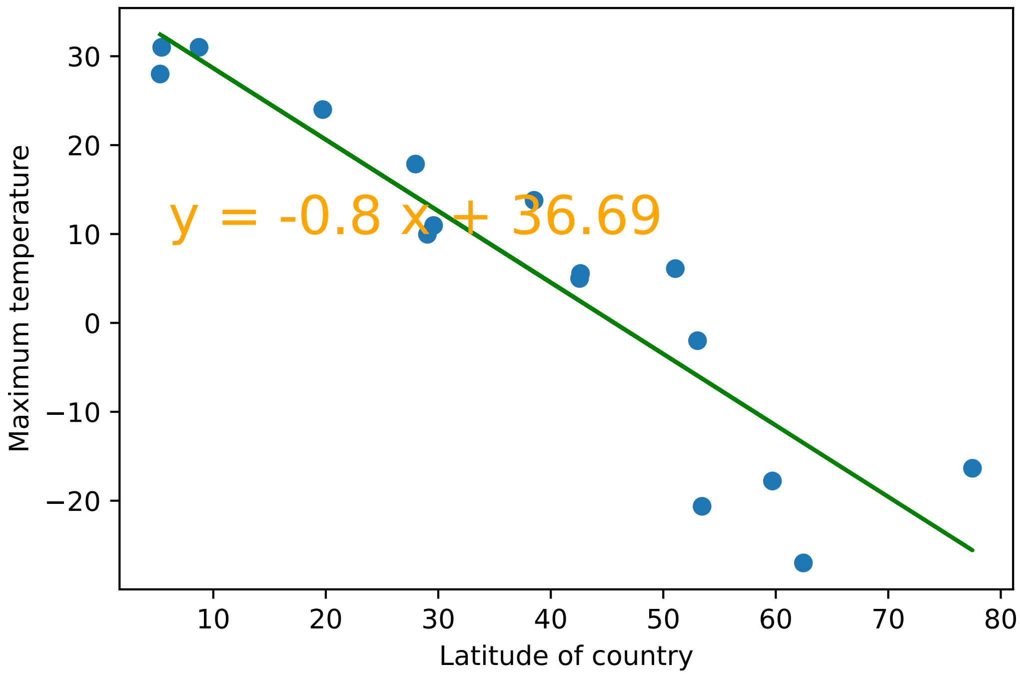



```
<Figure size 432x288 with 0 Axes>
```

In [36]:

```
# Add the linear regression equation and line to plot
x_values = North_data['lat']
y_values = North_data['temp_max']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(6,10), fontsize=20, color="orange")
```

```
plt.xlabel('Latitude of country')
plt.ylabel('Maximum temperature')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```




```
<Figure size 432x288 with 0 Axes>
```

In [37]:

```
#City: Arraial do Cabo, Río Gallegos, Atuona, Vaini, Hobart, Lebu, Kipini
#Lat: -23, -51.6, -9.8, -21.2, -42.9, -37.6, -2.53
#temp_max: 24, 8, 26.19, 29, 18.89, 13.07, 24.15
#humidity: 94, 61, 79, 70, 44, 79, 91
#clouds: 75, 20, 53, 20, 75, 0, 100
#wind_speed: 1.03, 10.29, 6.77, 3.6, 3.6, 8.03, 2.75
```

In [38]:

```
# DataFrame of Cities in Southern hemisphere using a dictionary of lists
import pandas as pd
south_data = {'cities': ['Arraial do Cabo', 'Río Gallegos', 'Atuona', 'Vaini', 'Hobart', 'Lebu', 'Kipini'],
    'Lat': [-23, -51.6, -9.8, -21.2, -42.9, -37.6, -2.53],
    'temp_max': [24, 8, 26.19, 29, 18.89, 13.07, 24.15],
    'humidity':[94, 61, 79, 70, 44, 79, 91],
    'clouds': [75, 20, 53, 20, 75, 0, 100],
    'wind_speed': [1.03, 10.29, 6.77, 3.6, 3.6, 8.03, 2.75]
    }
```

```
south_data = pd.DataFrame(south_data, columns = ['cities', 'Lat','temp_max', 'humidity', 'clouds', 'wind_speed'
print (south_data)
```

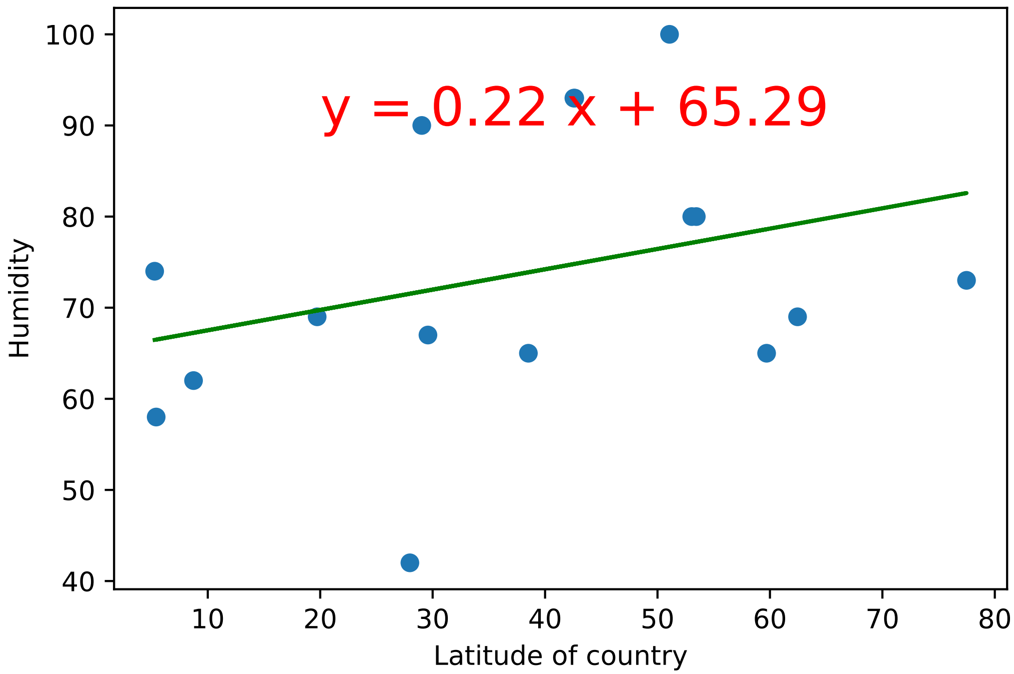
```
             cities    Lat  temp_max  humidity  clouds  wind_speed
0  Arraial do Cabo -23.00     24.00        94      75        1.03
1     Río Gallegos -51.60      8.00        61      20       10.29
2           Atuona  -9.80     26.19        79      53        6.77
3            Vaini -21.20     29.00        70      20        3.60
4           Hobart -42.90     18.89        44      75        3.60
5             Lebu -37.60     13.07        79       0        8.03
6           Kipini  -2.53     24.15        91     100        2.75
```

In [39]:
```
south_data.dtypes
```

Out[39]:
```
cities         object
Lat           float64
temp_max      float64
humidity        int64
clouds          int64
wind_speed    float64
dtype: object
```

Northern Hemisphere - Humidity (%) vs. Latitude Linear Regression

In [103…
```
# linear regression equation and line plot of North Hem humidity vs latitude
x_values = North_data['lat']
y_values = North_data['humidity']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(20,90), fontsize=20, color="red")

plt.xlabel('Latitude of country')
plt.ylabel('Humidity')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

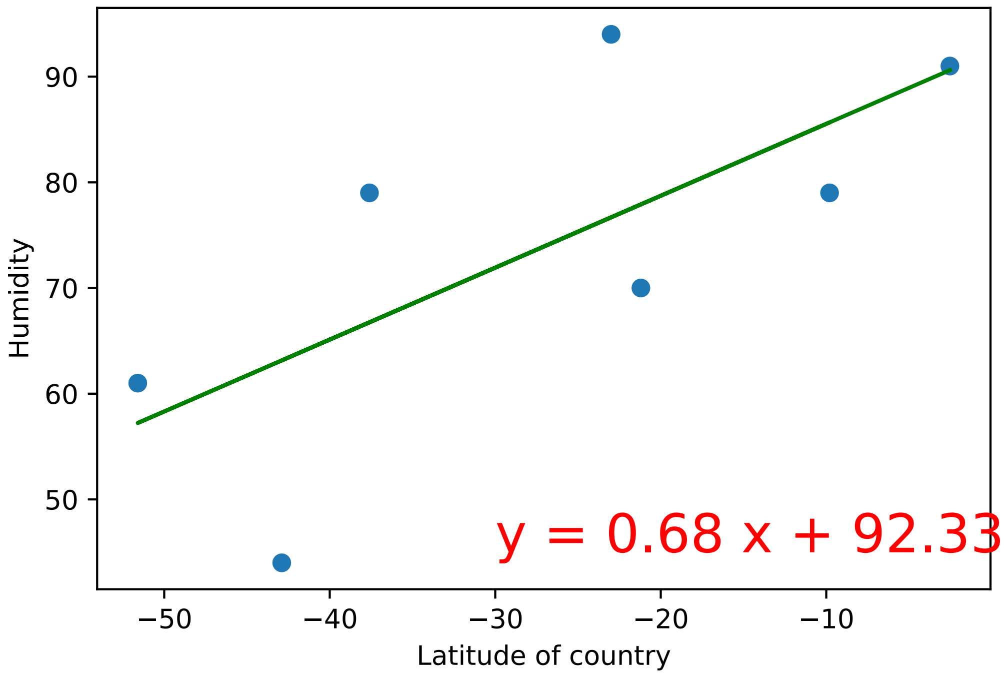



```
<Figure size 432x288 with 0 Axes>
```

Southern Hemisphere - Humidity (%) vs. Latitude Linear Regression

In [101…

```
# linear regression equation and line plot of North Hem humidity vs latitude
x_values = south_data['Lat']
y_values = south_data['humidity']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(-30, 45), fontsize=20, color="red")

plt.xlabel('Latitude of country')
plt.ylabel('Humidity')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

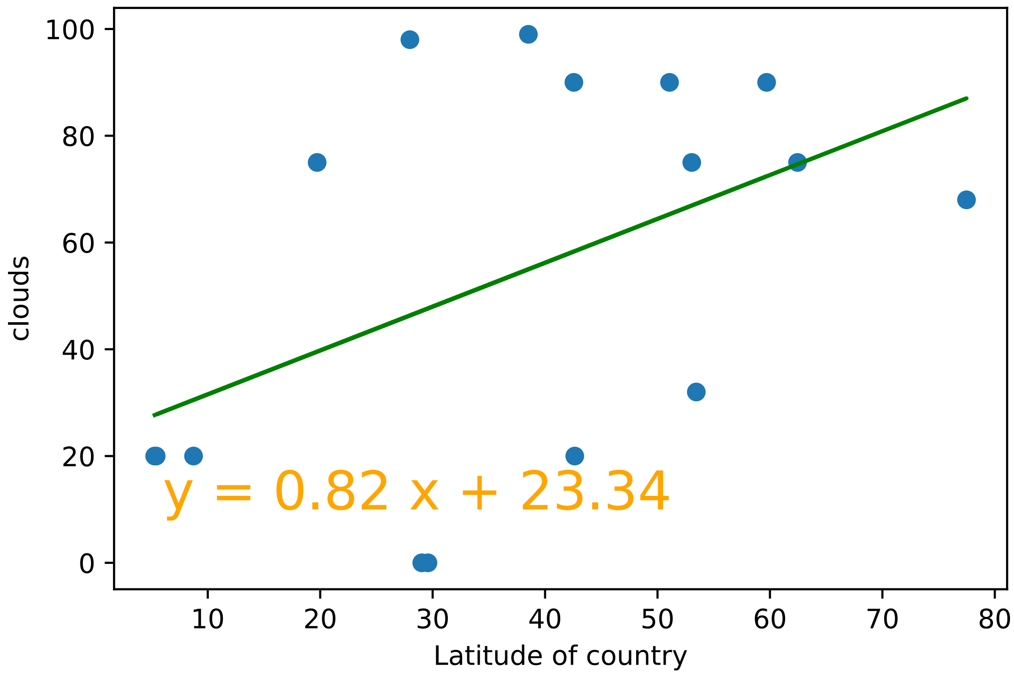



```
<Figure size 432x288 with 0 Axes>
```

Northern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

In [42]:

```python
# linear regression equation and line plot of North Hem humidity vs latitude
x_values = North_data['lat']
y_values = North_data['clouds']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(6,10), fontsize=20, color="orange")

plt.xlabel('Latitude of country')
plt.ylabel('clouds')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

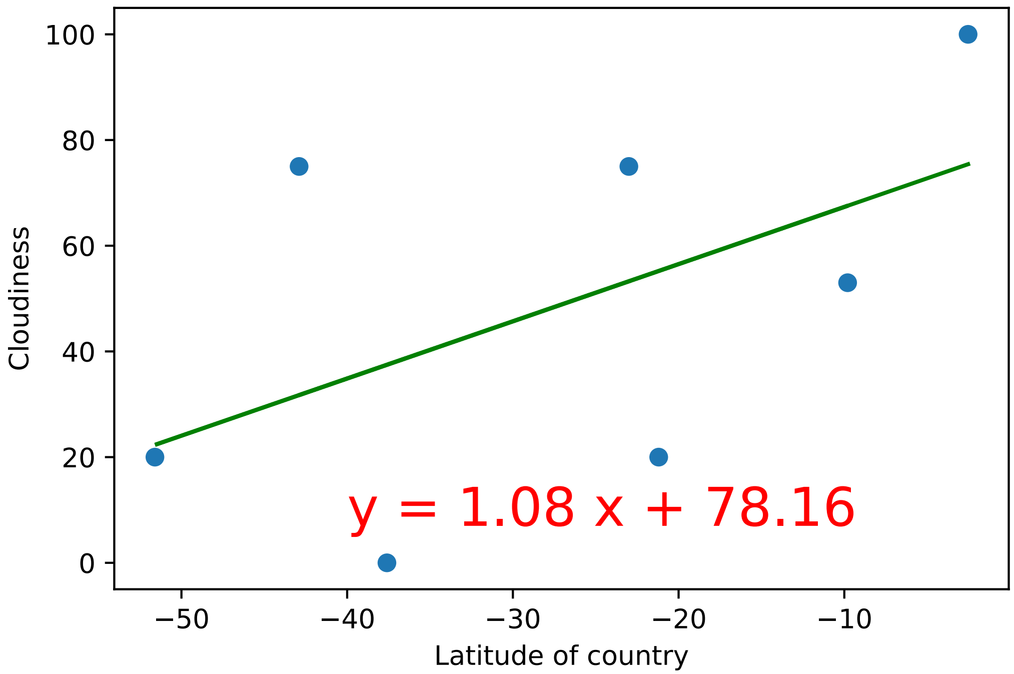



```
<Figure size 432x288 with 0 Axes>
```

Southern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

In [104…

```
# linear regression equation and line plot of North Hem cloudiness vs latitude
x_values = south_data['Lat']
y_values = south_data['clouds']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(-40,7), fontsize=20, color="red")

plt.xlabel('Latitude of country')
plt.ylabel('Cloudiness')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

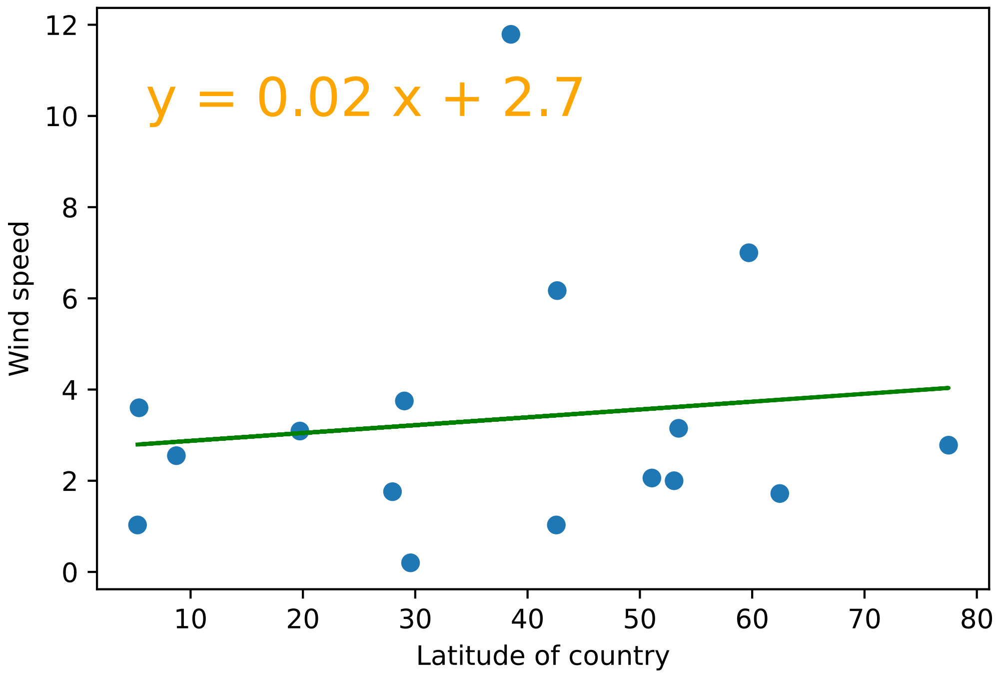


<Figure size 432x288 with 0 Axes>

Northern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

In [44]:

```
# linear regression equation and line plot of North Hem wind speed vs latitude
x_values = North_data['lat']
y_values = North_data['speed']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"

plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(6,10), fontsize=20, color="orange")

plt.xlabel('Latitude of country')
plt.ylabel('Wind speed')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```



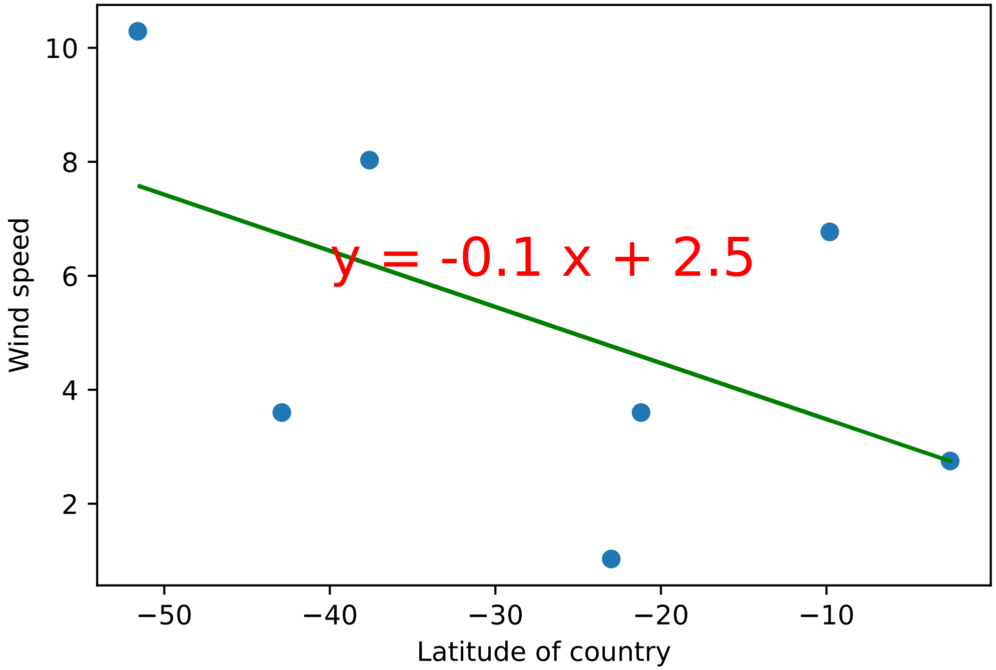

```
<Figure size 432x288 with 0 Axes>
```

Southern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

In [67]:

```
# linear regression equation and line plot of South Hem wind speed vs latitude
x_values = south_data['Lat']
y_values = south_data['wind_speed']

(slope, intercept, rvalue, pvalue, stderr) = linregress(x_values, y_values)

regress_values = x_values * slope + intercept

line_eq = f"y = {round(slope,2)} x + {round(intercept,2)}"
print(line_eq)
plt.scatter(x_values,y_values)
plt.plot(x_values,regress_values,"g-")

plt.annotate(line_eq,(-40, 6), fontsize=20, color="red")

plt.xlabel('Latitude of country')
plt.ylabel('Wind speed')
plt.show()
plt.savefig("foo.png", bbox_inches='tight')
```

```
y = -0.1 x + 2.5
```




```
<Figure size 432x288 with 0 Axes>
```

In [ ]:

In [ ]: