

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 [1]:

```
# Dependencies and Setup
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import requests
import time
import datetime
import scipy.stats as st
import json

from scipy.stats import linregress

# Import API key
from api_keys import weather_api_key

# Incorporated citipy to determine city based on Latitude and Longitude
from citipy import citipy

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

# Range of Latitudes and Longitudes
lat_range = (-90, 90)
lng_range = (-180, 180)
```

Generate Cities List

In [2]:

```
# List for holding lat_lngs and cities
lat_lngs = []
cities = []

# Create a set of random lat and lng combinations
lats = np.random.uniform(low = -90.000, high = 90.000, size=1500)
lngs = np.random.uniform(low = -180.000, high = 180.000, 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[2]:

633

In [3]:

```
city_namelist = []
cloudinesslist = []
countrylist = []
datelist = []
humiditylist = []
latlist = []
lnglist = []
max_templist = []
wind_speedlist = []
```

Perform API Calls

- Perform a weather check on each city using a series of successive API calls.
- Include a print log of each city as it's being processed (with the city number and city name).

In [4]:

```
# weather_api_key = "594b5010edacb2d53a61476b21c379a9"
# url = "http://api.openweathermap.org/data/2.5/weather?appid=" + weather_api_key + "&q=" + city
# this code was run several times using: except with "key error", to make sure the coding is clean
# counters:
index_counter = 0
set_counter = 1

print("Beginning Data Retrieval")
print("-----")

base_url = "http://api.openweathermap.org/data/2.5/weather?"
units = "imperial"
query_url = f"{base_url}appid={weather_api_key}&units={units}&q="

# iteration:
for index, city in enumerate(cities, start = 1):
    try:
        response = requests.get(query_url + city).json()
        city_namelist.append(response["name"])
        cloudinesslist.append(response["clouds"]["all"])
        countrylist.append(response["sys"]["country"])
        datelist.append(response["dt"])
        humiditylist.append(response["main"]["humidity"])
        latlist.append(response["coord"]["lat"])
        lnglist.append(response["coord"]["lon"])
        max_templist.append(response["main"]["temp_max"])
        wind_speedlist.append(response["wind"]["speed"])
        if index_counter > 49:
            index_counter = 0
            set_counter = set_counter + 1

    else:
        index_counter = index_counter + 1

    print(f"Processing Record {index_counter} of set {set_counter} : {city}")

except (KeyError, IndexError):
    print("The city was not found. Skipping to the following")
```

```
print("-----")  
print("The data retrieval is now completed")
```

Beginning Data Retrieval

```
-----  
Processing Record 1 of set 1 : jiazi  
Processing Record 2 of set 1 : tiksi  
Processing Record 3 of set 1 : pangnirtung  
Processing Record 4 of set 1 : emba  
Processing Record 5 of set 1 : aitape  
Processing Record 6 of set 1 : east london  
Processing Record 7 of set 1 : mahebourg  
Processing Record 8 of set 1 : limon  
Processing Record 9 of set 1 : ushuaia  
Processing Record 10 of set 1 : zlitani  
Processing Record 11 of set 1 : pijijiapan  
Processing Record 12 of set 1 : punta arenas  
Processing Record 13 of set 1 : sobolevo  
Processing Record 14 of set 1 : qaanaaq  
Processing Record 15 of set 1 : kiunga  
Processing Record 16 of set 1 : butaritari  
Processing Record 17 of set 1 : port alfred  
Processing Record 18 of set 1 : tuktoyaktuk  
Processing Record 19 of set 1 : busselton  
Processing Record 20 of set 1 : rikitea  
Processing Record 21 of set 1 : mataura  
Processing Record 22 of set 1 : zhigansk  
Processing Record 23 of set 1 : khatanga  
Processing Record 24 of set 1 : chokurdakh  
Processing Record 25 of set 1 : longyearbyen  
Processing Record 26 of set 1 : atuona  
Processing Record 27 of set 1 : ionia  
Processing Record 28 of set 1 : poum  
Processing Record 29 of set 1 : kodiak  
Processing Record 30 of set 1 : provideniya  
Processing Record 31 of set 1 : mandera  
Processing Record 32 of set 1 : castro  
Processing Record 33 of set 1 : mahajanga  
Processing Record 34 of set 1 : lianzhou  
The city was not found. Skipping to the following  
Processing Record 35 of set 1 : faanui  
Processing Record 36 of set 1 : ulkan  
Processing Record 37 of set 1 : nouadhibou  
Processing Record 38 of set 1 : lompoc  
Processing Record 39 of set 1 : agirish  
The city was not found. Skipping to the following
```

Processing Record 40 of set 1 : albany
Processing Record 41 of set 1 : cape town
Processing Record 42 of set 1 : new norfolk
Processing Record 43 of set 1 : acajutla
Processing Record 44 of set 1 : san quintin
Processing Record 45 of set 1 : torbay
Processing Record 46 of set 1 : vila franca do campo
Processing Record 47 of set 1 : puri
The city was not found. Skipping to the following
Processing Record 48 of set 1 : roald
Processing Record 49 of set 1 : payakumbuh
Processing Record 50 of set 1 : sosua
Processing Record 0 of set 2 : pevek
Processing Record 1 of set 2 : bowen
Processing Record 2 of set 2 : narsaq
Processing Record 3 of set 2 : hamilton
Processing Record 4 of set 2 : makkaveyevo
Processing Record 5 of set 2 : gjovik
Processing Record 6 of set 2 : turukhansk
Processing Record 7 of set 2 : hambantota
Processing Record 8 of set 2 : yellowknife
Processing Record 9 of set 2 : oranjemund
Processing Record 10 of set 2 : chuy
Processing Record 11 of set 2 : kapaa
Processing Record 12 of set 2 : champasak
Processing Record 13 of set 2 : beidao
Processing Record 14 of set 2 : hermanus
Processing Record 15 of set 2 : kyshtovka
Processing Record 16 of set 2 : cabo san lucas
Processing Record 17 of set 2 : severo-yeniseyskiy
Processing Record 18 of set 2 : bluff
Processing Record 19 of set 2 : dikson
The city was not found. Skipping to the following
Processing Record 20 of set 2 : geraldton
Processing Record 21 of set 2 : gidole
Processing Record 22 of set 2 : thompson
Processing Record 23 of set 2 : jumla
Processing Record 24 of set 2 : xam nua
Processing Record 25 of set 2 : mar del plata
Processing Record 26 of set 2 : chipinge
Processing Record 27 of set 2 : hilo
Processing Record 28 of set 2 : beringovskiy
Processing Record 29 of set 2 : poretskoye

The city was not found. Skipping to the following
Processing Record 30 of set 2 : san patricio
The city was not found. Skipping to the following
Processing Record 31 of set 2 : namibe
Processing Record 32 of set 2 : pahrump
Processing Record 33 of set 2 : saint-philippe
Processing Record 34 of set 2 : hay river
Processing Record 35 of set 2 : sorland
Processing Record 36 of set 2 : vagur
Processing Record 37 of set 2 : luanda
Processing Record 38 of set 2 : lagos
Processing Record 39 of set 2 : vestmannaeyjar
Processing Record 40 of set 2 : yelizovo
Processing Record 41 of set 2 : kavaratti
Processing Record 42 of set 2 : yenagoa
The city was not found. Skipping to the following
Processing Record 43 of set 2 : plouzane
Processing Record 44 of set 2 : bonthe
Processing Record 45 of set 2 : douglas
Processing Record 46 of set 2 : georgetown
Processing Record 47 of set 2 : bodden town
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 48 of set 2 : santa cruz
Processing Record 49 of set 2 : port elizabeth
Processing Record 50 of set 2 : waipawa
Processing Record 0 of set 3 : coquimbo
Processing Record 1 of set 3 : muscat
Processing Record 2 of set 3 : orlik
Processing Record 3 of set 3 : barrow
The city was not found. Skipping to the following
Processing Record 4 of set 3 : bredasdorp
Processing Record 5 of set 3 : avera
Processing Record 6 of set 3 : kruisfontein
Processing Record 7 of set 3 : bunbury
Processing Record 8 of set 3 : leningradskiy
The city was not found. Skipping to the following
Processing Record 9 of set 3 : puerto ayora
Processing Record 10 of set 3 : hobart
Processing Record 11 of set 3 : shimoda
Processing Record 12 of set 3 : kisanga
Processing Record 13 of set 3 : amberley
Processing Record 14 of set 3 : shanghai

Processing Record 15 of set 3 : salinas
Processing Record 16 of set 3 : upernavik
The city was not found. Skipping to the following
Processing Record 17 of set 3 : tres picos
Processing Record 18 of set 3 : najran
Processing Record 19 of set 3 : yakeshi
Processing Record 20 of set 3 : ribeira grande
The city was not found. Skipping to the following
Processing Record 21 of set 3 : cidreira
The city was not found. Skipping to the following
Processing Record 22 of set 3 : traverse city
Processing Record 23 of set 3 : hasaki
Processing Record 24 of set 3 : rio grande
Processing Record 25 of set 3 : tasiilaq
Processing Record 26 of set 3 : joao pinheiro
Processing Record 27 of set 3 : san policarpo
Processing Record 28 of set 3 : acarau
Processing Record 29 of set 3 : nikolskoye
Processing Record 30 of set 3 : llanes
Processing Record 31 of set 3 : quzhou
The city was not found. Skipping to the following
Processing Record 32 of set 3 : ilheus
The city was not found. Skipping to the following
Processing Record 33 of set 3 : ulladulla
Processing Record 34 of set 3 : taoudenni
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 35 of set 3 : lebu
Processing Record 36 of set 3 : bengkulu
Processing Record 37 of set 3 : cabra
Processing Record 38 of set 3 : victoria
Processing Record 39 of set 3 : nagato
Processing Record 40 of set 3 : kloulklubed
Processing Record 41 of set 3 : kenora
Processing Record 42 of set 3 : saskylakh
Processing Record 43 of set 3 : rosario
Processing Record 44 of set 3 : iqaluit
Processing Record 45 of set 3 : ayan
Processing Record 46 of set 3 : santa luzia
Processing Record 47 of set 3 : paamiut
Processing Record 48 of set 3 : rongcheng
Processing Record 49 of set 3 : nanortalik
Processing Record 50 of set 3 : sitka

Processing Record 0 of set 4 : katsuura
Processing Record 1 of set 4 : goderich
Processing Record 2 of set 4 : lazaro cardenas
Processing Record 3 of set 4 : chiniot
The city was not found. Skipping to the following
Processing Record 4 of set 4 : lagoa
Processing Record 5 of set 4 : norman wells
Processing Record 6 of set 4 : shaunavon
Processing Record 7 of set 4 : vaini
Processing Record 8 of set 4 : ancud
Processing Record 9 of set 4 : jamestown
Processing Record 10 of set 4 : tual
Processing Record 11 of set 4 : lata
Processing Record 12 of set 4 : launceston
Processing Record 13 of set 4 : bethel
The city was not found. Skipping to the following
Processing Record 14 of set 4 : talnakh
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 15 of set 4 : marzuq
Processing Record 16 of set 4 : raahe
Processing Record 17 of set 4 : rio gallegos
Processing Record 18 of set 4 : birao
Processing Record 19 of set 4 : yueyang
Processing Record 20 of set 4 : troitsko-pechorsk
Processing Record 21 of set 4 : solnechnyy
Processing Record 22 of set 4 : sola
Processing Record 23 of set 4 : la romana
Processing Record 24 of set 4 : gizo
Processing Record 25 of set 4 : palmas
Processing Record 26 of set 4 : celestun
Processing Record 27 of set 4 : makakilo city
Processing Record 28 of set 4 : bambous virieux
Processing Record 29 of set 4 : kavieng
Processing Record 30 of set 4 : honningsvag
Processing Record 31 of set 4 : bereda
Processing Record 32 of set 4 : barda
Processing Record 33 of set 4 : sohag
Processing Record 34 of set 4 : nalut
Processing Record 35 of set 4 : puerto lopez
The city was not found. Skipping to the following
Processing Record 36 of set 4 : wanganui
Processing Record 37 of set 4 : laguna

Processing Record 38 of set 4 : ballina
The city was not found. Skipping to the following
Processing Record 39 of set 4 : comodoro rivadavia
Processing Record 40 of set 4 : kieta
Processing Record 41 of set 4 : vardo
Processing Record 42 of set 4 : aklavik
Processing Record 43 of set 4 : esperance
Processing Record 44 of set 4 : am timan
Processing Record 45 of set 4 : sao filipe
Processing Record 46 of set 4 : vestmanna
The city was not found. Skipping to the following
Processing Record 47 of set 4 : carutapera
The city was not found. Skipping to the following
Processing Record 48 of set 4 : dingle
Processing Record 49 of set 4 : chilmari
Processing Record 50 of set 4 : ketchikan
Processing Record 0 of set 5 : tura
Processing Record 1 of set 5 : muroto
Processing Record 2 of set 5 : turkan
Processing Record 3 of set 5 : riyadh
Processing Record 4 of set 5 : hemnesberget
Processing Record 5 of set 5 : teya
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 6 of set 5 : nehe
Processing Record 7 of set 5 : kozlovka
Processing Record 8 of set 5 : hede
Processing Record 9 of set 5 : arraial do cabo
Processing Record 10 of set 5 : lavrentiya
The city was not found. Skipping to the following
Processing Record 11 of set 5 : pineville
Processing Record 12 of set 5 : severo-kurilsk
Processing Record 13 of set 5 : belyy yar
Processing Record 14 of set 5 : saint-pierre
Processing Record 15 of set 5 : mashhad
Processing Record 16 of set 5 : vao
Processing Record 17 of set 5 : coihaque
Processing Record 18 of set 5 : logansport
Processing Record 19 of set 5 : vostok
Processing Record 20 of set 5 : constitucion
The city was not found. Skipping to the following
Processing Record 21 of set 5 : san cristobal
Processing Record 22 of set 5 : hurghada

Processing Record 23 of set 5 : sabha
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 24 of set 5 : buraydah
Processing Record 25 of set 5 : manokwari
Processing Record 26 of set 5 : mayo
Processing Record 27 of set 5 : kolokani
Processing Record 28 of set 5 : flin flon
Processing Record 29 of set 5 : zhanaozen
Processing Record 30 of set 5 : yulara
Processing Record 31 of set 5 : hithadhoo
Processing Record 32 of set 5 : los llanos de aridane
Processing Record 33 of set 5 : pochinki
Processing Record 34 of set 5 : whitehorse
Processing Record 35 of set 5 : sao domingos
Processing Record 36 of set 5 : aguimes
Processing Record 37 of set 5 : cockburn town
Processing Record 38 of set 5 : gat
Processing Record 39 of set 5 : petropavlovsk-kamchatskiy
Processing Record 40 of set 5 : north bend
Processing Record 41 of set 5 : kalemie
Processing Record 42 of set 5 : kuching
Processing Record 43 of set 5 : honiara
Processing Record 44 of set 5 : conde
Processing Record 45 of set 5 : sistranda
Processing Record 46 of set 5 : klaksvik
Processing Record 47 of set 5 : ust-nera
Processing Record 48 of set 5 : teguise
Processing Record 49 of set 5 : hovd
Processing Record 50 of set 5 : neuquen
The city was not found. Skipping to the following
Processing Record 0 of set 6 : bubaque
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 1 of set 6 : maniitsoq
Processing Record 2 of set 6 : newtownards
Processing Record 3 of set 6 : alofi
Processing Record 4 of set 6 : pisco
Processing Record 5 of set 6 : biltine
Processing Record 6 of set 6 : suozhen
Processing Record 7 of set 6 : bella union
Processing Record 8 of set 6 : pitea
Processing Record 9 of set 6 : oistins

Processing Record 10 of set 6 : bilma
Processing Record 11 of set 6 : bogorodskoye
Processing Record 12 of set 6 : ugoofaaru
Processing Record 13 of set 6 : codrington
Processing Record 14 of set 6 : bitung
Processing Record 15 of set 6 : salekhard
Processing Record 16 of set 6 : tianpeng
Processing Record 17 of set 6 : huilong
Processing Record 18 of set 6 : araruama
Processing Record 19 of set 6 : cabedelo
Processing Record 20 of set 6 : salalah
Processing Record 21 of set 6 : bandarbeyla
Processing Record 22 of set 6 : port lincoln
Processing Record 23 of set 6 : luena
Processing Record 24 of set 6 : lubsko
Processing Record 25 of set 6 : aswan
Processing Record 26 of set 6 : wawa
Processing Record 27 of set 6 : denpasar
Processing Record 28 of set 6 : rosarito
Processing Record 29 of set 6 : santa rosa
Processing Record 30 of set 6 : winnemucca
The city was not found. Skipping to the following
Processing Record 31 of set 6 : avarua
Processing Record 32 of set 6 : mirnyy
Processing Record 33 of set 6 : eganville
Processing Record 34 of set 6 : kushima
Processing Record 35 of set 6 : isla vista
Processing Record 36 of set 6 : sinnamary
The city was not found. Skipping to the following
Processing Record 37 of set 6 : saint-augustin
Processing Record 38 of set 6 : kanepi
Processing Record 39 of set 6 : hecun
Processing Record 40 of set 6 : saint george
Processing Record 41 of set 6 : kaitangata
The city was not found. Skipping to the following
Processing Record 42 of set 6 : inhambane
Processing Record 43 of set 6 : boden
Processing Record 44 of set 6 : quelimane
Processing Record 45 of set 6 : vytegra
Processing Record 46 of set 6 : dois riachos
Processing Record 47 of set 6 : lypnyazhka
Processing Record 48 of set 6 : clifton
Processing Record 49 of set 6 : ostrovnoy

Processing Record 50 of set 6 : mao
Processing Record 0 of set 7 : port hedland
Processing Record 1 of set 7 : san carlos
Processing Record 2 of set 7 : santa marta
Processing Record 3 of set 7 : ponta delgada
Processing Record 4 of set 7 : kurilsk
Processing Record 5 of set 7 : haines junction
Processing Record 6 of set 7 : rawson
Processing Record 7 of set 7 : tromso
Processing Record 8 of set 7 : labuhan
Processing Record 9 of set 7 : lesosibirsk
Processing Record 10 of set 7 : varkaus
Processing Record 11 of set 7 : dakar
Processing Record 12 of set 7 : berlevag
Processing Record 13 of set 7 : peniche
Processing Record 14 of set 7 : airai
Processing Record 15 of set 7 : shingu
Processing Record 16 of set 7 : george
Processing Record 17 of set 7 : dicabisagan
Processing Record 18 of set 7 : chapais
The city was not found. Skipping to the following
Processing Record 19 of set 7 : ilulissat
Processing Record 20 of set 7 : nishihara
Processing Record 21 of set 7 : quatre cocos
Processing Record 22 of set 7 : huangnihe
Processing Record 23 of set 7 : acapulco
Processing Record 24 of set 7 : banepa
Processing Record 25 of set 7 : cefalu
Processing Record 26 of set 7 : tevriz
Processing Record 27 of set 7 : zhangjiakou
Processing Record 28 of set 7 : isangel
Processing Record 29 of set 7 : hofn
Processing Record 30 of set 7 : flers
Processing Record 31 of set 7 : sembakung
Processing Record 32 of set 7 : guerrero negro
Processing Record 33 of set 7 : padang
Processing Record 34 of set 7 : port macquarie
Processing Record 35 of set 7 : nelspruit
Processing Record 36 of set 7 : olafsvik
Processing Record 37 of set 7 : biak
Processing Record 38 of set 7 : san lawrenz
Processing Record 39 of set 7 : jawhar
Processing Record 40 of set 7 : henties bay

Processing Record 41 of set 7 : dutse
Processing Record 42 of set 7 : bar harbor
Processing Record 43 of set 7 : westport
Processing Record 44 of set 7 : fort-shevchenko
Processing Record 45 of set 7 : port hawkesbury
Processing Record 46 of set 7 : mogadishu
Processing Record 47 of set 7 : treinta y tres
Processing Record 48 of set 7 : omboue
Processing Record 49 of set 7 : kabinda
Processing Record 50 of set 7 : washington
Processing Record 0 of set 8 : hickory
Processing Record 1 of set 8 : rocha
Processing Record 2 of set 8 : luderitz
Processing Record 3 of set 8 : diffa
Processing Record 4 of set 8 : san andres
Processing Record 5 of set 8 : kafanchan
Processing Record 6 of set 8 : marquette
Processing Record 7 of set 8 : margate
Processing Record 8 of set 8 : alice springs
The city was not found. Skipping to the following
Processing Record 9 of set 8 : marawi
Processing Record 10 of set 8 : jiblah
Processing Record 11 of set 8 : labuan
Processing Record 12 of set 8 : bell ville
Processing Record 13 of set 8 : ahipara
Processing Record 14 of set 8 : umarkot
Processing Record 15 of set 8 : souillac
Processing Record 16 of set 8 : rantepao
Processing Record 17 of set 8 : puerto leguizamo
Processing Record 18 of set 8 : along
Processing Record 19 of set 8 : lydenburg
Processing Record 20 of set 8 : senador jose porfirio
The city was not found. Skipping to the following
Processing Record 21 of set 8 : terrace bay
Processing Record 22 of set 8 : santa maria del oro
Processing Record 23 of set 8 : antas
Processing Record 24 of set 8 : lecce
Processing Record 25 of set 8 : polovinnoye
Processing Record 26 of set 8 : severobaykalsk
Processing Record 27 of set 8 : husavik
Processing Record 28 of set 8 : wahiawa
Processing Record 29 of set 8 : owando
The city was not found. Skipping to the following

Processing Record 30 of set 8 : flinders
Processing Record 31 of set 8 : duldurga
Processing Record 32 of set 8 : san jose de guanipa
Processing Record 33 of set 8 : dergachi
Processing Record 34 of set 8 : kaeo
Processing Record 35 of set 8 : channel-port aux basques
Processing Record 36 of set 8 : talaya
Processing Record 37 of set 8 : sumenep
Processing Record 38 of set 8 : berbera
Processing Record 39 of set 8 : amapa
Processing Record 40 of set 8 : manta
Processing Record 41 of set 8 : diamantino
Processing Record 42 of set 8 : kirksville
Processing Record 43 of set 8 : talcahuano
Processing Record 44 of set 8 : hobyo
Processing Record 45 of set 8 : erzin
Processing Record 46 of set 8 : college
The city was not found. Skipping to the following
Processing Record 47 of set 8 : mount gambier
Processing Record 48 of set 8 : las tunas
Processing Record 49 of set 8 : basco
Processing Record 50 of set 8 : half moon bay
Processing Record 0 of set 9 : zimmi
Processing Record 1 of set 9 : anadyr
Processing Record 2 of set 9 : axim
Processing Record 3 of set 9 : te anau
Processing Record 4 of set 9 : renfrew
Processing Record 5 of set 9 : lethem
Processing Record 6 of set 9 : tynda
Processing Record 7 of set 9 : okhotsk
Processing Record 8 of set 9 : pitimbu
Processing Record 9 of set 9 : sept-iles
Processing Record 10 of set 9 : alindao
The city was not found. Skipping to the following
Processing Record 11 of set 9 : saint-denis
Processing Record 12 of set 9 : svetlogorsk
Processing Record 13 of set 9 : allen
The city was not found. Skipping to the following
Processing Record 14 of set 9 : sur
Processing Record 15 of set 9 : usinsk
Processing Record 16 of set 9 : port augusta
Processing Record 17 of set 9 : camacha
Processing Record 18 of set 9 : requena

Processing Record 19 of set 9 : beawar
Processing Record 20 of set 9 : suifenhe
Processing Record 21 of set 9 : maltahohe
Processing Record 22 of set 9 : beatrice
Processing Record 23 of set 9 : deputatskiy
Processing Record 24 of set 9 : grande prairie
Processing Record 25 of set 9 : banikoara
Processing Record 26 of set 9 : wuwei
Processing Record 27 of set 9 : sao joao da barra
Processing Record 28 of set 9 : churapcha
Processing Record 29 of set 9 : aguada de pasajeros
Processing Record 30 of set 9 : zabol
Processing Record 31 of set 9 : carnarvon
Processing Record 32 of set 9 : kidal
Processing Record 33 of set 9 : toppenish
Processing Record 34 of set 9 : garissa
Processing Record 35 of set 9 : tarakan
The city was not found. Skipping to the following
Processing Record 36 of set 9 : burgersdorp
Processing Record 37 of set 9 : pedernales
The city was not found. Skipping to the following
Processing Record 38 of set 9 : kichera
Processing Record 39 of set 9 : mana
Processing Record 40 of set 9 : bara
Processing Record 41 of set 9 : phitsanulok
Processing Record 42 of set 9 : lorengau
Processing Record 43 of set 9 : bundaberg
Processing Record 44 of set 9 : atar
Processing Record 45 of set 9 : portsmouth
Processing Record 46 of set 9 : tjome
Processing Record 47 of set 9 : guiuan
Processing Record 48 of set 9 : abalak
Processing Record 49 of set 9 : nemuro
Processing Record 50 of set 9 : waingapu
Processing Record 0 of set 10 : linhares
Processing Record 1 of set 10 : san isidro
Processing Record 2 of set 10 : atyrau
Processing Record 3 of set 10 : nanakuli
Processing Record 4 of set 10 : vertientes
Processing Record 5 of set 10 : simi
Processing Record 6 of set 10 : el alto
Processing Record 7 of set 10 : samarai
Processing Record 8 of set 10 : canavieiras

Processing Record 9 of set 10 : tucuman
Processing Record 10 of set 10 : voi
Processing Record 11 of set 10 : jablah
Processing Record 12 of set 10 : nha trang
Processing Record 13 of set 10 : tiarei
Processing Record 14 of set 10 : clarence town
Processing Record 15 of set 10 : bantou
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 16 of set 10 : saldanha
Processing Record 17 of set 10 : hals
Processing Record 18 of set 10 : korla
Processing Record 19 of set 10 : north platte
Processing Record 20 of set 10 : gosen
Processing Record 21 of set 10 : strezhevoy
The city was not found. Skipping to the following
Processing Record 22 of set 10 : muisne
Processing Record 23 of set 10 : karasburg
Processing Record 24 of set 10 : casablanca
Processing Record 25 of set 10 : toul
Processing Record 26 of set 10 : otradnoye
Processing Record 27 of set 10 : mae hong son
Processing Record 28 of set 10 : khash
Processing Record 29 of set 10 : ordynskoye
Processing Record 30 of set 10 : igarka
Processing Record 31 of set 10 : macherla
Processing Record 32 of set 10 : manono
Processing Record 33 of set 10 : kjopsvik
Processing Record 34 of set 10 : panguna
Processing Record 35 of set 10 : lebanon
Processing Record 36 of set 10 : porangatu
Processing Record 37 of set 10 : bacolod
Processing Record 38 of set 10 : rundu
Processing Record 39 of set 10 : okany
Processing Record 40 of set 10 : epe
Processing Record 41 of set 10 : kenai
Processing Record 42 of set 10 : ararangua
Processing Record 43 of set 10 : concepcion
Processing Record 44 of set 10 : qasigianniguit
Processing Record 45 of set 10 : benghazi
Processing Record 46 of set 10 : mineiros
Processing Record 47 of set 10 : ponta do sol
Processing Record 48 of set 10 : caravelas

Processing Record 49 of set 10 : birjand
Processing Record 50 of set 10 : smithers
Processing Record 0 of set 11 : hoi an
Processing Record 1 of set 11 : ust-kuyga
Processing Record 2 of set 11 : nelson bay
Processing Record 3 of set 11 : necochea
Processing Record 4 of set 11 : monrovia
Processing Record 5 of set 11 : skjervoy
Processing Record 6 of set 11 : oskemen
Processing Record 7 of set 11 : chadiza
Processing Record 8 of set 11 : merauke
Processing Record 9 of set 11 : timra
Processing Record 10 of set 11 : tongren
Processing Record 11 of set 11 : kuchinarai
Processing Record 12 of set 11 : gazli
Processing Record 13 of set 11 : baft
Processing Record 14 of set 11 : mukhen
The city was not found. Skipping to the following
The city was not found. Skipping to the following
Processing Record 15 of set 11 : sale
The city was not found. Skipping to the following
Processing Record 16 of set 11 : salvador
Processing Record 17 of set 11 : broken hill
Processing Record 18 of set 11 : merrill
Processing Record 19 of set 11 : japura
Processing Record 20 of set 11 : wanning
Processing Record 21 of set 11 : walla walla
Processing Record 22 of set 11 : binghamton
Processing Record 23 of set 11 : belmonte
The city was not found. Skipping to the following
Processing Record 24 of set 11 : srednekolymsk
Processing Record 25 of set 11 : nicoya
Processing Record 26 of set 11 : noshiro
Processing Record 27 of set 11 : hays
Processing Record 28 of set 11 : cap malheureux
Processing Record 29 of set 11 : nipawin
Processing Record 30 of set 11 : makarov
The city was not found. Skipping to the following
Processing Record 31 of set 11 : komsomolskiy
Processing Record 32 of set 11 : kananga
Processing Record 33 of set 11 : abu kamal
Processing Record 34 of set 11 : gemena
The city was not found. Skipping to the following

```
Processing Record 35 of set 11 : abu zabad
Processing Record 36 of set 11 : kathu
Processing Record 37 of set 11 : kampene
Processing Record 38 of set 11 : coahuayana
Processing Record 39 of set 11 : vaitape
Processing Record 40 of set 11 : karpogory
Processing Record 41 of set 11 : saint anthony
The city was not found. Skipping to the following
Processing Record 42 of set 11 : bima
Processing Record 43 of set 11 : kailua
Processing Record 44 of set 11 : gelibolu
Processing Record 45 of set 11 : panzhihua
Processing Record 46 of set 11 : kholmogory
Processing Record 47 of set 11 : anloga
Processing Record 48 of set 11 : bembereke
Processing Record 49 of set 11 : medeiros neto
Processing Record 50 of set 11 : milyutinskaya
Processing Record 0 of set 12 : kidodi
Processing Record 1 of set 12 : huarmey
Processing Record 2 of set 12 : kula
Processing Record 3 of set 12 : seoul
Processing Record 4 of set 12 : qaqortoq
Processing Record 5 of set 12 : nantucket
Processing Record 6 of set 12 : praya
Processing Record 7 of set 12 : malakal
Processing Record 8 of set 12 : pacific grove
Processing Record 9 of set 12 : bozoum
Processing Record 10 of set 12 : de aar
Processing Record 11 of set 12 : at-bashi
Processing Record 12 of set 12 : brigantine
Processing Record 13 of set 12 : shahr-e babak
Processing Record 14 of set 12 : faya
Processing Record 15 of set 12 : chara
-----
The data retrieval is now completed
```

In [6]:

```
# Raw data to dataframe

WeatherNew = pd.DataFrame({
    "City" : city_namelist,
    "Cloudiness" : cloudinesslist,
    "Country" : countrylist,
    "Date" : datelist,
    "Humidity" : humiditylist,
    "Lat" : latlist,
    "Lng" : lnglist,
    "Max Temp" : max_templist,
    "Wind Speed" : wind_speedlist
})
```

In [7]:

```
# counting data
WeatherNew.count()
```

Out[7]:

| | |
|------------|-------|
| City | 576 |
| Cloudiness | 576 |
| Country | 576 |
| Date | 576 |
| Humidity | 576 |
| Lat | 576 |
| Lng | 576 |
| Max Temp | 576 |
| Wind Speed | 576 |
| dtype: | int64 |

In [8]:

```
WeatherNew
```

Out[8]:

| | City | Cloudiness | Country | Date | Humidity | Lat | Lng | Max Temp | Wind Speed |
|-----|---------------|------------|---------|------------|----------|-------|--------|----------|------------|
| 0 | Jiazi | 3 | CN | 1595003225 | 88 | 22.88 | 116.07 | 82.60 | 10.63 |
| 1 | Tiksi | 99 | RU | 1595003225 | 78 | 71.69 | 128.87 | 43.48 | 17.49 |
| 2 | Pangnirtung | 90 | CA | 1595003225 | 49 | 66.15 | -65.71 | 68.00 | 12.75 |
| 3 | Emba | 25 | KZ | 1595003226 | 17 | 48.83 | 58.14 | 90.14 | 7.54 |
| 4 | Aitape | 100 | PG | 1595003226 | 85 | -3.14 | 142.35 | 77.58 | 5.10 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 571 | At-Bashi | 100 | KG | 1595003323 | 70 | 41.17 | 75.81 | 57.87 | 3.89 |
| 572 | Brigantine | 90 | US | 1595003324 | 78 | 39.41 | -74.36 | 80.60 | 8.05 |
| 573 | Shahr-e Bābak | 75 | IR | 1595003324 | 28 | 30.12 | 55.12 | 78.76 | 2.06 |
| 574 | Faya | 20 | SA | 1595003324 | 49 | 18.39 | 42.45 | 75.20 | 11.41 |
| 575 | Chara | 100 | RU | 1595003324 | 85 | 56.91 | 118.26 | 59.27 | 1.03 |

576 rows × 9 columns

Inspect the data and remove the cities where the humidity > 100%.

Skip this step if there are no cities that have humidity > 100%.

In []:

In []:

```
# Get the indices of cities that have humidity over 100%.
```

In []:

```
# Make a new DataFrame equal to the city data to drop all humidity outliers by index.  
# Passing "inplace=False" will make a copy of the city_data DataFrame, which we call "clean_city_data".
```

In []:

```
# Extract relevant fields from the data frame
```

```
# Export the City_Data into a csv
```

In [9]:

```
# dataframe to CSV
```

```
WeatherNew.to_csv("cities.csv", index = False)
```

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.

Latitude vs. Temperature Plot

In [10]:

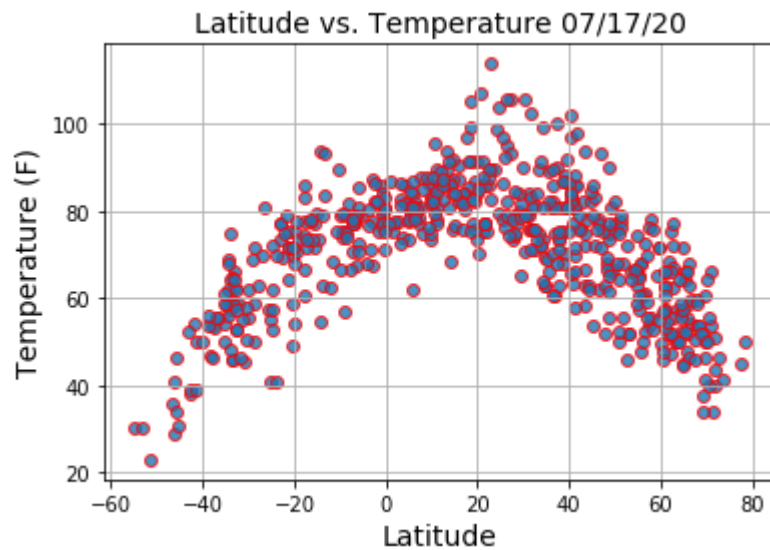
```
# Today's date

date = datetime.date.today()
date = time.strftime("%m/%d/%y")

plt.scatter(WeatherNew["Lat"], WeatherNew["Max Temp"],
            edgecolor = "red", linewidths = 1, marker = "o", alpha = 0.8, label = "cities")
plt.title(f"Latitude vs. Temperature {date}", fontsize = "14")
plt.xlabel("Latitude", fontsize = "14")
plt.ylabel("Temperature (F)", fontsize = "14")
plt.grid(True)

plt.savefig("Fig_1.png")

plt.show()
```



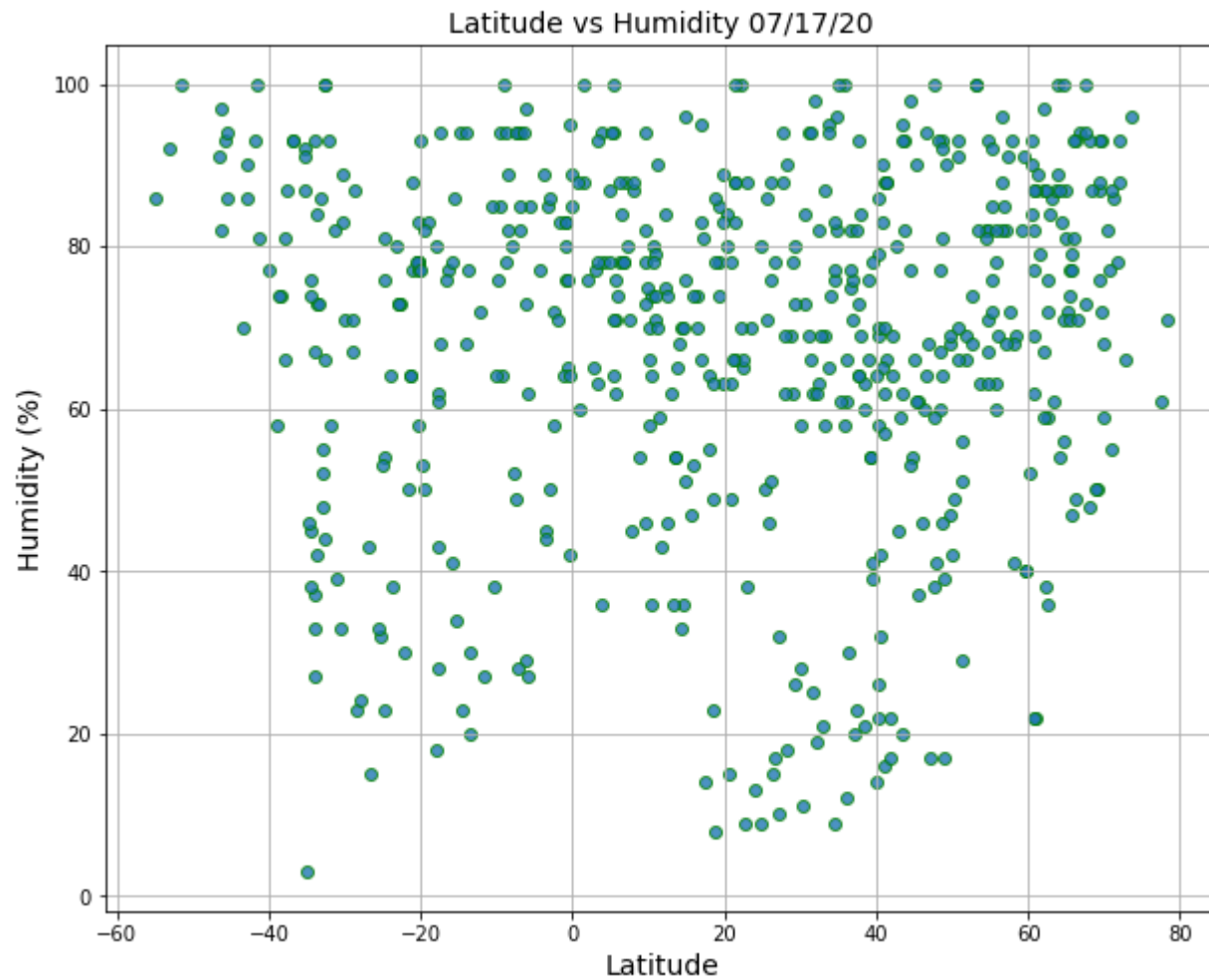
Latitude vs. Humidity Plot

In [11]:

```
plt.figure(figsize = (10,8))
plt.scatter(WeatherNew["Lat"], WeatherNew["Humidity"],
            edgecolor = "green", linewidths = 1, marker = "o", alpha = 0.8, label = "cities")
plt.title(f"Latitude vs Humidity {date}", fontsize = "14")
plt.xlabel("Latitude", fontsize = "14")
plt.ylabel("Humidity (%)", fontsize = "14")
plt.grid(True)

plt.savefig("Fig_2.png")

plt.show()
```



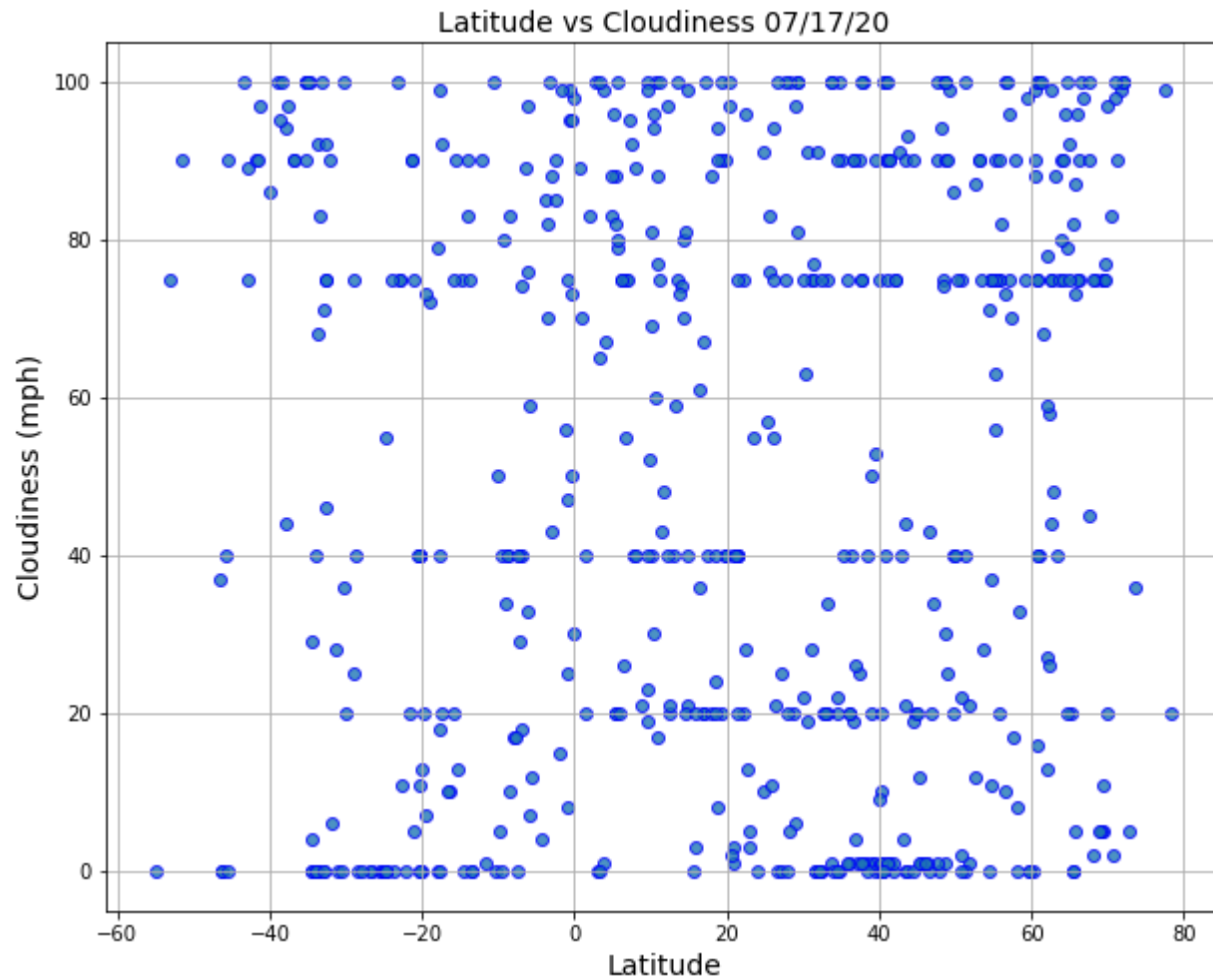
Latitude vs. Cloudiness Plot

In [12]:

```
plt.figure(figsize = (10,8))
plt.scatter(WeatherNew["Lat"], WeatherNew["Cloudiness"],
            edgecolor = "blue", linewidths = 1, marker = "o", alpha = 0.8, label = "cities")
plt.title(f"Latitude vs Cloudiness {date}", fontsize = "14")
plt.xlabel("Latitude", fontsize = "14")
plt.ylabel("Cloudiness (mph)", fontsize = "14")
plt.grid(True)

plt.savefig("Fig_3.png")

plt.show()
```



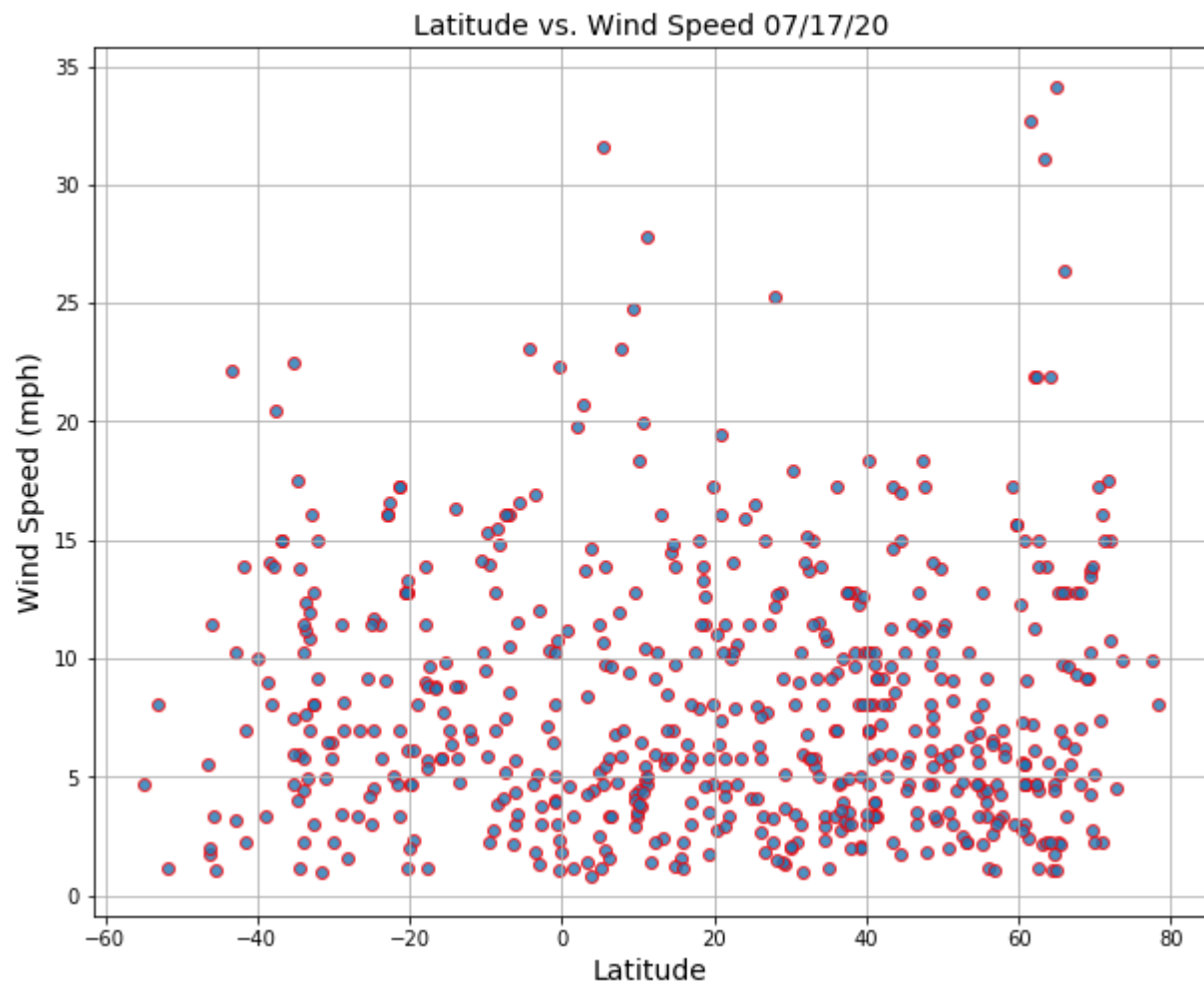
Latitude vs. Wind Speed Plot

In [13]:

```
plt.figure(figsize = (10,8))
plt.scatter(WeatherNew["Lat"], WeatherNew["Wind Speed"],
            edgecolor = "red", linewidths = 1, marker = "o", alpha = 0.8, label = "cities")
plt.title(f"Latitude vs. Wind Speed {date}", fontsize = "14")
plt.xlabel("Latitude", fontsize = "14")
plt.ylabel("Wind Speed (mph)", fontsize = "14")
plt.grid(True)

plt.savefig("Fig_4.png")

plt.show()
```



In []:

```
# All plotted figures were saved
```

Linear Regression

In []:

```
# OPTIONAL: Create a function to create Linear Regression plots
```

In []:

```
# Create Northern and Southern Hemisphere DataFrames
```

In [21]:

```
Northern = WeatherNew.loc[WeatherNew["Lat"] >= 0.0]
Northern.reset_index(inplace = True)

Southern = WeatherNew.loc[WeatherNew["Lat"] < 0.0]
Southern.reset_index(inplace = True)

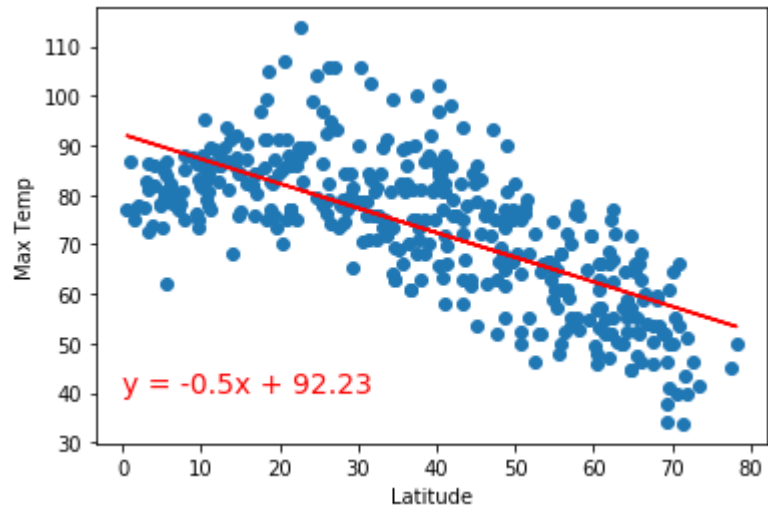
def plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos):
    (slope, intercept, rvalue, pvalue, stderr) = linregress(xdata, ydata)
    print("The r-squared is: ", format(rvalue, ".2f"))
    regress_values = xdata * slope + intercept
    line_eq = "y = " + str(round(slope, 2)) + "x + " + str(round(intercept, 2))

    plt.scatter(xdata, ydata)
    plt.plot(xdata, regress_values, "r-")
    plt.annotate(line_eq, lblpos, fontsize = 14, color = "red")
    plt.xlabel(xlabel)
    plt.ylabel(ylabel)
    plt.show()

xlabel = "Latitude"
ylabel = "Max Temp"
xdata = Northern["Lat"]
ydata = Northern["Max Temp"]
lblpos = (0,40)
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)

# Northern Hemisphere - Max temperature vs Latitude
```


The r-squared is: -0.70

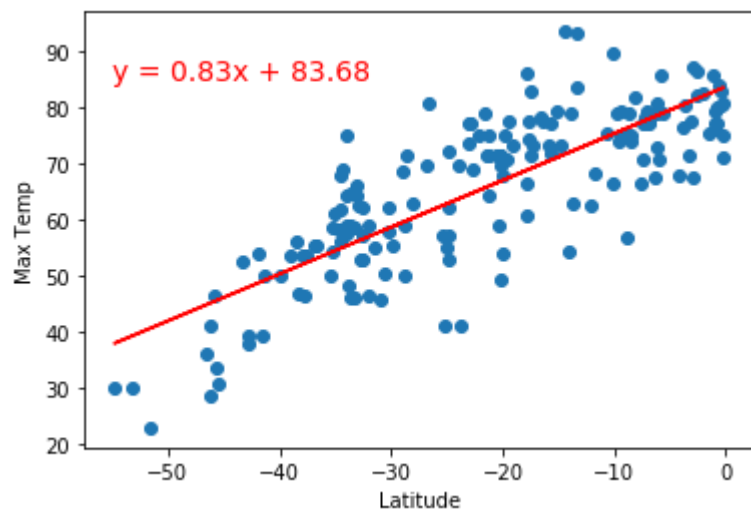


Southern Hemisphere - Max Temp vs. Latitude Linear Regression

In [22]:

```
xlbl = "Latitude"  
ybl = "Max Temp"  
xdata = Southern["Lat"]  
ydata = Southern["Max Temp"]  
lblpos = (-55,85)  
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: 0.81

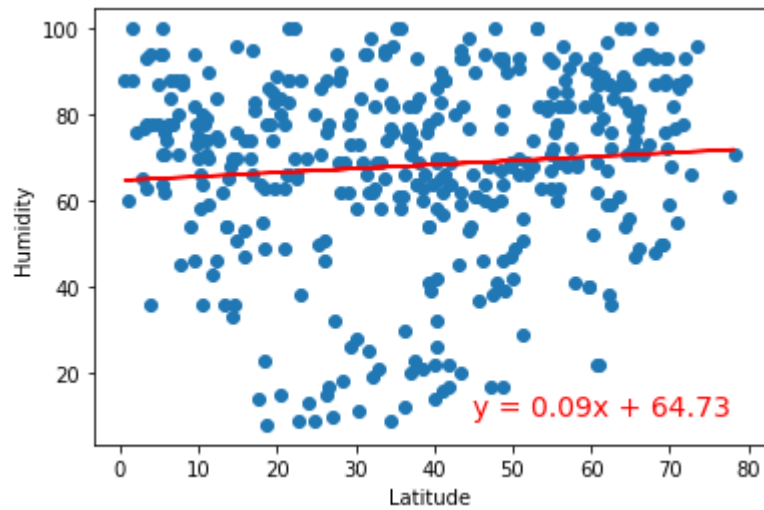


Northern Hemisphere - Humidity (%) vs. Latitude Linear Regression

In [24]:

```
xlbl = "Latitude"  
ylbl = "Humidity"  
xdata = Northern["Lat"]  
ydata = Northern["Humidity"]  
lblpos = (45,10)  
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: 0.09

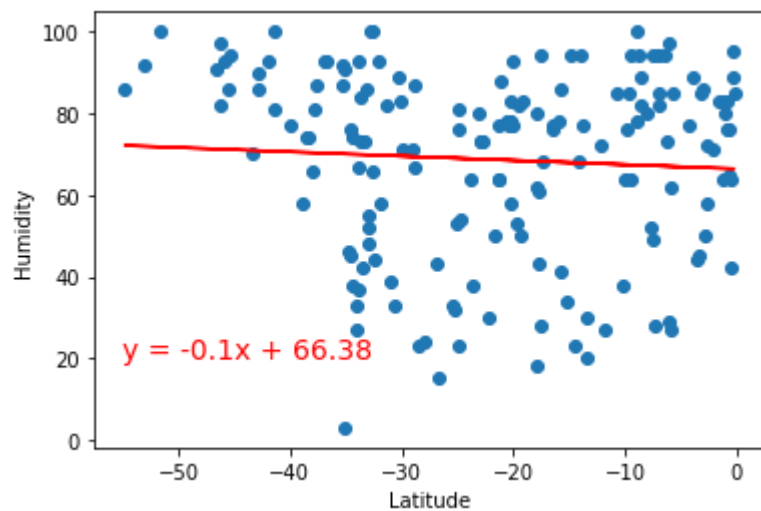


Southern Hemisphere - Humidity (%) vs. Latitude Linear Regression

In [26]:

```
xlbl = "Latitude"
ybl = "Humidity"
xdata = Southern["Lat"]
ydata = Southern["Humidity"]
lblpos = (-55, 20)
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: -0.06

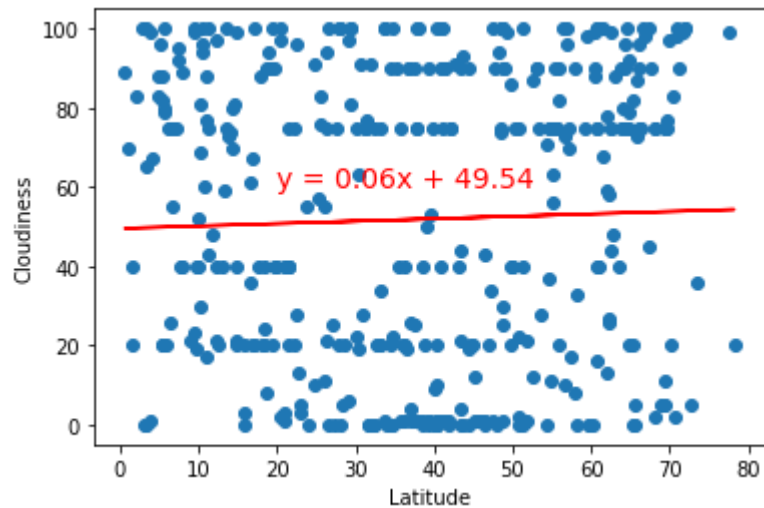


Northern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

In [27]:

```
xlbl = "Latitude"  
ybl = "Cloudiness"  
xdata = Northern["Lat"]  
ydata = Northern["Cloudiness"]  
lblpos = (20,60)  
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: 0.03

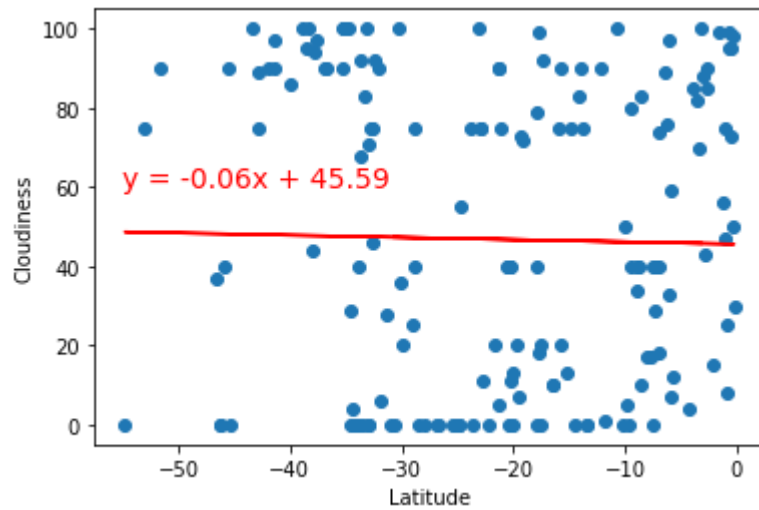


Southern Hemisphere - Cloudiness (%) vs. Latitude Linear Regression

In [28]:

```
xlbl = "Latitude"
ylbl = "Cloudiness"
xdata = Southern["Lat"]
ydata = Southern["Cloudiness"]
lblpos = (-55,60)
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: -0.02

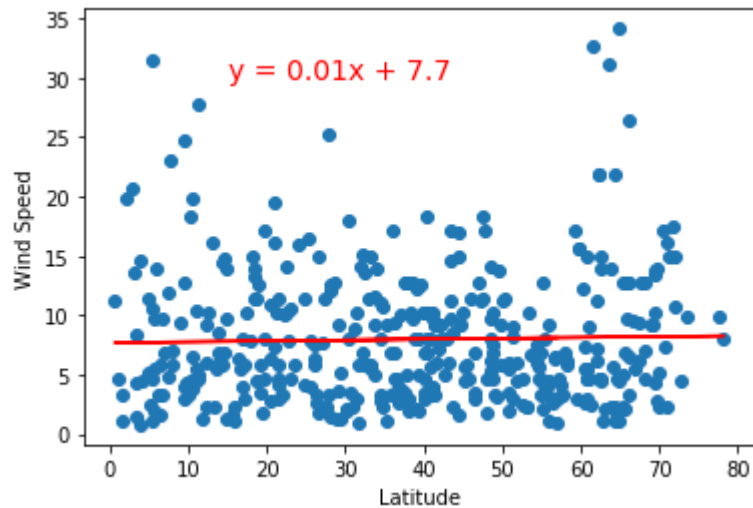


Northern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

In [30]:

```
xlbl = "Latitude"  
ylbl = "Wind Speed"  
xdata = Northern["Lat"]  
ydata = Northern["Wind Speed"]  
lblpos = (15,30)  
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: 0.03

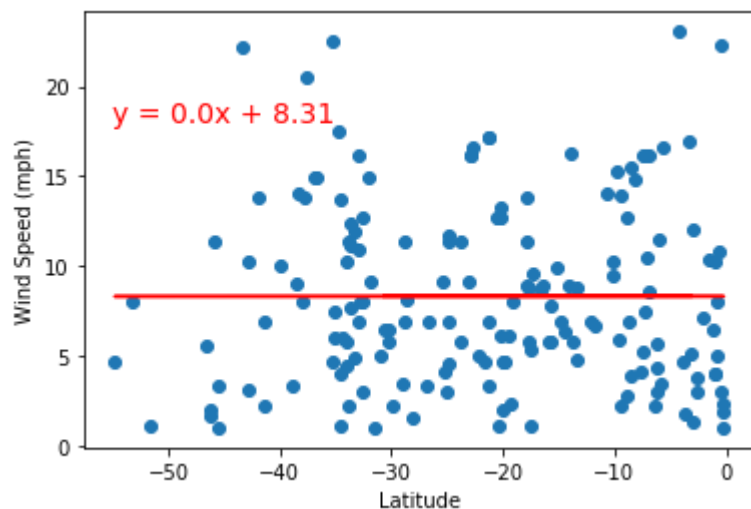


Southern Hemisphere - Wind Speed (mph) vs. Latitude Linear Regression

In [32]:

```
xlbl = "Latitude"  
ylbl = "Wind Speed (mph)"  
xdata = Southern["Lat"]  
ydata = Southern["Wind Speed"]  
lblpos = (-55,18)  
plotLinearRegression(xdata, ydata, xlabel, ylabel, lblpos)
```

The r-squared is: 0.00



In []:

```
# Temperatures correlates well with Latitudes nerby equator  
# No correlation between humidity and Latitude  
# No correlation between winds and Latitud
```