WeatherPy

Analysis

- As expected, the weather becomes significantly warmer as one approaches the equator (0 Deg. Latitude). More interestingly, however, is the fact that the southern hemisphere tends to be warmer this time of year than the northern hemisphere. This may be due to the tilt of the earth.
- There is no strong relationship between latitude and cloudiness. However, it is interesting to see that a strong band of cities sits at 0, 80, and 100% cloudiness.
- There is no strong relationship between latitude and wind speed. However, in northern hemispheres there is a flurry of cities with over 20 mph of wind.

```
In [1]:  # Dependencies and Setup
         import matplotlib.pyplot as plt
         import pandas as pd
         import numpy as np
         import requests
         import time

         # Import API key
         from api_keys import 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)
```

```
---------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
<ipython-input-1-e1c48ad5406f> in <module>
     10
     11 # Incorporated citipy to determine city based on latitude and longitude
---> 12 from citipy import citipy
     13
     14 # Output File (CSV)

ModuleNotFoundError: No module named 'citipy'
```

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]:  605
```

Perform API Calls

```python
In [3]:  # Starting URL for Weather Map API Call
         url = "http://api.openweathermap.org/data/2.5/weather?units=Imperial&APPID=" + api_key

         # List of city data
         city_data = []

         # Print to logger
         print("Beginning Data Retrieval     ")
         print("-----------------------------")

         # Create counters
         record_count = 1
         set_count = 1

         # Loop through all the cities in our list
         for i, city in enumerate(cities):

             # Group cities in sets of 50 for logging purposes
             if (i % 50 == 0 and i >= 50):
                 set_count += 1
                 record_count = 0

             # Create endpoint URL with each city
             city_url = url + "&q=" + city

             # Log the url, record, and set numbers
             print("Processing Record %s of Set %s | %s" % (record_count, set_count, city))

             # Add 1 to the record count
             record_count += 1

             # Run an API request for each of the cities
             try:
                 # Parse the JSON and retrieve data
                 city_weather = requests.get(city_url).json()

                 # Parse out the max temp, humidity, and cloudiness
                 city_lat = city_weather["coord"]["lat"]
                 city_lng = city_weather["coord"]["lon"]
                 city_max_temp = city_weather["main"]["temp_max"]
                 city_humidity = city_weather["main"]["humidity"]
                 city_clouds = city_weather["clouds"]["all"]
                 city_wind = city_weather["wind"]["speed"]
                 city_country = city_weather["sys"]["country"]
                 city_date = city_weather["dt"]

                 # Append the City information into city_data list
                 city_data.append({"City": city,
                                   "Lat": city_lat,
                                   "Lng": city_lng,
                                   "Max Temp": city_max_temp,
                                   "Humidity": city_humidity,
                                   "Cloudiness": city_clouds,
                                   "Wind Speed": city_wind,
                                   "Country": city_country,
                                   "Date": city_date})

             # If an error is experienced, skip the city
             except:
                 print("City not found. Skipping...")
                 pass

         # Indicate that Data Loading is complete
         print("-----------------------------")
         print("Data Retrieval Complete      ")
         print("-----------------------------")
```

```
Beginning Data Retrieval
-----------------------------
Processing Record 1 of Set 1 | severo-kurilsk
Processing Record 2 of Set 1 | darhan
Processing Record 3 of Set 1 | tarakan
Processing Record 4 of Set 1 | komsomolskiy
Processing Record 5 of Set 1 | souillac
Processing Record 6 of Set 1 | jiuquan
Processing Record 7 of Set 1 | sesheke
Processing Record 8 of Set 1 | punta arenas
Processing Record 9 of Set 1 | clarence town
Processing Record 10 of Set 1 | mataura
Processing Record 11 of Set 1 | magadan
Processing Record 12 of Set 1 | salym
Processing Record 13 of Set 1 | carnarvon
Processing Record 14 of Set 1 | puerto ayora
Processing Record 15 of Set 1 | arys
Processing Record 16 of Set 1 | prince rupert
Processing Record 17 of Set 1 | albany
Processing Record 18 of Set 1 | dikson
Processing Record 19 of Set 1 | kapaa
Processing Record 20 of Set 1 | rikitea
Processing Record 21 of Set 1 | rio gallegos
Processing Record 22 of Set 1 | kropotkin
Processing Record 23 of Set 1 | butaritari
Processing Record 24 of Set 1 | dahra
Processing Record 25 of Set 1 | khatanga
Processing Record 26 of Set 1 | stephenville
Processing Record 27 of Set 1 | hobart
Processing Record 28 of Set 1 | north bend
Processing Record 29 of Set 1 | ponta do sol
Processing Record 30 of Set 1 | faya
Processing Record 31 of Set 1 | vryburg
Processing Record 32 of Set 1 | lolua
City not found. Skipping...
Processing Record 33 of Set 1 | hasaki
Processing Record 34 of Set 1 | zhigansk
Processing Record 35 of Set 1 | ushuaia
Processing Record 36 of Set 1 | thompson
Processing Record 37 of Set 1 | margate
Processing Record 38 of Set 1 | oksfjord
Processing Record 39 of Set 1 | chumikan
Processing Record 40 of Set 1 | kudat
Processing Record 41 of Set 1 | jamestown
Processing Record 42 of Set 1 | laguna
Processing Record 43 of Set 1 | abu zabad
Processing Record 44 of Set 1 | jiroft
City not found. Skipping...
Processing Record 45 of Set 1 | saint-joseph
Processing Record 46 of Set 1 | cabo san lucas
Processing Record 47 of Set 1 | new norfolk
Processing Record 48 of Set 1 | port alfred
Processing Record 49 of Set 1 | kirkwall
Processing Record 50 of Set 1 | luderitz
Processing Record 0 of Set 2 | bethel
Processing Record 1 of Set 2 | vao
Processing Record 2 of Set 2 | saldanha
Processing Record 3 of Set 2 | melo
Processing Record 4 of Set 2 | taolanaro
City not found. Skipping...
Processing Record 5 of Set 2 | college
Processing Record 6 of Set 2 | prinos
Processing Record 7 of Set 2 | kodiak
Processing Record 8 of Set 2 | cabo rojo
Processing Record 9 of Set 2 | nuevo ideal
Processing Record 10 of Set 2 | yumen
Processing Record 11 of Set 2 | khonsa
Processing Record 12 of Set 2 | biloela
Processing Record 13 of Set 2 | sungaipenuh
Processing Record 14 of Set 2 | namatanai
Processing Record 15 of Set 2 | kungurtug
Processing Record 16 of Set 2 | port elizabeth
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Processing Record 17 of Set 2 | busselton
Processing Record 18 of Set 2 | san rafael
Processing Record 19 of Set 2 | cape town
Processing Record 20 of Set 2 | hovd
Processing Record 21 of Set 2 | isangel
Processing Record 22 of Set 2 | ancud
Processing Record 23 of Set 2 | humenne
Processing Record 24 of Set 2 | natal
Processing Record 25 of Set 2 | moron
Processing Record 26 of Set 2 | saryshagan
City not found. Skipping...
Processing Record 27 of Set 2 | kaitangata
Processing Record 28 of Set 2 | poya
Processing Record 29 of Set 2 | yellowknife
Processing Record 30 of Set 2 | pangai
Processing Record 31 of Set 2 | havre-saint-pierre
Processing Record 32 of Set 2 | takoradi
Processing Record 33 of Set 2 | bathsheba
Processing Record 34 of Set 2 | kirksville
Processing Record 35 of Set 2 | pangody
Processing Record 36 of Set 2 | qaanaaq
Processing Record 37 of Set 2 | hithadhoo
Processing Record 38 of Set 2 | borujan
City not found. Skipping...
Processing Record 39 of Set 2 | cambridge
Processing Record 40 of Set 2 | damaturu
Processing Record 41 of Set 2 | bardiyah
City not found. Skipping...
Processing Record 42 of Set 2 | carbonear
Processing Record 43 of Set 2 | nikolskoye
Processing Record 44 of Set 2 | mar del plata
Processing Record 45 of Set 2 | charlestown
Processing Record 46 of Set 2 | mixtepec
City not found. Skipping...
Processing Record 47 of Set 2 | touros
Processing Record 48 of Set 2 | boissevain
Processing Record 49 of Set 2 | bluff
Processing Record 0 of Set 3 | kudahuvadhoo
Processing Record 1 of Set 3 | illoqqortoormiut
City not found. Skipping...
Processing Record 2 of Set 3 | tairua
Processing Record 3 of Set 3 | tuatapere
Processing Record 4 of Set 3 | bredasdorp
Processing Record 5 of Set 3 | silver city
Processing Record 6 of Set 3 | veracruz
Processing Record 7 of Set 3 | barentsburg
City not found. Skipping...
Processing Record 8 of Set 3 | rincon
Processing Record 9 of Set 3 | hermanus
Processing Record 10 of Set 3 | toktogul
Processing Record 11 of Set 3 | lebu
Processing Record 12 of Set 3 | mahebourg
Processing Record 13 of Set 3 | yilan
Processing Record 14 of Set 3 | mumford
Processing Record 15 of Set 3 | atuona
Processing Record 16 of Set 3 | diffa
Processing Record 17 of Set 3 | saskylakh
Processing Record 18 of Set 3 | yambio
City not found. Skipping...
Processing Record 19 of Set 3 | lompoc
Processing Record 20 of Set 3 | ribeira grande
Processing Record 21 of Set 3 | dana point
Processing Record 22 of Set 3 | castro
Processing Record 23 of Set 3 | upernavik
Processing Record 24 of Set 3 | kavieng
Processing Record 25 of Set 3 | barabinsk
Processing Record 26 of Set 3 | port lincoln
Processing Record 27 of Set 3 | malinovoye ozero
Processing Record 28 of Set 3 | ambatofinandrahana
Processing Record 29 of Set 3 | puerto del rosario
Processing Record 30 of Set 3 | pevek
Processing Record 31 of Set 3 | chuy
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Processing Record 32 of Set 3 | zhezkazgan
Processing Record 33 of Set 3 | avarua
Processing Record 34 of Set 3 | batagay-alyta
Processing Record 35 of Set 3 | baltiysk
Processing Record 36 of Set 3 | parfino
Processing Record 37 of Set 3 | barrow
Processing Record 38 of Set 3 | hilo
Processing Record 39 of Set 3 | mackenzie
Processing Record 40 of Set 3 | lebanon
Processing Record 41 of Set 3 | nishihara
Processing Record 42 of Set 3 | antalaha
Processing Record 43 of Set 3 | narsaq
Processing Record 44 of Set 3 | hami
Processing Record 45 of Set 3 | shaoyang
Processing Record 46 of Set 3 | chokurdakh
Processing Record 47 of Set 3 | petropavlovsk-kamchatskiy
Processing Record 48 of Set 3 | leningradskiy
Processing Record 49 of Set 3 | amderma
City not found. Skipping...
Processing Record 0 of Set 4 | mehamn
Processing Record 1 of Set 4 | vaini
Processing Record 2 of Set 4 | bara
Processing Record 3 of Set 4 | krasnoselkup
City not found. Skipping...
Processing Record 4 of Set 4 | risch
Processing Record 5 of Set 4 | along
Processing Record 6 of Set 4 | vestmanna
Processing Record 7 of Set 4 | mwinilunga
Processing Record 8 of Set 4 | kamenskoye
City not found. Skipping...
Processing Record 9 of Set 4 | pozo colorado
Processing Record 10 of Set 4 | tumannyy
City not found. Skipping...
Processing Record 11 of Set 4 | werder
Processing Record 12 of Set 4 | lovington
Processing Record 13 of Set 4 | qasigianguit
Processing Record 14 of Set 4 | mackay
Processing Record 15 of Set 4 | pisco
Processing Record 16 of Set 4 | marcona
City not found. Skipping...
Processing Record 17 of Set 4 | sisimiut
Processing Record 18 of Set 4 | banda aceh
Processing Record 19 of Set 4 | fortuna
Processing Record 20 of Set 4 | ouadda
Processing Record 21 of Set 4 | sucua
Processing Record 22 of Set 4 | nanortalik
Processing Record 23 of Set 4 | longyearbyen
Processing Record 24 of Set 4 | araouane
Processing Record 25 of Set 4 | barra patuca
Processing Record 26 of Set 4 | warqla
City not found. Skipping...
Processing Record 27 of Set 4 | louisbourg
City not found. Skipping...
Processing Record 28 of Set 4 | wattegama
Processing Record 29 of Set 4 | tuktoyaktuk
Processing Record 30 of Set 4 | tabou
Processing Record 31 of Set 4 | arraial do cabo
Processing Record 32 of Set 4 | stabat
Processing Record 33 of Set 4 | klaksvik
Processing Record 34 of Set 4 | alofi
Processing Record 35 of Set 4 | sumbawanga
Processing Record 36 of Set 4 | lagoa
Processing Record 37 of Set 4 | sentyabrskiy
City not found. Skipping...
Processing Record 38 of Set 4 | bambous virieux
Processing Record 39 of Set 4 | saint george
Processing Record 40 of Set 4 | hibbing
Processing Record 41 of Set 4 | bandar-e lengeh
Processing Record 42 of Set 4 | viedma
Processing Record 43 of Set 4 | kazalinsk
City not found. Skipping...
Processing Record 44 of Set 4 | grand river south east
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City not found. Skipping...
Processing Record 45 of Set 4 | port keats
Processing Record 46 of Set 4 | jinchang
Processing Record 47 of Set 4 | lata
Processing Record 48 of Set 4 | fairbanks
Processing Record 49 of Set 4 | olupona
Processing Record 0 of Set 5 | genhe
Processing Record 1 of Set 5 | dingle
Processing Record 2 of Set 5 | williamsburg
Processing Record 3 of Set 5 | anloga
Processing Record 4 of Set 5 | esperance
Processing Record 5 of Set 5 | saint-philippe
Processing Record 6 of Set 5 | provideniya
Processing Record 7 of Set 5 | bargal
City not found. Skipping...
Processing Record 8 of Set 5 | cockburn harbour
City not found. Skipping...
Processing Record 9 of Set 5 | dalvik
Processing Record 10 of Set 5 | salalah
Processing Record 11 of Set 5 | inta
Processing Record 12 of Set 5 | naze
Processing Record 13 of Set 5 | juneau
Processing Record 14 of Set 5 | kurumkan
Processing Record 15 of Set 5 | ranong
Processing Record 16 of Set 5 | cockburn town
Processing Record 17 of Set 5 | sakakah
City not found. Skipping...
Processing Record 18 of Set 5 | norman wells
Processing Record 19 of Set 5 | hoquiam
Processing Record 20 of Set 5 | georgetown
Processing Record 21 of Set 5 | marv dasht
City not found. Skipping...
Processing Record 22 of Set 5 | ostrovnoy
Processing Record 23 of Set 5 | placido de castro
Processing Record 24 of Set 5 | anar darreh
City not found. Skipping...
Processing Record 25 of Set 5 | suksun
Processing Record 26 of Set 5 | bengkulu
City not found. Skipping...
Processing Record 27 of Set 5 | samusu
City not found. Skipping...
Processing Record 28 of Set 5 | belushya guba
City not found. Skipping...
Processing Record 29 of Set 5 | faanui
Processing Record 30 of Set 5 | ust-barguzin
Processing Record 31 of Set 5 | itacare
Processing Record 32 of Set 5 | nacogdoches
Processing Record 33 of Set 5 | cape canaveral
Processing Record 34 of Set 5 | puri
Processing Record 35 of Set 5 | umzimvubu
City not found. Skipping...
Processing Record 36 of Set 5 | jubayl
City not found. Skipping...
Processing Record 37 of Set 5 | tarnow
Processing Record 38 of Set 5 | vicuna
City not found. Skipping...
Processing Record 39 of Set 5 | jumla
Processing Record 40 of Set 5 | ust-kuyga
Processing Record 41 of Set 5 | saleaula
City not found. Skipping...
Processing Record 42 of Set 5 | rocha
Processing Record 43 of Set 5 | tasiilaq
Processing Record 44 of Set 5 | ribeira brava
Processing Record 45 of Set 5 | norrtalje
Processing Record 46 of Set 5 | warrington
Processing Record 47 of Set 5 | noumea
Processing Record 48 of Set 5 | akyab
City not found. Skipping...
Processing Record 49 of Set 5 | meadow lake
Processing Record 0 of Set 6 | chimoio
Processing Record 1 of Set 6 | oussouye
Processing Record 2 of Set 6 | gazojak
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Processing Record 3 of Set 6 | balikpapan
Processing Record 4 of Set 6 | jabiru
City not found. Skipping...
Processing Record 5 of Set 6 | torbay
Processing Record 6 of Set 6 | elko
Processing Record 7 of Set 6 | sao joao da barra
Processing Record 8 of Set 6 | saquena
Processing Record 9 of Set 6 | makokou
Processing Record 10 of Set 6 | hambantota
Processing Record 11 of Set 6 | beidao
Processing Record 12 of Set 6 | praia da vitoria
Processing Record 13 of Set 6 | port blair
Processing Record 14 of Set 6 | tsihombe
City not found. Skipping...
Processing Record 15 of Set 6 | awbari
Processing Record 16 of Set 6 | reconquista
Processing Record 17 of Set 6 | aklavik
Processing Record 18 of Set 6 | teya
Processing Record 19 of Set 6 | toliary
City not found. Skipping...
Processing Record 20 of Set 6 | edinet
Processing Record 21 of Set 6 | taoudenni
Processing Record 22 of Set 6 | goundam
Processing Record 23 of Set 6 | socorro
Processing Record 24 of Set 6 | merrill
Processing Record 25 of Set 6 | vagay
Processing Record 26 of Set 6 | comodoro rivadavia
Processing Record 27 of Set 6 | pudozh
Processing Record 28 of Set 6 | sambava
Processing Record 29 of Set 6 | batesville
Processing Record 30 of Set 6 | mys shmidta
City not found. Skipping...
Processing Record 31 of Set 6 | itaituba
Processing Record 32 of Set 6 | la asuncion
Processing Record 33 of Set 6 | east london
Processing Record 34 of Set 6 | chipinge
Processing Record 35 of Set 6 | cedartown
Processing Record 36 of Set 6 | miranda
Processing Record 37 of Set 6 | utiroa
City not found. Skipping...
Processing Record 38 of Set 6 | sabang
Processing Record 39 of Set 6 | abong mbang
Processing Record 40 of Set 6 | port hardy
Processing Record 41 of Set 6 | canon city
Processing Record 42 of Set 6 | santa quiteria do maranhao
Processing Record 43 of Set 6 | ryotsu
Processing Record 44 of Set 6 | pacific grove
Processing Record 45 of Set 6 | kishi
Processing Record 46 of Set 6 | obihiro
Processing Record 47 of Set 6 | katsuura
Processing Record 48 of Set 6 | saint augustine
Processing Record 49 of Set 6 | bushehr
Processing Record 0 of Set 7 | nizhniy kuranakh
Processing Record 1 of Set 7 | bonthe
Processing Record 2 of Set 7 | saint-augustin
Processing Record 3 of Set 7 | nizwa
Processing Record 4 of Set 7 | kamenka
Processing Record 5 of Set 7 | tiksi
Processing Record 6 of Set 7 | saint anthony
Processing Record 7 of Set 7 | vardo
Processing Record 8 of Set 7 | riyadh
Processing Record 9 of Set 7 | malim
Processing Record 10 of Set 7 | makakilo city
Processing Record 11 of Set 7 | henties bay
Processing Record 12 of Set 7 | caravelas
Processing Record 13 of Set 7 | gazli
Processing Record 14 of Set 7 | nizhneyansk
City not found. Skipping...
Processing Record 15 of Set 7 | san juan
Processing Record 16 of Set 7 | moose factory
Processing Record 17 of Set 7 | kashi
City not found. Skipping...
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Processing Record 18 of Set 7 | fuerte olimpo
Processing Record 19 of Set 7 | saint-pierre
Processing Record 20 of Set 7 | raca
Processing Record 21 of Set 7 | san quintin
Processing Record 22 of Set 7 | sedro-woolley
Processing Record 23 of Set 7 | berdigestyakh
Processing Record 24 of Set 7 | high level
Processing Record 25 of Set 7 | khorramshahr
Processing Record 26 of Set 7 | san jose
Processing Record 27 of Set 7 | emba
Processing Record 28 of Set 7 | farcasu
Processing Record 29 of Set 7 | kruisfontein
Processing Record 30 of Set 7 | garango
Processing Record 31 of Set 7 | boa vista
Processing Record 32 of Set 7 | novopskov
Processing Record 33 of Set 7 | shimoda
Processing Record 34 of Set 7 | portland
Processing Record 35 of Set 7 | waingapu
Processing Record 36 of Set 7 | zuwarah
Processing Record 37 of Set 7 | muroto
Processing Record 38 of Set 7 | sao filipe
Processing Record 39 of Set 7 | attawapiskat
City not found. Skipping...
Processing Record 40 of Set 7 | lunenburg
Processing Record 41 of Set 7 | novyy urengoy
Processing Record 42 of Set 7 | ferry pass
Processing Record 43 of Set 7 | crotone
Processing Record 44 of Set 7 | arlit
Processing Record 45 of Set 7 | auki
Processing Record 46 of Set 7 | ambilobe
Processing Record 47 of Set 7 | ilhabela
Processing Record 48 of Set 7 | kirakira
Processing Record 49 of Set 7 | cidreira
Processing Record 0 of Set 8 | chambas
Processing Record 1 of Set 8 | gat
Processing Record 2 of Set 8 | petatlan
Processing Record 3 of Set 8 | nha trang
Processing Record 4 of Set 8 | hermosillo
Processing Record 5 of Set 8 | airai
Processing Record 6 of Set 8 | kahului
Processing Record 7 of Set 8 | yeppoon
Processing Record 8 of Set 8 | manavgat
Processing Record 9 of Set 8 | jarjis
City not found. Skipping...
Processing Record 10 of Set 8 | xambioa
City not found. Skipping...
Processing Record 11 of Set 8 | katima mulilo
Processing Record 12 of Set 8 | carutapera
Processing Record 13 of Set 8 | yar-sale
Processing Record 14 of Set 8 | haines junction
Processing Record 15 of Set 8 | half moon bay
Processing Record 16 of Set 8 | vanavara
Processing Record 17 of Set 8 | santander
Processing Record 18 of Set 8 | amuntai
Processing Record 19 of Set 8 | esmeraldas
Processing Record 20 of Set 8 | okhotsk
Processing Record 21 of Set 8 | datong
Processing Record 22 of Set 8 | sidi ali
Processing Record 23 of Set 8 | muravlenko
Processing Record 24 of Set 8 | amahai
Processing Record 25 of Set 8 | santa isabel do rio negro
Processing Record 26 of Set 8 | wageningen
Processing Record 27 of Set 8 | svetlogorsk
Processing Record 28 of Set 8 | paita
Processing Record 29 of Set 8 | maniitsoq
Processing Record 30 of Set 8 | port augusta
Processing Record 31 of Set 8 | yulara
Processing Record 32 of Set 8 | bur gabo
City not found. Skipping...
Processing Record 33 of Set 8 | hofn
Processing Record 34 of Set 8 | pulupandan
Processing Record 35 of Set 8 | wajima
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Processing Record 36 of Set 8 | dnestrovsc
Processing Record 37 of Set 8 | biak
Processing Record 38 of Set 8 | bam
Processing Record 39 of Set 8 | tacoronte
Processing Record 40 of Set 8 | otavi
Processing Record 41 of Set 8 | adrar
Processing Record 42 of Set 8 | srednekolymsk
Processing Record 43 of Set 8 | belmonte
Processing Record 44 of Set 8 | san cristobal
Processing Record 45 of Set 8 | kalomo
City not found. Skipping...
Processing Record 46 of Set 8 | callaway
Processing Record 47 of Set 8 | birao
Processing Record 48 of Set 8 | itoman
Processing Record 49 of Set 8 | uch
Processing Record 0 of Set 9 | santona
Processing Record 1 of Set 9 | onguday
Processing Record 2 of Set 9 | hangu
Processing Record 3 of Set 9 | geraldton
Processing Record 4 of Set 9 | gorele
Processing Record 5 of Set 9 | erenhot
Processing Record 6 of Set 9 | hauterive
Processing Record 7 of Set 9 | kerema
Processing Record 8 of Set 9 | jalu
Processing Record 9 of Set 9 | inhambane
Processing Record 10 of Set 9 | kenai
Processing Record 11 of Set 9 | azimur
City not found. Skipping...
Processing Record 12 of Set 9 | joshimath
Processing Record 13 of Set 9 | hamilton
Processing Record 14 of Set 9 | talnakh
Processing Record 15 of Set 9 | nam tha
City not found. Skipping...
Processing Record 16 of Set 9 | dzhusaly
City not found. Skipping...
Processing Record 17 of Set 9 | egvekinot
Processing Record 18 of Set 9 | victoria
Processing Record 19 of Set 9 | atbasar
Processing Record 20 of Set 9 | bulembu
Processing Record 21 of Set 9 | hohhot
Processing Record 22 of Set 9 | halifax
Processing Record 23 of Set 9 | rehoboth
Processing Record 24 of Set 9 | beloha
Processing Record 25 of Set 9 | sehithwa
Processing Record 26 of Set 9 | burdur
Processing Record 27 of Set 9 | baruun-urt
Processing Record 28 of Set 9 | fagernes
Processing Record 29 of Set 9 | domoni
City not found. Skipping...
Processing Record 30 of Set 9 | toyooka
Processing Record 31 of Set 9 | nantucket
Processing Record 32 of Set 9 | martaban
Processing Record 33 of Set 9 | puerto escondido
Processing Record 34 of Set 9 | port moresby
Processing Record 35 of Set 9 | malinovskiy
Processing Record 36 of Set 9 | kumluca
Processing Record 37 of Set 9 | salinas
Processing Record 38 of Set 9 | mount isa
Processing Record 39 of Set 9 | cherskiy
Processing Record 40 of Set 9 | gobabis
Processing Record 41 of Set 9 | bilma
Processing Record 42 of Set 9 | abiy adi
City not found. Skipping...
Processing Record 43 of Set 9 | fort nelson
Processing Record 44 of Set 9 | quesnel
Processing Record 45 of Set 9 | dakar
Processing Record 46 of Set 9 | maloshuyka
City not found. Skipping...
Processing Record 47 of Set 9 | santiago del estero
Processing Record 48 of Set 9 | buala
Processing Record 49 of Set 9 | irbeyskoye
Processing Record 0 of Set 10 | vila franca do campo
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Processing Record 1 of Set 10 | coihaique
Processing Record 2 of Set 10 | los llanos de aridane
Processing Record 3 of Set 10 | muros
Processing Record 4 of Set 10 | port hedland
Processing Record 5 of Set 10 | kieta
Processing Record 6 of Set 10 | satitoa
City not found. Skipping...
Processing Record 7 of Set 10 | green river
Processing Record 8 of Set 10 | mosonmagyarovar
Processing Record 9 of Set 10 | mindelo
Processing Record 10 of Set 10 | roblin
Processing Record 11 of Set 10 | la ronge
Processing Record 12 of Set 10 | tubuala
Processing Record 13 of Set 10 | port-gentil
Processing Record 14 of Set 10 | mordovo
Processing Record 15 of Set 10 | clyde river
Processing Record 16 of Set 10 | karaul
City not found. Skipping...
Processing Record 17 of Set 10 | aykhal
Processing Record 18 of Set 10 | tuensang
Processing Record 19 of Set 10 | pascagoula
Processing Record 20 of Set 10 | korla
City not found. Skipping...
Processing Record 21 of Set 10 | canto do buriti
Processing Record 22 of Set 10 | bijie
Processing Record 23 of Set 10 | san-pedro
Processing Record 24 of Set 10 | luorong
Processing Record 25 of Set 10 | yei
City not found. Skipping...
Processing Record 26 of Set 10 | berlevag
Processing Record 27 of Set 10 | hihifo
City not found. Skipping...
Processing Record 28 of Set 10 | satipo
Processing Record 29 of Set 10 | rawson
Processing Record 30 of Set 10 | marsh harbour
Processing Record 31 of Set 10 | taupo
Processing Record 32 of Set 10 | san carlos de bariloche
Processing Record 33 of Set 10 | pervomayskoye
Processing Record 34 of Set 10 | chicama
Processing Record 35 of Set 10 | angoche
Processing Record 36 of Set 10 | brae
Processing Record 37 of Set 10 | manokwari
Processing Record 38 of Set 10 | mauganj
Processing Record 39 of Set 10 | te anau
Processing Record 40 of Set 10 | vila velha
Processing Record 41 of Set 10 | tautira
Processing Record 42 of Set 10 | dong xoai
Processing Record 43 of Set 10 | batemans bay
Processing Record 44 of Set 10 | diapaga
Processing Record 45 of Set 10 | mangrol
Processing Record 46 of Set 10 | mersing
Processing Record 47 of Set 10 | maldonado
Processing Record 48 of Set 10 | mikhaylovka
Processing Record 49 of Set 10 | temple
Processing Record 0 of Set 11 | gigmoto
Processing Record 1 of Set 11 | makow mazowiecki
Processing Record 2 of Set 11 | lasa
Processing Record 3 of Set 11 | mazamari
Processing Record 4 of Set 11 | matagami
Processing Record 5 of Set 11 | steamboat springs
Processing Record 6 of Set 11 | mount gambier
Processing Record 7 of Set 11 | chyhyryn
Processing Record 8 of Set 11 | nortelandia
Processing Record 9 of Set 11 | imperial
Processing Record 10 of Set 11 | progreso
Processing Record 11 of Set 11 | hvammstangi
City not found. Skipping...
Processing Record 12 of Set 11 | arriaga
Processing Record 13 of Set 11 | qusar
Processing Record 14 of Set 11 | tessalit
Processing Record 15 of Set 11 | de aar
Processing Record 16 of Set 11 | kutum
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Processing Record 17 of Set 11 | ketchikan
Processing Record 18 of Set 11 | peleduy
Processing Record 19 of Set 11 | libenge
Processing Record 20 of Set 11 | kapoeta
City not found. Skipping...
Processing Record 21 of Set 11 | tomatlan
Processing Record 22 of Set 11 | lalmohan
Processing Record 23 of Set 11 | vastervik
City not found. Skipping...
Processing Record 24 of Set 11 | serowe
Processing Record 25 of Set 11 | mihail kogalniceanu
Processing Record 26 of Set 11 | broken hill
Processing Record 27 of Set 11 | ajaccio
Processing Record 28 of Set 11 | suntar
Processing Record 29 of Set 11 | mezica
Processing Record 30 of Set 11 | sitka
Processing Record 31 of Set 11 | ewa beach
Processing Record 32 of Set 11 | songea
Processing Record 33 of Set 11 | monroe
Processing Record 34 of Set 11 | cravo norte
Processing Record 35 of Set 11 | ystad
Processing Record 36 of Set 11 | beyneu
Processing Record 37 of Set 11 | almaznyy
Processing Record 38 of Set 11 | vestmannaeyjar
Processing Record 39 of Set 11 | cananeia
Processing Record 40 of Set 11 | alta floresta
Processing Record 41 of Set 11 | maketu
Processing Record 42 of Set 11 | mecca
Processing Record 43 of Set 11 | felidhoo
City not found. Skipping...
Processing Record 44 of Set 11 | manta
Processing Record 45 of Set 11 | nebug
Processing Record 46 of Set 11 | temaraia
City not found. Skipping...
Processing Record 47 of Set 11 | constitucion
Processing Record 48 of Set 11 | cabimas
Processing Record 49 of Set 11 | palabuhanratu
City not found. Skipping...
Processing Record 0 of Set 12 | khudumelapye
Processing Record 1 of Set 12 | husavik
Processing Record 2 of Set 12 | olinda
Processing Record 3 of Set 12 | coquimbo
Processing Record 4 of Set 12 | kambove
Processing Record 5 of Set 12 | iquique
Processing Record 6 of Set 12 | yenagoa
Processing Record 7 of Set 12 | konakovo
Processing Record 8 of Set 12 | labuhan
Processing Record 9 of Set 12 | sampit
Processing Record 10 of Set 12 | gayny
Processing Record 11 of Set 12 | trafaria
Processing Record 12 of Set 12 | zyryanka
Processing Record 13 of Set 12 | soavinandriana
Processing Record 14 of Set 12 | xiongzhou
Processing Record 15 of Set 12 | labutta
City not found. Skipping...
Processing Record 16 of Set 12 | chagda
City not found. Skipping...
Processing Record 17 of Set 12 | batamshinskiy
Processing Record 18 of Set 12 | kailua
Processing Record 19 of Set 12 | kaliyaganj
Processing Record 20 of Set 12 | cozumel
City not found. Skipping...
Processing Record 21 of Set 12 | obo
Processing Record 22 of Set 12 | mushie
Processing Record 23 of Set 12 | ishigaki
Processing Record 24 of Set 12 | newport
Processing Record 25 of Set 12 | quang ngai
Processing Record 26 of Set 12 | butembo
Processing Record 27 of Set 12 | palmer
Processing Record 28 of Set 12 | motril
Processing Record 29 of Set 12 | patitirion
Processing Record 30 of Set 12 | omboue
```

```
Processing Record 31 of Set 12 | waipawa
Processing Record 32 of Set 12 | sakaiminato
Processing Record 33 of Set 12 | raga
City not found. Skipping...
Processing Record 34 of Set 12 | xingcheng
Processing Record 35 of Set 12 | necochea
Processing Record 36 of Set 12 | gao
Processing Record 37 of Set 12 | mrirt
City not found. Skipping...
Processing Record 38 of Set 12 | gardan diwal
City not found. Skipping...
Processing Record 39 of Set 12 | jiwani
Processing Record 40 of Set 12 | yurla
Processing Record 41 of Set 12 | codrington
Processing Record 42 of Set 12 | kalmunai
Processing Record 43 of Set 12 | flinders
Processing Record 44 of Set 12 | primorsko-akhtarsk
Processing Record 45 of Set 12 | ilulissat
Processing Record 46 of Set 12 | vaitupu
City not found. Skipping...
Processing Record 47 of Set 12 | isfana
Processing Record 48 of Set 12 | borshchiv
Processing Record 49 of Set 12 | hobyo
Processing Record 0 of Set 13 | aktash
City not found. Skipping...
Processing Record 1 of Set 13 | syamzha
Processing Record 2 of Set 13 | mahibadhoo
Processing Record 3 of Set 13 | tiznit
Processing Record 4 of Set 13 | point fortin
----------------------------
Data Retrieval Complete
----------------------------
```

In [4]:
```python
# Convert array of JSONs into Pandas DataFrame
city_data_pd = pd.DataFrame(city_data)

# Extract relevant fields from the data frame
lats = city_data_pd["Lat"]
max_temps = city_data_pd["Max Temp"]
humidity = city_data_pd["Humidity"]
cloudiness = city_data_pd["Cloudiness"]
wind_speed = city_data_pd["Wind Speed"]

# Export the City_Data into a csv
city_data_pd.to_csv(output_data_file, index_label="City_ID")

# Show Record Count
city_data_pd.count()
```

Out[4]:
```
City          535
Cloudiness    535
Country       535
Date          535
Humidity      535
Lat           535
Lng           535
Max Temp      535
Wind Speed    535
dtype: int64
```

```
In [5]:  # Display the City Data Frame
         city_data_pd.head()
```

Out[5]:

	City	Cloudiness	Country	Date	Humidity	Lat	Lng	Max Temp	Wind Speed
0	severo-kurilsk	92	RU	1534988024	93	50.68	156.12	54.27	2.73
1	darhan	8	MN	1534988024	71	49.49	105.92	72.81	8.55
2	tarakan	48	ID	1534988024	100	3.30	117.63	80.10	4.41
3	komsomolskiy	48	RU	1534987754	72	67.55	63.78	54.46	15.46
4	souillac	0	FR	1534986000	73	45.60	-0.60	71.60	3.36

Latitude vs. Temperature Plot

```
In [1]:  # Build scatter plot for latitude vs. temperature
         plt.scatter(lats,
                     max_temps,
                     edgecolor="black", linewidths=1, marker="o",
                     alpha=0.8, label="Cities")

         # Incorporate the other graph properties
         plt.title("City Latitude vs. Max Temperature (%s)" % time.strftime("%x"))
         plt.ylabel("Max Temperature (F)")
         plt.xlabel("Latitude")
         plt.grid(True)

         # Save the figure
         plt.savefig("output_data/Fig1.png")

         # Show plot
         plt.show()
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
<ipython-input-1-5ef3229c5b43> in <module>
      1 # Build scatter plot for latitude vs. temperature
----> 2 plt.scatter(lats,
      3             max_temps,
      4             edgecolor="black", linewidths=1, marker="o",
      5             alpha=0.8, label="Cities")

NameError: name 'plt' is not defined
```
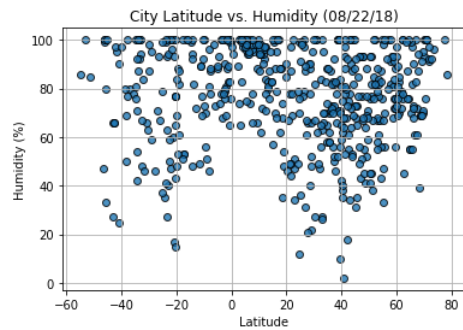
Latitude vs. Humidity Plot

In [7]:
```python
# Build the scatter plots for latitude vs. humidity
plt.scatter(lats,
            humidity,
            edgecolor="black", linewidths=1, marker="o",
            alpha=0.8, label="Cities")

# Incorporate the other graph properties
plt.title("City Latitude vs. Humidity (%s)" % time.strftime("%x"))
plt.ylabel("Humidity (%)")
plt.xlabel("Latitude")
plt.grid(True)

# Save the figure
plt.savefig("output_data/Fig2.png")

# Show plot
plt.show()
```


City Latitude vs. Humidity (08/22/18)

Latitude vs. Cloudiness Plot

```
In [8]:   # Build the scatter plots for latitude vs. cloudiness
          plt.scatter(lats,
                       cloudiness,
                       edgecolor="black", linewidths=1, marker="o",
                       alpha=0.8, label="Cities")

          # Incorporate the other graph properties
          plt.title("City Latitude vs. Cloudiness (%s)" % time.strftime("%x"))
          plt.ylabel("Cloudiness (%)")
          plt.xlabel("Latitude")
          plt.grid(True)

          # Save the figure
          plt.savefig("output_data/Fig3.png")

          # Show plot
          plt.show()
```
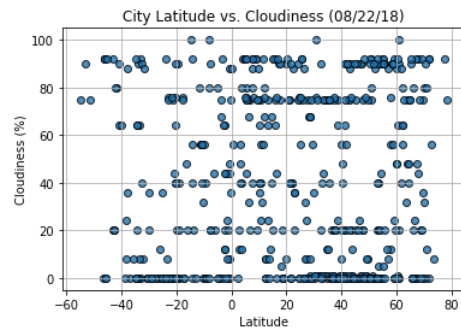

Latitude vs. Wind Speed Plot
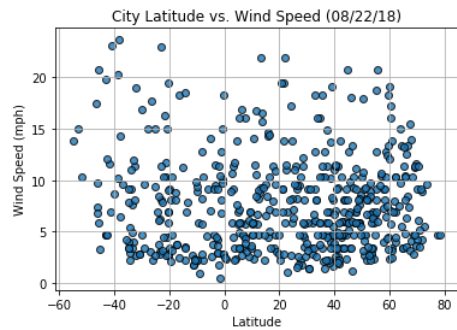
```
In [9]: # Build the scatter plots for latitude vs. wind speed
        plt.scatter(lats,
                    wind_speed,
                    edgecolor="black", linewidths=1, marker="o",
                    alpha=0.8, label="Cities")

        # Incorporate the other graph properties
        plt.title("City Latitude vs. Wind Speed (%s)" % time.strftime("%x"))
        plt.ylabel("Wind Speed (mph)")
        plt.xlabel("Latitude")
        plt.grid(True)

        # Save the figure
        plt.savefig("output_data/Fig4.png")

        # Show plot
        plt.show()
```


City Latitude vs. Wind Speed (08/22/18)

In [ ]: