

# WeatherPy

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## Description

This notebook contains Python script to visualize the weather of 500+ cities across the world of varying distance from the equator. A set of various latitudes and longitudes are selected and the nearest cities to these latitude longitude pairs is identified using citipy module. Once a list of unique cities accross the globe is identified, the temperature, humidity, cloudiness and wind speeds at these locations is retrived using an API call. The weather is then shown as 4 different plots.

In [105]:

```
# Dependencies and Setup
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import requests
import time
from citipy import citipy
from datetime import date

# 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 = "cities.csv"

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

## Generate Cities List

In [106]:

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

# Create a List of Lat and Lng
lats = list(range(-90, 90, 5))
lngs = list(range(-180, 180, 5))
```

In [107]:

```
# Identify nearest city for each lat, lng combination
for lng in lngs:
    for lat in lats:
        city = citipy.nearest_city(lat, lng)
        name_of_city = city.city_name

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

In [108]:

```
def get_weather_json(city, api_key):
    url = "http://api.openweathermap.org/data/2.5/weather"
    r = requests.get(url, params={"appid": api_key, "q": city, "units": "imperial"})
    if r.status_code == 200:
        r_json = r.json()
        return r_json
    else:
        return None
```

## 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 [109]:

```
out_cities = []
print("Beginning data retrieval")
i=0
for in_city in cities:
    i+=1
    print(f"Processing Record {i} for city {in_city}")
    out_city = get_weather_json(in_city, api_key)
    #print(out_city)
    if out_city:
        out_cities.append(out_city)
    else:
        print("city not found: skipping data")
out_cities_stored = pd.DataFrame(out_cities)
```

Beginning data retrieval  
Processing Record 1 for city vaini  
Processing Record 2 for city halalo  
city not found: skipping data  
Processing Record 3 for city vaitupu  
city not found: skipping data  
Processing Record 4 for city kapaa  
Processing Record 5 for city provideniya  
Processing Record 6 for city egvekinot  
Processing Record 7 for city mys shmidta  
city not found: skipping data  
Processing Record 8 for city pangai  
Processing Record 9 for city hihifo  
city not found: skipping data  
Processing Record 10 for city alofi  
Processing Record 11 for city satittoa  
city not found: skipping data  
Processing Record 12 for city samalaeulu  
city not found: skipping data  
Processing Record 13 for city saleaula  
city not found: skipping data  
Processing Record 14 for city bethel  
Processing Record 15 for city lavrentiya  
Processing Record 16 for city mataura  
Processing Record 17 for city avarua  
Processing Record 18 for city samusu  
city not found: skipping data  
Processing Record 19 for city makakilo city  
Processing Record 20 for city nome  
Processing Record 21 for city barrow  
Processing Record 22 for city faanui  
Processing Record 23 for city hilo  
Processing Record 24 for city ewa beach  
Processing Record 25 for city kodiak  
Processing Record 26 for city avera  
Processing Record 27 for city kahului  
Processing Record 28 for city ahui manu  
Processing Record 29 for city kenai  
Processing Record 30 for city teahupoo  
Processing Record 31 for city fare  
Processing Record 32 for city atuona  
Processing Record 33 for city sterling  
Processing Record 34 for city college  
Processing Record 35 for city tautira  
Processing Record 36 for city palmer  
Processing Record 37 for city fairbanks  
Processing Record 38 for city rikitea  
Processing Record 39 for city fortuna  
Processing Record 40 for city sitka  
Processing Record 41 for city haines junction  
Processing Record 42 for city mayo  
Processing Record 43 for city aklavik  
Processing Record 44 for city tuktoyaktuk  
Processing Record 45 for city lompoc  
Processing Record 46 for city half moon bay  
Processing Record 47 for city port hardy  
Processing Record 48 for city ketchikan  
Processing Record 49 for city whitehorse  
Processing Record 50 for city guerrero negro  
Processing Record 51 for city pacific grove  
Processing Record 52 for city pacifica

Processing Record 53 for city newport  
Processing Record 54 for city prince rupert  
Processing Record 55 for city juneau  
Processing Record 56 for city norman wells  
Processing Record 57 for city punta arenas  
Processing Record 58 for city cabo san lucas  
Processing Record 59 for city constitucion  
Processing Record 60 for city san quintin  
Processing Record 61 for city campbell river  
Processing Record 62 for city fort saint james  
Processing Record 63 for city fort nelson  
Processing Record 64 for city rosarito  
Processing Record 65 for city santa maria  
Processing Record 66 for city sun valley  
Processing Record 67 for city hermiston  
Processing Record 68 for city peachland  
Processing Record 69 for city beaverlodge  
Processing Record 70 for city hay river  
Processing Record 71 for city san patricio  
Processing Record 72 for city san felipe  
Processing Record 73 for city bullhead city  
Processing Record 74 for city elko  
Processing Record 75 for city hamilton  
Processing Record 76 for city fernie  
Processing Record 77 for city slave lake  
Processing Record 78 for city yellowknife  
Processing Record 79 for city castro  
Processing Record 80 for city puerto ayora  
Processing Record 81 for city ixtapa  
Processing Record 82 for city coahuayana  
Processing Record 83 for city la paz  
Processing Record 84 for city cumpas  
Processing Record 85 for city winslow  
Processing Record 86 for city price  
Processing Record 87 for city livingston  
Processing Record 88 for city maple creek  
Processing Record 89 for city grand centre  
city not found: skipping data  
Processing Record 90 for city ancud  
Processing Record 91 for city lebu  
Processing Record 92 for city acapulco  
Processing Record 93 for city tomatlan  
Processing Record 94 for city nuevo ideal  
Processing Record 95 for city ojinaga  
Processing Record 96 for city las vegas  
Processing Record 97 for city erie  
Processing Record 98 for city gillette  
Processing Record 99 for city regina  
Processing Record 100 for city la ronge  
Processing Record 101 for city puerto escondido  
Processing Record 102 for city temascalcingo  
Processing Record 103 for city galeana  
Processing Record 104 for city uvalde  
Processing Record 105 for city elk city  
Processing Record 106 for city lexington  
Processing Record 107 for city pierre  
Processing Record 108 for city brandon  
Processing Record 109 for city the pas  
Processing Record 110 for city thompson  
Processing Record 111 for city pisco  
Processing Record 112 for city hualmay

Processing Record 113 for city champerico  
Processing Record 114 for city salina cruz  
Processing Record 115 for city anton lizardo  
Processing Record 116 for city matamoros  
Processing Record 117 for city atascocita  
Processing Record 118 for city fort smith  
Processing Record 119 for city saint joseph  
Processing Record 120 for city willmar  
Processing Record 121 for city kenora  
Processing Record 122 for city qaanaaq  
Processing Record 123 for city ushuaia  
Processing Record 124 for city marcona  
city not found: skipping data  
Processing Record 125 for city huarmey  
Processing Record 126 for city san cristobal  
Processing Record 127 for city la libertad  
Processing Record 128 for city san agustin acasaguastlan  
Processing Record 129 for city hecelchakan  
Processing Record 130 for city progreso  
Processing Record 131 for city chalmette  
Processing Record 132 for city southaven  
Processing Record 133 for city jacksonville  
Processing Record 134 for city merrill  
Processing Record 135 for city thunder bay  
Processing Record 136 for city sioux lookout  
Processing Record 137 for city talcahuano  
Processing Record 138 for city pimentel  
Processing Record 139 for city talara  
Processing Record 140 for city manta  
Processing Record 141 for city burica  
city not found: skipping data  
Processing Record 142 for city puntarenas  
Processing Record 143 for city wampusirpi  
city not found: skipping data  
Processing Record 144 for city cozumel  
city not found: skipping data  
Processing Record 145 for city bahia honda  
Processing Record 146 for city callaway  
Processing Record 147 for city east brainerd  
Processing Record 148 for city richmond  
Processing Record 149 for city traverse city  
Processing Record 150 for city hornepayne  
Processing Record 151 for city attawapiskat  
city not found: skipping data  
Processing Record 152 for city clyde river  
Processing Record 153 for city coihaique  
Processing Record 154 for city coquimbo  
Processing Record 155 for city taltal  
Processing Record 156 for city chimbote  
Processing Record 157 for city morropon  
Processing Record 158 for city pedernales  
Processing Record 159 for city la palma  
Processing Record 160 for city portobelo  
Processing Record 161 for city san andres  
Processing Record 162 for city bodden town  
Processing Record 163 for city key largo  
Processing Record 164 for city ormond beach  
Processing Record 165 for city rockingham  
Processing Record 166 for city uniontown  
Processing Record 167 for city midland  
Processing Record 168 for city cochrane

Processing Record 169 for city iqaluit  
Processing Record 170 for city valdivia  
Processing Record 171 for city camana  
city not found: skipping data  
Processing Record 172 for city nazca  
Processing Record 173 for city oxapampa  
Processing Record 174 for city lagunas  
Processing Record 175 for city puerto leguizamo  
Processing Record 176 for city libano  
Processing Record 177 for city el guamo  
Processing Record 178 for city morant bay  
Processing Record 179 for city Guantanamo  
Processing Record 180 for city cockburn town  
Processing Record 181 for city marsh harbour  
Processing Record 182 for city elizabeth city  
Processing Record 183 for city cinnaminson  
Processing Record 184 for city massena  
Processing Record 185 for city chapais  
Processing Record 186 for city rio gallegos  
Processing Record 187 for city san carlos de bariloche  
Processing Record 188 for city rengo  
Processing Record 189 for city vicuna  
city not found: skipping data  
Processing Record 190 for city iquique  
Processing Record 191 for city azangaro  
Processing Record 192 for city manolo urbano  
Processing Record 193 for city benjamin constant  
Processing Record 194 for city mitu  
Processing Record 195 for city cumaribo  
city not found: skipping data  
Processing Record 196 for city carora  
Processing Record 197 for city oranjestad  
Processing Record 198 for city sosua  
Processing Record 199 for city nantucket  
Processing Record 200 for city madison  
Processing Record 201 for city forestville  
Processing Record 202 for city port-cartier  
Processing Record 203 for city narsaq  
Processing Record 204 for city rawson  
Processing Record 205 for city viedma  
Processing Record 206 for city mercedes  
Processing Record 207 for city villa carlos paz  
Processing Record 208 for city salta  
Processing Record 209 for city betanzos  
Processing Record 210 for city trinidad  
Processing Record 211 for city guajara-mirim  
city not found: skipping data  
Processing Record 212 for city tefe  
Processing Record 213 for city santa isabel do rio negro  
Processing Record 214 for city puerto ayacucho  
Processing Record 215 for city barcelona  
Processing Record 216 for city maunabo  
Processing Record 217 for city road town  
Processing Record 218 for city saint george  
Processing Record 219 for city shelburne  
Processing Record 220 for city middleton  
Processing Record 221 for city murdochville  
Processing Record 222 for city havre-saint-pierre  
Processing Record 223 for city pangnirtung  
Processing Record 224 for city tres arroyos  
Processing Record 225 for city chivilcoy

Processing Record 226 for city reconquista  
Processing Record 227 for city presidencia roque saenz pena  
Processing Record 228 for city mayor pablo lagerenza  
Processing Record 229 for city pontes e lacerda  
Processing Record 230 for city aripuana  
Processing Record 231 for city novo aripuana  
Processing Record 232 for city boa vista  
Processing Record 233 for city lethem  
Processing Record 234 for city rio claro  
Processing Record 235 for city le vauclin  
Processing Record 236 for city codrington  
Processing Record 237 for city the valley  
Processing Record 238 for city port hawkesbury  
Processing Record 239 for city louisbourg  
city not found: skipping data  
Processing Record 240 for city saint-augustin  
Processing Record 241 for city upernavik  
Processing Record 242 for city necochea  
Processing Record 243 for city mar del plata  
Processing Record 244 for city maldonado  
Processing Record 245 for city cacequi  
Processing Record 246 for city san alberto  
Processing Record 247 for city terenos  
Processing Record 248 for city chapada dos guimaraes  
Processing Record 249 for city alta floresta  
Processing Record 250 for city itaituba  
Processing Record 251 for city alenquer  
Processing Record 252 for city brokopondo  
Processing Record 253 for city marienburg  
Processing Record 254 for city bathsheba  
Processing Record 255 for city saint-pierre  
Processing Record 256 for city lewisporte  
Processing Record 257 for city saint anthony  
Processing Record 258 for city nuuk  
Processing Record 259 for city maniitsoq  
Processing Record 260 for city kangaatsiaq  
Processing Record 261 for city rocha  
Processing Record 262 for city rio grande  
Processing Record 263 for city tramandai  
Processing Record 264 for city carambei  
Processing Record 265 for city cardoso  
Processing Record 266 for city rubiataba  
Processing Record 267 for city miranorte  
city not found: skipping data  
Processing Record 268 for city itupiranga  
Processing Record 269 for city tucuma  
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Processing Record 270 for city saint-georges  
Processing Record 271 for city sinnamary  
Processing Record 272 for city torbay  
Processing Record 273 for city bonavista  
Processing Record 274 for city paamiut  
Processing Record 275 for city ilulissat  
Processing Record 276 for city chuy  
Processing Record 277 for city cidreira  
Processing Record 278 for city imbituba  
Processing Record 279 for city ilhabela  
Processing Record 280 for city nova serrana  
Processing Record 281 for city januarua  
city not found: skipping data  
Processing Record 282 for city gilbues



Processing Record 283 for city esperantinopolis  
Processing Record 284 for city carutapera  
Processing Record 285 for city salinopolis  
Processing Record 286 for city cayenne  
Processing Record 287 for city ribeira grande  
Processing Record 288 for city nanortalik  
Processing Record 289 for city qaqortoq  
Processing Record 290 for city laguna  
Processing Record 291 for city arraial do cabo  
Processing Record 292 for city serra  
Processing Record 293 for city ibicui  
Processing Record 294 for city jaguarari  
Processing Record 295 for city boa viagem  
Processing Record 296 for city acarau  
city not found: skipping data  
Processing Record 297 for city ponta do sol  
Processing Record 298 for city tasiilaq  
Processing Record 299 for city sao joao da barra  
Processing Record 300 for city caravelas  
Processing Record 301 for city belmonte  
Processing Record 302 for city maceio  
Processing Record 303 for city touros  
Processing Record 304 for city aquiraz  
Processing Record 305 for city trairi  
Processing Record 306 for city sao filipe  
Processing Record 307 for city porto novo  
Processing Record 308 for city lagoa  
Processing Record 309 for city illoqqortoormiut  
city not found: skipping data  
Processing Record 310 for city vila velha  
Processing Record 311 for city olinda  
Processing Record 312 for city cabedelo  
Processing Record 313 for city grindavik  
Processing Record 314 for city olafsvik  
city not found: skipping data  
Processing Record 315 for city bolungarvik  
city not found: skipping data  
Processing Record 316 for city maragogi  
Processing Record 317 for city los llanos de aridane  
Processing Record 318 for city vila franca do campo  
Processing Record 319 for city rabo de peixe  
Processing Record 320 for city praia da vitoria  
Processing Record 321 for city jamestown  
Processing Record 322 for city georgetown  
Processing Record 323 for city goderich  
Processing Record 324 for city oussouye  
Processing Record 325 for city dakar  
Processing Record 326 for city nouadhibou  
Processing Record 327 for city dingle  
Processing Record 328 for city vestmannaeyjar  
Processing Record 329 for city blonduos  
city not found: skipping data  
Processing Record 330 for city cape town  
Processing Record 331 for city monrovia  
Processing Record 332 for city bonthe  
Processing Record 333 for city sangueya  
Processing Record 334 for city linguere  
city not found: skipping data  
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Processing Record 336 for city aguimes  
Processing Record 337 for city tias

Processing Record 338 for city camacha  
Processing Record 339 for city peniche  
Processing Record 340 for city muros  
Processing Record 341 for city hofn  
Processing Record 342 for city husavik  
Processing Record 343 for city hermanus  
Processing Record 344 for city harper  
Processing Record 345 for city buchanan  
Processing Record 346 for city tokonou  
Processing Record 347 for city nioro  
Processing Record 348 for city tiznit  
Processing Record 349 for city azimur  
city not found: skipping data  
Processing Record 350 for city carballo  
Processing Record 351 for city skibbereen  
Processing Record 352 for city ballina  
Processing Record 353 for city sorvag  
city not found: skipping data  
Processing Record 354 for city saldanha  
Processing Record 355 for city tabou  
Processing Record 356 for city grand-lahou  
Processing Record 357 for city ferkessedougou  
Processing Record 358 for city tenenkou  
Processing Record 359 for city araouane  
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Processing Record 361 for city mriit  
city not found: skipping data  
Processing Record 362 for city tawnat  
city not found: skipping data  
Processing Record 363 for city talavera de la reina  
Processing Record 364 for city villaviciosa  
Processing Record 365 for city falmouth  
Processing Record 366 for city stranraer  
Processing Record 367 for city stromness  
Processing Record 368 for city klaksvik  
Processing Record 369 for city barentsburg  
city not found: skipping data  
Processing Record 370 for city luderitz  
Processing Record 371 for city port-gentil  
Processing Record 372 for city takoradi  
Processing Record 373 for city accra  
Processing Record 374 for city yendi  
Processing Record 375 for city gorom-gorom  
Processing Record 376 for city tessalit  
Processing Record 377 for city adrar  
Processing Record 378 for city wahran  
city not found: skipping data  
Processing Record 379 for city burriana  
Processing Record 380 for city libourne  
Processing Record 381 for city fecamp  
Processing Record 382 for city scarborough  
Processing Record 383 for city lerwick  
Processing Record 384 for city brae  
Processing Record 385 for city raudeberg  
Processing Record 386 for city roald  
Processing Record 387 for city henties bay  
Processing Record 388 for city namibe  
Processing Record 389 for city luanda  
Processing Record 390 for city omboue  
Processing Record 391 for city warri  
Processing Record 392 for city kontagora

Processing Record 393 for city tahoua  
Processing Record 394 for city arlit  
Processing Record 395 for city gat  
Processing Record 396 for city warqla  
city not found: skipping data  
Processing Record 397 for city tazmalt  
Processing Record 398 for city mahon  
Processing Record 399 for city romans-sur-isere  
Processing Record 400 for city gedinne  
Processing Record 401 for city harlingen  
Processing Record 402 for city storebo  
Processing Record 403 for city bud  
Processing Record 404 for city walvis bay  
Processing Record 405 for city opuwo  
Processing Record 406 for city mayumba  
Processing Record 407 for city kango  
Processing Record 408 for city nkongsamba  
Processing Record 409 for city bauchi  
Processing Record 410 for city goure  
Processing Record 411 for city nalut  
Processing Record 412 for city sidi bu zayd  
city not found: skipping data  
Processing Record 413 for city tortoli  
Processing Record 414 for city cremona  
Processing Record 415 for city werneck  
Processing Record 416 for city guderup  
Processing Record 417 for city vikersund  
Processing Record 418 for city a  
city not found: skipping data  
Processing Record 419 for city sorland  
Processing Record 420 for city bredasdorp  
Processing Record 421 for city oranjemund  
Processing Record 422 for city khorixas  
Processing Record 423 for city caluquembe  
Processing Record 424 for city kibala  
Processing Record 425 for city mbanza-ngungu  
Processing Record 426 for city ewo  
Processing Record 427 for city baboua  
city not found: skipping data  
Processing Record 428 for city fianga  
city not found: skipping data  
Processing Record 429 for city mao  
Processing Record 430 for city bilma  
Processing Record 431 for city marzuq  
Processing Record 432 for city hun  
Processing Record 433 for city marsaxlokk  
Processing Record 434 for city agropoli  
Processing Record 435 for city senj  
Processing Record 436 for city pecky  
Processing Record 437 for city aakirkeby  
city not found: skipping data  
Processing Record 438 for city ludvika  
Processing Record 439 for city storforshei  
Processing Record 440 for city myre  
Processing Record 441 for city longyearbyen  
Processing Record 442 for city calvinia  
Processing Record 443 for city aranos  
Processing Record 444 for city grootfontein  
Processing Record 445 for city menongue  
Processing Record 446 for city saurimo  
Processing Record 447 for city ilebo

Processing Record 448 for city boende  
Processing Record 449 for city kouango  
Processing Record 450 for city am timan  
Processing Record 451 for city biltine  
Processing Record 452 for city faya  
Processing Record 453 for city awjilah  
Processing Record 454 for city ajdabiya  
Processing Record 455 for city methoni  
Processing Record 456 for city delvine  
Processing Record 457 for city indija  
Processing Record 458 for city wieliczka  
Processing Record 459 for city primore  
city not found: skipping data  
Processing Record 460 for city maarianhamina  
city not found: skipping data  
Processing Record 461 for city skelleftea  
Processing Record 462 for city lyngseidet  
Processing Record 463 for city skjervoy  
Processing Record 464 for city kruisfontein  
Processing Record 465 for city colesberg  
Processing Record 466 for city kanye  
Processing Record 467 for city gweta  
Processing Record 468 for city kaoma  
Processing Record 469 for city bukama  
Processing Record 470 for city lubao  
Processing Record 471 for city kisangani  
Processing Record 472 for city zemio  
Processing Record 473 for city raga  
city not found: skipping data  
Processing Record 474 for city kutum  
Processing Record 475 for city jalu  
Processing Record 476 for city bardiyah  
city not found: skipping data  
Processing Record 477 for city asimion  
Processing Record 478 for city mirina  
city not found: skipping data  
Processing Record 479 for city titesti  
Processing Record 480 for city brody  
Processing Record 481 for city sirvintos  
Processing Record 482 for city helsinki  
Processing Record 483 for city haukipudas  
Processing Record 484 for city lakselv  
Processing Record 485 for city havoyund  
Processing Record 486 for city port elizabeth  
Processing Record 487 for city port alfred  
Processing Record 488 for city east london  
Processing Record 489 for city lydenburg  
Processing Record 490 for city shurugwi  
Processing Record 491 for city luangwa  
Processing Record 492 for city luwingu  
Processing Record 493 for city mwandiga  
Processing Record 494 for city kilembe  
Processing Record 495 for city maridi  
city not found: skipping data  
Processing Record 496 for city talawdi  
city not found: skipping data  
Processing Record 497 for city bara  
Processing Record 498 for city marawi  
Processing Record 499 for city sohag  
Processing Record 500 for city madinat sittah uktubar  
Processing Record 501 for city kumluca

Processing Record 502 for city bozuyuk  
Processing Record 503 for city sulina  
city not found: skipping data  
Processing Record 504 for city fastiv  
Processing Record 505 for city senno  
Processing Record 506 for city lisiy nos  
Processing Record 507 for city kostomuksha  
Processing Record 508 for city vadso  
Processing Record 509 for city berlevag  
Processing Record 510 for city mehamn  
Processing Record 511 for city margate  
Processing Record 512 for city richards bay  
Processing Record 513 for city manjacaze  
Processing Record 514 for city beira  
Processing Record 515 for city balaka  
Processing Record 516 for city mahanje  
city not found: skipping data  
Processing Record 517 for city mungaa  
Processing Record 518 for city ahero  
Processing Record 519 for city kapoeta  
city not found: skipping data  
Processing Record 520 for city mendi  
Processing Record 521 for city kassala  
Processing Record 522 for city sinkat  
city not found: skipping data  
Processing Record 523 for city safaga  
city not found: skipping data  
Processing Record 524 for city elat  
Processing Record 525 for city dipkarpaz  
city not found: skipping data  
Processing Record 526 for city alaca  
Processing Record 527 for city staryy krym  
Processing Record 528 for city okhtyrka  
Processing Record 529 for city iznoski  
Processing Record 530 for city nikolskoye  
Processing Record 531 for city kem  
Processing Record 532 for city tumanny  
city not found: skipping data  
Processing Record 533 for city skalistyy  
city not found: skipping data  
Processing Record 534 for city vardo  
Processing Record 535 for city umzimvubu  
city not found: skipping data  
Processing Record 536 for city beloha  
Processing Record 537 for city toliary  
city not found: skipping data  
Processing Record 538 for city mocuba  
Processing Record 539 for city mocambique  
city not found: skipping data  
Processing Record 540 for city lindi  
Processing Record 541 for city micheweni  
Processing Record 542 for city garissa  
Processing Record 543 for city shakiso  
Processing Record 544 for city abomsa  
city not found: skipping data  
Processing Record 545 for city ginda  
Processing Record 546 for city mecca  
Processing Record 547 for city umm lajj  
Processing Record 548 for city sakakah  
city not found: skipping data  
Processing Record 549 for city abu kamal

Processing Record 550 for city bayburt  
Processing Record 551 for city novolabinskaya  
Processing Record 552 for city mitrofanovka  
Processing Record 553 for city spas-klepiki  
Processing Record 554 for city kharovsk  
Processing Record 555 for city severodvinsk  
Processing Record 556 for city ostrovnoy  
Processing Record 557 for city tsihombe  
city not found: skipping data  
Processing Record 558 for city miandrivazo  
Processing Record 559 for city mahajanga  
Processing Record 560 for city mitsamiouli  
Processing Record 561 for city lamu  
Processing Record 562 for city barawe  
city not found: skipping data  
Processing Record 563 for city xuddur  
Processing Record 564 for city berbera  
city not found: skipping data  
Processing Record 565 for city sayyan  
Processing Record 566 for city najran  
Processing Record 567 for city buraydah  
Processing Record 568 for city doha  
Processing Record 569 for city kifri  
Processing Record 570 for city zangakatun  
Processing Record 571 for city urozhaynoye  
Processing Record 572 for city petrov val  
Processing Record 573 for city gagino  
Processing Record 574 for city nikolsk  
Processing Record 575 for city leshukonskoye  
Processing Record 576 for city kamenka  
Processing Record 577 for city belushya guba  
city not found: skipping data  
Processing Record 578 for city taolanaro  
city not found: skipping data  
Processing Record 579 for city vangaindrano  
Processing Record 580 for city mahanoro  
Processing Record 581 for city antalaha  
Processing Record 582 for city ambilobe  
Processing Record 583 for city victoria  
Processing Record 584 for city mogadishu  
Processing Record 585 for city hobyu  
Processing Record 586 for city bandarbeyla  
Processing Record 587 for city bereda  
Processing Record 588 for city abu samrah  
Processing Record 589 for city umm bab  
Processing Record 590 for city hendijan  
city not found: skipping data  
Processing Record 591 for city tafresh  
Processing Record 592 for city zig  
Processing Record 593 for city fort-shevchenko  
Processing Record 594 for city ozinki  
Processing Record 595 for city bazarnyye matakhi  
Processing Record 596 for city raduzhnyy  
Processing Record 597 for city koslan  
Processing Record 598 for city saint-joseph  
Processing Record 599 for city le port  
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Processing Record 602 for city salalah  
Processing Record 603 for city dubai

Processing Record 604 for city shahr-e babak  
Processing Record 605 for city damghan  
Processing Record 606 for city balkanabat  
Processing Record 607 for city beyneu  
Processing Record 608 for city sol-iletsk  
Processing Record 609 for city alekseyevka  
Processing Record 610 for city kosa  
Processing Record 611 for city izhma  
Processing Record 612 for city iskateley  
Processing Record 613 for city saint-philippe  
Processing Record 614 for city souillac  
Processing Record 615 for city grand river south east  
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Processing Record 616 for city cap malheureux  
Processing Record 617 for city sur  
Processing Record 618 for city chabahar  
Processing Record 619 for city zabol  
Processing Record 620 for city torbat-e jam  
Processing Record 621 for city hazorasp  
Processing Record 622 for city karauzyak  
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Processing Record 623 for city dombarovskiy  
Processing Record 624 for city turgoyak  
Processing Record 625 for city volchansk  
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Processing Record 627 for city amderma  
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Processing Record 628 for city mahebourg  
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Processing Record 630 for city grand gaube  
Processing Record 631 for city hithadhoo  
Processing Record 632 for city thinadhoo  
Processing Record 633 for city ugoofaaru  
Processing Record 634 for city kavaratti  
Processing Record 635 for city mangrol  
Processing Record 636 for city dwarka  
Processing Record 637 for city ormara  
Processing Record 638 for city nushki  
Processing Record 639 for city ciras  
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Processing Record 640 for city navoi  
Processing Record 641 for city tasbuget  
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Processing Record 642 for city derzhavinsk  
Processing Record 643 for city glyadyanskoye  
Processing Record 644 for city uray  
Processing Record 645 for city muzhi  
Processing Record 646 for city severnyy  
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Processing Record 657 for city bulaevo  
Processing Record 658 for city gornopravdinsk  
Processing Record 659 for city yar-sale  
Processing Record 660 for city dikson  
Processing Record 661 for city busselton  
Processing Record 662 for city viligili  
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Processing Record 665 for city mundgod  
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Processing Record 668 for city kalanwali  
Processing Record 669 for city bandipur  
Processing Record 670 for city kashi  
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Processing Record 673 for city okoneshnikovo  
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Processing Record 675 for city pangody  
Processing Record 676 for city matara  
Processing Record 677 for city weligama  
Processing Record 678 for city valvedditturai  
Processing Record 679 for city kavali  
Processing Record 680 for city mul  
Processing Record 681 for city khajuraho  
Processing Record 682 for city bageshwar  
Processing Record 683 for city leh  
Processing Record 684 for city aksu  
Processing Record 685 for city sarkand  
Processing Record 686 for city semey  
Processing Record 687 for city kargat  
Processing Record 688 for city kargasok  
Processing Record 689 for city urengoy  
Processing Record 690 for city tazovski  
Processing Record 691 for city geraldton  
Processing Record 692 for city hambantota  
Processing Record 693 for city wattegama  
Processing Record 694 for city batticaloa  
Processing Record 695 for city yarada  
Processing Record 696 for city nayagarh  
Processing Record 697 for city tekari  
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Processing Record 699 for city jumla  
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Processing Record 702 for city ust-koksa  
Processing Record 703 for city krasnoye  
Processing Record 704 for city belyy yar  
Processing Record 705 for city krasnoselkup  
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Processing Record 706 for city dudinka  
Processing Record 707 for city albany  
Processing Record 708 for city carnarvon  
Processing Record 709 for city bengkulu  
city not found: skipping data  
Processing Record 710 for city meulaboh



Processing Record 711 for city banda aceh  
Processing Record 712 for city port blair  
Processing Record 713 for city mathbaria  
Processing Record 714 for city sherpur  
Processing Record 715 for city lasa  
Processing Record 716 for city urumqi  
city not found: skipping data  
Processing Record 717 for city mugur-aksy  
Processing Record 718 for city kopyevo  
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Processing Record 720 for city turukhansk  
Processing Record 721 for city talnakh  
Processing Record 722 for city palabuhanratu  
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Processing Record 724 for city sibolga  
Processing Record 725 for city labutta  
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Processing Record 727 for city phek  
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Processing Record 729 for city yumen  
Processing Record 730 for city hami  
Processing Record 731 for city erzin  
Processing Record 732 for city aginskoye  
Processing Record 733 for city yuzhno-yeniseyskiy  
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Processing Record 736 for city payakumbuh  
Processing Record 737 for city ayer itam  
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Processing Record 739 for city doembang nangbuat  
Processing Record 740 for city chiang rai  
Processing Record 741 for city dali  
Processing Record 742 for city yaan  
Processing Record 743 for city xining  
Processing Record 744 for city zhangye  
Processing Record 745 for city hovd  
Processing Record 746 for city moron  
Processing Record 747 for city atagay  
Processing Record 748 for city kodinsk  
Processing Record 749 for city tura  
Processing Record 750 for city metro  
Processing Record 751 for city kijang  
Processing Record 752 for city paka  
Processing Record 753 for city rach gia  
Processing Record 754 for city det udom  
Processing Record 755 for city thanh hoa  
Processing Record 756 for city xingyi  
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Processing Record 758 for city beidao  
Processing Record 759 for city shitanjing  
Processing Record 760 for city mandalgovi  
Processing Record 761 for city petropavlovka  
Processing Record 762 for city zhigalovo  
Processing Record 763 for city vanavara  
Processing Record 764 for city yerbogachen  
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Processing Record 777 for city krasnyy chikoy  
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Processing Record 779 for city aykhal  
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Processing Record 781 for city karratha  
Processing Record 782 for city denpasar  
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Processing Record 793 for city baruun-urt  
Processing Record 794 for city nizhniy tsasuchey  
Processing Record 795 for city taksimo  
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Processing Record 797 for city almaznyy  
Processing Record 798 for city new norfolk  
Processing Record 799 for city northam  
Processing Record 800 for city port hedland  
Processing Record 801 for city broome  
Processing Record 802 for city waingapu  
Processing Record 803 for city sinjai  
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Processing Record 816 for city khani  
Processing Record 817 for city verkhnevilyuysk  
Processing Record 818 for city zhigansk  
Processing Record 819 for city esperance  
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Processing Record 821 for city kununurra  
Processing Record 822 for city soe

Processing Record 823 for city katobu  
Processing Record 824 for city tondano  
Processing Record 825 for city sarangani  
Processing Record 826 for city macrohon  
Processing Record 827 for city pandan  
Processing Record 828 for city basco  
Processing Record 829 for city hirara  
Processing Record 830 for city shenjiamen  
Processing Record 831 for city seoul  
Processing Record 832 for city dandong  
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Processing Record 836 for city nizhniy kuranakh  
Processing Record 837 for city tiksi  
Processing Record 838 for city hobart  
Processing Record 839 for city mount gambier  
Processing Record 840 for city port lincoln  
Processing Record 841 for city flinders  
Processing Record 842 for city port keats  
Processing Record 843 for city nguiu  
city not found: skipping data  
Processing Record 844 for city amahai  
Processing Record 845 for city sorong  
Processing Record 846 for city pundaguitan  
Processing Record 847 for city bacolod  
Processing Record 848 for city san policarpo  
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Processing Record 850 for city gushikawa  
Processing Record 851 for city kaseda  
Processing Record 852 for city fukuma  
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Processing Record 854 for city chaihe  
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Processing Record 860 for city alice springs  
Processing Record 861 for city ngukurr  
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Processing Record 863 for city nabire  
Processing Record 864 for city manokwari  
Processing Record 865 for city kloulklubed  
Processing Record 866 for city airai  
Processing Record 867 for city nishihara  
Processing Record 868 for city naze  
Processing Record 869 for city muroto  
Processing Record 870 for city nishiwaki  
Processing Record 871 for city preobrazheniye  
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Processing Record 873 for city litovko  
Processing Record 874 for city chumikan  
Processing Record 875 for city ust-maya  
Processing Record 876 for city khandyga  
Processing Record 877 for city ust-kuyga  
Processing Record 878 for city nizhneyansk

city not found: skipping data  
Processing Record 879 for city murray bridge  
Processing Record 880 for city broken hill  
Processing Record 881 for city mount isa  
Processing Record 882 for city alyangula  
Processing Record 883 for city merauke  
Processing Record 884 for city kiunga  
Processing Record 885 for city vanimo  
Processing Record 886 for city shingu  
Processing Record 887 for city shimoda  
Processing Record 888 for city kamogawa  
Processing Record 889 for city tenno  
Processing Record 890 for city wakkanai  
Processing Record 891 for city vysokogornyy  
Processing Record 892 for city mnogovershinnyy  
Processing Record 893 for city solnechnyy  
Processing Record 894 for city ust-nera  
Processing Record 895 for city deputatskiy  
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Processing Record 898 for city emerald  
Processing Record 899 for city charters towers  
Processing Record 900 for city mareeba  
Processing Record 901 for city daru  
Processing Record 902 for city madang  
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Processing Record 904 for city tateyama  
Processing Record 905 for city katsuura  
Processing Record 906 for city hasaki  
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Processing Record 914 for city chokurdakh  
Processing Record 915 for city bluff  
Processing Record 916 for city lakes entrance  
Processing Record 917 for city goulburn  
Processing Record 918 for city narrabri  
Processing Record 919 for city biloela  
Processing Record 920 for city mackay  
Processing Record 921 for city samarai  
Processing Record 922 for city alotau  
city not found: skipping data  
Processing Record 923 for city kimbe  
Processing Record 924 for city kavieng  
Processing Record 925 for city kamaishi  
Processing Record 926 for city sentyabrskiy  
city not found: skipping data  
Processing Record 927 for city vostok  
Processing Record 928 for city magadan  
Processing Record 929 for city arman  
Processing Record 930 for city zyryanka  
Processing Record 931 for city batemans bay  
Processing Record 932 for city nelson bay  
Processing Record 933 for city hervey bay  
Processing Record 934 for city yeppoon  
Processing Record 935 for city gizo

Processing Record 936 for city arawa  
Processing Record 937 for city namatanai  
Processing Record 938 for city severo-kurilsk  
Processing Record 939 for city sobolevo  
Processing Record 940 for city dukat  
Processing Record 941 for city srednekolymsk  
Processing Record 942 for city tuatapere  
Processing Record 943 for city te anau  
Processing Record 944 for city port macquarie  
Processing Record 945 for city byron bay  
Processing Record 946 for city koumac  
Processing Record 947 for city poum  
Processing Record 948 for city kirakira  
Processing Record 949 for city honiara  
Processing Record 950 for city buala  
Processing Record 951 for city kieta  
Processing Record 952 for city butaritari  
Processing Record 953 for city petropavlovsk-kamchatskiy  
Processing Record 954 for city milkovo  
Processing Record 955 for city palana  
Processing Record 956 for city evensk  
Processing Record 957 for city cherskiy  
Processing Record 958 for city ahipara  
Processing Record 959 for city vao  
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Processing Record 963 for city lata  
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Processing Record 965 for city bairiki  
city not found: skipping data  
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Processing Record 967 for city kamenskoye  
city not found: skipping data  
Processing Record 968 for city bilibino  
Processing Record 969 for city pevek  
Processing Record 970 for city kaitangata  
Processing Record 971 for city ranfurly  
Processing Record 972 for city westport  
Processing Record 973 for city isangel  
Processing Record 974 for city sola  
Processing Record 975 for city utiroa  
city not found: skipping data  
Processing Record 976 for city tabiauea  
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Processing Record 977 for city dunedin  
Processing Record 978 for city christchurch  
Processing Record 979 for city wanganui  
Processing Record 980 for city ngunguru  
Processing Record 981 for city kaeo  
Processing Record 982 for city vila  
Processing Record 983 for city asau  
city not found: skipping data  
Processing Record 984 for city lolua  
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Processing Record 985 for city temaraia  
city not found: skipping data  
Processing Record 986 for city beringovskiy  
Processing Record 987 for city anadyr  
Processing Record 988 for city komsomolskiy  
Processing Record 989 for city leningradskiy

## Convert Raw Data to DataFrame

- Export the city data into a .csv.
- Display the DataFrame

In [110]:

```
#import pprint
#pprint.pprint(out_cities, indent=4)
cleaned_out_cities = [{
    "Name": d["name"],
    "Temp": d["main"]["temp"],
    "Cloudiness": d["clouds"]["all"],
    "Country": d["sys"]["country"],
    "Date": date.fromtimestamp(d['dt']).isoformat(),
    "Humidity": d["main"]["humidity"],
    "Lat": d["coord"]["lat"],
    "Lng": d["coord"]["lon"],
    "Max Temp": d["main"]["temp_max"],
    "Wind Speed": d["wind"]["speed"]
}] for d in out_cities]
df=pd.DataFrame(cleaned_out_cities)

f = open(output_data_file, "+w")
df.to_csv(f)
f.close()
df.head()
```

Out[110]:

	Name	Temp	Cloudiness	Country	Date	Humidity	Lat	Lng	Max Temp	Wind Speed
0	Vaini	64.36	0	IN	2019-12-30	85	15.34	74.49	64.36	2.75
1	Kapaa	77.90	90	US	2019-12-30	74	22.08	-159.32	78.80	14.99
2	Provideniya	-5.80	0	RU	2019-12-30	63	64.42	-173.23	-5.80	20.13
3	Egvekinot	-26.77	0	RU	2019-12-30	87	66.32	-179.17	-26.77	7.76
4	Pangai	80.98	100	TO	2019-12-30	82	-19.80	-174.35	80.98	32.70

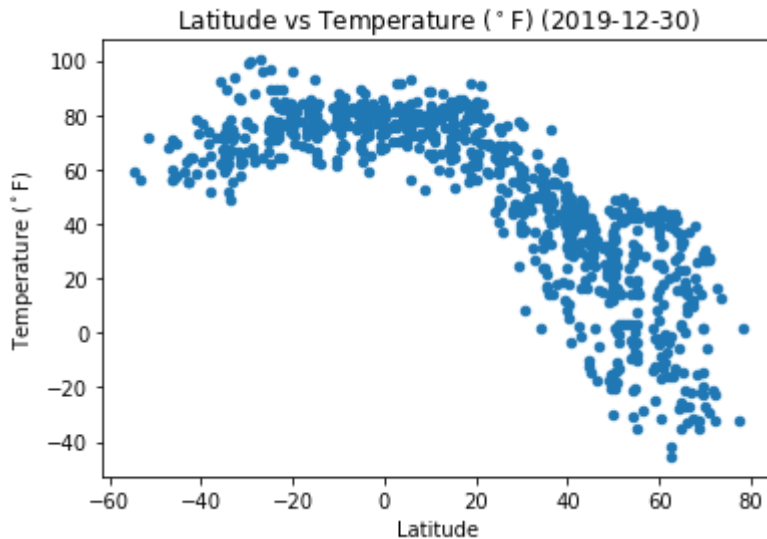
In [ ]:

## Plotting the Data

### Latitude vs. Temperature Plot

In [113]:

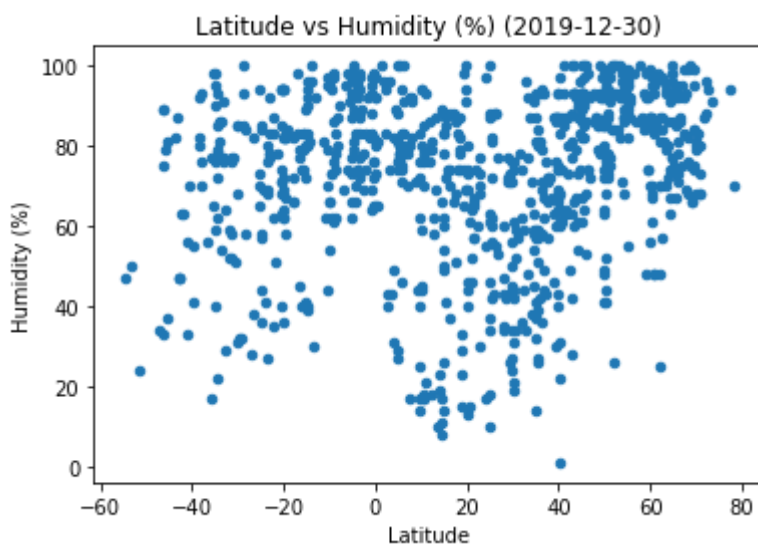
```
def plot_graph(df, x, y):  
    df.plot.scatter(x = x, y = y)  
  
plot_graph(df, 'Lat', 'Temp')  
plt.ylabel('Temperature ( $^{\circ}$ F)')  
plt.xlabel('Latitude')  
plt.title("Latitude vs Temperature ( $^{\circ}$ F) ({}).format(df["Date"][0]))  
plt.savefig("Lat_vs_Temp.png")  
plt.show()
```



### Latitude vs. Humidity Plot

In [114]:

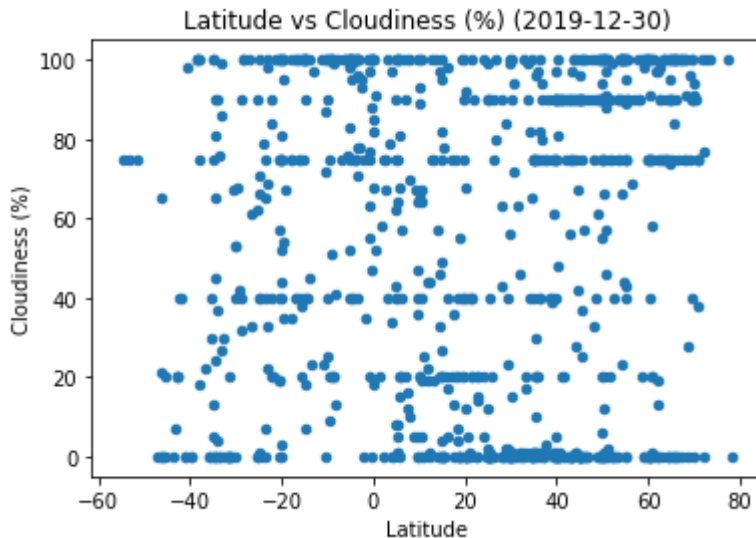
```
plot_graph(df, 'Lat', 'Humidity')  
plt.ylabel('Humidity (%)')  
plt.xlabel('Latitude')  
plt.title("Latitude vs Humidity (%) ({}).format(df["Date"][0]))  
plt.savefig("Lat_vs_Humidity.png")  
plt.show()
```



## Latitude vs. Cloudiness Plot

In [115]:

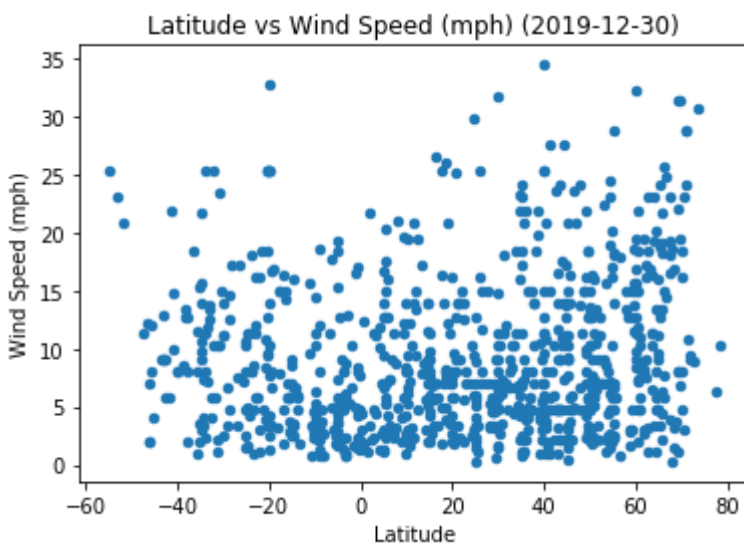
```
plot_graph(df, 'Lat', 'Cloudiness')
plt.ylabel('Cloudiness (%)')
plt.xlabel('Latitude')
plt.title("Latitude vs Cloudiness (%) ({}).format(df["Date"][0]))
plt.savefig("Lat_vs_Cloudiness.png")
plt.show()
```



## Latitude vs. Wind Speed Plot

In [116]:

```
plot_graph(df, 'Lat', 'Wind Speed')
plt.ylabel('Wind Speed (mph)')
plt.xlabel('Latitude')
plt.title("Latitude vs Wind Speed (mph) ({}).format(df["Date"][0]))
plt.savefig("Lat_vs_WindSpeed.png")
plt.show()
```





## Observations

- The plot Latitude versus temperature shows that as we go away from the equator, the temperature starts decreasing.
- The temperatures are lot cooler in the northern hemisphere compared to southern hemisphere. This is because the northern hemisphere is in winter season and southern is in summer.
- Majority of the cities have wind speeds in the range of 0 mph to 10 mph regardless of the latitude.
- The cloudiness accross the globe seems to vary in steps. You can observe this as horizontal lines on the plot Latitude verses cloudiness.
- Majority of the cities have humidity in the range of 60% to 100% regardless of the latitude.