

Report of Assignment 02

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```
In [150]: import pandas as pd
import numpy as np
import netCDF4
import xarray as xr
import math
from matplotlib import pyplot as plt
%matplotlib inline
```

```
In [151]: Sig_Eqs=pd.read_csv(r"D:\ESE5023\earthquakes-2023-11-05_23-57-13_+0800.tsv", sep='\t')
```

```
In [152]: #1.1
#每个Country的Total Deaths求和
Sig_Eqs_1=Sig_Eqs.groupby('Country')['Total Deaths'].sum().reset_index()
#按Total Deaths的和降序排列, 取前十, 去掉原索引
Sig_Eqs_1=Sig_Eqs_1.sort_values(by='Total Deaths', ascending=[False])[:10].reset_index()
Sig_Eqs_1
```

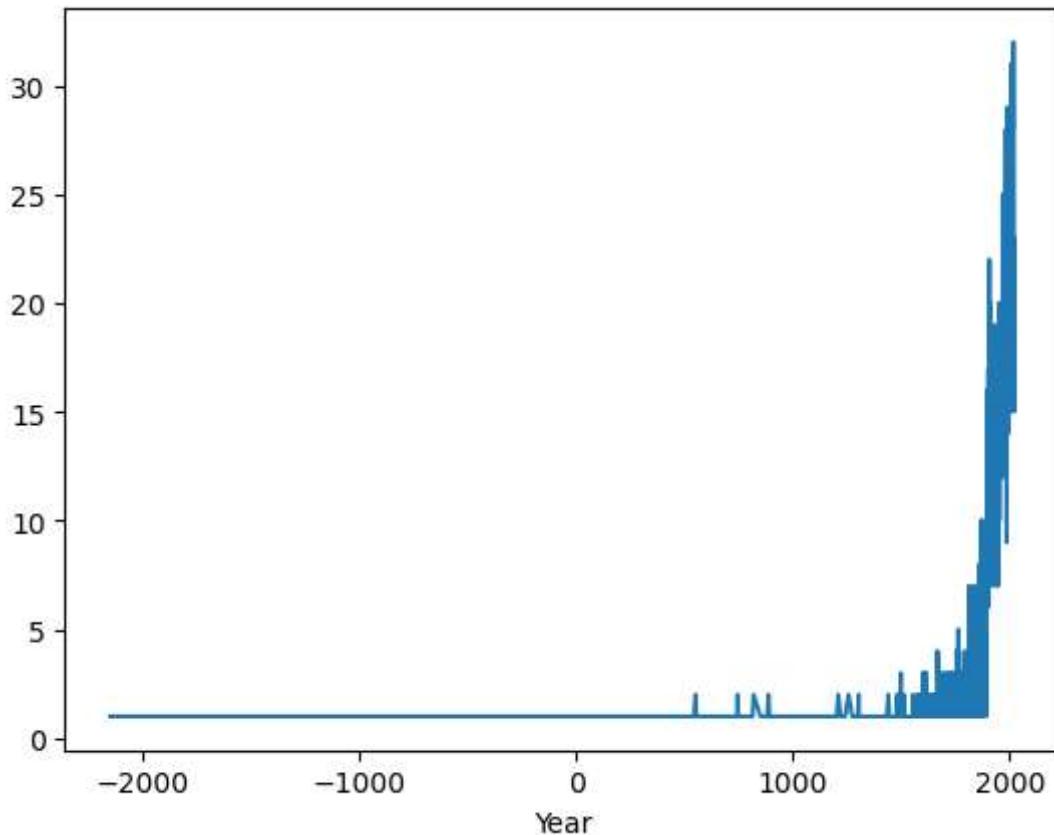
Out[152]:

	Country	Total Deaths
0	CHINA	2041929.0
1	TURKEY	995648.0
2	IRAN	758650.0
3	SYRIA	437700.0
4	ITALY	422679.0
5	JAPAN	356083.0
6	HAITI	323776.0
7	AZERBAIJAN	310119.0
8	INDONESIA	282819.0
9	ARMENIA	189000.0

```
In [153]: #1.2  
#筛选Mag>6.0的数据  
Sig_Eqs_2=Sig_Eqs.loc[Sig_Eqs['Mag']>6.0]  
#年份-该年内6级以上地震次数  
Sig_Eqs_2=Sig_Eqs_2.groupby('Year')['Mag'].count()  
print(Sig_Eqs_2)  
#根据年份画图  
Sig_Eqs_2.plot()  
#The trend is upward. There may be scientific and technological progress, rising popu
```

```
Year  
-2150.0      1  
-2000.0      1  
-1250.0      1  
-1050.0      1  
-479.0       1  
..  
2019.0       27  
2020.0       15  
2021.0       23  
2022.0       20  
2023.0       22  
Name: Mag, Length: 536, dtype: int64
```

```
Out[153]: <Axes: xlabel='Year'>
```



```
In [154]: #1.3
def CountEq_LargestEq(Country_input):

    #每次开始时重新读一下数据（因为后面把NAN替换为0了，多次运行的时候会导致计数有误）
    Sig_Eqs=pd.read_csv(r"D:\ESE5023\earthquakes-2023-11-05_23-57-13_+0800.tsv", sep=
    a=Sig_Eqs.loc[Sig_Eqs['Country'] == Country_input]['Mag']
    #地震计数
    CountEq=a.count()

    #找最大一次地震的行数
    LargestEq_line=a.idxmax()
    if pd.isnull(LargestEq_line) == True:
        Date="No data"
    else:

        #找对应的时间
        #处理没有“最大地震的时间”的数据
        if np.isnan(LargestEq_line) == True:
            Date="No data"
        else:
            #把NAN替换为0
            Sig_Eqs.fillna(0, inplace=True)

            Year=int(Sig_Eqs.iloc[LargestEq_line, 2])
            Month=int(Sig_Eqs.iloc[LargestEq_line, 3])
            Day=int(Sig_Eqs.iloc[LargestEq_line, 4])

            #处理没有详细M、D时间记录的数据
            if Month == 0:
                Date=str(Year)
            elif Day == 0:
                Date=str(Year)+ '-' +str(Month)
            else:
                Date=str(Year)+ '-' +str(Month)+ '-' +str(Day)

    #输出Country_input、CountEq
    print(str(Country_input)+': Total number of earthquakes: '+str(CountEq)+', Large-
    return CountEq
```

```
In [155]: #取出所有国家的一列
Sig_Eqs_3=Sig_Eqs.groupby('Country')['Mag'].count().reset_index()
Country=Sig_Eqs_3["Country"]

#计算地震数量
CountEq_list=[]
for i in Country:
    CountEq_list.append(CountEq_LargestEq(i))

#拼接Country、CountEq-Date (顺序相同)
Country_list=Country.tolist()
Sig_Eqs_4=pd.DataFrame(Country_list, columns=['Country'])
Sig_Eqs_5=pd.DataFrame(CountEq_list, columns=['CountEq'])
Sig_Eqs_6=pd.concat([Sig_Eqs_4, Sig_Eqs_5], axis=1)

#降序排序
Sig_Eqs_CountEq=Sig_Eqs_6.sort_values(by='CountEq', ascending=[False]).reset_index()
print(Sig_Eqs_CountEq)
```



AFGHANISTAN: Total number of earthquakes: 60, Largest earthquake: 1909-7-7
ALBANIA: Total number of earthquakes: 35, Largest earthquake: 1893-6-14
ALGERIA: Total number of earthquakes: 39, Largest earthquake: 1980-10-10
ANTARCTICA: Total number of earthquakes: 5, Largest earthquake: 1998-3-25
ANTIGUA AND BARBUDA: Total number of earthquakes: 2, Largest earthquake: 1690-4-16
ARGENTINA: Total number of earthquakes: 17, Largest earthquake: 1944-1-15
ARMENIA: Total number of earthquakes: 8, Largest earthquake: 1988-12-7
ATLANTIC OCEAN: Total number of earthquakes: 5, Largest earthquake: 1941-11-25
AUSTRALIA: Total number of earthquakes: 22, Largest earthquake: 1989-5-23
AUSTRIA: Total number of earthquakes: 2, Largest earthquake: 1590-9-15
AZERBAIJAN: Total number of earthquakes: 14, Largest earthquake: 1667-11
AZORES (PORTUGAL): Total number of earthquakes: 10, Largest earthquake: 1968-2-28
BANGLADESH: Total number of earthquakes: 15, Largest earthquake: 1918-7-8
BARBADOS: Total number of earthquakes: 0, Largest earthquake: No data
BELGIUM: Total number of earthquakes: 1, Largest earthquake: 1983-11-8
BERING SEA: Total number of earthquakes: 1, Largest earthquake: 1991-2-21
BHUTAN: Total number of earthquakes: 5, Largest earthquake: 2009-9-21
BOLIVIA: Total number of earthquakes: 6, Largest earthquake: 1994-6-9
BOSNIA-HERZEGOVINA: Total number of earthquakes: 9, Largest earthquake: 1969-10-27
BRAZIL: Total number of earthquakes: 6, Largest earthquake: 1963-11-9
BRITISH VIRGIN ISLANDS: Total number of earthquakes: 0, Largest earthquake: No data
BULGARIA: Total number of earthquakes: 12, Largest earthquake: 1904-4-4
BURUNDI: Total number of earthquakes: 1, Largest earthquake: 2004-2-24
CAMEROON: Total number of earthquakes: 1, Largest earthquake: 1945-9-12
CANADA: Total number of earthquakes: 15, Largest earthquake: 1949-8-22
CANARY ISLANDS: Total number of earthquakes: 0, Largest earthquake: No data
CENTRAL AFRICAN REPUBLIC: Total number of earthquakes: 1, Largest earthquake: 1921-9-16
CHILE: Total number of earthquakes: 146, Largest earthquake: 1960-5-22
CHINA: Total number of earthquakes: 589, Largest earthquake: 1668-7-25
COLOMBIA: Total number of earthquakes: 66, Largest earthquake: 1826-6-18
COMOROS: Total number of earthquakes: 1, Largest earthquake: 2018-5-15
CONGO: Total number of earthquakes: 7, Largest earthquake: 1992-9-11
COSTA RICA: Total number of earthquakes: 26, Largest earthquake: 1950-10-5
COTE D'IVOIRE: Total number of earthquakes: 2, Largest earthquake: 1879-2-11
CROATIA: Total number of earthquakes: 12, Largest earthquake: 1667-4-6
CUBA: Total number of earthquakes: 6, Largest earthquake: 2020-1-28
CYPRUS: Total number of earthquakes: 3, Largest earthquake: 1953-9-10
CZECH REPUBLIC: Total number of earthquakes: 1, Largest earthquake: 2008-11-22
DJIBOUTI: Total number of earthquakes: 1, Largest earthquake: 1989-8-20
DOMINICAN REPUBLIC: Total number of earthquakes: 8, Largest earthquake: 1946-8-4
ECUADOR: Total number of earthquakes: 57, Largest earthquake: 1906-1-31
EGYPT: Total number of earthquakes: 7, Largest earthquake: 1995-11-22
EL SALVADOR: Total number of earthquakes: 21, Largest earthquake: 1915-9-7
ERITREA: Total number of earthquakes: 4, Largest earthquake: 1875-11-2
ETHIOPIA: Total number of earthquakes: 7, Largest earthquake: 1906-8-25
FIJI: Total number of earthquakes: 17, Largest earthquake: 1919-1-1
FRANCE: Total number of earthquakes: 15, Largest earthquake: 1817-3-11
FRENCH GUIANA: Total number of earthquakes: 1, Largest earthquake: 1885-8-4
FRENCH POLYNESIA: Total number of earthquakes: 1, Largest earthquake: 1848-7-12
GABON: Total number of earthquakes: 1, Largest earthquake: 1974-9-23
GEORGIA: Total number of earthquakes: 15, Largest earthquake: 1905-10-21
GERMANY: Total number of earthquakes: 5, Largest earthquake: 1978-9-3
GHANA: Total number of earthquakes: 5, Largest earthquake: 1862-7-10
GREECE: Total number of earthquakes: 155, Largest earthquake: 365-7-21
GRENADA: Total number of earthquakes: 0, Largest earthquake: No data
GUADELOUPE: Total number of earthquakes: 5, Largest earthquake: 1843-2-8
GUATEMALA: Total number of earthquakes: 29, Largest earthquake: 1942-8-6
GUINEA: Total number of earthquakes: 1, Largest earthquake: 1983-12-22
HAITI: Total number of earthquakes: 10, Largest earthquake: 1842-5-7

HONDURAS: Total number of earthquakes: 9, Largest earthquake: 1856-8-4
HUNGARY: Total number of earthquakes: 5, Largest earthquake: 1834-10-15
ICELAND: Total number of earthquakes: 6, Largest earthquake: 1912-5-6
INDIA: Total number of earthquakes: 84, Largest earthquake: 1950-8-15
INDIAN OCEAN: Total number of earthquakes: 3, Largest earthquake: 1928-3-9
INDONESIA: Total number of earthquakes: 331, Largest earthquake: 2004-12-26
IRAN: Total number of earthquakes: 259, Largest earthquake: 856-12-22
IRAQ: Total number of earthquakes: 3, Largest earthquake: 1864-12-2
IRELAND: Total number of earthquakes: 0, Largest earthquake: No data
ISRAEL: Total number of earthquakes: 9, Largest earthquake: -31-9-2
ITALY: Total number of earthquakes: 102, Largest earthquake: 1915-1-13
JAMAICA: Total number of earthquakes: 3, Largest earthquake: 1899-6-14
JAPAN: Total number of earthquakes: 351, Largest earthquake: 2011-3-11
JORDAN: Total number of earthquakes: 5, Largest earthquake: -2150
KAZAKHSTAN: Total number of earthquakes: 10, Largest earthquake: 1889-7-11
KENYA: Total number of earthquakes: 2, Largest earthquake: 1928-1-6
KERMADEC ISLANDS (NEW ZEALAND): Total number of earthquakes: 21, Largest earthquake: 1986-10-20
KIRIBATI: Total number of earthquakes: 1, Largest earthquake: 1905-6-30
KYRGYZSTAN: Total number of earthquakes: 14, Largest earthquake: 1946-11-2
LAOS: Total number of earthquakes: 2, Largest earthquake: 2007-5-16
LEBANON: Total number of earthquakes: 3, Largest earthquake: 551-7-9
LIBYA: Total number of earthquakes: 1, Largest earthquake: 1963-2-21
MACEDONIA: Total number of earthquakes: 7, Largest earthquake: 1979-5-24
MADAGASCAR: Total number of earthquakes: 1, Largest earthquake: 2017-1-11
MALAWI: Total number of earthquakes: 4, Largest earthquake: 1989-3-10
MALAYSIA: Total number of earthquakes: 3, Largest earthquake: 1976-7-26
MARTINIQUE: Total number of earthquakes: 3, Largest earthquake: 1906-12-3
MEXICO: Total number of earthquakes: 128, Largest earthquake: 1899-1-24
MICRONESIA, FED. STATES OF: Total number of earthquakes: 3, Largest earthquake: 1911-8-16
MONGOLIA: Total number of earthquakes: 6, Largest earthquake: 1905-7-9
MONTENEGRO: Total number of earthquakes: 5, Largest earthquake: 1979-4-15
MONTSERRAT: Total number of earthquakes: 0, Largest earthquake: No data
MOROCCO: Total number of earthquakes: 4, Largest earthquake: 2023-9-8
MOZAMBIQUE: Total number of earthquakes: 3, Largest earthquake: 2006-2-22
MYANMAR (BURMA): Total number of earthquakes: 25, Largest earthquake: 1912-5-23
NEPAL: Total number of earthquakes: 17, Largest earthquake: 1505-6-6
NETHERLANDS: Total number of earthquakes: 3, Largest earthquake: 1992-4-13
NEW CALEDONIA: Total number of earthquakes: 25, Largest earthquake: 1875-3-28
NEW ZEALAND: Total number of earthquakes: 65, Largest earthquake: 1826
NICARAGUA: Total number of earthquakes: 27, Largest earthquake: 1898-4-29
NORTH KOREA: Total number of earthquakes: 6, Largest earthquake: 1518-7-2
NORWAY: Total number of earthquakes: 1, Largest earthquake: 1819-8-31
PACIFIC OCEAN: Total number of earthquakes: 2, Largest earthquake: 1932-11-2
PAKISTAN: Total number of earthquakes: 44, Largest earthquake: 1945-11-27
PALAU: Total number of earthquakes: 1, Largest earthquake: 1914-10-23
PANAMA: Total number of earthquakes: 20, Largest earthquake: 1882-9-7
PAPUA NEW GUINEA: Total number of earthquakes: 93, Largest earthquake: 1919-5-6
PERU: Total number of earthquakes: 153, Largest earthquake: 1716-2-6
PHILIPPINES: Total number of earthquakes: 136, Largest earthquake: 1897-9-21
POLAND: Total number of earthquakes: 7, Largest earthquake: 2004-9-21
PORTUGAL: Total number of earthquakes: 8, Largest earthquake: -60
ROMANIA: Total number of earthquakes: 13, Largest earthquake: 1977-3-4
RUSSIA: Total number of earthquakes: 142, Largest earthquake: 1952-11-4
RWANDA: Total number of earthquakes: 5, Largest earthquake: 2015-8-7

SAINT LUCIA: Total number of earthquakes: 0, Largest earthquake: No data
 SAINT VINCENT AND THE GRENADINES: Total number of earthquakes: 0, Largest earthquake: No data
 SAMOA: Total number of earthquakes: 8, Largest earthquake: 1917-6-26
 SAUDI ARABIA: Total number of earthquakes: 3, Largest earthquake: 2009-5-19
 SERBIA: Total number of earthquakes: 10, Largest earthquake: 1922-3-24
 SIERRA LEONE: Total number of earthquakes: 1, Largest earthquake: 1795-5-20
 SLOVAKIA: Total number of earthquakes: 1, Largest earthquake: 2004-1-10
 SLOVENIA: Total number of earthquakes: 14, Largest earthquake: 1511-3-26
 SOLOMON ISLANDS: Total number of earthquakes: 61, Largest earthquake: 1977-4-21
 SOLOMON SEA: Total number of earthquakes: 2, Largest earthquake: 1895-3-6
 SOUTH AFRICA: Total number of earthquakes: 13, Largest earthquake: 1942-11-10
 SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS: Total number of earthquakes: 7, Largest earthquake: 1929-6-27
 SOUTH KOREA: Total number of earthquakes: 20, Largest earthquake: 1643-7-25
 SOUTH SUDAN: Total number of earthquakes: 2, Largest earthquake: 1990-5-20
 SPAIN: Total number of earthquakes: 13, Largest earthquake: 881-5-26
 SRI LANKA: Total number of earthquakes: 0, Largest earthquake: No data
 SUDAN: Total number of earthquakes: 1, Largest earthquake: 1993-8-1
 SWITZERLAND: Total number of earthquakes: 4, Largest earthquake: 1601-9-18
 SYRIA: Total number of earthquakes: 3, Largest earthquake: 1202-5-20
 TAIWAN: Total number of earthquakes: 97, Largest earthquake: 1920-6-5
 TAJIKISTAN: Total number of earthquakes: 27, Largest earthquake: 1907-10-21
 TANZANIA: Total number of earthquakes: 8, Largest earthquake: 1910-12-13
 THAILAND: Total number of earthquakes: 3, Largest earthquake: 2014-5-5
 TOGO: Total number of earthquakes: 1, Largest earthquake: 1788
 TONGA: Total number of earthquakes: 20, Largest earthquake: 1919-4-30
 TRINIDAD AND TOBAGO: Total number of earthquakes: 6, Largest earthquake: 1888-1-10
 TUNISIA: Total number of earthquakes: 2, Largest earthquake: 1957-2-20
 TURKEY: Total number of earthquakes: 214, Largest earthquake: 1939-12-26
 TURKMENISTAN: Total number of earthquakes: 10, Largest earthquake: 1895-7-8
 UGANDA: Total number of earthquakes: 4, Largest earthquake: 1912-7-9
 UK: Total number of earthquakes: 7, Largest earthquake: 1580-4-6
 UK TERRITORY: Total number of earthquakes: 1, Largest earthquake: 1983-11-30
 UKRAINE: Total number of earthquakes: 12, Largest earthquake: 103
 URUGUAY: Total number of earthquakes: 0, Largest earthquake: No data
 USA: Total number of earthquakes: 223, Largest earthquake: 1964-3-28
 USA TERRITORY: Total number of earthquakes: 23, Largest earthquake: 1902-9-22
 UZBEKISTAN: Total number of earthquakes: 12, Largest earthquake: 1976-4-8
 VANUATU: Total number of earthquakes: 48, Largest earthquake: 1913-10-14
 VENEZUELA: Total number of earthquakes: 30, Largest earthquake: 1894-4-29
 VIETNAM: Total number of earthquakes: 5, Largest earthquake: 1935-11-1
 WALLIS AND FUTUNA (FRENCH TERRITORY): Total number of earthquakes: 1, Largest earthquake: 1993-3-12
 YEMEN: Total number of earthquakes: 3, Largest earthquake: 1982-12-13
 ZAMBIA: Total number of earthquakes: 1, Largest earthquake: 2017-2-24

	Country	CountEq
0	CHINA	589
1	JAPAN	351
2	INDONESIA	331
3	IRAN	259
4	USA	223
..
151	CANARY ISLANDS	0
152	SRI LANKA	0
153	IRELAND	0
154	GRENADA	0
155	SAINT VINCENT AND THE GRENADINES	0

[156 rows x 2 columns]

```
In [156]: #1.3的草稿（缺函数、缺最大值的日期）
''' #def CountEq_LargestEq(Country_input)
#计算每个国家发生地震的总数
Sig_Eqs_3=Sig_Eqs.groupby('Country')['Mag'].count().reset_index()
Sig_Eqs_3.rename(columns={"Mag": "CountEq"}, inplace=True)

#计算每个国家发生地震的最大级
Sig_Eqs_4=Sig_Eqs.groupby('Country')['Mag'].max().reset_index()
Sig_Eqs_4.rename(columns={"Mag": "LargestEq"}, inplace=True)

#提取最大值，放入Sig_Eqs_3最后一列
LargestEq=Sig_Eqs_4["LargestEq"]
Sig_Eqs_3.insert(loc=2, column='LargestEq', value=LargestEq)

#按地震发生数量降序重新排序，并去掉原索引
Sig_Eqs_3=Sig_Eqs_3.sort_values(by='CountEq', ascending=[False]).reset_index(drop=True)
Sig_Eqs_3'''
```

```
Out[156]: '#def CountEq_LargestEq(Country_input)\n#计算每个国家发生地震的总数\nSig_Eqs_3=Sig_Eqs.groupby('Country')['Mag'].count().reset_index()\nSig_Eqs_3.rename(columns={"Mag": "CountEq"}, inplace=True)\n\n#计算每个国家发生地震的最大级\nSig_Eqs_4=Sig_Eqs.groupby('Country')['Mag'].max().reset_index()\nSig_Eqs_4.rename(columns={"Mag": "LargestEq"}, inplace=True)\n\n#提取最大值，放入Sig_Eqs_3最后一列\nLargestEq=Sig_Eqs_4["LargestEq"]\nSig_Eqs_3.insert(loc=2, column='LargestEq', value=LargestEq)\n\n#按地震发生数量降序重新排序，并去掉原索引\nSig_Eqs_3=Sig_Eqs_3.sort_values(by='CountEq', ascending=[False]).reset_index(drop=True)\nSig_Eqs_3'
```

```
In [157]: #2
#读取数据
Data = pd.read_csv(r"D:\ESE5023\2281305\2281305.csv")
```

D:\anzhuang\ANACONDA\Temp\ipykernel_10352\3241900502.py:3: DtypeWarning: Columns (4, 8, 9, 12, 15, 21, 22, 24, 26, 31, 33, 34) have mixed types. Specify dtype option on import or set low_memory=False.

```
Data = pd.read_csv(r"D:\ESE5023\2281305\2281305.csv")
```

```
In [158]: #日期取到月份（20XX-XX）
Year_Month=Data["DATE"].astype(str).str[:7]

#分别取出WND列的type、speed、speed quality
WIND_type=Data["WND"].astype(str).str[6]
WIND_speed=Data["WND"].astype(str).str[8:12]
WIND_speed_quality=Data["WND"].astype(str).str[13]

#把需要用到的4列数据重新组成一个dataframe，重命名每列
WIND_data=pd.concat([Year_Month,WIND_type,WIND_speed,WIND_speed_quality], axis=1)
WIND_data.columns = ['DATE_Year_Month', 'WIND_type', 'WIND_speed', 'WIND_speed_quality']

#数据筛选，WIND_type=9 (Missing), WIND_speed=9999 (Missing), WIND_speed_quality=1 (Passed all quality control checks)
WIND_data_select=WIND_data.loc[(WIND_data["WIND_type"]!="9") & (WIND_data["WIND_speed"]!=9999) & (WIND_data["WIND_speed_quality"]==1)]
```

Explain how you filter the data : 数据筛选去掉了Missing的数据
(WIND_type=9, WIND_speed=9999), 另外WIND_speed_quality选择了“Passed all quality control checks”类型的。

```
In [159]: #风速变成小数点格式
WIND_data_select_1=WIND_data_select
WIND_data_select_1['WIND_speed']=WIND_data_select_1['WIND_speed'].astype(float)

#缩放因子 SCALING FACTOR=10, 风速转换为m/s
WIND_data_select_1['WIND_speed']=WIND_data_select_1['WIND_speed']/10
```

D:\anzhuang\ANACONDA\Temp\ipykernel_10352\1583423158.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
WIND_data_select_1['WIND_speed']=WIND_data_select_1['WIND_speed'].astype(float)
D:\anzhuang\ANACONDA\Temp\ipykernel_10352\1583423158.py:6: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.  
Try using .loc[row_indexer,col_indexer] = value instead
```

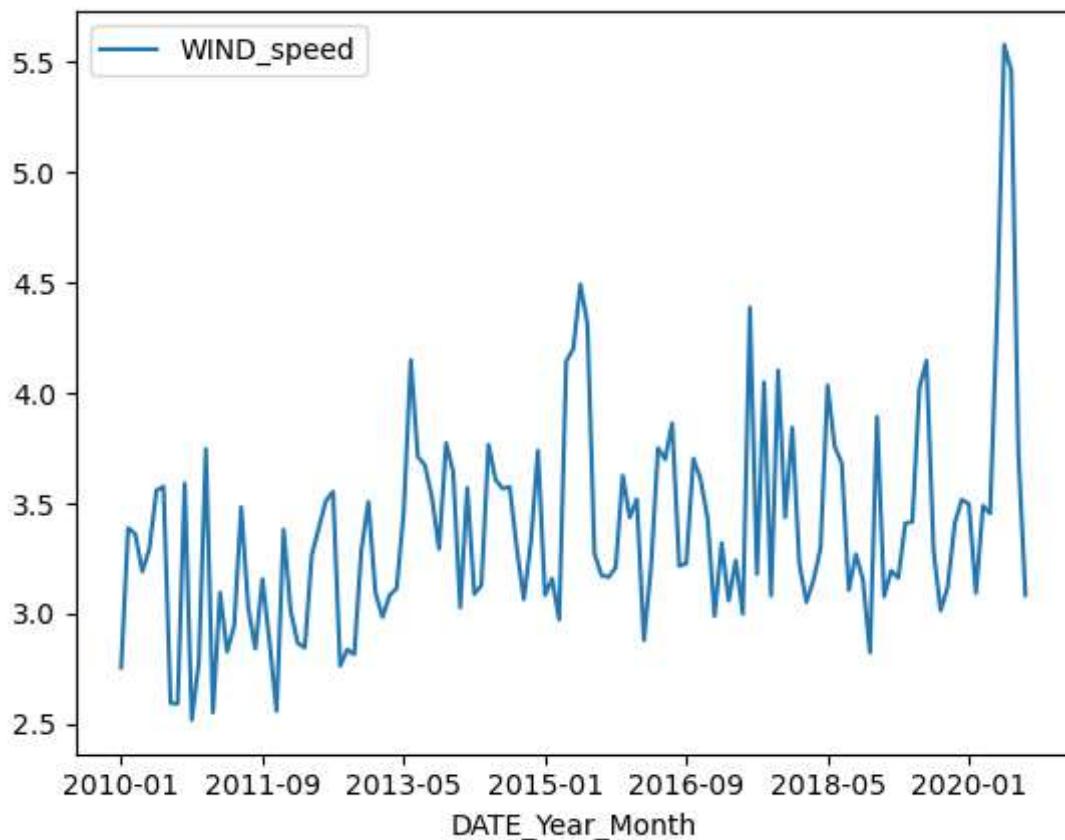
See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
WIND_data_select_1['WIND_speed']=WIND_data_select_1['WIND_speed']/10
```

```
In [160]: #按月份分组求平均
WIND_data_select_1=WIND_data_select.groupby('DATE_Year_Month')['WIND_speed'].mean()
#WIND_data_select_1
```

```
In [161]: #画图, 过去10年月均风速有缓慢上升的趋势  
WIND_data_select_1.plot('DATE_Year_Month', 'WIND_speed')
```

```
Out[161]: <Axes: xlabel='DATE_Year_Month'>
```



```
In [162]: #3  
#读取数据  
Data_3= pd.read_csv(r"D:\ESE5023\LONG BEACH DAUGHERTY AIRPORT, CA US (72297023129).cs
```

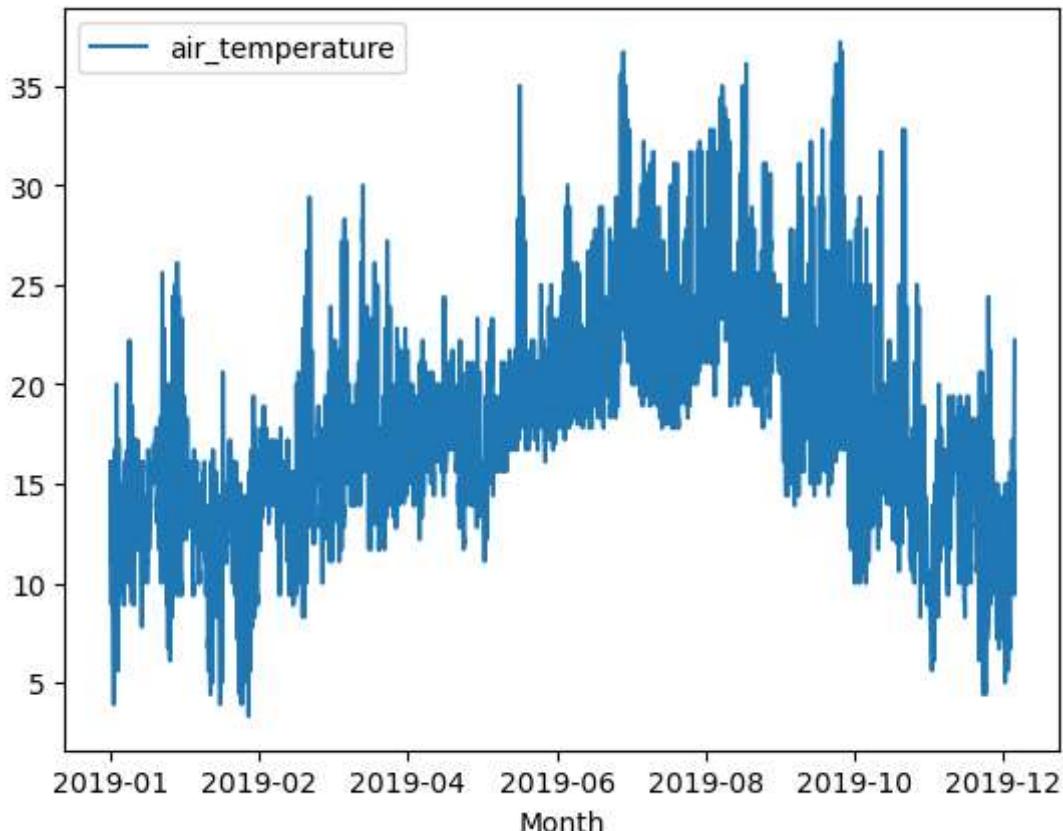
D:\anzhuang\ANACONDA\Temp\ipykernel_10352\3250873878.py:3: DtypeWarning: Columns (34, 35, 39, 40, 51) have mixed types. Specify dtype option on import or set low_memory=False.

```
    Data_3= pd.read_csv(r"D:\ESE5023\LONG BEACH DAUGHERTY AIRPORT, CA US (72297023129).csv")
```

```
In [163]: #3.1  
# 删除包含缺失值的列  
Data_3_1=Data_3.dropna(axis='columns')  
  
#日期  
Month=Data_3_1["DATE"].astype(str).str[:7]  
  
#分别取出TMP列的air temperature、air temperature quality  
air_temperature=Data_3_1["TMP"].astype(str).str[0:5]  
air_temperature_quality=Data_3_1["TMP"].astype(str).str[6]  
  
#把需要用到的3列数据重新组成一个dataframe，重命名每列  
air_temperature_data=pd.concat([Month,air_temperature,air_temperature_quality], axis=1)  
air_temperature_data.columns = ["Month", 'air_temperature', 'air_temperature_quality']  
  
#数据筛选，air_temperature=+9999 (Missing) , air_temperature_quality=3 (Erroneous)  
air_temperature_data=air_temperature_data.loc[(air_temperature_data['air_temperature']  
    < 9999) & (air_temperature_data['air_temperature_quality']  
    < 3)]
```

```
In [164]: #3.2  
#温度变成小数点格式  
air_temperature_data['air_temperature']=air_temperature_data['air_temperature'].astype(float)  
  
#缩放因子 SCALING FACTOR=10, 摄氏度  
air_temperature_data['air_temperature']=air_temperature_data['air_temperature']/10  
  
#日期-温度图  
air_temperature_data.plot('Month', 'air_temperature')
```

```
Out[164]: <Axes: xlabel='Month'>
```



```
In [165]: air_temperature_data
```

```
Out[165]:
```

	Month	air_temperature	air_temperature_quality
0	2019-01	16.1	1
1	2019-01	16.1	5
2	2019-01	15.6	5
3	2019-01	14.4	5
4	2019-01	13.9	5
...
12528	2019-12	20.0	5
12529	2019-12	21.1	5
12530	2019-12	21.7	5
12531	2019-12	22.2	5
12532	2019-12	22.2	5

12154 rows × 3 columns

```
In [166]: #3.3
```

```
#3.3.1 求平均温度
```

```
air_temperature_data["air_temperature"].mean()
```

```
Out[166]: 17.659256211946683
```

```
In [167]: #3.3.2 求温度标准差
```

```
air_temperature_data["air_temperature"].std()
```

```
Out[167]: 5.112108137274478
```

```
In [168]: #3.3.3 求最低温度所在行的数据
```

```
air_temperature_data.loc[air_temperature_data["air_temperature"].argmin()]
```

```
Out[168]: Month           2019-02  
air_temperature      13.9  
air_temperature_quality    5  
Name: 1855, dtype: object
```

```
In [169]: #3.3.4 随机取10天数据, 求最高温度
```

```
air_temperature_data.sample(n=10)["air_temperature"].max()
```

```
Out[169]: 21.7
```

```
In [170]: #3.3.5 统计温度出现的次数  
air_temperature_data["air_temperature"].value_counts()
```

```
Out[170]: 15.6    636  
16.7    540  
16.1    538  
15.0    528  
18.3    507  
...  
36.1     2  
29.0     1  
26.0     1  
8.0      1  
7.0      1  
Name: air_temperature, Length: 79, dtype: int64
```

```
In [ ]:
```